Tutorial “Quantification and binding" and "Intensionality”

Session 7

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Our agenda today

- **Q&A**
- **Assignment 3 Quantification**

Any questions?

Assignment 3 Quantification

Exercise 1 Consider the inferences of (1) in detail. What should the lexical entry for **both** be like? Compute the truth-conditions of (1) with an appropriate LF using the entry. (Hint: think of **DIST**).

(1) **The students both cried.**

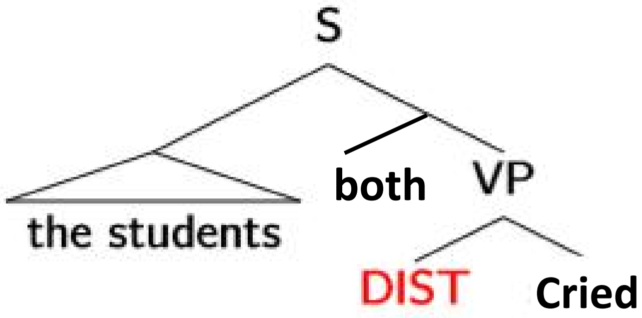
What inferences does (1) have?

Exercice 1

- (1a) There are more than one students.
- (1b) More than one students cried.
- (1c) There are two students. [[both]]=?
- (2c) There are two students who cried.

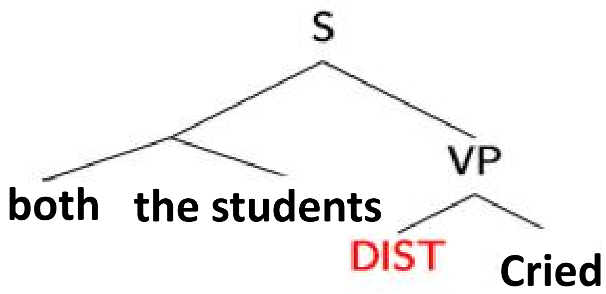
Possible LFs

(1\`) The students both cried.



$$
\begin{aligned}
\llbracket \text{VP} \rrbracket^w &= \llbracket \text{DIST} \rrbracket^w (\llbracket \text{cried} \rrbracket^w) \\
&= [\lambda f \in D_{\langle e,t \rangle} \, . \, [\lambda X \in D_e : X \text{ is a plurality} \, . \, \forall x[x \preceq X \rightarrow f(x) = 1]]] \\
&\quad ([\lambda y \in D_e \, . \, y \text{ cried in } w]) \\
&= \lambda X \in D_e : X \text{ is a plurality} \, . \, \forall x[x \preceq X \rightarrow x \text{ cried in } w]
\end{aligned}
$$

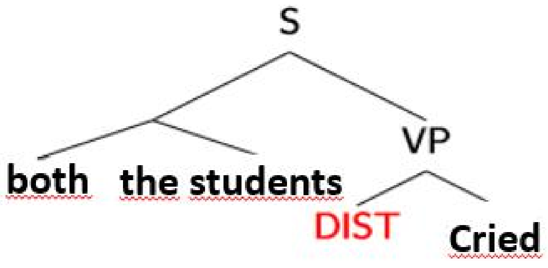
(1\`\`) Both the students cried.



$$
\begin{aligned}
&\llbracket \text{the students} \rrbracket^w \\
&= \llbracket \text{the} \rrbracket^w (\llbracket \text{pl} \rrbracket^w (\llbracket \text{student} \rrbracket^w)) \\
&= \llbracket \text{the} \rrbracket^w ([\lambda X \in D_e \, . \, X \text{ is a plurality} \wedge \forall x[x \preceq X \rightarrow x \text{ is a student in } w]]) \\
&= \iota X[X \text{ is a plurality} \wedge \forall x[x \preceq X \rightarrow x \text{ is a student in } w] \wedge \\
&\quad \forall Y[Y \text{ is a plurality} \wedge \forall y[y \preceq Y \rightarrow y \text{ is a student in } w] \rightarrow Y \preceq X]] \\
&= \text{the maximal plurality } X \text{ such that for all } x \preceq X, x \text{ is a student in } w \\
&\quad \text{defined only if there is such a maximal plurality}
\end{aligned}
$$

Add the information of `both`, but where?

(1``)

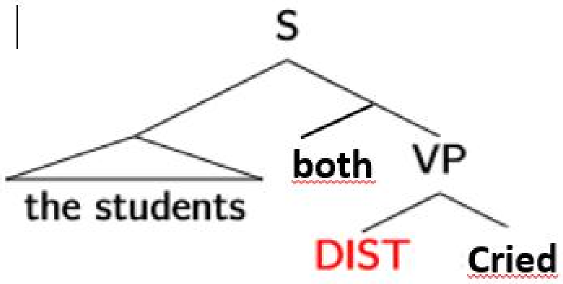


Under the LF in (1``), [[both]] denotes a function which takes the maximal plurality $X \in D_e$ (e.g. the one denoted by [[the students]]) and returns a $X`\in D_e$, i.e. a modified version of *X* with extra **definedness conditions** that *X* contains exactly two individuals.

$$
\begin{aligned}
&[\![\text{the students}]\!]^w \\
&= [\![\text{the}]\!]^w([\![\text{pl}]\!]^w([\![\text{student}]\!]^w)) \\
&= [\![\text{the}]\!]^w([\lambda X \in D_e\ .\ X \text{ is a plurality} \wedge \forall x[x \preceq X \rightarrow x \text{ is a student in } w]]) \\
&= \iota X[X \text{ is a plurality} \wedge \forall x[x \preceq X \rightarrow x \text{ is a student in } w] \wedge \\
&\quad \forall Y[Y \text{ is a plurality} \wedge \forall y[y \preceq Y \rightarrow y \text{ is a student in } w] \rightarrow Y \preceq X]] \\
&= \text{the maximal plurality } X \text{ such that for all } x \preceq X,\ x \text{ is a student in } w \\
&\quad \text{defined only if there is such a maximal plurality}
\end{aligned}
$$

Add the information of `both`, but where?

(1`)



Under the LF in (1`), [[both]] denotes a function which takes a f $\in D_{<e,t>}$ denoted by [[VP]] and returns a f` $\in D_{<e,t>}$, i.e. f incorporating extra information that there are exactly two individuals such that f(x)=1.

$$\begin{aligned}[\![\text{VP}]\!]^w &= [\![\text{DIST}]\!]^w([\![\text{cried}]\!]^w)\\ &= [\lambda f \in D_{\langle e,t\rangle} \,.\, [\lambda X \in D_e : X \text{ is a plurality} \,.\, \forall x[x \preceq X \rightarrow f(x) = 1]]]\\ &\quad ([\lambda y \in D_e \,.\, y \text{ cried in } w])\\ &= \lambda X \in D_e : X \text{ is a plurality} \,.\, \forall x[x \preceq X \rightarrow x \text{ cried in } w]\end{aligned}$$

Two options for f`

- <e + both, t>: $\lambda X \in D_e$: X is a plurality which contains exactly two individuals . $\forall x[x \preceq X \rightarrow x$ smiled in w]
- <e, t + both >: $\lambda X \in D_e$: X is a plurality. $\forall x[x \preceq X \rightarrow x$ smiled in w] = 2

What does (1) presuppose?

(1) The students both cried.

Presupposition test with Negation:

- The students both didn‘t cry (None of the two students cried).
- The students didn‘t both cry (It`s not the case that both of the two students cried).

Presupposition: <u>There is a maximal student plurality which is a plurality that contains exactly two individuals.</u>

This means, as for the two options for f`, we should take the option that modifies the definedness conditions of X.

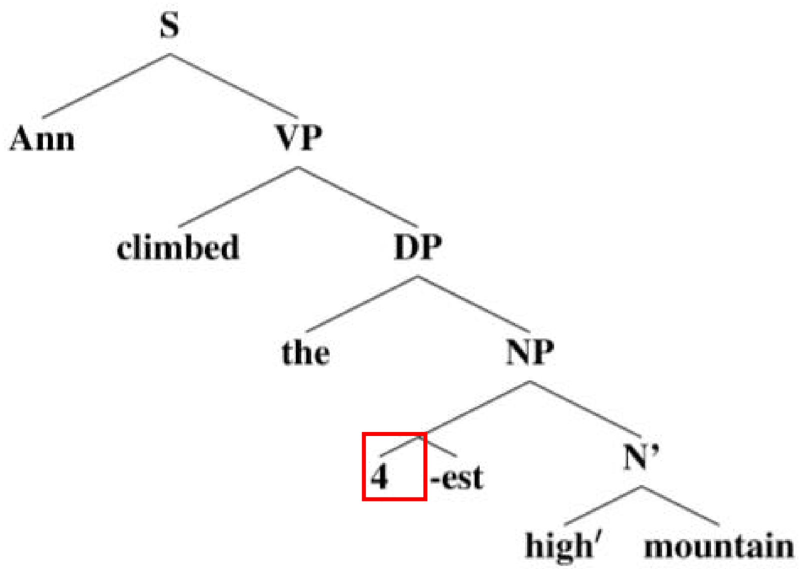
- **<e + both, t>: $\lambda X \in D_e$: X is a plurality which contains exactly two individuals . $\forall x[x \preceq X \rightarrow x$ smiled in w]**
- ~~<e, t + both >: $\lambda X \in D_e$: X is a plurality. $\forall x[x \preceq X \rightarrow x$ smiled in w] = 2~~

Exercice 2

Exercise 2 Compute the truth-conditions of (2a) under the LF in (3a). What must $g(\mathbf{4})$ be like so that these truth-conditions can yield both the absolute and the comparative reading?

(2) a. **Ann climbed the highest mountain.**
b. 'Ann climbed the Mount Everest.' (absolute)
c. 'Ann climbed a higher mountain than anyone else in her family.' (comparative)

(3) a.



b. $[\![\textbf{high}]\!]^w = \lambda d \in D_d \, . \, [\lambda x \in D_e \, . \, x \text{ is } d\text{-high in } w]$

Type shifting operation of [[high]]

The gradable adjective [[high]] must shift its denotation when occuring as a modifier.

$$[\![\textbf{high}]\!]^w = \lambda d \in D_d\ .\ [\lambda x \in D_e\ .\ x \text{ is } d\text{-high in } w]$$

In [**high** NP] $[\![\textbf{high}]\!]^w \Rightarrow$

$$[\![\textbf{high}']\!]^w = \lambda f \in D_{\langle e,t\rangle}\ .\ [\lambda d \in D_d\ .\ [\lambda x \in D_e\ .\ f(x) = 1 \wedge x \text{ is } d\text{-high in } w]]$$

Context variable argument

-est comes with a silent context variable C. Its denotation must be a (characteristic function of a) set of individuals.

$$[\![\text{-est}]\!]^w = \lambda C \in D_{\langle e,t\rangle} \,.\, [\lambda f \in D_{\langle d,\langle e,t\rangle\rangle} \,.\, [\lambda x : x \in D_e \wedge x \in C \,.\, \exists d[f(d)(x) = 1 \wedge \forall y[y \neq x \wedge y \in C \rightarrow f(d)(y) = 0]]]]$$

This set of individuals is made salient by the context.

(5) Ann is the tallest (comparing to other girls in her class).

Absolute vs. comparative reading

(2) a. Ann climbed the highest mountain.

b. 'Ann climbed the Mount Everest.' (absolute)

c. 'Ann climbed a higher mountain than anyone else in her family.' (comparative)

The ambiguity boils down to different choices for g(4).

If g(4) is the set of mountains on earth S1, we get the absolute reading.

If g(4) is a set of particularly salient mountains climbed by the individuals in Ann`s family S2, we get the comparative reading.

For (2) to yield both readings, S1 ≡ S2, i.e. S1 is equivalent to S2. This means, the individuals in Ann`s family have climbed all the mountains on earth.

Thanks and see you next week!