H&K Chapter 6

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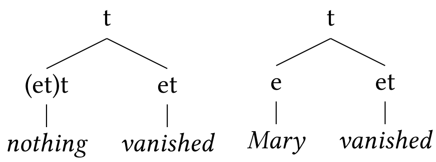
1 Quantifiers vs. Proper Names



- *nothing* $\rightsquigarrow \lambda P_{et}.\neg\exists x_e.P(x)$
- *Ann* $\rightsquigarrow$ $\textsc{Ann}_e$ ($/\textsc{a}_e$)
- *vanish* $\rightsquigarrow$ $\textsc{vanish}_{et}$

a. Quantifiers aren't of type e

- Not all quantifiers are upward monotonic ($P \wedge Q \rightarrow P$)
  - John came yesterday morning. $\Rightarrow$ John came yesterday.
  - $P(x_e) \wedge Q_{(}x_e) \rightarrow P(x_e)$
  - No letter came yesterday morning. $\not\Rightarrow$ No letter came yesterday.
  - $\neg\exists x_e.P(x) \wedge Q(x) \not\rightarrow \neg\exists x_e.P(x)$
  - Entailment from a more specific predication (subset) to a more general predication (superset) is not necessarily given under quantification.
  - Quantifiers like 'at most one' and 'no' are *downward entailing*.
- Not all quantifiers obey the law of contradiction ($\neg P \wedge \neg P$)
  - Mt. Rainier is on this side of the border and Mt. Rainier is on the other side of the border. $\Leftrightarrow \perp$
  - $P(x_e) \wedge Q(x_e) \leftrightarrow \perp$, where $P^{\rightsquigarrow} \cap Q^{\rightsquigarrow} = \varnothing$
  - Some mountains are on this side of the border and some mountains are on the other side of the border.
  - $\exists x_e.P(x) \wedge Q(x) \not\leftrightarrow \perp$, even if $P^{\rightsquigarrow} \cap Q^{\rightsquigarrow} = \varnothing$
- Not all quantifiers obey the law of the excluded middle ($P \vee \neg P$)
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- Scope ambiguities

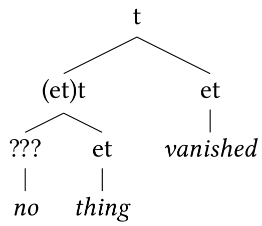
b. Quantifiers aren't of type et

- Should also be upward entailing
- Contradiction, Excluded middle + superset entailment should still hold

2 Semantics of quantifiers

a. Compositional semantics

- Consider an expanded, compositional version of the tree from before.



- *no*, *every*, and *some* need to have type $(et)(et)t$.
- *every* $\rightsquigarrow \lambda P_{et}\ \lambda Q_{et}\ \forall x_e\ P(x) \rightarrow Q(x)$
- *some* $\rightsquigarrow \lambda P_{et}\ \lambda Q_{et}\ \exists x_e\ P(x) \wedge Q(x)$
- *no* $\rightsquigarrow \lambda P_{et}\ \lambda Q_{et}\ \neg\exists x_e\ P(x) \wedge Q(x)$

b. Relations between sets

3 Presuppositional behaviour of quantifiers