

SELECTIONAL ELEMENTS IN THE LEXICAL CONCEPTUAL STRUCTURE

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A comparison of Spanish relocation predication with those of Chinese and English demonstrates that the PAS of relocation predication is determined not only by its θ -grid, and it must be augmented by selectional features. My previous research shows that the two formations of relocation verbs across languages have different θ -grids. This paper will demonstrate that the reason why certain relocation verbs have exclusively one formation is due to the cognitively defined selectional semantic restrictions such as [\pm Dimension] and [\pm Distributive]. Lexical Conceptual Structure should contain at least θ -relations and Argument Sectional Features.

I Lexical semantics and argument structure

The lexicon is traditionally considered as an appendix of the grammar formed by a repository of miscellaneous facts or a list of basic irregularities and idiosyncratic properties (Bloomfield 1933)? However, the knowledge that a speaker demonstrates with respect to lexical items suggests that there is more to lexical knowledge than knowledge of idiosyncratic word-specific properties. Within this context then, the ability to formulate the principles that determine syntactic properties from a predicate's meaning becomes essential. Verbal Lexicon has assumed an increasingly central place in several syntactic frameworks. The reason for this is that the characteristic of lexical knowledge is easily illustrated with respect to verbs. More and more conceptually oriented syntacists believe that the Predicate Argument Structure (PAS) is controlled or even determined by a kind of semantic mechanism called Lexical Conceptual (Cognitive) Structure (LCS). In the study of Lexicon, the following questions have arisen: 1) is the PAS of a given predicate type only constrained or can be determined by LCS, 2) which part of the meaning of a verbal type is syntactically relevant, or in other words, what elements constitute the LCS which are able to determine the PAS, 3) how can these semantic elements be found, and 4) how should it be represented in a linguistic theory?

Jackendoff claimed that the PAS is constrained to some extents by the Cognitive Structure of a given predicate's type. Rappaport and Levin (1988, 1992) further said that the PAS of a given predicate type is fully determined by the LCS plus Event Structure. As shown by Levin (1985, 1991), native speakers can make extremely subtle judgments concerning the possibilities of combining verbs with different arguments and adjuncts (their numbers and types). In the current version

of GB framework, Chomsky (1986), θ -roles are posited as syntactic primitives and the only components of lexical representations. However, many verbal types across languages may have diathesis alternation – the same morphological verbal forms which allow different alternative constructions, and many of them share the same θ -grid. Grimshaw (1990), Rappaport and Levin (1988), among others, assume that the fact that verbs can allow different diathesis alternation is due to the existence of different meaning components in their corresponding alternative formations. On the other hand, verbs referring to the same event, activity or action may allow or may not allow alternative formations. The nature of the meaning components of verbs with or without diathesis alternation, in turn, would be expected to influence the selection of a lexical representation of the verb. So the meaning component expressed by thematic relations must be decomposed into semantic features of lower level in order to further analyze the semantic-to-PAS mapping system in natural languages. The central topic posed in this paper is to find those elements in the LCS besides θ -roles which determine the PAS of all verbal subtypes that share major semantic similarities.

II. Argument Structures of Relocation Predication

Verbs referring to the common activity of relocation, i.e. moving something to a new location across languages are characterized either by their possible alternative configurations, i.e., state change (SC) formation and locative change (LC) formation, or by their unalternative SC or LC configuration. Rappaport and Levin (1988) name the relocation verbs with alternativity Locative Alternation Verbs (LAVs), and I name the other two verbal types without alternation Locative Complement Verbs (LCVs)-- ditransitive verbs meaning change of location, and State Change Verbs (SCVs)-- ditransitive verbs meaning change of state. Consider (01)

(01)

A) LCVs

Spanish	a) Juan puso un libro en la mesa	'John put a book on the table'
English	b) John put a book on the table	
	PONER $X < \underline{Y}$, P en Z >	
	'put'	

B) SCVs

Spanish	a) Juan llenó el tanque con agua	John filled the tank with water'
English	b) John filled the bottle with water	
	LLENAR $X < \underline{Z}$, P con Y >	
	'fill'	

C) LAVs

Spanish	a) Juan cargó la madera en el camión	'John loaded wood into the truck'
	b) Juan cargó el camión con madera	'John loaded the truck with wood'
English	a') John loaded wood into the truck	
	b') John loaded the truck with wood	

$$\text{CARGAR } \left\{ \begin{array}{l} X < \underline{Y}, P \text{ en } Z > \\ \text{'load'} \\ X < \underline{Z}, P \text{ con } Y > \end{array} \right.$$

In (01) the following signs are used to rewrite the PAS. The arguments inside $< >$ are internal arguments, the one outside $< >$ is the external argument, X, Y and Z represent respectively entities 1, 2, 3 involved in the action, P is the preposition 'P en Z' indicates that Z takes the preposition *en* to refer to a location argument in the structure and 'P con Y' indicates that Y takes the preposition *con* to refer to a prepositional argument in the structure. My hypothesis is that the one-directional or two directional Locative Change (LC) & State Change (SC) formations are due to the predicate's semantic properties. Then, the study of the choices between the two syntactic constructions for the different morphological verbal forms such as LCVs, SCVs and LAVs will constitute the starting point for understanding the interconnection between semantics and argument types. I will test the hypothesis that the presence or absence of certain semantic elements entail the direction of argument-to-role mapping, and will determine whether a given relocation verb is LAV, LCV or SCV.

In my previous research (Chen 1995) I build upon and modify key principles associated with Chomsky's (1982, 1986) θ -theory by using the cognitive semantics method. The data show that verbs across languages meaning relocation have two distinct configurations with major syntactic and semantic differences. Even their PASs are different: the locative indirect argument is obligatory in PAS for the LC formation, and the prepositional argument is optional in PAS for the SC formation. I will use parentheses () to represent an optional argument. (02) represents the PASs for both LC and SC formations.

- (02)
- a) LC X < Y, Pen Z >
 - b) SC X < Z, (Pcon X) >

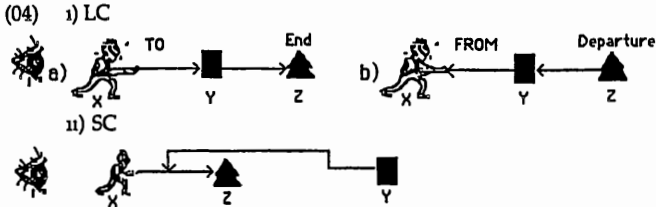
The following diagram shows the representation of θ -role assignment in the PASs of the two formations of relocation predication suggested by Rappaport and Levin (1988) & Stowell (1981), Jackendoff (1972, 1983), Fillmore's (1968), Gruber (1965) respectively.

(03)

	LC formation			SC formation		
	X < <u>Y</u>	, P z	>	X < <u>Y</u>	, P z	>
Rappa & Levin (88) Stowell (81)	Agent	Theme	Location	Agent	Location	Theme
Jackendoff (83)	Agent	Theme	Goal	Agent	Goal	Theme
Fillmore (68)	Agent	Instrument	Location	Agent	Locative	Instrument
Bruber (65)	Agent	Locatum	Location	Agent	Location	Locatum

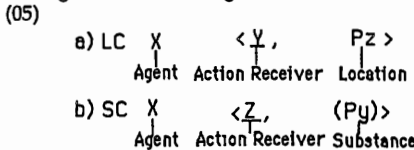
The differences in θ -role grids for relocation predication previously proposed show that the θ -roles' terminology and the definition for each thematic type is very confusing and is not consistent and unified. In this simple θ -role assignment device

the θ -roles are randomly used, cognitively not very founded, and a common θ -role often breaks down as it is extended to a larger class of verbs¹ I followed Jackendoff's semantic decomposition method and conceptual theory and represented the cognitively defined perceptive pictures guiding PASs of LC and SC formations as follow



(04) shows that both relocation formations have different cognitive basis in predication. From the visual perspective of a speaker, there are two possible cognitive processes. For LC structure (i), a motivating X entity (generally [+human]) moves a Y entity, and places it in a new position represented by a End Z entity or moves it from an old place represented by a Departure Z entity. For SC structure (ii), a motivating X entity (in general [+human]) acts upon a Z entity and changes its state by using a Y entity as a media.

After refining and defining more precisely the θ -roles as syntactically relevant semantic elements, in my previous research (Chen, 1985) a new θ -role called Substance is added to the existing list of θ -relations of SC formation. The justification for distinguishing Substance from the more traditional Theme role is that, according to GB Theory, expressions which bear the same thematic relation to some item will be subject to the same selectional restrictions within a given predicate type (Radford, 1988). However, Theme role assigned to the Y entity in the two formations have different selectional constraints. Substance role is characterized by a non-countable selectional restriction appropriate to an abstract entity, or substantial countable entity within a given space. Any lexical item taking Y entity which does not have this selectional properties cannot occur in any SC formation. The PASs together with the θ -grids of LC and SC formations are represented in (05).



(05) shows that LC & SC formations have different argument structure valences. Therefore LC and SC variants of LAVs are not real variants, and the LAVs are kind of semantically related homonyms or homographs.

¹ Separate papers will be given to discuss the problems of the θ -roles commonly used in modern linguistic literature.

III: Semantic selection for the Lexicon and S-selection

Modern linguists interpret PAS in two different approaches non-restrictive and restrictive The former is represented by Jackendoff's Conceptual Theory, while Fillmore's Case Theory, Chomsky's GB Theory, and MIT Lexical Program (MLP) hold the restrictive view of PAS A restrictive approach assumes that the meaning of a verb does have considerable ability to predict the PAS If it is restrictive we should be able to tell what is the cognitive nature of two separate formations of verbs with alternation which share very similar semantic interpretations, and also which semantic elements can determine the separation of verbs referring to the same activity, state, or action

S-Selection is originally proposed to deal with the choice of expressions which can fill a particular argument function In Standard Theory Chomsky (1965) proposed selection restrictions, present in D-structure, as all of the information necessary to provide an adequate semantic interpretation of a sentence Chomsky (1986 86) has intimated that Phrase Structure Rules and Subcategorization frames might be unnecessary According to his analysis, Categorical Selection (C-Selection) is predictable from θ -role information, while Phrase Structure Rules merely restate general principles and properties of the Lexicon Radford (1988) further clearly says that selectional information (S-selection) is redundant because it is also predictable from θ -information In this way the three components of Lexicon-Subcategorization, Phrase Structure Rules and Selection Restrictions in Chomsky's (1970) Extended Standard Theory are virtually eliminated from the lexical entries As a result, the θ -role information posited as serve as a basis for generating PAS becomes the only component of lexical representations According to Radford (1988) and Williams' (1988) the reason why S-Selection is no longer mentioned in GB Theory is that there is substantial empirical evidence in support of the crucial role-identity claim In the light of this observation, note that the NP which is the Object of English *V roll* in (a) seems to obey the same selection restrictions as the NP which is its Subject in (b) as shown in (06)

(06)

a) *John rolled the ball/the rock/*the theory/*sincerity down the hill*

b) *The ball/the rock/*the theory/*sincerity rolled down the hill*

Thus, the fact that the DO of *roll* when used transitively obeys the same selection restrictions as its subject when used ergatively provides interesting independent confirmation of the assumption that the two NPs play the same θ -role, even though they have different constituent structure status To take a example of cognitive predication, we might suppose that an Experiencer Argument must denote a Rational (i e mind-possessing) entity Consider²

(07)

a) *Mary/\$my goldfish/\$\$my birth* thinks/knows that John is very clever

b) John impressed *Mary/\$my goldfish/\$\$my birth* as very clever

c) John seems to *Mary/\$my goldfish/\$\$my birth* to be very clever

² In this paper \$ makes an inappropriate lexical item for a given argument of predication

Note that in (07) the expressions taking the Experiencer role are subject to the same selection restrictions in each case although the NP concerned fulfills different grammatical functions in each sentence: a subject in (a), a Verb Object in (b), and a Prepositional Object in (c). The degree to which a given speaker accepts a sentence with *goldfish* as lexical item taking Experiencer role depends on the degree to which he believes that *goldfish* is Rational one. My justification of Substance's selectional property also constitute a strong support of this assumption.

In short, according to those examples, selection restrictions are already contained in or attached inherently to θ -information, and we do not have to specify it for the lexical entry. As a result, it is possible to eliminate both C-selection and S-selection, and the Lexicon can be restricted to θ -relations. If that is the case, we might say that given a θ -grid of any predicate, its argument structure must be predictable. Moreover, this simplification of the Lexicon will only be possible if and only if both subcategorisation frames and selection restrictions are entirely predictable from θ -roles. However, so far I only proved that θ -relation must contain selectional information, but we still do not know if there are other selectional information needed in Lexicon rather than those attached to θ -roles.

Let us take LAVs, SCVs, and LCVs as example. With the new θ -grids for both relocation formations, we are able to predict that when a Substance role is attached to a Y entity in LAVs, both LC and SC formations are possible. With a Non-substance Y entity in the Lexicon of a LAV, an exclusive LC formation is totally predictable. Moreover, with different θ -roles assigned to the PASs of LC and SC formations, we still do not know why certain relocation verbs only have LC formation, others, only SC formation. A real restrictive LCS-to-PAS device should give us the answer to this question. In next section I will find the other elements which determine the PASs of the three relocation types.

IV. Arg -selectional features for relocation verbs

I will now propose solutions for the problems regarding relocation Lexicon-PAS mapping. I will begin by presenting the theoretical justifications for asserting that selectional restrictions apply to relocation verbs depending upon whether they are \pm Distributed ($\{\pm d\}$) and \pm DIMensional ($\{\pm DIM\}$).

1 Theoretical foundation of Arg -selectional restrictions

Gruber (1965, 1976), Fillmore (1966, 1968) among others first realized that θ -relations of different verbal categories are not enough to characterize all the semantic information that the speaker has about their PAS, above all when dealing with certain types of predicates which have alternative sentential structures. On the other hand, Chomsky (1986) never stated explicitly that Selectional Constraints are totally unnecessary for the Lexicon. In a theory of Conceptual Linguistics, meanings are mentally represented, and can be decomposed into a small set conceptual

constituents or features, i.e., the semantic properties that have a grammatical reflex. Theoretically it is acceptable that there is another type of lexico-semantic restriction that is not contained in θ -roles. Consider

(08)

a) Mary drinks water/ ?glue/ ??pollen/ ???books

b) Mary ate bread/ ?water/ ??the table/ ???the sky

(08) shows that *drink* selects a drinkable lexical item for its DO, *eat* requires an edible lexical item as DO. So, any direct argument of an action verb denoting an [+affected] entity must have a [+ (V meaning)-ble] semantic characteristic. This type of lexical information is totally idiosyncratic, and cannot be generalized as a semantic feature for the Lexicon of this verbal subcategory. Now, let's also compare selectional properties of English AVs *murder* & *chop*.

(09)

Specification of θ -properties

a) John murdered Mary/ *potatoes

Agent Action Receiver

Specification of selectional information <+Human>

<+Human, +affected>

b) John chops potatoes/ *Mary

Specification of θ -properties

Agent Action Receiver

Specification of selectional information <+Human> <-Human, +affected>

(09) shows that the selectional features for the Action Receiver role of *murder* (a) and *chop* differ from each other. So the [\pm human] feature cannot be generalized by θ -information of action verbs, but controls the choice of expressions which can occupy a given sentence-position within a given category. So, action predication may further be divided into two subclasses: one with the Action Receiver attached to [+human] feature, and the other with Action Receiver attached to [-human] feature. Both (08) and (09) show that there is lexical information that does not inherently relate to θ -information.

To conclude, there are three types of S-selections. First, selectional information inherently attached to θ -roles, which is redundant and unnecessary to specify in a Grammar (07). Second, idiosyncratic lexical-semantic restrictions on the choice of expressions which can occupy a given sentence-position, but have no selectional power and depend on pragmatic choices (08). Third, selectional information sensitive to verbal categorization and not contained in θ -information (09).

Previous discussions of relocation predication only attempt to make explicit how and why LAVs allow two alternative variants. However, there is another question in the study of relocation verbs: why do some verbs only allow LC formation, and others only allow SC formation? How do native speakers know that some verbs which are apparently related to *spray* and *load* do not allow both options, that *fill* and *cover* show one possibility, while *dump* and *pour* show the other? Let's repeat some English examples given by Jackendoff (1990) here.

(10)

(i) a) *Monica covered a blanket over the baby

b) Monica covered the baby with a blanket

(ii) a) Carla poured lemonade into the pitcher

b) *Carla poured the pitcher with lemonade

(10) shows that *cover* only allows SC formation, and *pour* LC formation. Since the reformed θ -grid of LCVs and that of the LC formation for LAVs are the same, and the θ -grid of SCVs and that of the SC formation for LAVs are also the same, we are unable to predict relocation verbal types from only θ -information. Is there a way to explain the multiple classification of these Vs? Additional component is needed to increase the restrictive power of GB framework. In other words, with different θ -grids assigned to the argument structure within GB Theory, and different LCSs for LC & SC formations we still cannot explain why certain relocation verbs only have LC formation, others, only SC formation, or both of them. This component must be formed by cognitively oriented semantic elements. If and only if there is such and such a semantic selectional element in the Lexicon of a given relocation predicate, this predicate must have either LC argument structure or SC argument structure or both or them.

In opposition to Radford's welcome prospect of eliminating all selection restrictions from the Lexicon, I will recover the third selection restriction that determines the choice of PAS of a given predicate type or subtype as an important component of the Lexicon for Chomsky's GB framework. I will use some featural elaboration of spatial functions of Jackendoff's Conceptual Theory (1990) and his semantic decomposition method in order to link linguistic notions to more general cognitive notions and to prelinguistic conceptual processes. Jackendoff (1990, P27) assumes that the syntactic category system and the conceptual category system match up fairly well. I call this type of selection restrictions Argument selectional features (Arg-selectional features). I propose that a restrictive framework must specify Arg-selectional features to determine which PAS can be selected if a verbal type has a given semantic feature. I assume that if an Arg-selectional feature is shared by all the members of one relocation verbal subclass, but not by members of the other two relocation subclasses, this feature must serve as mediator between Lexicon and PAS and determines the PAS of the former.

2 Non-dimensional feature for non-alternative LCVs

Following Jackendoff's (1990) semantic decomposition method, I assume that the Location role which marks the locative nature of Z entity in LC formation can be re-analyzed according to its inner space concept. In Lyons' (1977) spatial dimension concept, human language reflects our biological make-up, our natural terrestrial habitat, our mode of locomotion, and even the shape and properties of our bodies. This cognitive perspective view gives us the means of identifying one of the dimensions in a three-dimensional space. Here I will first analyze the dimensionality and shape concept reflected by the entity Z taking the Location role in LCVs.

Talmy (1985) points out that Paths are universally allowed in the conceptual structure of motion verbs. In a Figure/ Ground dichotomy, the Ground should

matter more semantically than the Figure in the long run, and the Ground's internal semantic properties such as dimensionality, countability, etc, often control the choice of Path, because it is the Ground that provides the reference point for the movement of the Figure. There can be a Ground with no Figure, but it is difficult to imagine a Figure with no Ground. Both LCVs & SCVs are motion predication. As a first step, I will examine the [-DIM] Arg -selectional feature as part of the Ground for LCVs.

From our perceptual viewpoint, a Place can be seen as single dimensional, two-dimensional or three-dimensional space. According to Frawley (1992), dimensional visual perception is derived from perceptual mechanisms that first deliver one and two-dimensional representations, and non-dimensional ([-DIM]) space is a neutralization of dimensionality beyond dimensions. Predicates may reflect [+DIM] concept, and can also reflect a [-DIM] Place. Now consider some LCVs

(11)

- a) Juan derramó sangre en el suelo 'John shed blood on the floor'
 b) Juan salpicó aceite por todas partes 'John splashed oil everywhere'
 c) Juan sumergió una tabla en el agua 'John submerged a board in water'
 d) Juan trajo un libro aquí 'John brought a book here'

In (11a & b) the prepositions *en* & *por* express 'on(to) the surface of' or 'at', while in (c) *en* represents a locative concept of 'into/ inside of something'. In (d) the location adverb *aquí* is obviously neutral to the dimensional concept. So the term Location for LCVs represents either *into* or *onto* or *at*. In all these cases, the locative concept expressed by the P *en* is not precise, it can be any place within the margin marked by the NP. Sometimes the locative argument can be expressed by a PP to indicate a Place without the spatial concept. The following sentences are commonly accepted by native speakers.

(12)

- a) Juan pegó un sello en/ a la carta 'John stuck a stamp on the letter'
 b) Juan incorporó un nuevo capítulo al/ en el libro
 'John incorporated a new chapter into the book.'

In (12) both *en* and *a* are accepted in PPs denoting the destination point. However, in some contexts, only *a* locative PP is allowed for LCVs. Consider

(13)

- a) Juan ya puso techo a/ ??en su casa recién construida
 'John roofed (put roof to) his recently built house.'
 (13) shows that although in most cases *poner* requires *en* in its locative PP, only *a* can be used to represent a span without concrete spatial meaning. A more exact locative can be specified in the locative argument of LCV. Consider

(14)

- a) Juan puso el libro a su derecha/ en la esquina
 'John put the book on his right/ on the corner.'
 (14) shows that the locative concept expressed by the P *en* can be a more concrete or precise point without spatial consideration. On the other hand, the P *de* 'from' in Spanish LCVs indicates exclusively a beginning point ignoring totally the spatial concept. Consider

(15)

a) Juan sacó una carta del cajón. 'John took a letter out of the drawer'

Another preposition-related semantic property of Spanish LCVs is that if the locative indirect argument has the [+human] feature, the preposition *a* is used exclusively for both TO and FROM concepts

(16)

a) Juan puso una chaqueta gris a (*en) su hijo 'John put a gray jacket on his son'

b) Juan quitó la chaqueta a (*de) su hijo 'John took the jacket off his son'

The preposition *a* in the sentences of (16) is neutral to the directions between the starting and ending. *A* is used to indicate a [+human] locative lexical item without any dimensional concept. The Location role conceptualized as a Place is represented visually by a Point-- a dimensionless geometric object for LCVs, and the inner space is totally ignored when the speakers connect locative Z entity with the indirect argument of LCVs

To further prove that the indirect argument of LCVs is characterized by non-dimensional concept, let's compare LCVs with SCVs and LAVs. In Spanish, if any predicate's internal argument expresses a [+DIM] location, the adjective *todo* 'entire, whole' must be allowed in the locative expression in any context, and if the locative argument has [-DIM] meaning, the adjective *todo* is not allowed into the locative expression. In this sense, the verbs expressing 'stay' and 'arrive' which have a typically [-DIM] locative argument are opposite to the verbs expressing movement that allow a [+DIM] locative argument. This property is illustrated in (17)

(17)

a) Juan está en (*toda la) casa 'John is in (all) the house'

b) Juan llegó a (*toda la) casa 'John arrived at (all) the house'

c) Juan camina a lo largo de toda la calle 'John walks along (all) the street'

Since verbs like *estar* 'stay' (a) and *llegar* 'arrive' (b) do not require a dimensional concept of the lexical entry for the Place argument, *todo* is not allowed as a modifier of the NP licensing locative argument. However, a Movement verb like *caminar* 'walk' does allow (c) dimensional locatives for lexical entry, and *todo* is acceptable to modify the locative NP. Now consider LAVs and SCVs

(18)

a) Juan cargó maíz en todo el camión 'John loaded corn onto the whole truck'

b) Juan cargó todo el camión con maíz. 'John loaded the whole truck with corn'

c) Juan llenó toda la botella con agua 'John filled the whole bottle with water'

d) Juan cubrió toda la mesa con arena 'John covered the whole table with sand'

In (18) *todo* is allowed in the locative expression, so the Z entity in LAVs and SCVs contains [+DIM] concept. For this reason, I will use *todo* as a touchstone to test the dimensionality of different spatial types of Spanish LCVs. The Location role of Spanish LCVs shows spatial Interiority or spatial Exteriority. Consider first LCVs expressing Exteriority

(19)

a) Juan pegó un sello en (??todo) el sobre 'John stuck a stamp on the (*whole) envelope'

b) Juan pasó un libro a (??toda) la biblioteca 'John passed a book to the (*whole) library'

c) El ratón arrastró un pedazo de pan a (*todo) el suelo

'The mouse pulled a piece of bread to the (*whole) floor'

d) Juan quitó la mancha de (??toda) la camisa

'John took the spot off from the (*whole) shirt'

Consider, second, the LCVs expressing Interiority:

(20)

Juan metió un papel en (*todo) el libro 'John put a paper into the (*whole) book.'

Consider, then, the LCVs expressing Exteriority or/and Interiority

(21)

Juan echó un pedazo de pan en (*todo) el suelo

'John threw a piece of bread on the (*whole) floor'

(19-21) show that none of the Spanish LCVs requires dimensional value for their locative argument. We can further test the [-DIM] Arg-selectional feature for locative argument of LCVs with *un punto fijo* 'a fixed point' which specifies exclusively the [-DIM] property of a Place. Consider

(22) 1) LCVs

a) Juan puso un chunche en un punto fijo de la mesa

'John put a thumbtack in a fixed point of the table'

b) Juan metió un chunche en un punto fijo de la mesa

'John inserted a thumbtack in a fixed point of the table'

1) LAVs & SCVs

a) *Juan cargó una tabla en un punto fijo del camión

'John loaded a board onto a fixed point of the truck'

b) *Juan infló oxígeno en un punto fijo de la llanta

'John inflated oxygen into a fixed point of the tire'

(22) shows that both LAVs and SCVs allow their indirect argument to have [+DIM] meaning, but LCVs ignore the dimension of the Location entity. Therefore I conclude that when a relocation verb requires its lexical entry for Z entity to be non-dimensional [-DIM], it has exclusively LC formation, and it is LCV. To specify this particular cognitive property for LCVs, we may change Rappaport and Levin's (1989) LCS to

(23) X [CAUSE [Y change to a [-DIM] Location]

1.3 Distributive feature on non-alternative SCVs

Now I will examine if there is any common Arg-selectional property that all members of SCVs share, but LAVs and LCVs do not. Jackendoff (1990) notes that SC formation (includes SCVs and LAV) incorporates a distributive meaning for the Location role, i.e., as result of a relocation movement, Substance comes to be everywhere or all around in the reference object represented by a container Z entity. He uses the subscript d to indicate the distributive feature and an ordinary location without it. I prefer to use [$\pm d$] to mark the the distributive and non-distributed location. This difference is illustrated by Jackendoff in (24)

(24) 1)

a) Water/ The water/ *Some water/ *A puddle of water was all over the floor

b) Telephone poles were/ The telephone poles were/ *A telephone pole was/ *Some telephone poles were all along the road

ii)

- a) *Water/ The water/ Some water/ A puddle of water was on the floor
 b) *Telephone poles were/ The telephone poles were/ A telephone pole was/ Some telephone poles were along/ beside the road

In (24i), *all over* & *all along* express distributive media/ location, and in (24ii) *on*, *along* & *beside* express non-distributive media or ordinary location. Languages make a distinction between entities that are vertically extended and those that are horizontally extended. These basic axes of space determine the particular orientation an entity has in its spatial extension. Schwartz-Norman's (1976) suggested a holistic feature for the selection of LAVs. There are also substantial differences between holistic feature and the [+d] feature. Holistic interpretation for LAVs only means that most of the referent, i.e., Y entity (Figure) is involved or affected by the action. But [+d] location denotes an unbounded and aggregate media and completeness denoting Z entity (Ground).

Frawley (1992: 438) observes that the linguistic concept of quantity can be expressed as distributive or non-distributed. Jackendoff (1990) assumes that a concept of [+d] location for SC formation is a state-change requirement, i.e. to specify that a surface, container, or medium undergoes a particular change resulting from the addition of substance to it. In English

(25)

- a) Bill loaded the truck with hay
 b) Bill sprayed the wall with paint
 c) John filled bottle with water

For Jackendoff SC formation of both LAVs (25a&b) and SCVs (25c) in English have [+d] interpretation. The object expressing Location must have substance denoted by entity Y distributed (horizontally and/or vertically extended) elsewhere within entity Z as the immediate result of relocation movement. Distributive ([+d]) space in SC formation represents aggregate & unbounded media and marks the completeness or the resultant state of a state-change process of an entity with two or three dimensional space. In other words, the Z entity, involved in this type of SC activity and realized as the direct argument of a proposition of SC, results in a state full of a substance. Thus, [+d] semantically represents the specific resultant state of relocation movement, and syntactically constitutes a particular selectional feature for the lexical entry of the direct argument of SC formation. Next I will examine Spanish, English and Chinese data to test Jackendoff's [+d] selectional feature for SCVs and LAVs.

First, I will examine SCVs. Across languages there are two subgroups of SCVs that denote relocation action, i.e., verbs meaning FILL & COVER. The [+d] feature can be semantically decomposed by two semantic features: completeness + unboundedness; i.e., the substance is distributed completely and in an unbounded manner within the space indicated by the entity Z as the final state of the action. The [+d] feature does not denote the density, pressure or thickness of the thing represented by entity Y within the space denoted by entity Z. I will examine the two

semantic properties separately Consider first the following Spanish and English data.

(26) Completiveness

a) Juan acaba de llenar la botella con agua, y ahora la botella está totalmente llena

John has just filled the bottle with water, and now the bottle is totally full

b) Juan llenó la botella con agua, #pero la botella no está llena/ #pero la botella no está totalmente llena/ #pero el agua sólo llegó a la mitad de la botella/ #pero la botella sólo se quedó un poco mojada

John filled the bottle with water, #but the bottle is not full/ #but the bottle is not totally full/ #but the water only reached the middle of the bottle/ #but the bottle is only a little bit wet

(27)

a) Juan acaba de cubrir la comida (con un papel), y la comida se queda totalmente/ completamente cubierta

John has just covered the food with a paper, and the food is totally/ completely covered

b) Juan acaba de cubrir la comida con un papel, #pero la comida no está totalmente cubierta/ #pero la comida no está completamente cubierta/#pero el papel sólo cubrió una parte de la comida/ #pero el papel sólo cubrió un rincón de la comida/ #pero la comida se quedó parcialmente descubierta/ #pero la comida se quedó en su mayor parte descubierta

John has just covered the food with a paper, #but the food is totally covered/ #but the food is not completely covered/ #but the paper only covered a part of the food/ #but the food is partially not covered/ #but the food is not mostly covered

(26-27) show that only completeness is expressed, the secondary clause can be consistent in meaning with the first clause when the SCVs are used. If not, the secondary clause results odd or contradictory. Now let's examine the [+d] feature as unbounded media in SCVs

(28)

a) Juan acaba de llenar la botella, ahora el agua está por todas partes/ por todos los lados de la botella

John has just filled the bottle, now the water is all over the bottle

b) Juan acaba de llenar la botella, ahora el agua está #en algunas partes/ #en un lado/ #en una parte/ #arriba/ #abajo/ #en la parte derecha/ *parcialmente/ *sólo en el borde/ a la mitad

John has just filled the bottle, now the water is #in some parts/ #in one side/ #in one part/ #up/ #down/ #at the right side/ #partially/ #only on the entrance/ till the middle

(28) shows that if the space denoted by a lexical item realized as entity Z is being reduced to a bounded or partial location by the secondary clause, it will result contradictory again to the main clause where a SCV is used

According to *The American Heritage Dictionary of the English Language fill* means "to put into as much as can be held, load completely, make full" The Random House's explanation for *fill* is 'make full, fill up, saturate, spread, overspread' These two explanations are pretty close to my definition of [+d] feature

Both Spanish and English SCVs require their Z entity licensing the direct argument to have [+d] selectional feature

Chinese does not have any relocation verb that has exclusively SC formation. All morphologically defined relocation verbs in Chinese are LCVs or LAVs. For instance, there are no verbs that express the meaning of 'fill', but there are verbs denoting 'put/ load liquid into' such as *Guàn*. There are no verbs that express the meaning of 'cover', but there are verbs denoting 'put something on the surface of' such as *Gài*.

Second, I will examine if the SC formation of LAVs has the [+d] feature for the Z entity, the direct argument. Intuitively, if someone says "I loaded the truck with sheep", we understand that the sheep will occupy a substantial space of the truck after loading, and the quantity or number of sheep must be significant with respect to the size of the truck, i.e., Substance concept. This does not mean that the sheep are one on top of another filling a three dimensional space of a truck, i.e., it is [-d] concept. However, if someone says "I filled the truck with sheep", we understand that the sheep are distributed everywhere in the three dimensional space of the truck, and they are piled one on the top of another, i.e., [+d] concept.

Now, I will examine this semantic difference between SCVs and the SC formation of LAVs in linguistic context. The following English sentences with the main clause of *load* in SC formation are not contradictory when the secondary clause expresses no-distributed meaning.

(29) 1) In English:

a) Bill loaded the truck with hay, but left some space for corn/ but the truck has some space left/ the hay was loaded only on the left side/ now one third of the space is still empty.

b) Bill sprayed the wall with paint, but many parts are unpainted.

c) Bill packed the boxes with books, but the boxes are not totally full of books.

ii) In Spanish

a) Juan cargó el camión con arroz, dejando el arroz solamente en la parte delantera del camión.

'John loaded the truck with rice, but the rice was loaded only in the front part of the truck.'

b) Juan acaba de rociar las plantas con agua, pero algunas plantas no tienen agua en sus hojas.

'John has just sprayed the plants with water, but some plants are without water on their leaves.'

c) Juan pintó la pared, pero una parte de la pared no está pintada todavía.

'John painted the wall, but one part of the wall is not painted yet.'

In command form

(30) 1) In English.

a) Load oil please, but don't fill the tank.

b) Don't fill the tank please, load only five liters.

ii) In Spanish

a) Carga el tanque sólo hasta la mitad. 'Load the tank only till the middle.'

b) Cargue nafta, pero no llene el tanque. 'Fill naphta, but don't fill the tank.'

(30) shows that when SC formation of LAVs is used for commanding, additional information with [-d] meaning is not contradictory at all to the meaning expressed by the LAVs

So Jackendoff's (1990) [+d] interpretation for the direct argument of LAV's SC formation is not correct in both English & Spanish LAV's SC formation has no inherent [+d] S-feature I conclude that when a relocation verb requires its lexical entry for Z entity to be distributed [+d] as result of the activity, it has exclusively SC formation, and it is SCV On the other hand, both LAVs and LCVs are typically [-d] verbs

Evidence can also be found in the Chinese data Chinese has no SCVs at all Like English and Spanish, Chinese LAVs do have alternative SC formation (Chen 1990), as illustrated in (31)

(31)

a) Wáng guān shuǐ

Wang load water

'Wang put water in'

b) Wáng guān-le pínzǐ le

Wang load-LE bottle Le

'Wang put bottle with water'

(31) shows that in Chinese there is no typical SCVs, and the basic SC formation is monotransitive because Chinese lacks a Substance role However, when the postverbal [+d] resultant particle MAN is used, the LC configuration is not allowed, and the SC formation is exclusive

(32)

a) Wáng guān-mǎn-le pínzǐ le

Wang load -full -LE bottle le

'Wang filled the bottle'

b) *Wáng guān-mǎn-le shuǐ zài pínzǐ lǐ

Wang load -full -LE water to bottle in

'Wang filled water into a bottle'

(32) shows that when MAN is introduced into a sentence in which a typical LAV is used, the LC formation is ill-formed (b), and only the SC formation is grammatical So like Spanish and English, in Chinese [+d] location must be expressed by a direct argument referring to a place being changed in state, and can never be expressed by an indirect argument referring to a thing being moved in location Now I will further test if MAN is really related to distributive meaning and is a [+d] feature marker Consider

(33)

Wáng guān-mǎn-le pínzǐ le,

Wang load-full -LE bottle LE

'Wang filled the bottle,

#dànshuǐ pínzǐ méi mǎn/ #dànshuǐ pínzǐ méi guān-mǎn

but bottle not full/ but bottle not load-full

#but the bottle is not full/ #but the bottle is not totally full'

In (33), when MAN is attached to the LAV, any secondary clause containing a [-d] meaning is considered contradictory However, in a sentence of LAV without MAN, a secondary clause referring to a [-d] meaning is totally acceptable as an additional explanation of the main clause, as illustrated in (34)

(34)

- a) Wáng guǎn-le píngzi-le, kékǒu méi guǎn-mǎn
 Wang load-LE bottle LE but not load-full
 'Wang loaded the bottle, but didn't fill it full'
- b) Wáng zhuāng-le kǎchē, dànsù dōu zhuāng dào yì biān qián le
 Wang load -LE truck but all load to one side forwards LE
 'Wang loaded the truck, but all the things were loaded at one side'

As shown in (34) sentences without MAN, additional information in Incompleteness (a), and also additional information on the obvious Boundedness of the Z entity taking the direct argument (b) in alterable SC formation is allowed as it is not contradictory in meaning to the main clause. So Chinese constitutes very important evidence for predicting that whenever, a [+d] feature is attached to Z entity in the lexical entry for a given relocation predicate, SC formation is inevitable, and LC formation is not allowed

With the [+d] feature not only can we determine the exclusive SC argument structure of relocation verbs, but we can also determine inchoative argument structure. In both Spanish and English stative or inchoative structure is allowed for SCVs, but not for SC formation of LAVs. Consider

(35)

- a) La nieve cubrió la tierra Snow covered the ground '
 b) *La madera cargó el camión. Wood loaded the truck
- (35) shows that SCVs have alternative structures, i.e., Y entity licensing. Substance role is associated with Subject and Z entity licensing. So the semantic element [+d] is an argument sensitive feature, and also constrains the well-formedness of inchoative constructions. Also in Chinese, when MAN is used in the SC formation of LAVs, an inchoative construction is well-formed, but in a SC formation of LAVs without MAN, the inchoative construction is ungrammatical. Consider

(36)

- a) Suǐ zhēngzhèng guǎn-mǎn-le píngzi
 Water really load -full -LE bottle 'Water really filled the whole bottle'
- b) *Suǐ guǎn-le píngzi
 Water load-LE bottle 'Water loaded the bottle'

In (36) the Chinese data also illustrate that the [+d] feature is directly related to inchoative formation.

Any relocation predicate with the [+d] feature for its Z entity, must have SC formation or Container-object formation, and LS formation is not allowed. To specify this particular cognitive property for SCVs, we may change Rappaport and Levin's (1988) LCS to

(37) X [CAUSE [Z change to a [+d] State [with Y]]

Although the two formations are used to represent the same relocation action, when the [+d] Arg selectional feature is introduced, the linguistic expression in predication must express the change of state. The reason for this is that the [+d] feature indicates a concrete resultant state of a dimensional entity due to the relocation activity, then the cognitive structure for proposition can only be SC but

not LC. We may interpret the cognitive process introduced by the [+d] feature as it stops the semantic-to-syntax mapping towards the LC formation. Therefore, the use of [+d] selectional feature is a cognitively motivated constraint to determine the argument structure of a relocation predicate, and the [+d] feature is a syntactically relevant cognitively oriented semantic feature for relocation predication. In this way the differentiation between LC & SC formations has a cognitively-oriented semantic basis instead of an apparent pragmatic or low-level semantic one as in Fillmore's (1968) focusing theory. When the lexical conceptual structure for a given relocation predicate is [An Agent causes a location to be a completely unbounded and aggregate media for a substance], the cognitive concept must be change of state (Rappaport and Levin 1988) for this predicate, i.e., the result of the relocation action is that the entity which receives the action that represents a space (two-dimensional or three dimensional) becomes full (totally and everywhere) of a substance, therefore a SC formation is inevitable and obligatory for a linguistic expression. On the other hand, LC formation is used to express the cognitive concept of [An Agent causes an entity to physically move to a [-DIM] Place].

V. Arg.-Selection of LCVs, SCVs & LAVs

To conclude, lexico-semantic information such as Arg.-selectional restriction, in addition to θ -role assignment, is needed for determining the PAS of a given predicate type. In principle, a language could encode all four of these selectional options as listed here: 1) [-DIM] [-d], 2) [+DIM] [+d], 3) [-DIM] [+d], and 4) [+DIM] [-d]. Across the three languages studied, [-DIM] and [-d] features determine an exclusive LC formation, and [+DIM] and [+d] features determine an exclusive SC formation, preventing any counterpart alternative formations. Thus, the remaining relocation verbs which require [+DIM] and [-d] features for their lexical entries, must be LAVs. Since semantically [-DIM] feature is incompatible with [+d] feature, there are no verbs that share the two features. All possible combinations are illustrated in (38).

(38)

a) $X, Y, Z \rightarrow LC$ PAS: $X \langle Y, Z \rangle$ [-DIM] [-d]	b) $X, Y, Z \rightarrow SC$ PAS: $X \langle Z, (Y) \rangle$ [+DIM] [+d]
c) $X, Y, Z \rightarrow LA$ PAS: $\{ X \langle Y, Z \rangle \}$ [+DIM] [-d]	d) X, Y, Z [-DIM] [+d]

Hale and Keyser (1987) hold that what enables a speaker to determine the behavior of a verb is its meaning. Generative grammarians have found many important and consistent correlations between syntactic structure and meaning. It seems clear to me that general theories of Grammar will have to be revised to account for these semantic/ syntactic correlations, which I call lexicon-to-PAS mapping. This work is guided by the assumption that verb meanings control the selection and interpretation of verb arguments. If this is so, careful examinations of various types of verbal structures should reveal underlying semantic consistencies. I

have attempted to delimit and systematize aspects of relocation verb behavior with the intention of contributing to the development of a theory of lexical knowledge. Ideally, such a theory must provide linguistically motivated lexical entries for verbs which incorporate a representation of verb meaning, and which allow the meanings of verbs to be properly associated with the syntactic expressions of their arguments. The study shows that θ -relations in the GB framework of Chomsky (1982, 1986) are insufficient to determine PAS. Other cognitively related semantic elements such as Arg-selectional constraints are necessary to determine PAS.

Why do these semantic elements, but not others, connect semantics to syntax? The answer is simple. When Z entity denotes a [-Dim] locative, the dimensionality of this entity is totally ignored by the speaker. Cognitively if there is no lexical-semantic denotation of the inner space of an entity, it is impossible to express the state-change of its inner space unless it disappears (if it could disappear, there wouldn't be a Z entity denoting a location). Therefore, the only possible syntactic structure for a relocation predicate requiring a [-Dim] Z entity will be exclusively the LC formation. When a relocation predicate requires its Y entity to fully occupy the space represented by the Z entity, this predicate cognitively focuses only on the changing state of the Z entity from 'not full' to 'full'. That is the reason why when a relocation predicate has [+d] Z entity in its Lexicon, only SC formation is permitted.

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