15th Amsterdam Colloquium, 19.-21.12.2005

EXHAUSTIVE IMPERATIVES

MAGDALENA SCHWAGER

Johann Wolfgang Goethe-Universtität Frankfurt am Main
magdalena@schwager.at

1 Introduction

imperative: sentence level form types which come with the prototypical function of COMMANDING/REQUESTING

(elements of the clause type systems of a given language (cf. Sadock and Zwicky 1985; imperativized verb is a (decisive) part for distinguishing the clause type)

observation: imperatives prototypically constitute COMMANDS/REQUESTS, but can also be used as WISHES, ADVICE,...

(1) a. Open the window! REQUEST
b. Get well soon! WISH
c. Take the A-train if you want to go to Harlem. ADVICE

plausible semantic core : an imperative ϕ! constrains the (permissible, advisable, preferable,...) future courses of events so as to make *you* ϕ true (within a (often contextually) given time span)

➥ imperatives are often analysed as necessity statements or dynamically as constraining sets of worlds/schedules/...to ϕ-worlds/schedules (cf. Zarnic 2002, Asher and Lascarides 2003, Mastop 2005, Veltman 2005, Franke 2005, Schwager 2005b,...)

counterexample? PERMISSIONS (normally corresponding to possibility statements), but cf. Schwager 2005b for a pragmatic account in terms of indirect usage of necessity statements

(2) Take an apple (if you want). PERMISSION

➥ It seems we can do with some sort of necessity semantics for imperatives.

2 A puzzle about *zum Beispiel* 'for example'

An interpretation in terms of necessity fails to account for one of the readings available for (3):

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

- bringing out both readings:

  (4) a. What must I do in order to stop smoking?
  b. One of the things you must not do is buy cigarettes. $\Box\neg BC(addressee)$
  ($\rightarrow$ *It is necessary that you don't buy cigarettes.*)

  (5) a. How could I save money?
  b. One of the things you could do is not buy cigarettes. $\Diamond\neg BC(addressee)$
  ($\not\rightarrow$ *It is necessary that you don't buy cigarettes.*)

- If imperatives express necessity, the (preferred) reading (5b) cannot be accounted for in a straightforward way.

- the quantificational force is not determined automatically by the one expressed in the question (*How could I stop smoking?* could also trigger the necessity reading in (4))

- ambiguity: necessity/possibility? :-(

✎ ADVICE-imperatives + *zum Beispiel* 'for example' suggest strongly that the necessity semantics for the imperative cannot be basic

3 Decomposing Necessity

3.1 A closer look at the two readings

- reading (4b): not buying cigarettes is an **inexhaustive necessity** (one obligation among others)

  reading (5b): not buying cigarettes is an **inexhaustive possibility** (one possibility among others)

- comparing with **exhaustive possibility**:

  (6) 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.'

  overt **exhaustifier** *nur* 'only' indicates exhaustivity:

  In order to stop smoking, there is no other possibility than stopping to buy cigarettes. $\Rightarrow$
  'If you want to stop smoking, it is necessary that you stop buying cigarettes.'

  ➥ exhaustive possibilities come out as necessities (not specified as to whether there are further necessities or not)

- unmodified *must* allows for interpretation as **exhaustive necessity**

evidence: coherence of the follow-up question in (7a), which is immediately infelicitous if *for example* indicates that further ingredients might be necessary (7b) (*for example* is an **antiexhaustifier**)

(7) a. A: To get into a good university, you must have a lot of money.
B: Really? And that's all?
b. A: To get into a good university, you must for example have a lot of money.
B: #Really? And that's all?

- note: exhaustive interpretation of *must* is not part of the asserted proposition, as evidenced by B's correction in (8)

(8) A: To get into a good university, you must have a lot of money.
B: Yes, but there is more to it than that!

- exhaustivity of *must* can't be made explicit by adding *only* which results in the **sufficiency modal construction** (cf. von Fintel and Iatridou 2005), cf. (9):

(9) To get into a good university, you only have to have a lot of money.

(i) this does not express necessity, and (ii) it ranks having a lot of money low on the scale of efforts

3.2 Diamonds for imperatives

- Semantically, imperatives express possibility with respect to a contextually given set of worlds but are mostly exhaustified to express exhaustive possibilities. But that is necessity (cf. (6)).

  ➥ Usually, an imperative $\phi!$ constrains to ϕ-worlds/courses of events.

- imperatives contain a modal operator OP_{Imp} (and a covert addressee designating subject pronoun you_{Imp})

(10) a. Go home!
b. [OP_{Imp} [you_{Imp} go home]] LF for (10a)

➥ imperatives express modalized propositions as expressed also in (11).

(11) a. You must go home.
b. You can go home.

- concern: truth values???

  OP_{Imp} differs from its modal verb counterparts in a presuppositional meaning component that constrains imperatives to usages in contexts in which the truth value is trivial: (i) the speaker is an authority on the contextually given source of the necessity (e.g. his wishes, his commands), (ii) the necessity is not epistemic, and (iii) the speaker affirms the source of the necessity (cf. Schwager 2005a).

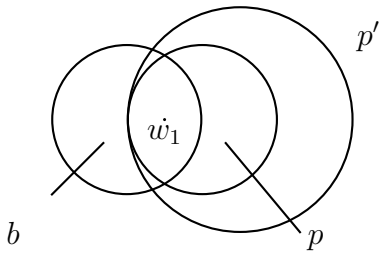

Figure 1: $\Diamond(b)(p)$ '*p is a possibility with respect to b*'

➥ either, the modalized proposition is true or a presupposition failure occurs.

- **modal operators** are propositional quantifiers that relate two sets of worlds (cf. Geurts 1999):
  - contextually given **background proposition** b

    for imperatives this is often the set of worlds in the Common Ground that comply best with what the speaker wants, or in which the addressee reaches his current goal in a convenient way
  - **proposition** p expressed by the lexical material

(12) a. $\Diamond = \lambda b \lambda p.(\exists w \in b)[w \in p]$
b. $\Box = \lambda b \lambda p.(\forall w \in b)[w \in p]$

- **imperative operator** expresses possibility

(13) $\boxed{OP_{Imp} = \Diamond}$

3.3 Exhaustivity and Antiexhaustivity

- wanted: *'p is possible (w.r.t. background b) and nothing else is possible'*
- accounts for exhaustivity/*only* in terms of identity (*'x has property P and no* $y \neq x$ *has property P*') cannot be applied for properties and domains such that the property holds of parts of the elements in the domain as well (cf. Zimmermann 2000)

(14) attempt: '$p \cap b \neq \emptyset$ and for no $q \neq p$: $q \cap b \neq \emptyset$'

problem: subsets and supersets of p
required (cf. figure 1): (i) $b - p = \emptyset$; but (ii) if $\{w_1\} \subset p$, $\{w_1\}$ is a q; and (iii) any p' s.t. $p \subset p'$ also falsifies the claim.

- one possibility for such domains: relativizing exhaustivity to relevance *'p is possible w.r.t. b and no other possibility that is equally relevant is possible*' (cf. van Rooij and Schulz ta) (sub-/superpositions are not equally relevant)

- alternatively: set-theoretic solution for exhaustive lists of possibilities, cf. Zimmermann 2000: an exhaustive list of possibilities covers the entire background (their union is a necessity).

  Adapted for single possibilities, covert exhaustivity operator *EXH* modifies the modal operator $\Diamond$:

  (15) $EXH(\Diamond) = \lambda b \lambda p.\Diamond(b)(p)\ \&\ (\forall q \in \Diamond(b))[q \in \Diamond(p)]$

  informally: *'p overlaps with the background and whatever else overlaps with the background also overlaps with p'*
  intuitively: *'p covers the entire background'*

  crucial equivalence ($\Leftarrow$ only for non-empty backgrounds b):

  (16) $\boxed{EXH(\Diamond)\ (= EXH(OP_{Imp})) \Leftrightarrow \Box}$

  proof (adapted from Zimmermann 2000):

  (17) For arbitrary b and p:
  $EXH(\Diamond) \Rightarrow \Box$: 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:
  $EXH(\Diamond) \Leftarrow \Box$: $(\forall w \in b)[w \in p]$, 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 $q \in \Diamond(b)$.

- extending it to $\Box$: **being an exhaustive necessity** (*'being the only obligation'*)

  (18) $EXH(\Box) = \lambda b \lambda p.\Box(b)(p)\ \&\ (\forall q \in \Box(b))[q \in \Box(p)]$

  nothing follows from b that doesn't follow from p as well
  amounts to $b = p$

- generalizing to **exhaustivity** with respect to an arbitrary propositional quantifier R:

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

- **antiexhaustivity**:

  (20) $zB(R) = \lambda b \lambda p.R(b)(p)\ \&\ \Diamond(Bel_S)[\neg\underline{(\forall q \in R(b))[q \in R(p))]}]$,
  where Bel_S is the set of the speaker's belief worlds.

  'p is a $b-R$, but the speaker doesn't exclude that other propositions than p are $b-R$-s as well'

3.4 Deriving the Readings

general schema: semantically, OP_{Imp} = *may*, but it requires 'inner' (anti)exhaustification, besides optional 'outer' (anti)exhaustification

➥ OP_{Imp} has to combine either with covert EXH or with overt zB, and behaves like a modal verb only after this has happened:

(21) a. $[\ [\ \{EXH, zB, \emptyset\}\ [\ \{EXH, zB\}(OP_{Imp})\ ]\ ]\ b\ p\ ]$
b. $[\ [\ \{EXH, zB, \emptyset\}\ [\ \ \{must,\ may, \ldots\}\ \ ]\ ]\ b\ p\ ]$

absence of zB:

(22) $p! = (\emptyset(EXH(OP_{Imp})))(b)(\phi) = \Box(b)(p)$ (by equivalence in (16))

ambiguity in (3) (repeated as (23)):

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

- **possibility** in (5b) (repeated as (24b)): preferred & straightforward

(24) a. How could I save money?
b. One of the things you could do is not buy cigarettes.

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

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

(27) $\Diamond(B)$(you don't buy cigarettes) &
$\Diamond(Bel_{c_S})[\neg(\forall q \in \Diamond(B))[q \in \Diamond$(you don't buy cigarettes)$]]$,
for a contextually given background B
'It is possible for you not to buy cigarettes, but I don't exclude that you have other possibilities as well'

- **inexhaustive necessity** in (4b) (repeated as (28b))

(28) a. What do I have to do in order to stop smoking?
b. One of the things you may not do is buy cigarettes.

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

(30) $zB(EXH(OP_{Imp})) = zB(\Box) =$ by equivalence in (16)
$\lambda b \lambda p.\Box(b)(p)\ \&\ \Diamond(Bel_{c_S})[\neg(\forall q \in \Box(b))[q \in \Box(p)]]$

(31) $zB(EXH(OP_{Imp}))(B)$(you don't buy cigarettes) =
$\Box(B)$(you don't buy cigarettes) &
$\Diamond(Bel_{c_S})[\neg(\forall q \in \Box(B))[q \in \Box$(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)*'

further combinations:

- for any R, $(EXH(zB(R)))$ comes out nonsensical:

  (32) $^{\#}EXH(zB(R)) =$
  $\lambda b\lambda p.(zB(R))(b)(p)$ & $(\forall q \in (zB(R)(b)))[q \in (zB(R))(p)] =$
  $\lambda b\lambda p.R(b)(p)$ & $\Diamond(Bel_{cs})[\neg(\forall q \in R(b))[q \in R(p)]]$ &
  $(\forall q \in \{t \mid R(b)(t)$ & $\Diamond(Bel_{cs})[\neg(\forall q' \in R(b))[q' \in R(t)]]\})$
  $[q \in \{s \mid R(p)(s)\&\Diamond(Bel_{cs})[\neg(\forall q' \in R(p))[q' \in R(s)]]\}]$

  for arbitrary b and p the last conjunct causes the contradiction:

  Insert p as a q. Then, by the first two conjuncts, p passes the restriction: $R(b)(p)$, and $\Diamond(Bel_{cs})[\neg(\forall q' \in R(b))[q' \in R(p)]]$. Hence, it should hold that $R(p)(p)$ (maybe!), but also that $\Diamond(Bel_{cs})[\neg(\forall q' \in R(p))[q' \in R(p)]]$ (contradiction!).

  ➥ applying EXH to an operator that has been antiexhaustified by zB attributes nonsensical beliefs to the speaker and is therefore most likely avoided.

- $EXH(EXH(\Diamond))$ comes out as $EXH(\Box)$ (due to the equivalence (16)), which is as desired
- exhaustifying exhaustified necessity is trivial $EXH(EXH(\Box)) = EXH(\Box)$ (because $EXH(\Box)(b)(p) \Leftrightarrow b = p$)

4 Conclusion and Outlook

- main claim:
  - imperatives express possibility and have to be (anti)exhaustified
  - antiexhaustifier (overt zB) and exhaustifier (covert EXH) modify modal operators
  - in the absence of zB, imperatives get exhaustified (exhaustive possibility = necessity)
  - imperatives containing zB are ambiguous because zB can (i) antiexhaustify the imperative operator, or (ii) antiexhaustify the (derived) necessity operator that is gained from exhaustifying the imperative operator
- Salish modal verbs might constitute an analogous case. They express necessity (*thanks to being exhaustified possibilities*?), unless this would result in a contradiction. In that case, they express possibility. (cf. Matthewson et al. 2005)
- necessity and possibility get conflated in disjunctions due to exhaustive interpretation of the 'possibilities' considered (cf. Geurts ta):

  (33) a. It may be here or it may be there.
  b. It may/must be here or it must be there.

- Menèndez-Benito 2005 argues that free choice items require exhaustification. Can *EXH* in imperatives shed light on the licensing of free choice items in imperatives?

- To do: So far, (anti-)exhaustification is treated as part of the proposition that gets expressed. This is maybe not as it should be...

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