The Lexicon
The Lexicon

Constraining X-bar theory using the mental dictionary
Overgeneration
Overgeneration

- X-bar theory can produce sentences that are NOT well formed.
Overgeneration

- X-bar theory can produce sentences that are NOT well formed.
- It over-generates (generates ungrammatical sentences)
Overgeneration
Overgeneration

- X-bar theory says complements are optional:
  \[ X' \rightarrow X' \ (WP) \]
- The philosopher loves caramel apples
- The philosopher smiled
Overgeneration

- X-bar theory says complements are optional:
  \[ X' \rightarrow X' \ (WP) \]
  - The philosopher loves caramel apples
  - The philosopher smiled

- BUT
  - *The philosopher loves
  - *The philosopher smiled the breadbox.
Overgeneration
Overgeneration

Traci gave the whale the jawbreaker.
Overgeneration

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Overgeneration

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Overgeneration

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Certain verbs require objects, others require that they don’t have them, others require two.
Overgeneration

- Traci gave the whale the jawbreaker.
- Traci gave the whale.
- Traci gave the jawbreaker.
- Certain verbs require objects, others require that they don’t have them, others require two.
- It depends on the particular verb.
The Lexicon

- The mental dictionary
The Lexicon

- The mental dictionary
- The store of information about particular words.
The Lexicon

- The mental dictionary
- The store of information about particular words.
- pronunciation of word
The Lexicon

- The mental dictionary
- The store of information about particular words.
  - pronunciation of word
  - morphological irregularities
The Lexicon

- The mental dictionary
- The store of information about particular words.
  - pronunciation of word
  - morphological irregularities
  - meaning of word
The Lexicon

- The mental dictionary
- The store of information about particular words.
  - pronunciation of word
  - morphological irregularities
  - meaning of word
  - requirements about other words they occur with.
Reminder: Subcategories of V

<table>
<thead>
<tr>
<th>Structure</th>
<th>Transitivity</th>
<th>Verb(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[NP__]</td>
<td>intrans 1</td>
<td>arrive</td>
</tr>
<tr>
<td>[NP __ NP]</td>
<td>trans 1</td>
<td>hit</td>
</tr>
<tr>
<td>[NP __ {NP/CP}]</td>
<td>trans 2</td>
<td>ask</td>
</tr>
<tr>
<td>[NP __ NP NP]</td>
<td>ditrans 1</td>
<td>spare</td>
</tr>
<tr>
<td>[NP __ NP PP]</td>
<td>ditrans 2</td>
<td>put</td>
</tr>
<tr>
<td>[NP __ NP {NP/PP}]</td>
<td>ditrans 3</td>
<td>give</td>
</tr>
<tr>
<td>[NP __ NP {NP/PP/CP}]</td>
<td>ditrans 4</td>
<td>tell</td>
</tr>
</tbody>
</table>
Selectional Restrictions
Selectional Restrictions

Selectional Restrictions limit the semantic properties of arguments

- My toothbrush loves raisins.
- The bolt of lightening killed the rock.
Thematic Relations
Thematic Relations

- A way of encoding selectional restrictions.
- Semantic relation between the argument and the predicate.
Thematic Relations
Thematic Relations

- **Agent**: initiator of the action, capable of volition
- Brad hit Andrew
Thematic Relations

- **Agent**: initiator of the action, capable of volition
  - Brad hit Andrew

- **Natural Phenomenon**: initiator of action, incapable of volition
  - A falling rock hit Terry.
Thematic Relations

- **Agent**: initiator of the action, capable of volition
  - Brad hit Andrew

- **Natural Phenomenon**: initiator of action, incapable of volition
  - A falling rock hit Terry.

We won’t really distinguish agents from natural phenomena.
Thematic Relations
Thematic Relations

- **Experiencer**: the argument that experiences or perceives the event
  - Becki saw the Eclipse
  - Syntax frightens Jim
  - Susanna loves cookies
  - A falling rock hit Terry.
Thematic Relations
Thematic Relations

- **Theme** (also patient and percept) the entity that undergo actions, are moved, experienced or perceived

- Susanna loves cookies
- A falling rock hit Terry.
- The syntactician bought a phonology textbook.
Thematic Relations
Thematic Relations

Goal: The entity towards which motion takes place. Goals may involve abstract motion.

- A falling rock hit Terry.
- The syntactician bought a phonology textbook.
- Millie went to Chicago
- Travis was given a semantics article.
Thematic Relations
Thematic Relations

**Recipient**: A special kind of goal that involves a change of possession

- Julie gave Jessica the book
- Roy received a scolding from Sherilyn.
Thematic Relations

- **Recipient**: A special kind of goal that involves a change of possession
  - Julie gave Jessica the book
  - Roy received a scolding from Sherilyn.

- **Source**: The opposite of goal, entity from which movement occurs.
  - Bob gave Steve the Syntax assignment
  - Stacy came directly from Sociolinguistics class.
Thematic Relations
Thematic Relations

Location: Place where action occurs

- Andrew is in Tucson's finest apartment
- We're all at school.
Thematic Relations

- **Location**: Place where action occurs
  - Andrew is in Tucson's finest apartment
  - We're all at school.

- **Instrument**: The entity with which action occurs.
  - Patrick hacked the computer apart with an axe
  - This key will open the door to the Douglass building.
Thematic Relations

- **Beneficiary**: The entity for whom the action occurs
  - He bought these flowers for Jason
  - She cooked Matt dinner.
Thematic Relations

**Beneficiary:** The entity for whom the action occurs

- He bought these flowers for Jason
- She cooked Matt dinner.

There are many other thematic relations, but these will do for our purposes.
Theta Roles
Theta Roles

- **Theta role** (θ-role) is a bundle of thematic relations associated with a particular argument.
Theta Roles

- **Theta role** (θ-role) is a bundle of thematic relations associated with a particular argument.
- Thematic relation ≠ theta role.
Theta Roles

- **Theta role** (θ-role) is a bundle of thematic relations associated with a particular argument.

- Thematic relation ≠ theta role.

- An argument can have many thematic relations, but only one theta role.
Theta Roles

- Brian gave the doorknob to Mary
Theta Roles

Brian gave the doorknob to Mary

- **agent**
- **source**
- **theme**
- **recipient**
- **goal**
Theta Roles

Brian gave the doorknob to Mary

agent  source

theme

recipient  goal

thematic relations
Theta Roles

Brian gave the doorknob to Mary

- agent
- source
- theme
- recipient
- goal

Thematic relations

\( \theta \)-roles
A note on the term “Theta Role”

Sometimes we talk about the “agent theta role”. Technically this is incorrect. Agent refers to the thematic relation. But when we are talking about the “Agent theta role” we mean the theta role whose most prominent thematic relation is the Agent.
One to one match of theta roles & arguments

- ‘put’ requires an agent, a theme, a goal
  
  John put the book on the table
  *put the book on the table
  *John put the book
  *John put on the table
  *John put the book the pen on the table
  *The rock put the sky with the fork

- Too many, too few, or the wrong kinds of arguments result in ungrammaticality.
Theta Grids

<table>
<thead>
<tr>
<th>Agent/Source DP</th>
<th>Theme DP</th>
<th>Goal PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>j</td>
<td>k</td>
</tr>
</tbody>
</table>

These indices (indexes) are NOT the same as the indices used in binding theory.
Theta Grids

[John]_i put [the book]_j [on the table]_k

These indices (indexes) are NOT the same as the indices used in binding theory.
### Theta Grids

The theta grid for the sentence `[John]_i put [the book]_j [on the table]_k` is shown below:

- **Predicate:** `put`
- **Agent/Source (DP):** `i`
- **Theme (DP):** `j`
- **Goal (PP):** `k`

These indices (indexes) are NOT the same as the indices used in binding theory.
Theta Grids

predicate

‘put’

\[ \theta \text{-role} \]

\[ \text{indices} \]

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[John]_i put [the book]_j [on the table]_k

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Theta Grids

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[John]_i put [the book]_j [on the table]_k

These indices (indexes) are NOT the same as the indices used in binding theory.
Theta Grids

θ-role:

- External θ role (subject)
- Internal theta roles

Indices:

- Agent/Source DP (i)
- Theme DP (j)
- Goal PP (k)

Predicate: 'put'

Example sentence: [John]_i put [the book]_j [on the table]_k

These indices (indexes) are NOT the same as the indices used in binding theory.
An important point!
An important point!

Adjuncts are NOT included in theta grids.
An important point!

- Adjuncts are NOT included in theta grids.
- (With verbs) Adjuncts are optional, complements & subjects are obligatory:
  - John put the book on the table on Friday
  - John put the book on the table
  - *John put the book on Friday
The Theta Criterion
The Theta Criterion

A sentence meets the theta criterion iff:

- Every argument must have one and only one theta role AND
- Every theta role must be assigned (indexed to) to one and only one an argument.
The Theta Criterion

A sentence meets the theta criterion iff:

- Every argument must have one and only one theta role AND
- Every theta role must be assigned (indexed to) to one and only one an argument.

There is a one to one correspondence between the number of theta roles and the number & type of arguments.
<table>
<thead>
<tr>
<th>Experiencer</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP</td>
<td>DP</td>
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</tbody>
</table>

`love`
<table>
<thead>
<tr>
<th>Experiencer</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP</td>
<td>DP</td>
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</tbody>
</table>

Megan: loves Kevin.

<table>
<thead>
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<tbody>
<tr>
<td>i</td>
<td>j</td>
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</tbody>
</table>

DP          DP

DP          DP
Megan_i loves Kevin_j

*Megan_i loves
Megan_i loves Kevin_j

*Megan_i loves

©Andrew Carnie, 2006
### 'love'

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\[
\text{Megan}_i \text{ loves } \text{Kevin}_j
\]

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\[
\text{*Megan}_i \text{ loves }
\]

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<td>DP</td>
</tr>
<tr>
<td>(i)</td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{*Megan}_i \text{ loves } \text{Kevin}_j \text{Jason}_k
\]

<table>
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### Experiencer vs. Theme

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<tbody>
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#### Megan loves Kevin

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#### *Megan loves*

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<tbody>
<tr>
<td>i</td>
<td></td>
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</tbody>
</table>

#### *Megan loves Kevin Jason*

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How does it all fit together?
How does it all fit together?

- The X-bar rules generate trees. These trees are then checked against constraints (like the binding conditions and the theta criterion) to make sure they are ok.
How does it all fit together?

- The X-bar rules generate trees. These trees are then checked against constraints (like the binding conditions and the theta criterion) to make sure they are ok.
- The constraints filter out badly constructed trees.
The Model of the Grammar (first try)

The Lexicon
- Theta roles

The Computational Component
- X-bar rules (build trees)
- Theta Criterion, Binding Conditions (check trees)

judgments
NPs without theta roles?

- It rained
- It snowed
- It hailed
- It is likely that Bob left
- These are called Expletives or Pleonastics.
Two Kinds of ‘it’

- it bit me on the leg  
- it is likely that I’ll leave

*pronoun*  
*expletive*
Weather verbs & propositional verbs

‘rain’

takes *no* arguments

‘is likely’

[That John will leave] is likely
It is likely [that John will leave]

Proposition
CP

i
Why do expletives exist?
Why do expletives exist?

There is another constraint on the grammar:
Why do expletives exist?

There is another constraint on the grammar:

The *Extended Projection Principle* (EPP)

Every sentence must have a subject.

*rain* (meets theta criterion, but violates EPP).
Why do expletives exist?

- There is another constraint on the grammar:
- The **Extended Projection Principle (EPP)**
  - Every sentence must have a subject.
  - *rain* (meets theta criterion, but violates EPP).

**Rule of Expletive insertion:**
- Insert an ‘it’ in subject position.
A contradiction
A contradiction

- Theta criterion: all NPs must have a theta role
A contradiction

- Theta criterion: all NPs must have a theta role
- EPP: all sentences must have a subject
A contradiction

- Theta criterion: all NPs must have a theta role
- EPP: all sentences must have a subject
- What do you do with verbs that have no theta roles to assign? Why doesn’t Expletive insertion cause a violation of the theta criterion.
A contradiction

- Theta criterion: all NPs must have a theta role
- EPP: all sentences must have a subject
- What do you do with verbs that have no theta roles to assign? Why doesn’t Expletive insertion cause a violation of the theta criterion.
- Solution lies in ordering
The Model of the Grammar (second try)

The Lexicon
- Theta roles

The Computational Component
- X-bar rules (build trees)
- Theta Criterion (check trees)
- Rule of Expletive Insertion (insert it)
- Binding Conditions, EPP (check trees)

judgments
Summary
Summary

- X-bar theory *overgenerates* (generates too many sentences)

- Use the Lexicon, Theta roles, and the theta criterion to limit it.
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- Predicate: a relation between entities
Summary

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- **Predicate**: a relation between entities

- **Arguments**: the participants in a predicate
Summary

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  - Use the Lexicon, Theta roles, and the theta criterion to limit it.

- **Predicate**: a relation between entities

- **Arguments**: the participants in a predicate

- **Thematic relations** describe the semantic properties of arguments
Summary
Summary

- **Theta roles** are bundles of thematic relations associated with a single argument position.
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- **Theta criterion** requires 1-1 relation between # of arguments and # of theta roles.
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- Adjuncts not part of the theta grid.
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- **Expletives** are NPs without theta roles.
Summary

- **Theta roles** are bundles of thematic relations associated with a single argument position.
- **Theta criterion** requires a 1-1 relation between the number of arguments and the number of theta roles.
- **Theta grid** is used for checking the theta criterion.
- Adjuncts are not part of the theta grid.
- **Expletives** are NPs without theta roles.
- **EPP** requires every sentence to have a subject.
Summary
Summary

Expletive insertion occurs to save the derivation.
Summary

- Expletive insertion occurs to save the derivation.
- There is ordering of operations.
  - Constraints filter out bad sentences.
  - Order: X-bar $\rightarrow$ Theta Criterion $\rightarrow$ Expl. Insertion $\rightarrow$ EPP & Binding conditions $\rightarrow$ Judgments.