

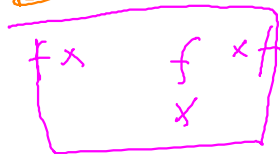
# Directionality

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COGS 543: Computational Semantics  
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# Fragment

$S \rightarrow NP VP$



John, NP :  $J'$

$sleeps = NP \rightarrow S : \lambda x. sleeps' x \mid sleeps'$

John sleeps.



$S : sleeps' J'$

↓  
model-theoretic  
interpretation

$\overleftarrow{NP} \rightarrow S \times NP$   
\* Sleeps John.

$sleeps = \overleftarrow{NP} \rightarrow S$

John := NP : j'

Mary := NP : m'

sleeps :=  $\overleftarrow{NP} \rightarrow S$  :  $\lambda x. \text{sleeps}'x$

loves :=  $\overleftarrow{NP} \rightarrow (\overleftarrow{NP} \rightarrow S)$  :  $\lambda x \lambda y. \text{loves}'xy$

sleeps.

loves Mary.

$\overleftarrow{NP} \rightarrow S$

$\Rightarrow$

loves

$\overrightarrow{NP} \rightarrow (\overleftarrow{NP} \rightarrow S)$

John      loves      Mary  
NP       $\overleftarrow{NP} \rightarrow (\overleftarrow{NP} \rightarrow S)$       NP  
j'      ( $\lambda x \lambda y. \text{loves}'xy$ )      m'

$\overleftarrow{NP} \rightarrow S$

( $\lambda y. \text{loves}'m'yj'$ ) j'

S : loves'm'j'

~~loves'j'm'~~



$\text{sleeps} := \overset{\leftarrow}{NP} \rightarrow S \equiv \underline{S \setminus NP}$

$\nearrow$  slash  $\rightarrow$  backward  
 $\rightarrow$  forward

$\underline{\text{loves}} := \underline{\overset{\rightarrow}{NP}} \rightarrow (\underline{\overset{\leftarrow}{NP} \rightarrow S}) \equiv \underline{(S \setminus NP) / NP}$

$(S \setminus NP)$

$\nearrow$

John	loves	Mary
<del>NP</del>	<del>(S \ NP) / NP</del>	<del>NP</del>
<del>S \ NP</del>		
S		