More Semantics

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Review of Quantifier Meaning

No American smokes.
Review of Quantifier Meaning

No American smokes.

set of Americans  set of people who smoke
Review of Quantifier Meaning

No American smokes.

set of Americans  set of people who smoke

no: the intersection of set #1 and set #2 is empty
Review of Quantifier Meaning

No American smokes.
Every Italian likes pasta.

no: the intersection of set #1 and set #2 is empty
Review of Quantifier Meaning

No American smokes.
Every Italian likes pasta.

no: the intersection of set #1 and set #2 is empty
every: set #1 is a subset of set #2
Review of Quantifier Meaning

No American smokes.
Every Italian likes pasta.
Many Alaskans ice-fish.

**no:** the intersection of set #1 and set #2 is empty
**every:** set #1 is a subset of set #2
Review of Quantifier Meaning

No American smokes.
Every Italian likes pasta.
Many Alaskans ice-fish.

no: the intersection of set #1 and set #2 is empty

every: set #1 is a subset of set #2

many: the intersection of set #1 and set #2 is "pretty large"
Downward Entailing Quantifiers

No American smokes.

No American smokes cigars.
Downward Entailing Quantifiers

No American smokes.

\[ \text{entails} \]

No American smokes cigars.
Downward Entailing Quantifiers

No American smokes. \( \downarrow \) entails \( \downarrow \) doesn't entail

No American smokes cigars.
Downward Entailing Quantifiers

Americans

Smokers
Downward Entailing Quantifiers

Americans  Smokers

No American smokes.
Downward Entailing Quantifiers

No American smokes.
Downward Entailing Quantifiers

No American smokes.
-->No American smokes cigars.
Downward Entailing Quantifiers

"No" is **downward entailing**:

if "No A are B" is true, and C is a subset of B, then "No A are C" is also true.
Downward Entailing Quantifiers

"No" is **downward entailing**:

If "No American smokes" is true, and **cigar smokers** are a subset of **smokers**, then "No American smokes cigars" is also true.
Downward Entailing Quantifiers

Is "every" downward entailing?
Downward Entailing Quantifiers

Is "every" downward entailing?

Every American smokes

Every American smokes cigars
Downward Entailing Quantifiers

Is "every" downward entailing?

Every American smokes  

doesn't entail  

Every American smokes cigars
Downward Entailing Quantifiers

Is "every" downward entail?

Every American smokes

\[ \downarrow \text{doesn't entail} \]

Every American smokes cigars

---> no.
Downward Entailing Quantifiers

No one lifted a finger to help.
No one contributed a red cent.
No one saw anything.
Downward Entailing Quantifiers

No one lifted a finger to help.
No one contributed a red cent.
No one saw anything.

*Everyone lifted a finger to help.
*Everyone contributed a red cent.
*Everyone saw anything.
Downward Entailing Quantifiers

No one lifted a finger to help.
No one contributed a red cent.
No one saw anything.

*Everyone lifted a finger to help.
*Everyone contributed a red cent.
*Everyone saw anything.

-->what's with these expressions?
<table>
<thead>
<tr>
<th>Quantifier</th>
<th>Downward Entailing</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>√</td>
</tr>
<tr>
<td>every</td>
<td>x</td>
</tr>
<tr>
<td>few</td>
<td></td>
</tr>
<tr>
<td>a few</td>
<td></td>
</tr>
<tr>
<td>most</td>
<td></td>
</tr>
<tr>
<td>more than ten</td>
<td></td>
</tr>
<tr>
<td>less than ten</td>
<td></td>
</tr>
</tbody>
</table>
# Downward Entailing Quantifiers

<table>
<thead>
<tr>
<th></th>
<th>downward entailing?</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>√</td>
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<tr>
<td>every</td>
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<tr>
<td>more than ten</td>
<td>x</td>
</tr>
<tr>
<td>less than ten</td>
<td>√</td>
</tr>
</tbody>
</table>
**Downward Entailing Quantifiers**

**downward entailing?**

<table>
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<th>Downward Entailing</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>✓</td>
</tr>
<tr>
<td><em>every student</em> did anything...</td>
<td>x</td>
</tr>
<tr>
<td>every</td>
<td>x</td>
</tr>
<tr>
<td><em>every student</em> did anything...</td>
<td>✓</td>
</tr>
<tr>
<td>few</td>
<td>✓</td>
</tr>
<tr>
<td>a few</td>
<td>x</td>
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<td>more than ten</td>
<td>x</td>
</tr>
<tr>
<td>less than ten</td>
<td>✓</td>
</tr>
</tbody>
</table>
Downward Entailing Quantifiers

downward entailing?

no \(\checkmark\) no student did anything...

every \(\times\) *every student did anything...

glass \(\checkmark\) few students did anything...

a few \(\times\) *a few students did anything...

most \(\times\) *most students did anything...

more than ten \(\times\) *more than ten students did anything

less than ten \(\checkmark\) less than ten students did anything...
Downward Entailing Quantifiers

No one lifted a finger to help.
No one contributed a red cent.
No one saw anything.

*Everyone lifted a finger to help.
*Everyone contributed a red cent.
*Everyone saw anything.

-->these expressions must be in a downward entailing context.
Downward Entailing Quantifiers

John didn't lift a finger to help.
John didn't contribute a red cent.
John didn't see anything.

*John lifted a finger to help.
*John contributed a red cent.
*John saw anything.

-->what's licensing these expressions here?
Downward Entailing Quantifiers

John doesn't smoke.

John doesn't smoke cigars.
Downward Entailing Quantifiers

John doesn't smoke.

\[\text{entails}\]

John doesn't smoke cigars.
Downward Entailing Quantifiers

John doesn't smoke. \[\downarrow\text{entails}\] John doesn't smoke cigars.

\[\rightarrow\text{not creates a downward entailing context.}\]
Downward Entailing Quantifiers

Expressions like *lift a finger, a red cent*, and *anything* are **Negative Polarity Items** (NPIs)

--> need to be in a downward entailing context.
Quantifiers and Ellipsis

VP-ellipsis:

John bought a book, and Mary did ___ too.
Quantifiers and Ellipsis

VP-ellipsis:

John bought a book, and Mary did ___ too.

"buy a book"
Quantifiers and Ellipsis

identity condition on VP-ellipsis:

John bought a book, and Mary did ___ too.

"buy a book"

*"sell an okapi"
Quantifiers and Ellipsis

VP-ellipsis:

John bought a book, and Mary did ___ too.

"buy a book"

John dislikes his father, and Bill does ___ too.
Quantifiers and Ellipsis

VP-ellipsis:

John bought a book, and Mary did ___ too.
"buy a book"

John dislikes his father, and Bill does ___ too.
"dislike his (J or B's) father"
Quantifiers and Ellipsis

Antecedent Contained Deletion (ACD)

John visited every city [that Mary did __]
Quantifiers and Ellipsis
Antecedent Contained Deletion (ACD)
John visited every city [that Mary did ___]
Quantifiers and Ellipsis

IP

NP  I'

John  I  VP

-ed

V'

V  NP

visit

every city that Mary did __
Quantifiers and Ellipsis

IP

NP  I'

John  I
-ed

VP

V'

V  NP

visit  every city that Mary did  __
Quantifiers and Ellipsis

IP

NP I'

John I-ed

VP

V' V NP

visit every city that Mary did [visit every city that Mary did ___]
Quantifiers and Ellipsis

IP
  NP I'
    △
    John I -ed VP
      V' V NP
         visit

every city that Mary did [visit every city that Mary did __]
Quantifiers and Ellipsis

This Way Lies Madness!

John -ed

VP

V

visit

every city that Mary did [visit every city that Mary did __]
Quantifiers and Ellipsis

IP

NP I'

John I VP

-aged

V' V NP

visit every city that Mary did __
Quantifiers and Ellipsis

Quantifier Raising

every city that Mary did __
Quantifiers and Ellipsis

every city that Mary

did __

IP

NP

every city

NP

NP

I'

I

-ed

VP

V'

V

visit
Quantifiers and Ellipsis

IP

NP  NP  I'

every city  John  I-ed

did __

V'
V
visit
Quantifiers and Ellipsis

This Way Lies Sanity!

did [visit]

every city

that Mary

John

-I

-ed

VP

V'

V

visit
Quantifiers and Ellipsis

John refused to visit every city Mary visited.
Quantifiers and Ellipsis

John refused to visit every city Mary visited.

> John said, "I won't visit every city Mary visited"

> John said, "I won't visit Paris, London, or Tuscaloosa" (and those are the cities Mary visited)
Quantifiers and Ellipsis

John refused to visit every city Mary visited.

> John said, "I won't visit every city Mary visited"

> John said, "I won't visit Paris, London, or Tuscaloosa"
  (and those are the cities Mary visited)
John refused to visit every city Mary visited.

> John said, "I won't visit every city Mary visited"

> John said, "I won't visit Paris, London, or Tuscaloosa"
   (and those are the cities Mary visited)
Quantifiers and Ellipsis

John refused to visit every city Mary did ___.

Quantifiers and Ellipsis

John refused to visit every city Mary did ___.

"visited"

"refused to visit"
Quantifiers and Ellipsis

John refused to visit every city Mary did ___.

2 ambiguities:
  • "visit" vs. "refuse to visit"
Quantifiers and Ellipsis

John refused to visit every city Mary did ___.

2 ambiguities:
- "visit" vs. "refuse to visit"
- John's refusal mentions "every city", or not.
Quantifiers and Ellipsis

John refused to visit every city Mary did ___.

2 ambiguities:
• "visit" vs. "refuse to visit"
• John's refusal mentions "every city", or not.

in principle, 4 readings:
• John said, "I refuse to visit Paris, Rome, or Tuscaloosa"
  (and Mary had visited these cities)
• John said, "I refuse to visit Paris, Rome, or Tuscaloosa"
  (and Mary had refused to visit these cities)
Quantifiers and Ellipsis

John refused to visit every city Mary did ___.

2 ambiguities:
- "visit" vs. "refuse to visit"
- John's refusal mentions "every city", or not.

in principle, 4 readings:
- John said, "I refuse to visit Paris, Rome, or Tuscaloosa" (and Mary had visited these cities)
- John said, "I refuse to visit Paris, Rome, or Tuscaloosa" (and Mary had refused to visit these cities)
- John said, "I refuse to visit every city Mary visits"
- John said, "I refuse to visit every city Mary refuses to visit"
Quantifiers and Ellipsis

John refused to visit every city Mary did ___.

2 ambiguities:
- "visit" vs. "refuse to visit"
- John's refusal mentions "every city", or not.

in fact, only 3 readings:
- John said, "I refuse to visit Paris, Rome, or Tuscaloosa"
  (and Mary had visited these cities)
- John said, "I refuse to visit Paris, Rome, or Tuscaloosa"
  (and Mary had refused to visit these cities)
- John said, "I refuse to visit every city Mary visits"
- John said, "I refuse to visit every city Mary refuses to visit"
But why? To be continued....