Fine-tuning natural language imperatives: between logic and linguistics

Magdalena Kaufmann (University of Connecticut)

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Grammar to the rescue

• Linguistic sophistication:

(1)  
  a. I am hungry.
  b. I need food!
  c. You should feed me!
  d. ...
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• Other sentence types – other canonical functions
In search of imperative meanings

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This talk:
• ‘imperative’ (grammar) = ‘imperative’ (logic)?
• Formal analysis of NL imperatives?
1. Imperatives in linguistics
2. Desiderata for a semantics of NL imperatives
3. Various accounts discussed in linguistics
4. The modal story
5. Put to use
Functional diversity: beyond commands

- Directives that aren’t commands: instructions, warnings, invitations (‘permissions’):

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  (5) Ok, then go to that damn party!
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- Various types of wishes (expressives):
  
  (6) a. Enjoy the conference! 
      b. Please don’t have broken another vase! 
      c. Don’t be home, please!
Imperatives in embedded contexts

Traditional view in linguistics: ‘impossible’  
(Sadock & Zwicky 1985, . . ., Han 2000)
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Current view:

- **Conditional imperatives:**

  (7) a. If it rains take an umbrella with you.
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• Conditional conjunction:

  (8) Call him and he’ll be annoyed that you woke him up, don’t call him and he’ll be annoyed that you didn’t contact him.
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• Relative clauses
The heart’s command

One form - one meaning!
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In the absence of arguments in favor of...

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  Indirect speech acts?
Doubts about indirectness

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- Non-command imperatives display neither:

  (9) Please don’t have broken another vase.

a. I only hope that you haven’t broken another vase!

b. #He expressed a wish by commanding me not to have broken another vase.
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      broken another vase.

(10) (To go to Harlem) Take the A-train.
    a. The best thing to do is to take the A-train.
    b. #He advised me to take the A-train by commanding me
       to do so.
Truth-values and assertions

(11) Submit your contribution before the end of the week.
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- Imperatives do not have truth values.
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  - Non-boolean combinatorics: Ross’s paradox, no scope under negation, . . .

(12) a. Post the letter
    b. Post the letter or burn it
Practical inferences and others

- Intuitive validity of inferences with quantifiers, conjunctions, ... 

(13) Take any book that is on the desk.
Kindaichi’s grammar of Japanese is on the desk.
Take Kindaichi’s grammar of Japanese.

Same problems as with modal verbs (Charlow 2014).
Practical inferences and others

- Intuitive validity of inferences with quantifiers, conjunctions, \ldots

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\item Take any book that is on the desk.

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\end{enumerate}

Same problems as with modal verbs (Charlow 2014).

- Subsequent modals (Portner 2007):

\begin{enumerate}
\item A: Take the train!

- According to A, you should take the train.
\end{enumerate}
Speaker endorsement and openness

- **Deontic Moore’s paradox** (Frank 1996):

  (15) #You should go to Paris, but in fact, I think it is not advisable.

  (16) A: How do I get to Harlem?
      B: Take the A-train. But I don’t want you to do this.  
      (Kaufmann 2006/2012)

  (17) Ok, then go through this door since you want it so much!
      a. #But don’t forget, I don’t want you to.
      b. But it’s not officially allowed, so I wish you would not.  
      (Condoravdi & Lauer 2012)
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- **Epistemic openness** (Kaufmann 2006/2012)

  (18) a. Sam must go to confession (#but he’s not going to).

      (Ninan 2005)

  b. Go to confession (#but I know you won’t go).
Complete answers

- Imperatives can answer questions of practical deliberation (variant of Kolodny & MacFarlane’s 2010 miners paradox)

(19) Which shaft should we block?
   a. Block shaft A. That’s where they are.
   b. Find out where they are and block that shaft.
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• Partial answers aren’t felicitious unless it is clear that the addressee will arrive at a complete answer in time:

  (20) a. #Block the shaft the miners are in. But I’m not sure you can find out where they are.
  b. You’d have to block the shaft they are in. But I’m not sure you can find out where they are.
Complete answers

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- Contrasts with objective readings for modals like *ought* or *should* (Kaufmann & Kaufmann 2013: subjunctive marking crucial).
For comparison: logical form $!\phi$

- Overt subjects provide evidence of a propositional core

(21) a. YOU pick up the phone.
b. Everybody pick up the phone.

(22) a. Don’t you pick up the phone.
b. Don’t anybody pick up the phone.

(Schmerling 1982, Kaufmann 2006/2012, Zanuttini 2008)
For comparison: logical form $\text{!}\phi$

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- Logical form of imperative clauses: ‘$\text{!}\phi$’
  - $\phi$: propositional core, prejacent
  - !: place-holder for imperative-specific assumptions
Some **propositional** and **non-propositional** proposals

Facts + Rules, Goals, Desires ⇒ Optimal choice
Some propositional and non-propositional proposals

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\[ \phi \]

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Some propositional and non-propositional proposals

\[ \text{Facts} \quad \begin{array}{|c|} \hline \text{Rules,} \\
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\hline \end{array} \quad \Rightarrow \text{Optimal choice} \]


\[ \lambda x. \phi \text{ is added to the addressee's To Do List} \]
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Portner (2004,2007): ‘\(\lambda x. \phi \text{ is added to the addressee’s To Do List}\’

Starr (2010): ‘\(\text{preference structure on information state gets enriched by } \phi > \neg \phi\’

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- Rules,
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**Lewis (1979), Kaufmann (2006/2012):** ‘\[ \square \phi \]’
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Lewis (1979), Kaufmann (2006/2012): ‘□φ’

Condoravdi & Lauer (2012):
‘φ is a maximal element of the speaker’s effective (all ties resolved) preferences’
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Charlow (2014): \textquotesingle the property of a plan to single out } \phi \text{ as optimal\textquotesingle}
Comparing: representation of utterance context

- Belief state/Stalnaker’s Common Ground
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- Additions: Permissibility Sphere (Lewis), To Do List (Portner), Plan/Set of plans (Charlow)
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- Belief state/Stalnaker’s Common Ground
- Additions: Permissibility Sphere (Lewis), To Do List (Portner), Plan/Set of plans (Charlow)
- Assumptions about status of additions, e.g.:

(23) Portner’s (2007) Agent’s Commitment:
For any participant i, the participants in the conversation mutually agree to deem i’s actions rational and cooperative to the extent that those actions in any world $w_1 \in \bigcap \text{CG}$ tend to make it more likely that there is no $w_2 \in \bigcap \text{CG}$ such that $w_1 <_i w_2$.

with: $w_1 <_i w_2$ iff

\[
\{ P \mid P \text{ is on } i \text{'s TDL and } P(w_1)(i) \} \\
\subset \{ P \mid P \text{ is on } i \text{'s TDL and } P(w_2)(i) \}
\]
Comparing: relationship to modality

(24) a. Open the door.
    b. You should/must open the door.
Comparing: relationship to modality

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• Close for everyone
Comparing: relationship to modality

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• Close for everyone
• Semantically identical (Lewis, Kaufmann)

⇑

Imperatives guarantee truth of subsequent modal statements (Portner)
Modality in linguistics: Kratzer (1977, . . .)

- Possible worlds semantics (Hintikka 1969, Kripke 1972)
- Context determines *modal flavor* of modal expressions:
  
  (25) Mary may come to the party.
  
  a. 
  
  b. 
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  - notions other than □ and ♦
Krater’s Framework: Modals

- Conversational backgrounds $F : W \rightarrow \mathcal{P} (\mathcal{P} (W))$
Kratzer’s Framework: Modals

- Conversational backgrounds \( F : W \rightarrow \mathcal{P}(\mathcal{P}(W)) \)
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- Ordering source $g$ at $w$ introduces preorder $\leq_{g(w)}$ on $W$:
  \[(26) \quad u \leq_{g(w)} v \iff \{p \in g(w) : p(v) = 1\} \subseteq \{p \in g(w) : p(u) = 1\}\]
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  \{ p \in g(w) \mid p(v) = 1 \} & \subseteq \{ p \in g(w) \mid p(u) = 1 \}
  \end{align*}

- Consider only finite approximation (Lewis’s Limit Assumption)
  \begin{align*}
  (27) \quad a. \quad O(f, g, w) & := \\
  \{ u \in \bigcap f(w) \mid \forall v \in \bigcap f(w) [v \leq_{g(w)} u \rightarrow u \leq_{g(w)} v] \} \\
  b. \quad wR^{f,g} u & \iff u \in O(f, g, w)
  \end{align*}
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- Ordering source $g$ at $w$ introduces preorder $\leq_{g(w)}$ on $W$:
  \[
  u \leq_{g(w)} v \iff \{p \in g(w) \mid p(v) = 1\} \subseteq \{p \in g(w) \mid p(u) = 1\}
  \]
- Consider only finite approximation (Lewis’s Limit Assumption)
  \[
  O(f, g, w) := \{u \in \bigcap f(w) \mid \forall v \in \bigcap f(w)[v \leq_{g(w)} u \rightarrow u \leq_{g(w)} v]\}
  \]
  \[
  wR^{f,g} u \text{ iff } u \in O(f, g, w)
  \]
- **must/may** as $\Box/\Diamond$ interpreted w.r.t. $R^{f,g}$.
(28) ‘Jon must pay a fine’ is true at $w, f, g$ iff
\[ \forall u \in O(f, g, w)[\text{John pays a fine in } u]. \]

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- \( g(w) = \{\text{people who park on area 1 lots without an area 1 permit pay a fine, people who park on area 2 lots without an area 2 permit pay a fine}\} \)
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- Among worlds in $\bigcap f(w)$: worlds where Jon pays a fine outrank worlds where he doesn’t.
Restrictor analysis for conditionals (Kratzer 1978)

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  - Conditionals with overt modals: restriction of overt or covert epistemic modal (Frank 1996)
Lewis’s identity (1979)

- Lewis (1979): master, slave; commanding, permitting.
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- Challenge for NL imperatives
  - Explain magical adjustment
  - General analysis for imperatives beyond commanding
Why split that way?

- Semantic uniformity for descriptive and performative modal verbs (Schulz 2005, Kaufmann 2012, Kamp 1978)

  (29)  
  a. Mary, you may leave now.  
  b. You may leave now. (John said so.)  
  c. John said that you may leave now.

- Non-propositional accounts of imperatives (properties, plans, action terms,...) still need to explain contextual profile (non-assertive, inferences, embedded occurrences...).
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- Analogous challenge: specify the status of a TDL (Portner) or plan set (Charlow)
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- Non-boolean inferential behavior, specifically: Ross’s paradox
  Does not correlate with descriptive vs. performative language (von Wright 1969)

(30) a. You can pay online or at the police station. (I checked the rules.)

  b. If you may take an apple or a pear, you should consider yourself lucky. (Barker 2010)

  c. You may take an apple or a pear depending on what you’re allergic to.
Contexts and propositional utterances

Context $c = \langle CS, \Pi, f, g \rangle$
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Uttering a proposition

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- For simplicity: practical interrogatives (‘What should $\alpha$ do?’) are split into modal parameters ($f$, $g$) and possible prejacents (the cells of $\Pi^\Delta_{\alpha}$)
Non-descriptive contexts $c$

Context $c = \langle CS, \Pi, f, g \rangle$ and prejacent $p$:

- The speaker counts as epistemic authority on $f$ and $g$ (EA): At all worlds $w \in CS$: $p \in f(w)$ iff $p \in f(w')$ at all $w'$ compatible with what the speaker believes at $w$.

- $g$ meets the Ordering Source Restriction (OSR): – Either $c$ is a practical context for the addressee (so $f$, $g$: decisive modality) and $p$ is a complete or $c$-completable answer to $\Pi$ $\Delta addr$ – or it is not the case that both there is an actual addressee and $p$ is not settled: then $g$ is speaker-bouletic.

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settled: true or false across historical alternatives

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- Deriving expressives (wishes):
  - No actual addressee, speaker-bouletic (OSR): absent wishes

(31) a. Please don’t be home yet!
    b. Just don’t forget to call him tomorrow!
Predicting desiderata about imperatives

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- Deriving expressives (wishes):
  - Actual addressee, \( p \) settled (OSR): wishes
    
    \[(31)\]
    
    a. Please don’t have broken another vase.
    
    b. Please be the person we were looking for.
Predicting desiderata about imperatives

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- Deriving expressives (wishes):
  - Actual addressee, \( p \) unsettled, actual addressee: no wish (Condoravdi & Lauer 2012); accommodation of \( \Pi^\Delta_{\text{addr}} \)

(31)  
  a. Get a lot of work done tomorrow.
  b. #Be well again next week.
Predicting desiderata about imperatives

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- Non-descriptive: different directives (context dependency of Kratzerian modality) or expressive speech acts (OSR)
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- Deriving expressives (wishes):
  - #‘... but I don’t want you to’ (OSR: decisive modality/speaker bouletic)
  - #‘... but you won’t do it’ (EA: true, OSR: decisive modality/want vs. wish)
Possibility-like readings

- Stronger than permissions:

(31) Take a cookie!

(32) a. You may leave by the front door and you may leave by the back door.
   b. #Leave by the front door, and leave by the back door.

Best option given addressee’s wishes (‘if you like’).
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- **Concessions**

  (33) Ok, go then to Paris since you want it so much.

  Accommodation that the hearer’s (contextually relevant) preferences serve as $g$ of decisive modality.
Some further benefits of the modal story

- Standard account of conditionals extends naturally:

  \[(34)\]
  a. If it rains, bring an umbrella.
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  a. Post it or burn it / You should post it or burn it  
  b. . . . depending on whether they have already paid.  
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- **Entailment patterns** (quantifiers, conjunction) as with prioritizing modals.
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  (34)  
  a. If it rains, bring an umbrella.  
  b. If it rains, you should bring an umbrella.

- **Free choice disjunction** yes/no can be treated uniformly (Kaufmann 2013, Ms.):
  
  (35)  
  a. Post it or burn it/You should post it or burn it  
  b. ... depending on whether they have already paid.  
  c. ... depending on your preferences.

- **Entailment patterns** (quantifiers, conjunction) as with prioritizing modals.

- **Compositional behavior of embedded imperatives**: modalized proposition plus presuppositions (projection, local accommodation).

Magdalena Kaufmann (University of Connecticut)  
Fine-tuning natural language imperatives
Embedded imperatives in speech reports

- Traditional view: impossible, only quotes

(36)  
  a. * John said that open the door.
  b. John said, ‘Open the door.’
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  a.  John₁ said call his₁ mom.
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  c.  ?Who did John say call at three?
  d.  John thought Mary said call her mom.
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- Presuppositions: properties of original speech event - local resolution/accommodation (Heim 1983, van der Sandt 1992)
  
  (38) John wants the banshee in his attic to leave.
Embedded imperatives: Slovenian

- Apparently just like ‘you should’ (Dvorak 2005, Rus 2005)

(39) Marko je rekel Petru da mu pomagaj.
Marko AUX said Peter.DAT that him help.2PIMP
‘Marko said to Peter that you should help him.’
Embedded imperatives: Slovenian

- Semantic/pragmatic restrictions

  (40) a. Paul to George: ‘Ringo should listen to Brian!’
       b. John to Ringo: ‘Paul said to George that [you should listen]_{2plmp} to Brian.’

  (41) a. Paul to John: ‘I should listen to Brian!’
       b. John to Paul: ‘You said to me that [you should listen]_{2plmp} to Brian!’

  (42) a. Paul to Paul (John eavesdropping): ‘I should listen to Brian.’
       b. John to Paul: ‘You said to yourself that [you should listen]_{2plmp} to Brian.’
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- **Context properties split between original and actual context**
Restrictive relative clauses

- Cross-linguistically rarer; hypothesis: requires compatibility with complementizer
- Ancient Greek (Meideiros 2013), Slovenian (Dvorak 2005, Rus 2005)
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- Ancient Greek (Meideiros 2013), Slovenian (Dvorak 2005, Rus 2005)
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    43) This is the book that [you should read] \(2pSg\), and this is the book that [you should give] \(2pSg\) to your father.
  - Choosable actions:
    44) #The book that [you should buy] \(2pSg\) is sold out.
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    (45) The book that [you should buy]_{2pSg} as soon as it is available is not yet out.
Conclusions

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- Semantically, they are less specific than ‘imperatives’ in logic
- Challenge: theoretically satisfactory unification of directives, speaker disinterested advice, and expressives
- Analyses of NL imperatives must capture ‘decisive modality’ - relying on notions familiar from deontic logic
References I


References II


Magdalena Kaufmann. Imperatives, disjunction, free choice, and what it all depends on. Colloquium, Cornell University, November 7, 2013.


References V


