

chapter 8

Constraining X-bar Theory: The Lexicon

0. INTRODUCTION

In chapters 6 and 7, we developed a very simple and general theory of phrase structure: X-bar theory. Using only three rules, this theory accounts for the distinction between adjuncts, complements, and specifiers. It incorporates the more articulated view of sentence hierarchy required by constituency tests, and it captures cross-categorical generalizations (i.e., the fact that all kinds of phrases – NPs, VPs, APs, PPs, CPs, DPs, and TPs – have the same basic properties). Most importantly, it allows us to draw trees for most of the sentences of any language.

This said, there is a significant problem with X-bar theory: it also generates sentences that are not acceptable or grammatical. Take for example the following pairs of grammatical and ungrammatical sentences:

- 1) a) Rosemary hates New York.
b) *Rosemary hates.
- 2) a) Jennie smiled.
b) *Jennie smiled the breadbox.
- 3) a) Traci gave the whale a jawbreaker.
b) *Traci gave the whale.
c) *Traci gave a jawbreaker.

Sentence (1b) should be perfectly acceptable (compare it to *Rosemary ran*). X-bar theory says that complements are optional. Therefore, direct objects,

which are complements, should always be optional. The opposite type of fact is seen in the pair in (2). X-bar theory optionally allows a complement. So having a direct object here should be fine too. The same kind of effect is seen in (3), where both the direct object and indirect object are obligatory – contra X-bar theory.

What seems to be at work here is that certain verbs require objects and others don't. It appears to be a property of the *particular* verb. Information about the peculiar or particular properties of verbs is contained in our mental dictionary or *lexicon*. In this chapter, we'll look at how we can use the lexicon to constrain X-bar theory, so that it doesn't predict the existence of ungrammatical sentences.

1. SOME BASIC TERMINOLOGY

In chapter 2, we discussed how different verb types take a different number of arguments. For example, an intransitive verb like *leave* takes a single DP, which is the subject. A transitive verb such as *hit* takes a DP subject and a DP object. Below are the subcategories we came up with in chapter 2 (substituting DP for NP):

4)

<i>Subcategory</i>	<i>Example</i>
$V_{[DP_]} (intransitive)$	Leave
$V_{[DP_ DP]} (transitive\ type\ 1)$	Hit
$V_{[DP_ \{DP/CP\}]} (transitive\ type\ 2)$	Ask
$V_{[DP_ DP DP]} (ditransitive\ type\ 1)$	Spare
$V_{[DP_ DP PP]} (ditransitive\ type\ 2)$	Put
$V_{[DP_ DP \{DP/PP\}]} (ditransitive\ type\ 3)$	Give
$V_{[DP_ DP \{DP/PP/CP\}]} (ditransitive\ type\ 4)$	Tell

In addition to these restrictions, we also find semantic restrictions on what can appear in particular positions:

- 5) a) #My comb hates raisonnettes.
 b) #A bolt of lightning killed the rock.

There is something decidedly strange about these sentences. Combs can't hate anything and rocks can't be killed. These semantic criteria are called *selectional restrictions*.

In the next section, we'll look at the theory of thematic relations, which is a particular way of representing selectional and subcategorizational restrictions.

2. THEMATIC RELATIONS AND THETA ROLES

One way of encoding selectional restrictions is through the use of what are called *thematic relations*. These are particular semantic terms that are used to describe the role that the argument plays with respect to the predicate. This section describes some common thematic relations (this list is by no means exhaustive, and the particular definitions are not universally accepted).

The initiator or doer of an action is called the *agent*. In the following sentence, *Ryan* and *Michael* are an agent.

- 6) a) *Ryan* hit Andrew.
- b) *Michael* accidentally broke the glass.

Agents are most frequently subjects, but they can also appear in other positions.

Arguments that feel or perceive events are called *experiencers*. Experiencers can appear in a number of argument positions including subject and object:

- 7) a) *Leah* likes cookies.
- b) *Lorenzo* saw the eclipse.
- c) Syntax frightens *Kenna*.

Entities that undergo actions, are moved, experienced or perceived are called *themes*.

- 8) a) Alyssa kept *her syntax book*.
- b) The arrow hit *Ben*.
- c) The syntactician hates *phonology*.

The entity towards which motion takes place is called a *goal*. Goals may involve abstract motion:

- 9) a) Doug went *to Chicago*.
- b) *Dave* was given the piña colada mix.

There is a special kind of goal called *recipient*. Recipients only occur with verbs that denote a change of possession:

- 10) a) Mikaela gave *Jessica* the book.

- b) *Daniel* received a scolding from Hanna.

The opposite of a goal is the **source**. This is the entity from which a motion takes place:

- 11) a) *Bob* gave Steve the syntax assignment.
b) Stacy came directly *from sociolinguistics class*.

The place where the action occurs is called the **location**:

- 12) a) Andrew is *in Tucson's finest apartment*.
b) We're all *at school*.

The object with which an action is performed is called the **instrument**:

- 13) a) Chris hacked the computer apart *with an axe*.
b) *This key* will open the door to the linguistics building.

Finally, the one for whose benefit an event took place is called the **beneficiary**:

- 14) a) He bought these flowers for *Aaron*.
b) She cooked *Matt* dinner.

You now have enough information to try General Problem Sets 1 & 2

Notice that any given DP can have more than one thematic relation. In the following sentence, the DP *Jason* bears the thematic relations of agent and source (at the very least).

- 15) *Jason* gave the books to Anna.

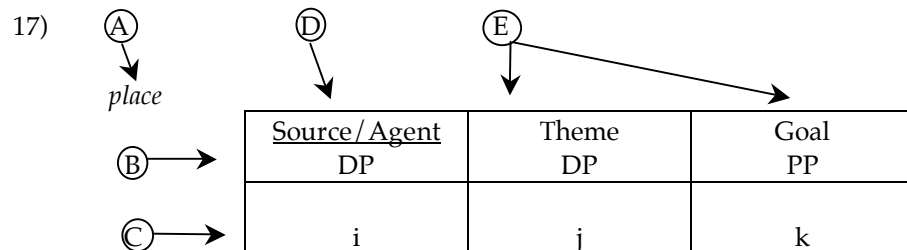
There is not a one-to-one relationship between thematic relations and arguments. However, linguists have a special construct called a **theta role** (or **θ role**) that does map one-to-one with arguments. Theta roles are bundles of thematic relations that cluster on one argument. In (15) above, *Jason* gets two thematic relations (agent and source), but only one theta role (the one that contains the agent and source thematic relations). Somewhat confusingly, syntacticians often refer to particular theta roles by the most prominent thematic relation that they contain. So you might hear a syntactician refer to the "agent theta role" of $[_{DP} Jason]$. Strictly speaking, this is incorrect: Agent refers to a thematic relation, whereas the theta role is a bundle of thematic relations. But the practice is common, so we'll do it here. Remember, thematic relations are things like agent, theme, goal, etc., but theta roles are bundles of thematic relations assigned to a particular argument.

Let's now see how we can use these theta roles to represent the argument structure of a verb. Take a ditransitive verb like *place*. *Place* requires

three arguments, a subject that must be an agent (the placer), a direct object, which represents the theme (the thing being placed), and an indirect object, which represents a location or goal (the the thing on which the theme is being placed). Any variation from this results in ungrammaticality:

- 16) a) John placed the flute on the table.
 b) *placed the flute on the table.
 c) *John placed on the table.
 d) *John placed the flute.
 e) *John placed the flute the violin on the table.¹
 f) *The rock placed the sky with the fork.
 g) *John placed the flute the table.

Examples (16a–e) show that either having too many or too few arguments results in ungrammaticality. Example (16f) shows that using DPs with the wrong theta roles does the same (*the rock* can't be an agent; *the sky* can't be a theme – it can't be given to anyone; and *with the fork* is an instrument, not a goal). (16g) shows us that the category of the argument is important (this we already knew from chapter 2), the goal argument of the verb *place* must be a PP. It appears as if the verb *place* requires three arguments, which bear precisely the theta roles of agent (DP), theme (DP), and goal (PP). We represent this formally in terms of what is called a *theta grid*.²



This grid consists of several parts. First of all, we have the name of the predicate (A). Next, for each argument that the predicate requires, there is a column (with two rows). Each of these columns represents a theta role. Notice that a column can have more than one thematic relation in it (but only one theta role). The number of columns corresponds exactly to the number of arguments the predicate requires. The first row (B) tells you the thematic relations and the categories associated with each of these theta roles. The

¹ This sentence would be OK if there were a conjunction between *the flute* and *the violin*. What does this tell us about what conjunction does to theta roles?

² There are many ways to formalize theta grids, but I adopt here the indexing box method that Haegeman (1994) uses, since it seems to be the most transparent.

second row (C), gives you what are called indices (singular: index) for each theta role. These are not the same as the indices in binding theory. When a predicate appears in an actual sentence, we mark the DP bearing the particular theta role with that index. Applying our grid to sentence (18), we get the following indexed sentence:

18) John_i placed [the flute]_j [on the table]_k.

The _i index maps the agent theta role to *John*. The _j index maps the theme theta role to *the book*, etc.

Theta roles actually come in two types. The first is the *external theta role* (D). This is the one assigned to the subject. External theta roles are usually indicated by underlining the name of the theta role in the theta grid. The other kind are *internal theta roles* (E). These are the theta roles assigned to the object and indirect object. There is a semantic reason for the distinction between internal and external theta roles (see Marantz 1984 for extensive discussion), but we will leave that issue aside here. We will have use for the external/internal distinction in chapter 10, when we do DP movement. For now, however, you should simply indicate which argument is the subject by underlining its name.

If you look carefully at the theta grid in (17) you'll notice that it only contains a specifier (subject) and complements (direct object and indirect object). There are no adjuncts listed in the theta grid. Adjuncts seem to be entirely optional:

- 19) a) John put the book on the table (with a pair of tongs). *instrument*
 b) (In the classroom) John put the book on the table. *location*

This corresponds to our observation in chapter 6, that you can have as many or as few adjuncts as you like, but the number of complements and specifiers are more restricted. *Adjuncts are never arguments, and they never appear in theta grids.*

You can now try General Problem Sets 3 & 4 (you may wish to review section 4 below before trying these)

Up until now, we have been representing our grammar solely through the mechanism of rules (phrase structure, then X-bar rules). In order to stop X-bar rules from overgenerating, we need a constraint. Constraints are like filters. They take the output of rules, and throw away any that don't meet the constraint's requirements. In essence, we are going to allow the X-bar rules to wildly overgenerate, and produce ungrammatical sentences. Those sentences, however, will be thrown out by our constraint. The constraint we are going to use is called the *Theta Criterion*. The theta criterion ensures that

there is a strict match between the number and types of arguments in a sentence and the theta grid.

20) *The Theta Criterion*

- a) Each argument is assigned one and only one theta role.
- b) Each theta role is assigned to one and only one argument.

This constraint requires that there is a strict one-to-one match between argument DPs and theta roles. You can't have more arguments than you have theta roles, and you can't have more theta roles than you have DPs. Furthermore, since theta roles express particular thematic relations, the arguments will have to be of appropriate semantic types for the sentence to pass the constraint.

Let's look at some examples to see how this works. Consider the verb *love*. It has the theta grid given in (21). I haven't written in the indices here, because we'll add them when we compare the grid to a particular sentence.

21) *love*

<u>Experiencer</u> DP	Theme DP

When a sentence containing the predicate *love* is produced, we apply indices to each of the arguments, and match those arguments to theta roles in the grid. The sentence in (22) is grammatical with the correct number of arguments. It is matched to the theta grid in (23). There is a one-to-one matching between arguments and theta roles. So the theta criterion is satisfied, and the sentence is allowed to pass through the filter and surface.

22) Megan_i loves Kevin_j.

23) *love*

<u>Experiencer</u> DP	Theme DP
i	j

Contrast this with the ungrammatical sentence in (24):

24) *Megan_i loves.

This sentence lacks a theme argument, as seen in the following theta grid:

25) *love*

<u>Experiencer</u> DP	Theme DP
i	

The theme theta role is not assigned to an argument (there is no index in its lower box). This violates the second condition of the theta criterion: Every theta role is assigned to an argument. There is not a one-to-one matching of the theta roles to the arguments in this sentence. Since the theta criterion is violated, the sentence is filtered out (marked as ungrammatical). Notice, our X-bar rules *can* generate this sentence; it is ruled as ungrammatical by our constraint.

The next sentence shows the opposite problem: A sentence with too many arguments.

26) *Megan_i loves Jason_j Kevin_k.

27) *love*

<u>Experiencer</u> DP	Theme DP	
i	j	k

Here, the argument *Kevin* doesn't get a theta role. There are only two theta roles to be assigned, but there are three arguments. This violates the first part of the theta criterion: the requirement that every argument have a theta role. Again, the theta criterion filters out this sentence as ungrammatical.

To summarize, we can constrain the output of the X-bar rules using a semantic tool: theta roles. The theta criterion is a constraint or filter that rules out otherwise well-formed sentences. The theta criterion requires that there is a strict one-to-one matching between the number and kind of theta roles and the number and kind of arguments.

You now have enough information to try General Problem Set 5 and Challenge Problem Set 1

3. THE LEXICON

Let's take a step back from these details and look at the big picture. We have developed a model of grammar where we have three simple rules (the X-bar rules) that can generate a hierarchical constituent structure. These rules are constrained by the theta criterion, which uses the semantic notion of theta roles. Recall that our theory of syntax is meant to be a cognitive theory, so let's consider the question of where these rules and these theta roles are stored in the mind. Chomsky proposes that the part of the mind devoted to language is essentially divided into two parts. One part, which he calls the *computational component*, contains all the rules and constraints. This part of the mind does the work of building sentences and filtering out any ill-

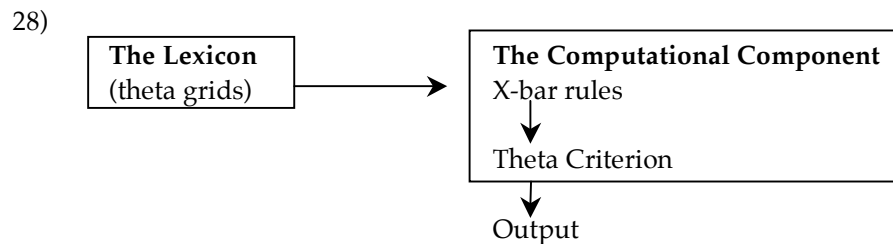
formed ones. The computational component can't work in a vacuum, however. It needs access to information about theta roles and the like. Chomsky claims that this information is stored in the *lexicon*, the other part of the human language faculty. The lexicon is your mental dictionary or list of words (and their properties). If you think about it, this is the obvious place for theta grids to be stored. Which theta role is assigned to which argument is a property of each predicate. It is information that must be associated with that predicate and that predicate only. The obvious place to store information about particular words (or more properly *lexical items*) is in the lexicon.

The lexicon contains all the irregular and memorized parts of language. Each lexical entry (dictionary entry) must contain at least the following information):

- the meaning of the word
- the syntactic category of the word (N, V, A, P, T, C, etc.)
- the pronunciation of the word
- exceptional information of all kinds (such as morphological irregularities)
- the theta grid (argument structure).

When you learn a new word, you memorize all this information.

On an abstract level we can diagram the grammatical system as looking something like:



The lexicon feeds into the computational component, which then combines words and generates sentences. The fact that lexical information affects the form of the sentence is formalized in what we call the *Projection Principle*:

29) *The Projection Principle*

Lexical information (such as theta roles) is syntactically represented at all levels.

4. EXPLETIVES AND THE EXTENDED PROJECTION PRINCIPLE

Before leaving the topic of the lexicon, I'd like to point out two special classes of predicates. Consider first the following "weather" verbs. These predicates don't seem to assign any theta roles:

- 30) a) It rained.
 b) It snowed.
 c) It hailed.

What theta role does the pronoun *it* get in these sentences? If you are having a problem figuring this out, ask yourself what *it* refers to in the above sentences. It appears as if *it* doesn't refer to anything. In syntax, we refer to pronouns like this as *expletive* or *pleonastic pronouns*. These pronouns don't get a theta role (which of course is a violation of the theta criterion – a point we will return to below). The theta grid for weather verbs is empty. They don't assign any theta roles.

There is another class of predicates that take expletive pronouns. These are predicates that optionally take a CP subject:

- 31) [_{CP} That Bill loves chocolate] is likely.

The predicate *is likely* assigns one theta role. It takes one argument (the clause). (We will notate clausal arguments with the theta role *proposition*.)

- 32) *is likely*

Proposition CP

You'll note that in (32) the theta role is not underlined. This is because the clause bearing the theta role of proposition is a complement. This can be seen in the following example:

- 33) It is likely that Bill likes chocolate.

In this sentence, we again have an expletive *it*, which gets no theta role.

In order to maintain the theta criterion, we need to account for these expletive DPs without theta roles. Expletive pronouns usually appear in subject position. When *it* appears in other positions, it usually bears a theta role:

- 34) a) I love *it*. (it is a theme)
 b) I put a book on *it*. (it is a goal or location)

Expletives seem to appear where there is no theta marked DP (or CP) that fills the subject position. This is encoded in a revised version of the Projection Principle: The *Extended Projection Principle* (EPP):

35) *Extended Projection Principle* (EPP)

All clauses must have subjects. (i.e. the specifier of TP must be filled by a DP or CP)

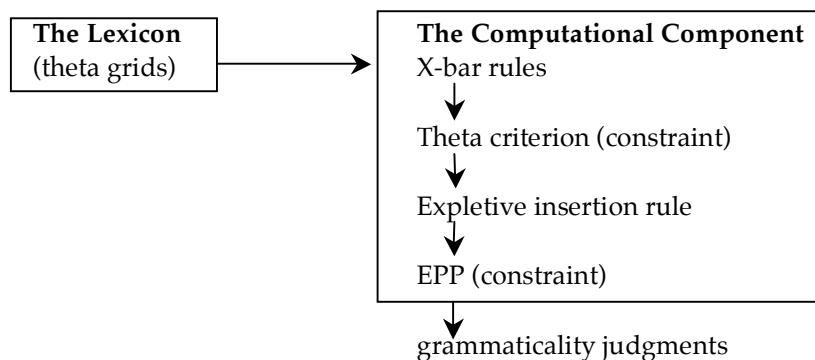
The EPP works like the theta criterion, it is a constraint on the output of the X-bar rules. It requires that every sentence have a subject. Next, we must account for the fact that expletives violate the theta criterion.

One way of doing this is by claiming that expletives are not generated by the X-bar rules. Instead they are inserted by a special *expletive insertion* rule:

36) *Expletive insertion rule*

Insert an expletive pronoun into the specifier of TP.

This rule applies when there is no other subject. If there is no theta marked subject and no expletive subject, then the EPP will filter the sentence out. The way in which we get around the theta criteria is by *ordering* the expletive insertion rule after the theta criterion has applied.



Since expletives are inserted *after* the theta criterion has applied, they can't be filtered out by it.

Two Kinds of *It*

There are two *it* pronouns in English. One is the expletive found with weather verbs. The other is the neuter pronoun *it* found in sentences like:

i) It bit me on the leg.

If you contrast the *it* in (i) with the ones in the weather verbs, you'll see that the *it* in (i) does take a theta role (agent) and does refer to something (probably an insect or some other animal). Not every sentence with an *it* involves an expletive.

The model we've drawn here is very preliminary. In the next chapter, we will introduce a new kind of rule (the transformation – of which expletive insertion is a very special case) that will cause us to significantly revise this diagram.

You now have enough information to try Challenge Problem Sets 2, 3, 4, & 5

5. SUMMARY

We started this chapter off with the observation that while X-bar rules capture important facts about constituency and cross-categorical generalizations, they overgenerate (that is they generate ungrammatical sentences). One way of constraining X-bar theory is by invoking lexical restrictions on sentences, such that particular predicates have specific argument structures, in the form of theta grids. The theta criterion rules out any sentence where the number and type of arguments don't match up one to one with the number and type of theta roles in the theta grid.

We also looked at one apparent exception to the theta criterion: theta role-less expletive pronouns. These pronouns only show up when there is no other subject, and are forced by the EPP. They escape the theta criterion by being inserted after the theta criterion has filtered out the X-bar rules.

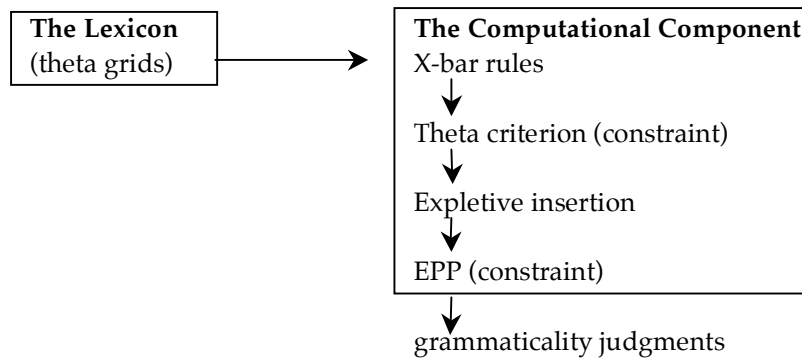
By using lexical information (like theta roles) we're able to stop the X-bar rules from generating sentences that are ungrammatical. Unfortunately, as we'll see in the next chapter, there are also many sentences that the X-bar rules *cannot* generate. In order to account for these, we'll introduce a further theoretical tool: the movement rule.

IDEAS, RULES, AND CONSTRAINTS INTRODUCED IN THIS CHAPTER

- i) ***Selectional Restrictions***: Semantic restrictions on arguments.
- ii) ***Thematic Relations***: Semantic relations between a predicate and an argument – used as a means of encoding selectional restrictions.
- iii) ***Agent***: The doer of an action (under some definitions must be capable of volition).

- iv) **Experiencer:** The argument that perceives or experiences an event or state.
- v) **Theme:** The element that is perceived, experienced or undergoing the action or change of state
- vi) **Goal:** The end point of a movement.
- vii) **Recipient:** A special kind of goal, found with verbs of possession (e.g., *give*).
- viii) **Source:** The starting point of a movement.
- ix) **Location:** The place an action or state occurs.
- x) **Instrument:** A tool with which an action is performed.
- xi) **Beneficiary:** The entity for whose benefit the action is performed.
- xii) **Proposition:** The thematic relation assigned to clauses.
- xiii) **Theta Role:** A bundle of thematic relations associated with a particular argument (DPs or CPs).
- xiv) **Theta Grid:** The schematic representation of the argument structure of a predicate, where the theta roles are listed.
- xv) **External Theta Role:** The theta role associated with subject DPs or CPs.
- xvi) **Internal Theta Role:** The theta role associated with objects or indirect objects.
- xvii) **The Theta Criterion:**
 - a) Each argument is assigned one and only one theta role.
 - b) Each theta role is assigned to one and only one argument.
- xviii) **Lexical Item:** Another way of saying “word.” A lexical item is an entry in the mental dictionary.
- xix) **The Projection Principle:** Lexical information (like theta roles) is syntactically represented at all levels.
- xx) **Expletive (or Pleonastic) Pronouns:** A pronoun (usually *it* or *there*) without a theta role. Usually found in subject position.
- xxi) **Extended Projection Principle (EPP):** All clauses must have subjects. Lexical information is syntactically represented.
- xxii) **Expletive Insertion:** Insert an expletive pronoun into the specifier of TP.

- xxiii) **The Lexicon:** The mental dictionary or list of words. Contains all irregular and memorized information about language, including the argument structure (theta grid) of predicates.
- xxiv) **The Computational Component:** The combinatorial, rule-based, part of the mind. Where the rules and filters are found.
- xxv) **The Model:**



FURTHER READING

- Gruber, Jeffrey (1965) *Studies in Lexical Relations*. Ph.D. dissertation, MIT.
- Haegeman, Liliane (1994) *Introduction to Government and Binding Theory*. Oxford: Blackwell.
- Marantz, Alec (1984) *On the Nature of Grammatical Relations*. Cambridge: MIT Press.
- Williams, Edwin (1980) Predication. *Linguistic Inquiry* 11, 203–38.
- Williams, Edwin (1994) *Thematic Structure in Syntax*. Cambridge: MIT Press.
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GENERAL PROBLEM SETS

1. IDENTIFYING THEMATIC RELATIONS

[Data Analysis and Application of Skills; Basic]

Part 1: Identify the thematic relations associated with each DP or embedded CP in the following sentences. Each DP or CP may have more than one thematic relation associated with it.

- a) Shannon sent Dan an email.
- b) Jerid thinks that Sumayya cooked some beef waffles for him.
- c) Stacy hit a baseball to Yosuke.

- d) Jaime danced a jig.
- e) Yuko rubbed the pizza with a garlic clove.
- f) It's foggy in San Francisco.

Part 2: Draw the trees for (b–f), use CPs, DPs and TPs.

2. WARLPIRI³

[Data Analysis; Basic]

Consider the following data from Warlpiri:

- a) Lungkarda ka ngulya-ngka nguna-mi.
bluetongue AUX burrow-A lie-NON.PAST
“The bluetongue skink is lying in the burrow.”
- b) Nantuwu ka karru-kurra parnka-mi.
horse AUX creek-B run-NON.PAST
“The horse is running to the creek.”
- c) Karli ka pirli-ngirli wanti-mi.
boomerang AUX stone-C fall-NON.PAST
“The boomerang is falling from the stone.”
- d) Kurdu-ngku ka-jana pirli yurutu-wana yirra-rni.
child-D AUX stone road-E put.NON.PAST
“The child is putting stones along the road.”

What is the meaning of *each* of the affixes (suffixes) glossed with -A, -B, -C, -D, and -E. Can you relate these suffixes to thematic relations? Which ones?

3. THETA GRIDS

[Data Analysis; Basic]

For each of the sentences below identify each of the predicates (including non-verbal predicates like *is likely*). Provide the theta grid for each. Don't forget: include only arguments in the theta grid; DPs and PPs that are adjuncts are not included. Index each DP, PP, CP argument with the theta role it takes. Assume that there are two different verbs *give* (each with their own theta grids) to account for (c) and (d); two different verbs *eat* (each with their own theta grids for (e) and (f); and two different verbs *ask* for (i) and (j).

- a) The stodgy professor left with his teaching assistant.
- b) I played a tune on my iPod.
- c) Molly gave Calvin a kiss.
- d) Mercedes gave a test to the students in the lecture hall.

³ The data for this problem set comes from Ken Hale via Barb Brunson.

- e) Pangur ate a cat treat.
- f) Susan ate yesterday at the restaurant.
- g) Gwen saw a fire truck.
- h) Gwen looked at a fire truck.
- i) Michael asked a question.
- j) Adam asked if Hyacinth likes pineapples.
- k) It is sunny in the dining room.
- l) I feel it is unfortunate that television is so vulgar these days.
- m) That Angus hates sushi is mysterious.

4. SINHALA⁴

[Data Analysis; Basic/Intermediate]

Two forms of the Sinhala verb appear in the data below and are identified in the glosses as A or B. (Data from Gair 1970)

- 1) Provide a complete theta grid for each of the verbs in the following data. Be sure to primarily look at the second line of each piece of data, not the English translation.
- 2) Using indexes identify what theta role is assigned to each DP.
- 3) Discuss briefly (no more than 2 sentences) what kind of DP the suffix *-tə* attaches to.
- 4) What is the difference between *mamə* and *matə*? (Hint: the answer to this question is related to the answer to question (3).)
- 5) In terms of theta roles, what is the difference between the A and the B verb forms?

- a) Mamə kawi kiənəwa.

I poetry tell-A

“I recite poetry.”

- b) Matə kawi kiəwenəwa.

I poetry tell-B

“I started reciting poetry (despite myself).”

- c) Lamea kataawə ahanəwa.

child story hear-A

“The child listens to the story.”

⁴ This problem is loosely based on one given to me by Barb Brunson. However, the data and questions have been altered. The data in this version of the problem set is taken directly from Gair, with some minor modifications to the glosses.

- d) Lameaṭə kataawə æhenəwa.
 child story hear-B
 “The child hears the story.”
- e) Mamə naṭənəwa.
 I dance-A
 “I dance.”
- f) Maṭə næṭənenəwa.
 I dance-B
 “I dance (I can’t help but do so).”
- g) Həmə irida mə mamə koləmbə yanəwa.
 every Sunday EMPH I Columbo go-A
 “Every Sunday I deliberately go to Colombo.”
- h) Həmə irida mə maṭə koləmbə yəwenəwa.
 every Sunday EMPH I Columbo go-B
 “Every Sunday I experience going to Colombo.”
- i) Malli nitərəmə aṇḍənəwa.
 brother always cries-A
 “Brother always cries.”
- j) Malliṭə nitərəmə æṇḍənəwa.
 brother always cries-B
 “Brother always bursts out crying without control.”
- k) Mamə untə baninəwa.
 I them scold-A
 “I deliberately scold them.”
- l) Maṭə untə bænenəwa.
 I them scold-B
 “I experienced scolding them.”
- m) Apiṭə pansələ peenəwa.
 we temple see-B
 “We saw the temple.”

5. THETA CRITERION*[Data Analysis; Intermediate]*

Show how each of the following sentences are violations of the theta criterion. Use theta grids to explain your answers.

- a) *Rosemary hates.
- b) *Jennie smiled the breadbox.
- c) *Traci gave the whale.
- d) *Traci gave a jawbreaker.
- e) *placed the flute on the table.
- f) *John placed on the table.
- g) *John placed the flute.
- h) *John placed the flute the violin on the table.
- i) *The rock placed the sky with the fork.
- j) *John placed the flute the table.

CHALLENGE PROBLEM SETS**CHALLENGE PROBLEM SET 1: IRISH AND THE THETA-CRITERION***[Data Analysis and Application of Skills; Challenge]*

What problems do each of the following examples give for the theta criterion? (As a starting point, it may help to draw the theta grid for each verb and show what DP gets what role.) Please, not more than 3–4 sentences of discussion per example.

- a) an fear a bhfaca mé é
the man who saw I him
“the man who I saw”
- b) Rinceamar.
Dance.1PL
“We danced.”
- c) Ba-mhaith liom an teach a thógail.
COND-good with-me the house its building
“I would like to build the house.”

CHALLENGE PROBLEM SET 2: OBJECT EXPLETIVES*[Critical Thinking; Challenge]*

In the text above, it was observed that theta-role-less expletives primarily appear in subject position. Consider the following sentence. Is *it* here an expletive?

I hate it that you're always late.

How could you tell?

CHALLENGE PROBLEM SET 3: PASSIVES*[Data Analysis; Challenge]*

Part 1: Write up the theta grids for the verbs in the following sentences. Assume there are two verbs *give* (*give*₁ is seen in (d), *give*₂ in (e)).

- a) John bit the apple.
- b) Susan forgave Louis.
- c) The jockey rides the horse.
- d) Phillip gave the medal to the soldier.
- e) Phillip gave the soldier the medal.

Part 2: English has a suffix *-en*, which when attached to verbs changes the structure of the sentence associated with them. This is called the **passive** morpheme. The following sentences are the passive equivalents of the sentences in part 1. The bracketed PPs starting with *by* are optional.

- f) The apple was bitten (by John).
- g) Louis was forgiven (by Susan).
- h) The horse was ridden (by the jockey).
- i) The medal was given to the soldier (by Phillip).
- j) The soldier was given the medal (by Phillip).

Describe in your own words what the *-en* passive suffix does to the theta grids of verbs. Pay careful attention to the last two examples, and to the optionality of the *by*-phrases.

CHALLENGE PROBLEM SET 4: HIAKI -WA⁵*[Data Analysis and Critical Thinking; Challenge]*

Part 1: Consider the function of the suffix *-wa* in Hiaki (also known as Yaqui), a language spoken in Southern Arizona and Mexico. Look carefully at the data below, and figure out what effect this suffix has on the theta grids of

⁵ Thanks to Heidi Harley for contributing this problem set.

Hiaki verbs. What English phenomenon is this similar to? (Data from Escalante 1990 and Jelinek and Escalante 2003).

(Notes: Sometimes when *-wa* attaches to a verb, the form of the root changes (usually /e/ becomes /i/). This is a morphophonological phenomenon that you don't need to worry about. ACC refers to accusative case, INST means instrument, and PERF means perfective aspect (aspect plays no role in the answer to this problem). There is no nominative suffix in Hiaki.)

- a) Peo Huan-ta chochon-ak.
Pete John-ACC punch-PERF
"Pete punched John."
- a') Huan chochon-wa-k.
John punch-WA- PERF
"John was punched."
- b) 'Ume uusi-m uka kuchu-ta kuchii-m-mea bwa'a-ka.
the children-PL the-ACC fish-ACC knife-PL-INST eat- PERF
"The children ate the fish with knives."
- b') 'U kuchu kuchii-m-mea bwa'a-wa-k.
the fish knife-PL-INST eat-WA-PERF
"The fish was eaten with knives."
- c) Peo bwiika.
Pete sing
"Pete is singing."
- c') Bwiik-wa.
sing-WA
"Singing is happening." or "There is singing going on." or "Someone is singing."

Part 2: Not all verbs allow *-wa*. Consider the following pairs of sentences that show verbs that don't allow *-wa*. In terms of theta grids, what do these sentences have in common with each other that differentiates them from the ones that allow *-wa* (above in part 1).

- a) 'U wikia chukte.
the rope come.loose
"The rope is coming loose."
- a') *Chukti-wa.
come.loose-WA
"Coming loose is happening." or "There is coming loose going on." or "Something is coming loose."

- b) 'U kaaro nasonte.
the car damage
"The car is damaged."
- b') *Nasonti-wa.
damage-WA
"Damage is happening." or "There is damage going on." or "Something is getting damaged."
- c) 'U kari veete-k.
The house burn-PERF
"The house burned."
- c') *Veeti-wa-k.
Burn-WA-PERF
"Burning happened." or "There was burning going on." or "Something is getting burned."
- d) 'U vachi bwase'e.
The corn cook
"The corn is cooking."
- d') *Bwase'i-wa.
cook-WA
"Cooking happened." or "There was cooking going on." or "Something is being cooked."

CHALLENGE PROBLEM SET 5: ANTIPASSIVES

[Data Analysis and Critical Thinking; Challenge]

In many languages there is an operation that changes the theta grid of certain verbs, this operation is called the **antipassive**.

Part 1: Here is some data from Inupiaq, an Inuit language of Canada and Alaska. Explain what adding the antipassive morpheme does to the theta grid of the verb. Verbs in Inupiaq agree with both their subjects and their objects. 3SUBJ-3OBJ means that the verb agrees with both a 3rd person subject and a 3rd person object. 3 means that the verb only agrees with a 3rd person subject. (Data from Seiler 1978.)

- a) Aguti-m umiaq qĩñig-aa tirrag-mi. *Active*
man-ERG boat-ABS see-3SUBJ.3OBJ beach-at
"The man sees the boat at the beach."

- b) Arjun (umiag-mik) qifiq-tuq tirrag-mi. *Antipassive*
 man-ABS boat-INST see-3 beach-at
 "The man sees (with a boat) at the beach."

Part 2: The following is some data from English. This might also be called an antipassive construction. How is it similar or different from the Inupiaq antipassive?

- c) I ate a basket of apples.
 d) I ate.

