

# ***On the Issue of Contraposition of Defeasible Rules***

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# *Rule based versus Assumption based*

→  $p \Rightarrow q$

*(Pollock, Prakken&Sartor,  
DeLP, ASPIC, ...)*

→  $p \supset q$

*(Besnard&Hunter, BDKT, ...)*

# *Contraposition and Counter Examples*

*“Men usually do not have beards”*

$\text{man} \Rightarrow \neg \text{beard}$

Does it then follow that:

$\text{beard} \Rightarrow \neg \text{man}$

*“If someone has a beard,  
then it's usually not a man.”*

# Contraposition and Counter Examples

*contraposition:*

*man  $\Rightarrow$   $\neg$ beard*

*$\neg/\neg$  beard  $\Rightarrow$   $\neg$ man*

*left conjunction:*

*mary(sue)  $\Rightarrow$  happy,*

*mary(ann)  $\Rightarrow$  happy*

*$\neg/\neg$  mary(sue) & mary(ann)  $\Rightarrow$  happy*

*transitivity:*

*student  $\Rightarrow$  adult,*

*adult  $\Rightarrow$  employed*

*$\neg/\neg$  student  $\Rightarrow$  employed*

# *Contraposition or not*

- ⇒ If we allow counter examples against contraposition, then we should also allow counter examples against more established principles of defeasible reasoning
- ⇒ Perhaps we should allow contraposition as a *defeasible* principle
- ⇒ In many “counter examples” against contraposition, the antecedent is a *negative* factor for the consequent:
  - man  $\Rightarrow \neg$ beard
  - human  $\Rightarrow \neg$ diabetics
  - lottery\_ticket  $\Rightarrow \neg$ winning

# *Epistemical vs. Constitutive reasoning*

TMA, TMA  $\Rightarrow$  A, A  $\Rightarrow$  CD, LIS, LIS  $\Rightarrow$   $\neg$ CD

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S, S  $\Rightarrow$  M, M  $\Rightarrow$  R, P, P  $\Rightarrow$   $\neg$ R

# *Epistemical vs. Constitutive reasoning*

“word to world” (Searle)

TMA,  $TMA \Rightarrow A$ ,  $A \Rightarrow CD$ , LIS,  $LIS \Rightarrow \neg CD$

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S,  $S \Rightarrow M$ ,  $M \Rightarrow R$ , P,  $P \Rightarrow \neg R$

“world to word” (Searle)

# *Epistemical vs. Constitutive reasoning*

Epistemical (Hage)

TMA, TMA  $\Rightarrow$  A, A  $\Rightarrow$  CD, LIS, LIS  $\Rightarrow$   $\neg$ CD

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S, S  $\Rightarrow$  M, M  $\Rightarrow$  R, P, P  $\Rightarrow$   $\neg$ R

constitutive (Hage)



# *Constitutive Reasoning and Contraposition*

move, move  $\Rightarrow$  people, people  $\Rightarrow$   $O(\neg\text{shoot})$   
order, order  $\Rightarrow$   $O(\text{shoot})$

# *Constitutive Reasoning and Contraposition*

snore, snore  $\Rightarrow$  misbeh, misbeh  $\Rightarrow$  P(remove)  
prof, prof  $\Rightarrow$   $\neg$ P(remove)

# Concluding Remarks

- ⇒ argument construction is *not* trivial
- ⇒ fundamental differences exist between epistemic and constitutive reasoning
- ⇒ research question:  
*which kind of argumentation formalisms are suitable for which domains?*