Quantifiers in NatLg

1. Quantificational Noun Phrases (QuNPs).

■ Some NPs do not denote objects of type e (= a particular individual or "entity"). The ones in (2a-b) don't. If the ones in (3) did, we would not expect the ambiguities in (5).

(1) Type e:
  a. Proper names: **Paul**, **Mathias, Tegucigalpa, Kosovo**.
  b. Definite descriptions: **the person next to me, my older sister** (="the older sister of mine").

(2) Not type e:
  a. $[\![$**No man**$]\!]^w$ = ???
  b. $[\![$**Only Susan**$]\!]^w \neq$ Susan, since $[\![(2c)]\!] \neq [\![(2d)]\!]$.
  c. **Only Susan came.**
  c. **Susan came**.

(3) Type e?:
  a. $[\![$**Every woman**$]\!]^w$ =? $[\![$**the women**$]\!]^w$ = the group or plural individual of all women.
  b. $[\![$**Exactly three women**$]\!]^w$ =? A particular group of women that includes exactly three women (e.g., the group formed by Stephanie, Emily and Sue).
  c. $[\![$**More than three women**$]\!]^w$ =? A particular group of women that includes more than three women (e.g., the group formed by Sue, Jana, Eva and Kate).

(4) a. Stephanie, Emily and Sue saw Erwin and Matts.
  b. Stephanie, Emily and Sue are such that they saw Erwin and Matts.
  a. Erwin and Matts are such that Stephanie, Emily and Sue saw them.

(5) a. Exactly three women saw every man.
  b. Exactly three women are such that they saw every man.
  c. Every man is such that exactly three women saw him.

■ Those problematic NPs do not denote sets of individuals either.

QUESTION: To see this, tentatively consider the denotations in (6). What semantic rule would we need to combine the NPsu **everything** with the VP **disappeared** in (7)? Spell out the rule in (8). What would this rule predict for (9)?

(6) a. $[\![$**everything**$]\!]^w$ = {x: x ∈ U in w}
  b. $[\![$**nothing**$]\!]^w$ = ∅

(7) Everything disappeared.

(8) S ^{w} =

r u

QuNP VP

(9) Nothing disappeared.

■ The solution: quantifiers like **every** and **no** denote relations between sets of individuals. Notation: X and Y are variables over sets of individuals, i.e., $X \subseteq U$ and $Y \subseteq U$.

(10) S

e i

QuNP VP

e i ¦

Every **city** **smells**

No

(11) ⟦**Every**⟧^{w} = $\{ \langle X,Y \rangle : X \subseteq Y \}$

(12) ⟦**No**⟧^{w} = $\{ \langle X,Y \rangle : X \cap Y = \varnothing \}$

QUESTION: Spell out the meaning of **everything** and **nothing** based on (11)-(12). Define the semantic rules in (15) and (16) to run the semantic computation of (17) and (10).

(13) ⟦**Everything**⟧^{w} =

(14) ⟦**Nothing**⟧^{w} =

(15) S ^{w} =

r u

QuNP VP

(16) QuNP ^{w} =

r u

Qu N’

(17) IP

e i

DP VP

¦ ¦

Everything **smells**

Nothing

■ RELATIONAL THEORY OF QUANTIFIERS: quantifiers denote relations between sets.

(18)

QUANTIFIERS	VENN'S DIAGRAMS	AS RELATIONS B/W SETS For any $A\subseteq U$ and and $B\subseteq U$:
Every A (**is**) B		$<A,B> \in R_{every}$ iff $A\subseteq B$
No A (**is**) B		$<A,B> \in R_{no}$ iff $A\cap B=\varnothing$
Some A (**is**) B		$<A,B> \in R_{some}$ iff $A\cap B\neq\varnothing$
Exactly two A (are) B		$<A,B> \in R_{exactly2}$ iff
At least four A (are) B		
A third of A (are) B		
Most A (are) B		
All but two A (are) B		