

# Unit 4: The modal operator analysis at work

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ESSLLI 2008: 'Optimizing the Future - Imperatives between Form and Function'

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## 5.1 QIP: imperatives between necessity and possibility

- imperatives pose a problem for semantics because their direct usages comprise an inhomogeneous set of speech act types (the *Functional Inhomogeneity Problem FIP*): ORDER, REQUEST, ADVICE, WISH, PROHIBITION, . . .

particular problem: *Quantificational Inhomogeneity Problem (QIP)*

- some examples:

imperatives used for giving PERMISSION and as CONCESSIONS:

both speech act types involve widening of the permissible worlds, and: widening of the set of worlds which are possible futures the speaker will not try to prevent

- two different solutions within the MOP-analysis
  - semantically, imperatives still express necessity (cf. Schwager 2005b; Schwager 2006b for PERMISSIONS and CONCESSIONS)  
a pragmatic mechanism (accommodation) lets the necessity statement have an effect that would normally be achieved by a possibility statement  
note: this does not render PERMISSION-imperatives indirect speech acts; i.e., no underlying act of ORDERing is computed
  - the imperative itself can express possibility (Schwager 2005a; Schwager 2006b for *zum Beispiel*)
    - ambiguity (Grosz 2008)
    - always possibility; this is normally exhaustified ("the only possibility" = necessity; Schwager 2005b)

### 5.1.1 Cases to consider

PERMISSIONS:

- (1) a. (It starts at eight, but) come earlier if you like! [Hamblin (1987)]  
b. Take an apple if you like.  
c. Nimm dir ruhig einen Apfel!  
take.IMP yourself PRT='CALM' an apple  
'Take an apple if you like.'

CONCESSIONS:

- (2) a. Alright, don't come then! (If you think you are so clever.) CONCESSION

- b. Okay, dann komm eben nicht!  
okay, then come.IMP PRT not

back to ESSLLI 2009 again:

- (3) a. B: Submit a proposal! - A: [...] - B: Okay, then don't submit anything.
- b. B: Schick was hin! - A: [...] - B: Dann schick nichts hin.  
B: send.IMP something to.there - A: - B: then send.IMP nothing to.there

ADVICE:

- (4) Kauf zum Beispiel keine Zigaretten!  
buy.IMP for example no cigarettes  
'For example, don't buy any cigarettes.' &&
- (5) a. How could I stop smoking?/What do I have to do in order to stop smoking?
- b. One of the things you may not do is buy cigarettes.  $\square \neg BC(\textit{addressee})$   
( $\rightarrow$  *It is necessary that you don't buy cigarettes.*)
- (6) a. How could I save money?
- b. One of the things you could do is not buy cigarettes.  $\diamond \neg BC(\textit{addressee})$   
( $\nrightarrow$  *It is necessary that you don't buy cigarettes.*)

\* remark: in classroom discussion, Paul Dekker remarked that both examples are more complicated than ordinary possibility or necessity: for the reading explored in (5), the fact that this is one of many necessities is brought out in the paraphrase (*one of the things*), and comes out correctly in the analysis proposed below; for (6), both paraphrase and analysis fail to bring out the point that not buying cigarettes is one among other sufficient means. This touches upon an issue problematic for overt possibility modals as well:

- (7) a. How do I get to Hamburg.
- b. You can take the ICE from Frankfurt.

According to (7b), taking the ICE from Frankfurt is not only compatible with reaching Hamburg, but is rather (under certain assumptions: e.g. that you ride the train to the very end,...) a sufficient means to get there. Cf. the literature on **anankastic conditionals** for more information on the issue, in particular Werner 2006.

Moreover, Sven Lauer pointed out that at least his variety of standard German does not allow to interpret (18) as in (5). \*

<UNKNOWN>:

*Mother to her child who is terribly afraid of frogs and doesn't want to touch a frog:*

- (8) Fass den Frosch ruhig an!  
touch.IMP the frog PRT at  
'Touch it [ruhig]! It won't do you any harm.'  
rendering P. Grosz: *'In view of what you need to do in order not to come to any harm, it's possible for you to touch the frog!'*

### 5.1.2 The pragmatic story for PERMISSIONS

- Schwager (2005b): imperatives always express necessity; in certain contextual constellations, they come to have the effect that is usually associated with an expression of possibility (i.e., widening of what the possibilities are)
- argument: avoid ambiguity; moreover: possibility effects are a lot harder to get than necessity effects, mostly marked by particles (*ruhig*), *if you like/wenn du magst*-antecedents, *then*,...
- we cannot rely on conditionalization: still no obligation; same problem for *may*-permissions

- (9)
- a. If you want to come earlier, (*given what your wishes are/given what my wishes are*...) you must come earlier.
  - b. You may come earlier if you like.
  - c. Wenn Du magst, kannst du auch schon früher kommen.  
if you like can you also already earlier come

⇒ *if you like* behaves in a funny way

- resolution of modal base and ordering source:

ORDER

- (10) [[Nimm dir einen Apfel!]] = *Given what we know the world to be like and given what I order* it is necessary that you take an apple.

PERMISSION: under the resolution of the contextual parameters as in (11), a permission effect is achieved if, in the utterance context, the propositions in (12) are common knowledge (note: (1c) is also very natural as just resolving uncertainty w.r.t. whether it is permitted or not)

- (11) [[Nimm dir ruhig einen Apfel!]] =  
*Given what we know the world to be like and given what you want* it is necessary that you take an apple.

- (12)
- a.  $\phi$  is among the wishes<sup>1</sup> of the hearer
  - b. the speaker is against the hearer's realizing  $\phi$
  - c. the hearer doesn't want to offend the speaker (keep the speaker pleased)
  - d. it is possible that, at the next moment,  $c_S$  permits taking an apple

- (13) proposition expressed by (11):  
 $p = \lambda w. \forall v \in O(cg_F, g, w)$ [the addressee takes an apple in  $v$ ]

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<sup>1</sup>Understood as primitive hearer would assent to "yes, (if it had not unpleasant consequences), I would like that"; these wishes need not be necessities according to what he wants - the two come apart in case of inconsistencies.

at  $t_1$  before the utterance (with  $g = \text{what } c_A \text{ wants}$ ,  $k = \text{what } c_S \text{ orders}$ ):

for any $w$ in CG:	$g(w) = \{\text{the speaker is pleased, the addressee takes an apple}\}$
for any $w$ in CG	$k(w) = \{c_A \text{ does not take an apple}\}$
for any $w$ in CG, for any $w$ in CG,	$k(w)$ is fulfilled or the speaker is not pleased, but not both $O(cg_F, g, w)$ contains two types of worlds $w_1$ : the speaker is pleased, the addressee does not take an apple $w_2$ : the speaker is not pleased, the addressee takes an apple
there is a world $w'$ in CG,	at $t_2$ , $c_S$ expresses $p$ and permits the taking of an apple (i.e., at $k(w') = \{ \}$ )

at  $t_2$ ,  $c_S$  expresses (13), which is true only if a permission occurs (plus metalinguistic information:  $w'$ -like worlds survive)

- $c_S$  tries to update with proposition  $p$ , hence, it is known at  $t_2$  that he believes  $p$ ;
- either, he is an authority and  $p$  is true (that is, CG does not contain worlds at which he tries to update with  $p$  but  $p$  is false), or, a presupposition failure occurs

hence: presupposition failure, or we are in a  $w'$ -like world, and this was a permission

alternative situation: it was not prohibited before - effect of an information that it is permitted (+ endorsing to go with your preference -?)

### 5.1.3 CONCESSION

- imperatives can be modally subordinated (cf. Roberts 1989; Schwager 2006a for imperatives)

- (14) a. If you want him<sub>i</sub> to say nice things about your work, treat every professor<sub>i</sub> with courtesy.  
b. \*If he<sub>i</sub> is already there, give every speaker<sub>i</sub> his badge.  
c. If John's already there, give him his badge. *epistemic*

- (15) Ede might make lasagne<sub>i</sub> tonight. <sup>???</sup>/<sub>(ok)</sub>In that case) try it<sub>i</sub>, he's an excellent cook.

- (16) Vielleicht bringt ja Maria einen Wein<sub>i</sub> mit. Dann stell ihn<sub>i</sub>  
perhaps brings PRT Maria a wine along. then put.IMP it  
einstweilen in den Kühlschrank.  
in-the-meantime in the fridge  
'Mary might bring some wine<sub>i</sub> with her. In that case, put it in the fridge in the meantime.'

- CONCESSION-type: contra Schwager (2005b) - *then* indicates modal subordination to *if you don't care about me, do it*

- (17) Okay, then don't do it, if you think you are so clever.

argument: presence of *then/dann*

### 5.1.4 (In)exhaustive advice

- genuine ambiguity of the modal force embedded under *zum Beispiel* ‘for example’

(18) Kauf zum Beispiel keine Zigaretten!  
 buy.IMP for example no cigarettes  
 ‘For example, don’t buy any cigarettes.’ &&

- (19) a. One of the things you may not do is buy cigarettes.  $\Box\neg BC(\textit{addressee})$   
 b. One of the things you could do is not buy cigarettes.  $\Diamond\neg BC(\textit{addressee})$

disambiguation by further particles *schon mal*:

(20) Kauf zum Beispiel schon mal keine Zigaretten!  
 buy.IMP for example already PRT no cigarettes  
 ‘For starters, one thing is not to buy cigarettes.’  $\Box\neg BC(\textit{addressee})$

idea:

1. underlyingly, imperatives express possibility; normally: exhaustive possibility

- (21) a. Q: What could I possibly do to stop smoking?  
 b. A: Du kannst **nur** aufhören, Zigaretten zu kaufen.  
 you can only stop, cigarettes to buy  
 ‘The only possibility you have (to achieve your task)  
 is to stop buying cigarettes.’

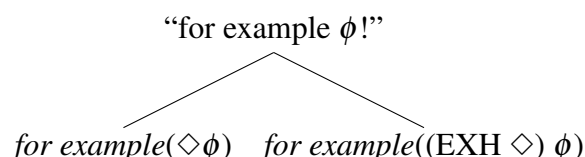
exhaustive possibility = necessity: *it’s your only possibility = you must*

compare: anti-exhaustive necessity (one necessity among others)

- (22) A: Um an eine gute Uni zu kommen, mußt du **zum**  
 A: in-order-to to a good university to get, must you for  
**Beispiel** viel Geld haben. B: Echt? #**Und das ist alles?**  
 example lots-of money have. B: really? and that is all?  
 ‘A: In order to get into a good university, you need lots of money, for  
 example. B: Really? #And that’s all?’

2. exhaustification can be blocked by *for example*

3. two possibilities for imperatives containing *for example*:

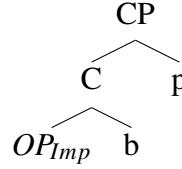


- the imperative operator as non-primitive necessity:  
 easier to see if we distinguish a background and a proposition that follows from the background (cf. Geurts 1999; roughly, at a world  $w$ ,  $b = O(\textit{cg}_F, g, w)$ )

- (23) a.  $\diamond = \lambda b \lambda p. (\exists w \in b)[w \in p]$   
 b.  $\square = \lambda b \lambda p. (\forall w \in b)[w \in p]$

- (24) a.  $OP_{Imp} = \diamond (= \lambda b \lambda p. (\exists w \in b)[w \in p])$

b.



exhaustification w.r.t. domains and properties where parts of elements in the domain can have the same property (mereology, propositions, ...)

- (25) exhaustification in terms of identity: *Only John came to the party.*  
 $P(\text{john}) \wedge \neg \exists y [y \neq \text{john} \wedge P(y)]$

domain:  $pow(W)$ ,  $P =$  “is a possibility w.r.t background  $b$ ”

- (26) a.  $\diamond bp \rightarrow \forall q [p \subset q \rightarrow \diamond bq]$   
 b.  $\forall q [[q \neq \emptyset \wedge q \subseteq (b \cap p)] \rightarrow \diamond bq]$

possibility 1: Rooy and Schulz 2004 relativize w.r.t. relevance ( $p$  is possible w.r.t.  $b$  and no other possibility that is equally relevant is possible) - assume: sub- or super-propositions are not (equally) relevant

problem:

- (27) What is necessary for you to stop smoking?  
 a. you don't buy any cigarettes anymore  
 b. you buy no cheap cigarettes anymore  
 c. you buy only bad cigarettes  
 d. ...

possibility 2: set-theoretic solution, cf. Zimmermann (2000) closes off lists of possibilities  $p_1, \dots, p_n$  to say that these propositions cover the entire background, that is, that their union is a necessity (proof Zimmermann's footnote 22):

- (28)  $(\forall q)[q \cap H_c \neq \emptyset \rightarrow [q \cap p_1 \neq \emptyset \vee \dots \vee q \cap p_n \neq \emptyset]]$  his (24 $\kappa'$ ), p.268

- (29)  $EXH(\diamond) = \lambda b \lambda p. \diamond(b)(p) \ \& \ (\forall q \in \diamond(b))[q \in \diamond(p)]$

- (30) For arbitrary  $b$  and  $p$ :  
 $EXH(\diamond) \Rightarrow \square$ : for any  $w$  if  $w \in b$ , then  $\{w\} \cap b \neq \emptyset$ , therefore  $\{w\} \cap p \neq \emptyset$ , therefore  $w \in p$ .  
 For non-empty  $b$  and arbitrary  $p$ :  
 $EXH(\diamond) \Leftarrow \square$ :  $(\forall w \in b)[w \in p]$ , therefore  $b \cap p \neq \emptyset$ . And if for any  $q$ ,

$\diamond(b)(q)$ , then there is a  $w \in b \cap q$ . But then  $w \in p$ , therefore  $q \cap p \neq \emptyset$ , so  $q \in \diamond(p)$ .

generalize to cover also necessity

$p$  is an exhaustive necessity with respect to background  $b$  (in symbols,  $(EXH(\square))(b)(p)$ ) as nothing follows from the background  $b$  that does not follow from  $p$ .

$$(31) \quad EXH(\square) = \lambda b \lambda p. \square(b)(p) \ \& \ (\forall q \in \square(b))[q \in \square(p)]$$

Exhaustified necessity ( $EXH(\square)$ ) boils down to identity of background and proposition, proof in (32).

$$(32) \quad \text{For arbitrary } b \text{ and } p, EXH(\square)(b)(p) \Leftrightarrow (b = p)$$

$\Leftarrow$ :  $b = p$ , therefore  $b \subseteq p$ , and  $(\forall q \in \square(b))[q \in \square(p)]$ .  
 $\Rightarrow$ :  $EXH(\square)(b)(p) = \square(b)(p) \ \& \ (\forall q \in \square(b))[q \in \square(p)]$ . So, by the first conjunct and the interpretation of  $\square$ ,  $b \subseteq p$ . Assume  $b \subset p$ . Then  $(\exists w \in p)[w \notin b]$ . Then, it would be the case that  $b \in \square(b)$ , but not  $b \in \square(p)$ . Therefore, it cannot be the case that  $b \subset p$ . Hence,  $b = p$ .

$$(33) \quad EXH(R) = \lambda b \lambda p. R(b)(p) \ \& \ (\forall q \in R(b))[q \in R(p)]$$

$$(34) \quad zB(R) = \lambda b \lambda p. R(b)(p) \ \& \ \diamond(Bel_S)[\neg(\forall q \in R(b))[R(p)(q)]],$$

where  $Bel_{c_S}$  the speaker's belief worlds.

$$(35) \quad \begin{array}{l} \text{a.} \quad [ [ \{ EXH, zB, \emptyset \} [ \{ EXH, zB \} (OP_{Imp}) ] ] b p ] \\ \text{b.} \quad [ [ \{ EXH, zB, \emptyset \} [ \{ must, may, \dots \} ] ] b p ] \end{array}$$

According to (35a), in absence of *zum Beispiel*,  $EXH$  is applied to  $OP_{Imp}$ .

$$(36) \quad \begin{array}{l} \text{Kauf} \quad \text{zum Beispiel keine Zigaretten!} \\ \text{buy.IMP for} \quad \text{example no} \quad \text{cigarettes} \\ \text{'For example, don't buy any cigarettes.'} \end{array}$$

If *zum Beispiel* serves as the obligatory modifier of  $OP_{Imp}$ , the imperative expresses possibility. (35a) is instantiated as in (37).

$$(37) \quad [ [ [ \emptyset [ zB OP_{Imp} ] ] b ] \text{ you don't buy cigarettes } ]$$

The complex modal operator is computed as in (38) and applies to the respective propositions as in (39). The reading obtained is the one of inexhaustive possibility as singled out in (19b).

$$(38) \quad zB(OP_{Imp}) = \lambda b \lambda p. \diamond(b)(p) \ \& \ \diamond(Bel_{c_S})[\neg(\forall q \in \diamond(b))[q \in \diamond(p)]]$$

$$(39) \quad \begin{array}{l} \diamond(B)(\text{you don't buy cigarettes}) \ \& \\ \diamond(Bel_{c_S})[\neg(\forall q \in \diamond(B))[q \in \diamond(\text{you don't buy cigarettes})]], \\ \text{for a contextually given background } B \end{array}$$

*'It is possible for you not to buy cigarettes, but I don't exclude that you have other possibilities as well'*

(40)  $[[[zB [EXH OP_{Imp}] b] \text{ you don't buy cigarettes } ]]$

(41)  $zB(EXH(OP_{Imp})) = zB(\Box) =$  by equivalence in (30)  
 $\lambda b \lambda p. \Box(b)(p) \ \& \ \Diamond(Bel_{CS})[\neg(\forall q \in \Box(b))[q \in \Box(p)]]$

(42)  $zB(EXH(OP_{Imp}))(B)(\text{you don't buy cigarettes}) =$   
 $\Box(B)(\text{you don't buy cigarettes}) \ \&$   
 $\Diamond(Bel_{CS})[\neg(\forall q \in \Box(B))[q \in \Box(\text{you don't buy cigarettes})]],$   
 for some contextually given  $B$ .

*'it is necessary that you don't buy cigarettes, and I don't exclude that there are more things necessary (w.r.t. B)'*

- modal operators in Salish that (like imperatives) express necessity as a default but are interpreted as possibility when necessity gives rise to a contradiction (cf. Matthewson, Rullman, and Davis 2005).

### 5.1.5 What particles show and why I am still not convinced that we should conflate the two kinds of possibility-usages

- Grosz (2008): imperatives do contain modal operators, and they are ambiguous/underspecified as to whether they express possibility or necessity

PERMISSION-imperatives express possibility in semantics

- his claim: there are German particles that

1. occur in modalized sentences only (*ruhig, bloss, JA*), and
2. impose restrictions on what kind of modal force they combine with (*ruhig*:  $\Diamond$ ; *bloss, JA*:  $\Box$ )
3. since all three particles can occur in imperatives, (i) imperatives contain modal operators, and (ii)  $OP_{Imp}$  is ambiguous between  $\Box/\Diamond$

- some examples:

- (43) a. Der isst {ruhig,\*bloß,\*JA} den Spinat.  
 he eats {ruhig, bloß, JA} the spinach  
 'He is eating/will eat the spinach.'
- b. Der kann/darf {ruhig,\*bloß,\*JA} den Spinat essen.  
 he can/may {ruhig, bloß, JA} the spinach eat  
 'He can/may eat the spinach.'
- c. Der soll {ruhig, bloß, JA} den Spinat essen.  
 he can/may {ruhig, bloß, JA} the spinach eat  
 'He can/may eat the spinach.'



- note: the correlation holds only if *sollen* is also ambiguous in modal force, as Grosz (2008) assumes (usually: □)

*sollen* in V1 is usually claimed to express ◇ (cf. Önnarfors 1997) - CONCESSIONS (initial *dann* 'then' - same effect)

(44) Soll er doch sauer sein.

shall he PRT offended be  
roughly: 'Let him be offended then.'

(45) Der Hans soll ruhig den Kühlschrank ausräumen.

the Hans shall ruhig the fridge empty  
'Hans shall [ruhig] empty the fridge.'

*In view of what I want*, it is possible for Hans to empty the fridge. Grosz 2008, (36)

- follow ups: test for PERMISSION vs. COMMAND, but not for modal force (*pace* Grosz 2008)

(46) a. ... das stört mich nicht.

that doesn't disturb me.

b. ... sonst wirst du bestraft.

or else you'll be punished.

(47) Du nimmst dir einfach, was du brauchst. Das stört

you take.2PSGPRESIND yourself simply what you need. That disturbs  
mich überhaupt nicht.

me at.all not

'You just take what you need. I really don't mind.'

- problem: *muss* (only: □) is incompatible with all particles for an independent reading (non-performative) - no clear evidence for incompatibility □ + *ruhig*

hence, alternative story (-?): *ruhig* can appear whenever a certain pragmatic effect is achieved - widening, no matter, if by ◇ or □

particles *ruhig*, *bloß*, *JA* require performative modality - out in conditionals of antecedents:

(48) Wenn er unbedingt/\*JA/\*bloß zur Beichte gehen soll, geht er morgen.

if he necessarily/JA/bloß to confession go shall, goes he tomorrow  
'If he necessarily/JA must go to confession, he will go tomorrow.'

- possibility test: compatibility of contradictory complements (cf. Grosz 2008, his (38))

(49) Father: Hans wants to spend Christmas abroad. He thinks about going to Toronto or to Sidney! Is there anything we can do to convince him to spend Christmas here with us? - Mother: Oh come on...

- a. Der kann's/soll's/soll's ruhig in Kanada verbringen, und der he can-it/shall-it/shall-it ruhig in Kanada spend, and he kann's/soll's/soll's ruhig in Australien verbringen. (I don't care) can-it/shall-it/shall-it ruhig in Australia spend 'He can spend it in Australia, and he can spend it in Kanada.'

for me: only *kann* is okay (footnote: "some speakers only accept these examples with *or*"; for me, *oder* 'or' rules in *soll's* under epistemic uncertainty w.r.t. an obligation, no possibility reading; and *soll's ruhig* is unacceptable)

- (50) a. Du kannst ruhig hingehen, aber du kannst auch (<sup>?</sup>ruhig) zu Hause bleiben.  
 you can ruhig go-there, but you can also (ruhig) at home stay  
 'You can ruhig go there, but it's also okay if you stay home.'
- b. #Du sollst ruhig hingehen, aber du sollst auch (ruhig) zu Hause bleiben.  
 you shall ruhig go-there, but you shall also (ruhig) at home stay  
*cannot meant*: 'You shall ruhig go there, but it's also okay if you stay home.'

maybe: *sollen* can achieve the effect of a possibility statement (e.g., be used as a PERMISSION), but: it does not seem to semantically express possibility → *ruhig* can combine with certain expressions of semantic necessity

- compare ADVICE-imperatives:

in the absence of closure intonation *for example*-imperatives can receive  $\diamond$ -interpretations, *sollen* only gets the  $\square$  interpretation:

- (51) Kauf zum Beispiel gar keine Zigaretten mehr, kauf Zigaretten, die dir nicht schmecken, . . .  $\diamond$   
 for example, buy.IMP not-any cigarettes anymore, buy.IMP cigarettes you don't like, . . .
- (51) Du sollst (zum Beispiel) keine Zigaretten mehr kaufen, du sollst Zigaretten kaufen, die dir nicht schmecken, . . .  $\square$   
 you should (for example) not buy cigarettes anymore, you should buy cigarettes you don't like, . . .  $\square$

*und* 'and': only the (contradictory) obligation reading is available (why?!)

*oder* 'or': all performative necessity and possibility modals behave alike: we get an (exhaustive) lists of all possibilities to fulfill an obligation; cf. Geurts ta)

⇒ *zum Beispiel*-imperatives and *sollen* behave differently

- issue: free choice items are licensed under possibility modals, not under necessity

- (52) a. You may pick any flower!

- b. #You must pick any flower.
- c. Pick any flower!

still, (52c) is different from mere possibility; there is an obligation to pick one flower, and a permission to pick whichever you want (cf. Aloni 2005)

- for the moment:
  1. imperatives express necessity statements, unless antiexhaustified (as can be done by *for example*)
  2. *sollen* = EXH(OP<sub>Imp</sub>)
  3. necessity statements sometimes achieve widening PERMISSION, . . . -effects (possibility-like effects)
  4. particles are maybe sensitive to the presence of modality as such, and the effect that modality achieves
- alternative: anti-exhaustification can be done by other particles as well (e.g. *ruhig*)