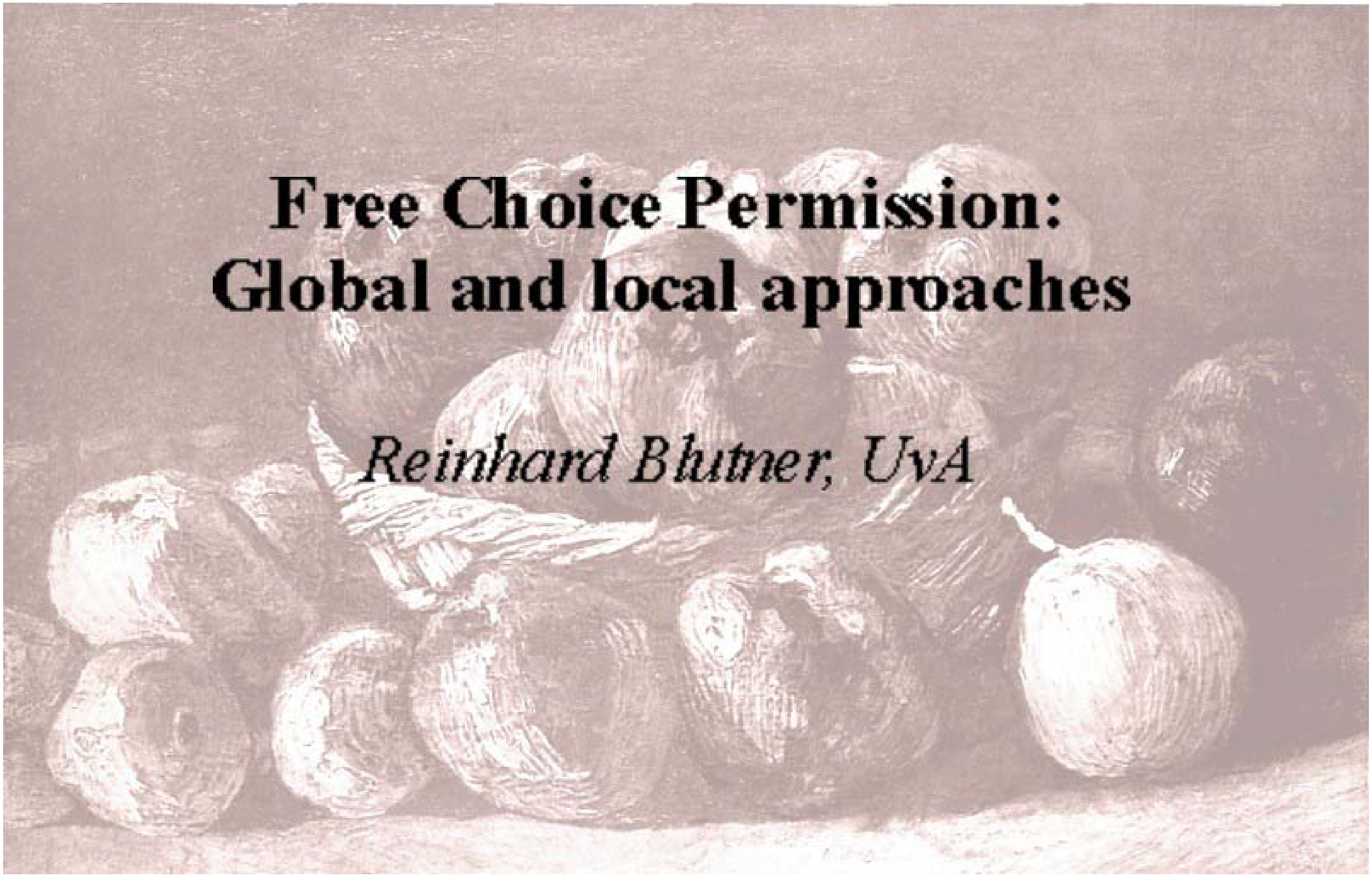
Berlin, May 16 / 2003



1 The challenge of free choice permission

- The basic puzzle
- epistemic variants
- wide disjunction
- FC permission and quantification
- Conjunctive permission

(1) a. You may take an apple or (take) a pear

b. You may take an apple and you may take a pear

However, the inference from (1a) to (1b) is not justified by any standard semantics for permission and disjunction (Åquist, Wright). And it is highly implausible to assume the inference as a general rule:

$$P\,(p \vee q) \rightarrow P\,p \wedge P\,q.$$

By substituting $p \wedge q$ for p and $p \wedge \neg q$ for q we get

$$P\,p \rightarrow P\,(p \wedge q)$$

as a general axiom, and this is an extremely implausible property.

(2) a. Paul might be in Berlin or in Dresden

b. Paul might be in Berlin and Paul might be in Dresden

Again, a general semantic principle on the interaction between epistemic modals and disjunction would appear disastrous.

The close relation between deontic and epistemic modalities should be reflected by a *common semantic core*.

Wide disjunction (Zimmermann)

(3) a. You may take an apple or you may take a pear
b. You may take an apple and you may take a pear

(4) a. Paul might be in Berlin or he might be in Dresden
b. Paul might be in Berlin and Paul might be in Dresden

The wide disjunctions in (3a) and (4a) may very well come with a choice effect producing the consequences given in (3b) and (4b). [The phenomenon of conjunctive OR]

Van Rooy (2000) argues that the standard analysis of DL cannot explain why numeral quantifiers under the scope of *may* get the ‘at most’ reading while in the scope of *must* they get the ‘at least’ reading:

(5) a. You may take three apples
    b. You must not take more than three apples

(6) a. You must take three apples
    b. You must not take less than three apples (… you may take more)

(7) Usually you may only take an apple. So, if you may take an apple or take a pear, you should bloody well be pleased.

- Obviously, the FC effect also appears in context like (7). According to Kamp, this is difficult to explain using an analysis in terms of conversational implicature.

(8) a. You may take an apple and a pear

b. You may take an apple.

- The interpretation of (8a) is, on normal readings, not weaker than the interpretation of (8b).
- (8a) does not mean: I only give you permission to take both. This is what many models predict: take either none or both (the *package deal* effect).
- Instead, it gives you permission (i) to take only a apple, (ii) to take only a pear, (iii) to take both, (iv) to take nothing (cf. Merin 1992).

2 Modelling free choice permission

- Syntactic approaches (rescoping)
- Semantic approaches
  - Zimmermann (2000); Geurts (2003):
    Non-classical disjunction
  - Asher & Morreau (2002); Aloni (2002):
    Non-classical interpretation of permission
- Pragmatic approaches
  - Van Rooy (2000): Context change theory with contraction
  - Kjell Johan Sæbø (2003, unpublished manuscript):
    Optimal interpretation formulated within bidirectional OT

Standard deontic logic

- Standard deontic logic has two operators, *O* and *P*, standing for *ought* or *obliged* and for *permission*.
- In model theory we make use of state descriptions *w* and permissibility sets $\wp(w)$.
- We define *O*(p) to be true in $<w, \wp>$ iff p is true in each world of $\wp(w)$.

  And *P*(p) is true in $<w, \wp>$ iff p is consistent with the set $\wp(w)$.
- In this way, a general relation between formulas *F* and models $m = <w, \wp>$ is defined: $m \models F$

Van Rooy's dynamic approach (simplified)

- Dynamic picture (Lewis, Kamp, Stalnaker, van Rooy):

  "Command and permission sentences are not primarily used to make true assertions about the world, but rather what the slave is obliged/permitted to do" (van Rooy, 2000).

- That is, command and permission sentences change the permissibility set $\Pi = \wp(w)$ in the given world w.

- *Simplified truth conditions:*

  $\Pi \models O(\mathrm{p})$ iff $w \models \mathrm{p}$ for all $w \in \Pi$

  $\Pi \models P(\mathrm{p})$ iff $w \models \mathrm{p}$ for some $w \in \Pi$

- *Context change potential*

  $\Pi\, [O(\mathrm{p})] = \Pi \cap \{ w : w \models \mathrm{p} \}$

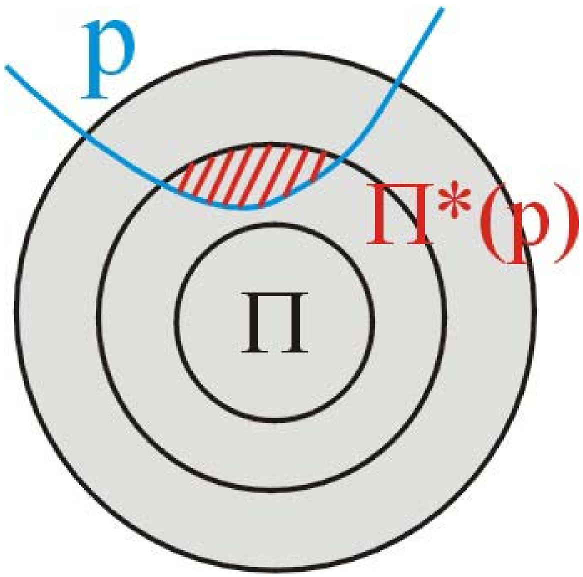
  Which one?

  $\Pi\, [P(\mathrm{p})] =$ a superset Π' of Π such that $\Pi' \cap \{ w : w \models \mathrm{p} \} \neq \emptyset$

- In order to solve this selection problem some ordering relation $\leq$ is assumed to structure the set of state description: $v \leq w$ means that v is less (or equally) reprehensible than w.

- Π is now assumed to be the set of least reprehensible worlds:
  $\Pi = \{w \in W\text{: for all } v \in W\text{: } v \geq w\}$ (set of ideal worlds)

- **Revision of Π by p**:
  $\Pi^*(\mathrm{p}) = \{w \in W\text{: } w \models \mathrm{p} \text{ \& for all } v \models \mathrm{p}\text{: } v \geq w\}$
  (the set of ideal p-worlds)



Definition 1

$\Pi\ [O(\mathrm{p})] = \Pi \cap \{\ w\text{: } w \models \mathrm{p}\}$

$\Pi\ [P(\mathrm{p})] = \Pi \cup \Pi^*\ (\mathrm{p})$

Comment: Via the Harper identity, this is contraction of Π by ¬p. In other words: By adding ideal p-worlds to Π we subtract the content of ¬p from Π. This makes the updated permissibility set consistent with p.

Example 1: (-A -B) ≤ {(A -B), (-A B)} ≤ (A B)

Π = {(-A -B)}

Π [*P*(A ∨ B)] = {(-A -B), (A -B), (-A B)}

Example 2: (-A -B) ≤ (A B) ≤ {(A -B), (-A B)}

Π = {(-A -B)}

Π [*P*(A ∨ B)] = {(-A -B), (A B)}

Kamp defined an inferential relation between performatively used permission sentences:

Definition 2

P p $|\approx_p$ P q iff for each appropriate initial ordering $\leq$ (with the set of ideal worlds Π): $\Pi[P \text{ p}][P \text{ q}] = \Pi[P \text{ p}]$.

$\Pi[P \text{ p}] \models P \text{ q}$

Observation: P (p $\vee$ q) $|\approx_p$ P p $\wedge$ P q

We have to assume that the "appropriate" initial orderings reflect a supposition of indifference between p and q, written p $\approx$ q (no difference in reprehensibility between p and q)! This excludes orderings like

(-A -B) $\leq$ (A -B) $\leq$ (-A B) $\leq$ (A B)

Basic puzzle	Yes (assuming $p \approx q$)
Wide disjunction	??
Numeral quantification	Yes
Implicating exclusive permission	No
Embedded permission	Yes
Conjunctive permission	NO (to explain it highly sophisticated stipulations are required)

3 Global and local theories of language

Local Theories

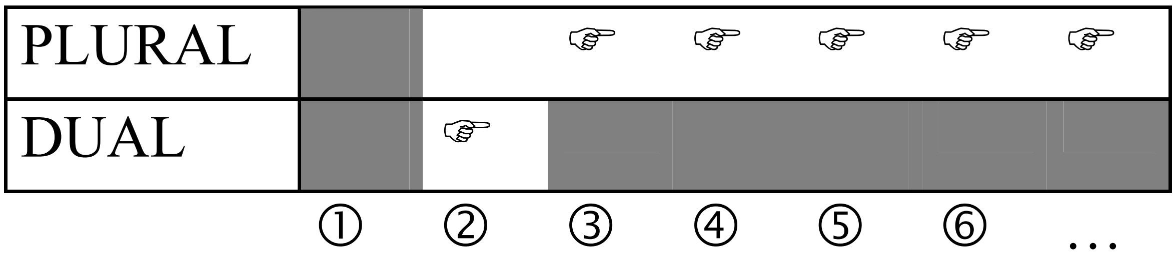
The (grammatical) status of a (linguistic) object LO is decided exclusively considering properties of LO, and the properties of other linguistic objects LO' are completely irrelevant for this decision.

***Examples**:* Generative Linguistics, Model Theoretic Semantics, Dynamic Semantics.

Global Theories (Competition-based)

There are different linguistic objects in competition. The winner of the competition suppresses the other competing candidates, ruling them out from the set of well-formed linguistic objects.

***Examples**:* Early Structuralism (Saussure), Field Theories, Prototype Theories, Optimality Theory, Connectionism.



The value of a German or Latin **plural** is not the value of a Sanskrit plural. But the meaning, if you like, is the same. In Sanskrit, there is the dual. Anyone who assigns the same value to the Sanskrit plural as to the Latin plural is mistaken because I cannot use the Sanskrit plural in all the cases where I use the Latin plural.

If you take on the other hand a simple lexical fact, any word such as, I suppose, **mouton** (French) may have the same meaning as **sheep** in English. However, it doesn't have the same value. For if you speak of the animal on the hoof and not on the table, you say sheep. It is the presence in the language of a second term (mutton) that limits the value attributable to sheep.

Notes taken by a student of Saussure's lectures [4 July 1911]

In OT semantics we look for optimal form model pairs. Assume a (well-founded) preference relation < between potential form model pairs (read < as *less costly* or *more harmonic*).

Definition 3

- A form – model pair $\langle F, m \rangle$ is called *hearer optimal* iff $m \models F$ and there is no m' such that $m' \models F$ and $\langle F, m' \rangle < \langle F, m \rangle$
- A form – model pair $\langle F, m \rangle$ is called *speaker optimal* iff $m \models F$ and there is no F' such that $m \models F'$ and $\langle F', m \rangle < \langle F, m \rangle$
- A form – model pair $\langle F, m \rangle$ is called *strongly optimal* iff it is both hearer and speaker optimal
- Other solution concepts …

Definition 2 (*strong and weak entailment*)

Let A and B be wffs.

(I) $A \models B$ (A strongly entails B) iff $m \models B$ for every model $m \models A$

(II) $A \mid\!\approx B$ (A weakly entails B) iff $m \models B$ for every model $m \models A$ such that $\langle A, m \rangle$ is hearer/speaker/strongly optimal.

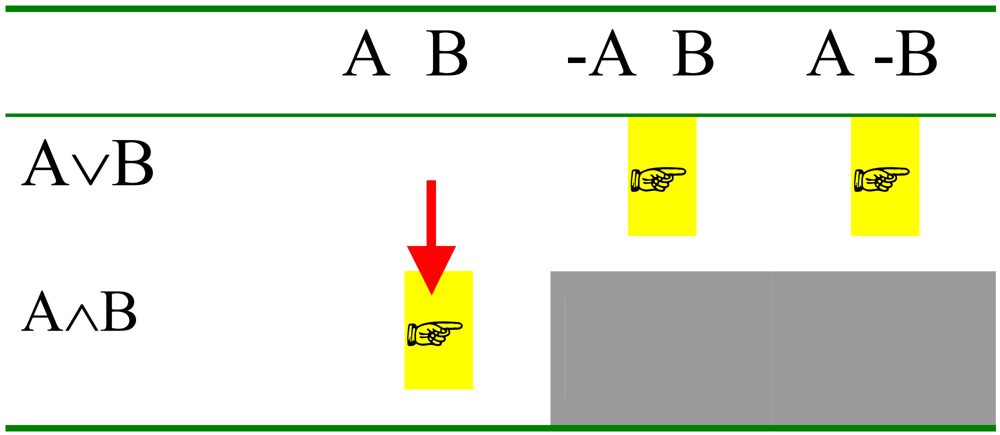
Examples

(i) $p \wedge q \models p$

(ii) $P(p \vee q) \models P p \vee P q$

(iii) $p \vee q \mid\!\approx \neg(p \wedge q)$ (exclusive OR; see below)

(iv) $P(p \vee q) \mid\!\approx P p \wedge P q$ (FC permission; see below)

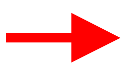


A form model pair ⟨*F*, *m*⟩ is evaluated by informativity or surprise:

The higher the surprise of selecting *m* given *F* the higher the cost.

$$\inf \langle F, m\rangle = -\log_2 \text{prob}(m/F)$$

e.g., $\inf\langle A \wedge B , A\ B\rangle = 0$, $\inf\langle A \vee B , A\ B\rangle = \log_2 3$, …

The arrow  marks pairs with different cost (tip = lower cost).

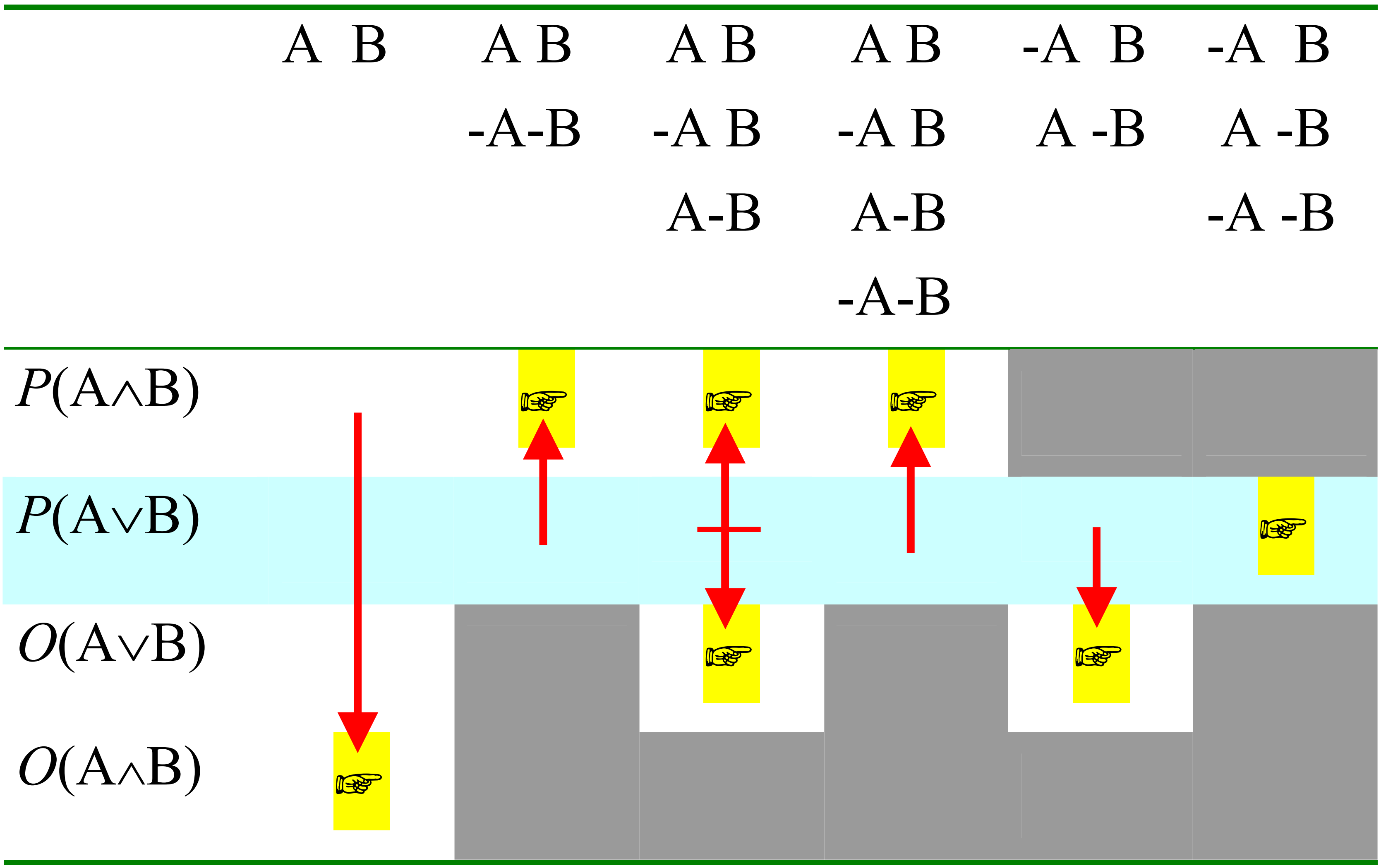
Sæbø’s approach to free choice permission

- Kjell Johan Sæbø (2003, unpublished manuscript) was the first who proposed an analysis of FC permission in terms of blocking (within the framework of bi-directional OT).

  “Indeed, on reasonable assumptions concerning relevance, the speaker's knowledge, and the semantics of permission, *You may take an apple or a pear* emerges as the optimal form for the content that you may take an apple and you may take a pear, and conversely, that you may take an apple and you may take a pear emerges as the optimal content for that form, in terms of the notion of conditional informativity.” [Sæbø 2003]

- The following treatment deviates a little from Sæbø’s – mainly in order to simplify the comparison with other frameworks.

A global approach to free choice permission



Generally assuming p ≈ q

Problem	Local approach (*van Rooy*)	Global approach (*Sæbø*)
Basic puzzle	Yes	Yes
Wide disjunction	??	Yes
Numeral quantification	Yes	Yes
Implicating exclusive permission	No	Yes
Embedded permission	Yes	No
Conjunctive permission	No	Yes

4 The advantage of local approaches

- Kamp's argument against conversational implicature – see the earlier example (7) repeated here..

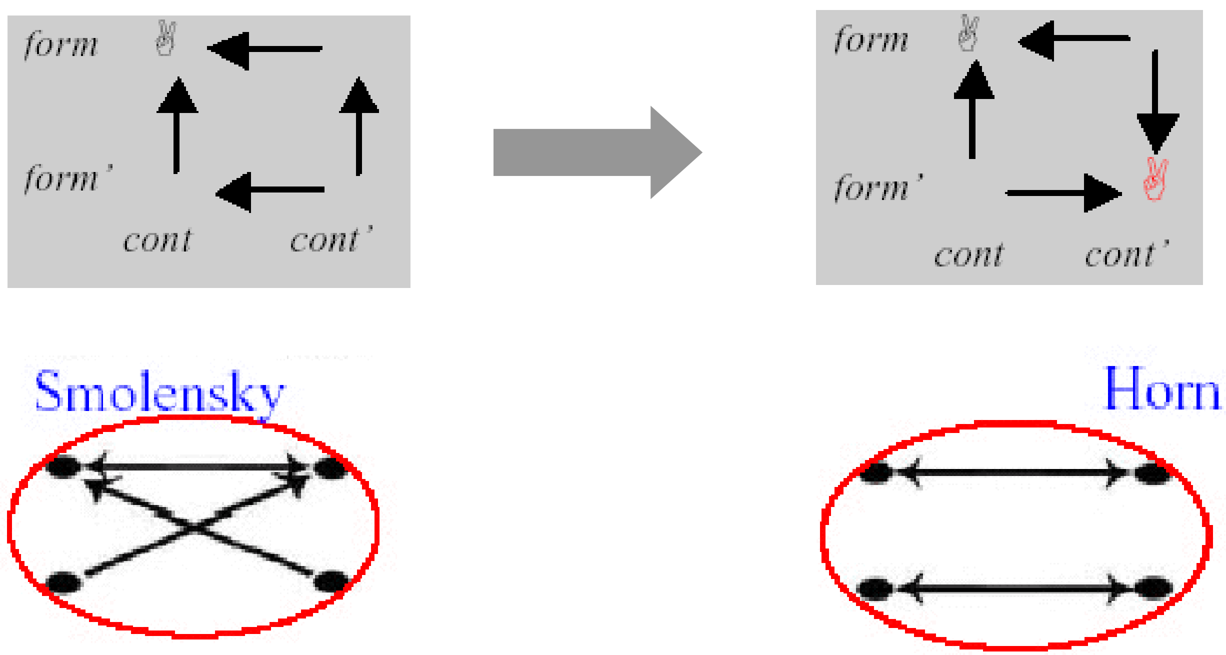
  (7) Usually you may only take an apple. So, if you may take an apple or take a pear, you should bloody well be pleased.

  The existence of the FC effect in this example is difficult to understand in terms of a global approach.

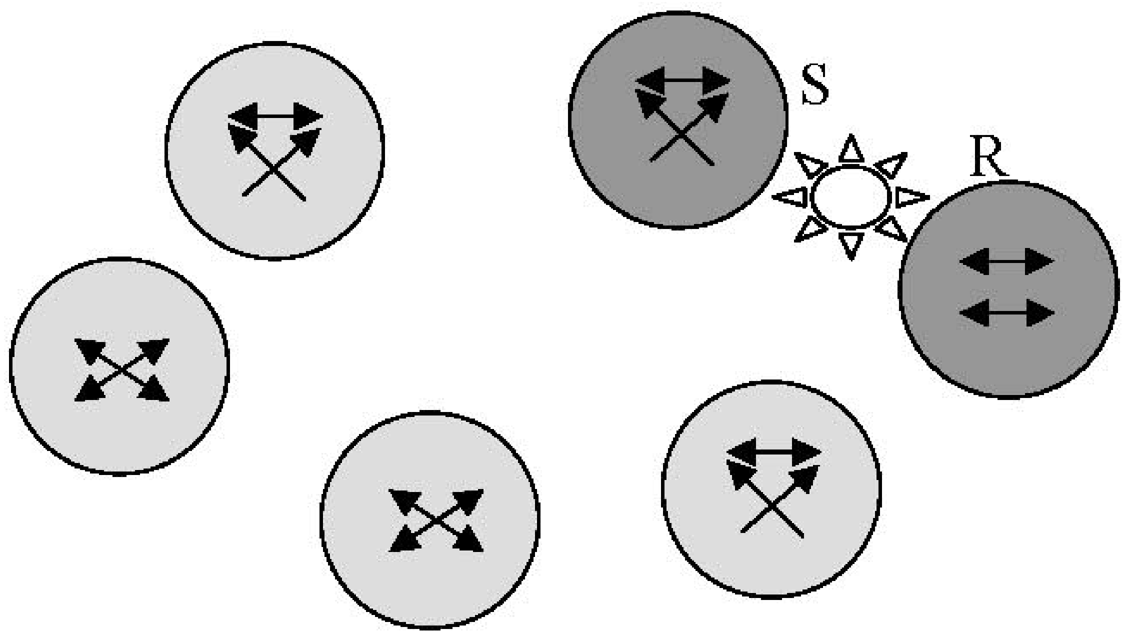
- Suggestion: Conventional implicatures as frozen conversational implicatures.

- Global approaches may be useful and necessary for diachronic explanations and for modelling language acquisition. For synchronic descriptions we should look for local aproaches.

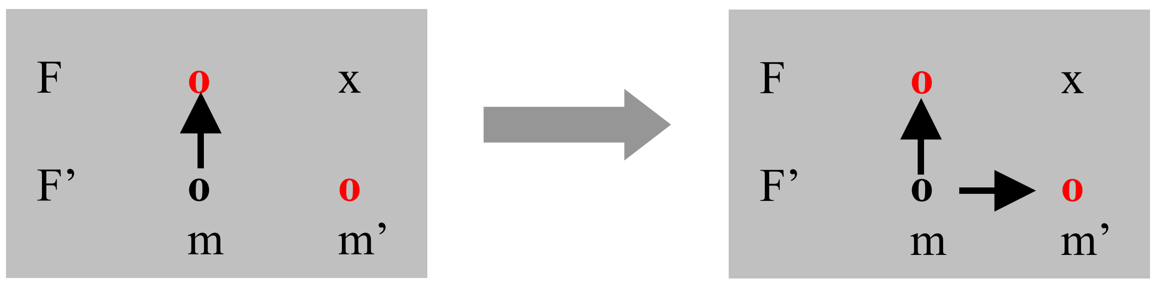
- Emerging problem: How to model conventionalisation? How to model freezing an implicature?
- Van Rooy (2002): Rediscovering Lewi's framework of ***signalling games***. The emergence of Horn-strategies can be explained.



The agents of the population randomly encounter one another in pairwise interaction. Each organism plays only one, but leaves its offspring behind, where the number of offspring is determined by the utility value U(a, b). Mutations change the strategies played by some elements of the population. After many plays of the game, a strategy yielding a higher number of expected offspring will gradually come to be used by larger and larger fractions of the population.



- The present situation is even simpler and corresponds to an initial pattern of “ambiguity”. In signalling games, such patterns are evolutionary instable.



- In the emerging new pattern we have: speaker optimal pairs = hearer optimal pairs = strongly optimal pairs = super optimal pairs.

Conclusions

- There is a straightforward global account to FC permission (making use of blocking)
- This solution accounts for resolving the basic puzzle. It explains the appearance of FC in wide disjunction. And it explains the effects of conjunctive permission.
- The global account does not explain the behaviour in embedded contexts.
- Synchronic, local systems can emerge from global systems via conventionalisation. This conforms to the good old idea that synchronic structure is significantly informed by diachronic forces.

From an intuitive point of view, the preference relation between $\langle F, m \rangle$ pairs reflects

(I) The value of information. Measures for information and relevance are involved here. $<_I$

(II) The processing demands for the pairing: (a) the processing demands for constructing a (NL) form for a given (mental) model; (b) the processing demands for constructing a mental model for a given (natural language) form. $<_{II}$

In composing the overall preference relation < it is assumed that the ordering source (II) is more important than (I):

$\pi < \pi'$ iff (i) $\pi <_{II} \pi'$ or (ii) $\pi \sim_{II} \pi'$ and $\pi <_I \pi'$