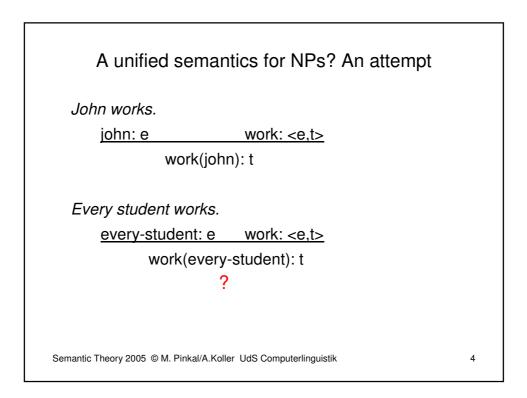
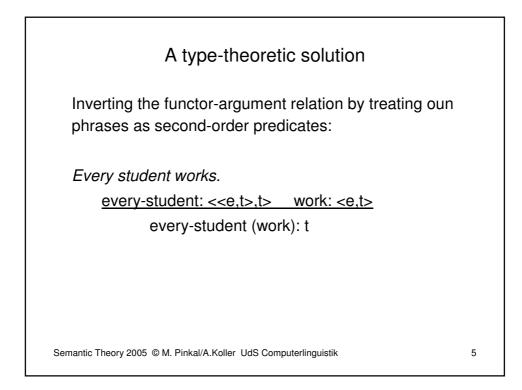


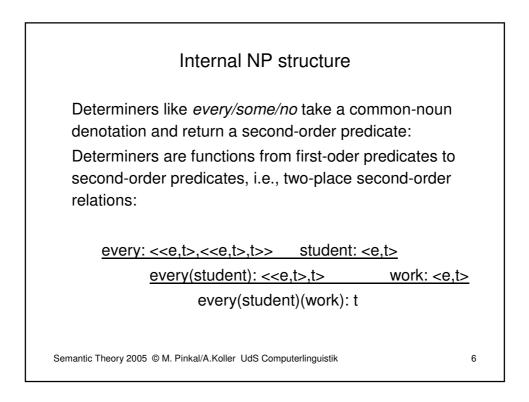
## Noun phrases and FOL representations

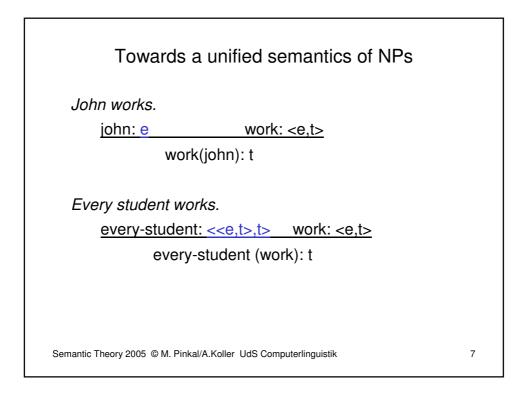
John works.	work(john)
Somebody works	∃x (work(x))
Every student works	$\forall x (student(x) \rightarrow work(x))$
No student works	$\neg \exists x (student(x) \land work(x))$
John and Mary work	<i>work(john)</i> ^ work(mary)

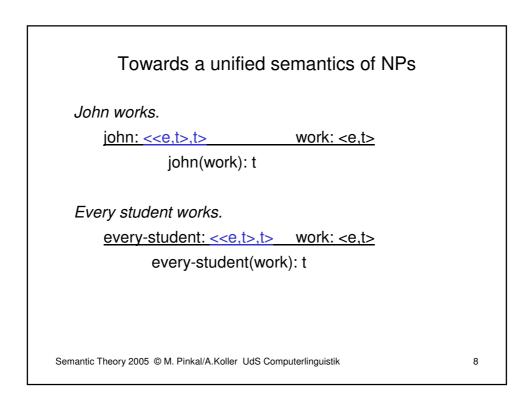
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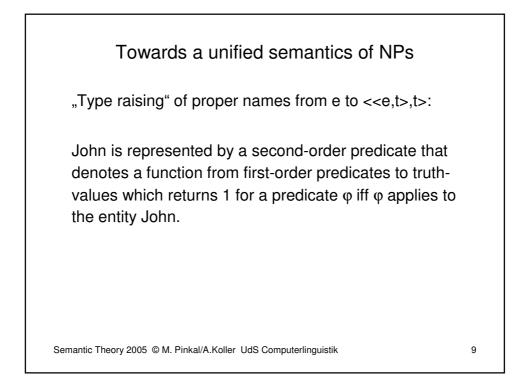


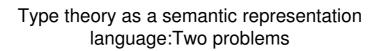












• Problem 1:

If we express quantification via second-order relations without quantifiers: How do we do inference?

• Problem 2:

Even (basic) type theory has problems with coverage

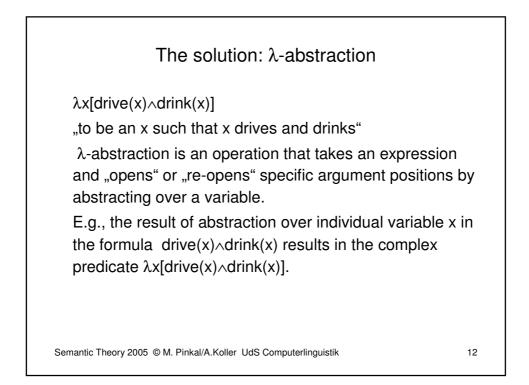
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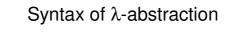
## Another coverage problem *Swimming is healthy* <u>swimming: <e,t> healthy <<e,t>,t></u> healthy(swimming): t *Not smoking is healthy*

John drives and drinks Some people drive and drink

Driving and drinking is dangerous

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If  $\alpha \in WE_{\tau}$ ,  $\nu \in Var_{\sigma}$ , then  $\lambda \nu \alpha \in WE_{<\sigma, \tau>}$ .

Note: The scope of the  $\lambda$ -operator is the smallest WE to its right. Wider scope must be indicated by brackets.

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