Steps Toward a Theory of Imperative Meaning

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Assumption 1: a major component of a theory of imperative *meaning* is an account of the *conventional force* of imperatives.

Assumption 2: accounts of imperative force have three parts.

- A *regimented language* for representing "logical forms" (in a very attenuated sense) of natural language imperative clauses
- A sufficiently rich *algebra of speech acts*
- A mapping $[\cdot]$ between them.

Not assuming:

- Imperative operator (or any dedicated device for encoding of imperative force) at syntax (cf. Portner 2004, 2007, but contra Krifka 2001, Han 1999, etc.).
- $[\cdot]$ can be defined on natural language imperatives, *or* on formulas of an illocutionary metalanguage.
- Dynamic semantics (contra Portner 2007, Potts 2003, Isaacs & Potts 2003).

My main goals in this talk fall into two piles.

- General/methodological: to organize the debate, give people new to the debate a sense of (how I see) the lay of the land.
  - Outline major theoretical possibilities for each component of an account of imperative force.
  - Locate the major extant accounts in the resulting partition.
  - Use this apparatus to articulate some precise theoretical constraints on the shape of an account of imperative force.
- Specific: applying these theoretical constraints to identify and resolve specific problems with extant accounts:
  - Identify serious (but also spurious) empirical challenges to the major types of account.
  - Give a precise account of (one dimension of) the meaning of certain imperative constructions (conditional and quantified-subject imperatives, in particular).

Ordinary imperatives (OIs) are of the form $!\phi$

- Shut the window!

Conditional imperatives (CIs) are of the form $(\mathit{if}\,\phi)(!\psi)$

- If the temperature drops, shut the window!

Directed imperatives (DIs) are of the form $a!\phi$ or $Qx!\phi$.

- Nunzio shut the window! [Non-quantified subject]
- Everyone$_i$ take off their$_i$ coat! [Quantified subject]

CIs and DIs demand a new understanding of illocutionary force (as *restrictable* and *composable*).

- This suggests a generalization of Kratzer's claim that *if*-clauses function to restrict the domain of a (default-epistemic) modal operator: *if*-clauses function to restrict the domain of a quantificational modal operator or non-quantificational speech-act operator.
- Evidence for "embeddability" under operators ($\approx \forall$ and $\wedge$) that 'serialize' speech-acts (cf. Krifka 2001, 2004).
  - Note: embeddability, in the sense intended here, is *not* a claim about NL syntax.
  - No clear evidence for embeddability under operators ($\approx \exists$ and $\vee$) that 'relationalize' speech-acts.

Standard accounts start with a theoretically motivated picture of the algebra of speech acts, which subsequently constrains their regimented language and understanding of $[\cdot]$.

Specifically, illocutionary force is said to be analogous to propositional attitudes (Stenius 1967, Lewis 1970, many others).

- Both fit into the schema *S Ψ's that* ϕ
- Contents, as such, have no inherent attitudinal or illocutionary function. Both attitudes and speech acts are the result of combining a attitude-type (belief, desire, etc.) or speech act-type (assertion, directing, etc.) with a forceless content.
- So, modeling *imperative* force means saying how a direction with content ϕ updates information-states (contexts, etc.).
- The attendant regimented language is one in which speech act operators take widest scope for any speech act designator.

Target-setting accounts (Lewis 1979): imperatives conventionally introduce new deontic facts into a discourse. They establish *modal targets*, that the discourse subsequently adjusts to meet. [So, their force is akin to the force of performative uses of necessity modals.]

- $[!\phi]$ outputs a state verifying $\Box\phi$

Natural questions:

- What is it for a state to verify $\Box\phi$?
- What does $[!\phi]$ do to make a state verify $\Box\phi$?

Lewis' answers (which are adequate, on the target-setting view):

- A state σ supplies a sphere of permissibility $ok_\sigma \subseteq W$
- Accessibility-relation semantics for obligation-sentences: $[\![\Box\phi]\!]^\sigma = 1 \Leftrightarrow ok_\sigma \subseteq [\![\phi]\!]$
- $[!\phi]$ updates σ so that $ok_{\sigma[!\phi]} = ok_\sigma \cap [\![\phi]\!]$.

What about CIs and DIs? Presumably Lewis will want to say all varieties establish corresponding modal targets:

- $[(if\,\phi)(!\psi)]$ outputs a state verifying $(if\,\phi)(\Box\psi)$
- $[a!\phi]$ / $[Qx!\phi]$ output a state verifying $a\Box\phi$ / $Qx\Box\phi$.

Obviously there is a problem here:

- CI force cannot be update on a permissibility sphere: sets of worlds lack sufficient structure to state a useful semantics for conditionals of the form $(if\,\phi)(\Box\psi)$. (These require, even by Lewis' lights, something like a deontic ordering on worlds.)
- Less interestingly, DI force cannot be update on a permissibility sphere: addressees are often multiple. Not every language game is played between MASTER and SLAVE.

Mechanistic accounts (Potts 2003, Isaacs & Potts 2003, Portner all): imperatives conventionally perform a single operation on a parameter which determines deontic facts (the To-Do List), but the operation itself is not specified *in terms of deontic facts*.

- TDLs are ordering-sources (sets of propositions; cf. Kratzer 1981) for $\Box$:
  - $u \preceq_T v \Leftrightarrow \{p \in T : v \in p\} \subseteq \{p \in T : u \in p\}$
- σ supplies, for each agent a, a TDL $T_\sigma(a)$
- Deontic sentences interpreted with respect to the ordering:
  - $[\![a\Box\phi]\!]^\sigma = 1 \Leftrightarrow \{u : \forall v(v \preceq_{T_\sigma(a)} u \Rightarrow u \preceq_{T_\sigma(a)} v)\} \subseteq [\![\phi]\!]$
- $[!\phi]$ updates σ so that $T_{\sigma[!\phi]}(addr_\sigma) = T_\sigma(addr_\sigma) \cup \{[\![\phi]\!]\}$
- $[a!\phi]$ updates σ so that $T_{\sigma[a!\phi]}(a) = T_\sigma(a) \cup \{[\![\phi]\!]\}$

This seems as if it might be enough structure to interpret CIs / DIs.

If $[\![\phi]\!]$ is on $T_\sigma(a)$, then uttering $a!\neg\phi$ tends to make it *permitted* that ϕ (since $\preceq_{T_{\sigma[a!\phi][a!\neg\phi]}}$ tends to rank ϕ and $\neg\phi$ worlds equally).

- That is strange. As Portner (2010) notes, there are permissive uses of imperatives ("Monday carry rocks! Tuesday carry rocks! And Wednesday carry rocks! [...Tuesday comes along.] Take tomorrow off!"). But it's unclear why a permission interpretation of the last imperative is privileged to a *non-permissive interpretation*.
- The semantic apparatus (TDLs, ordering-semantics) is independent of whether we go target-setting or mechanistic
  - We can say $[a!\phi]$ updates σ so that $[\![a\Box\phi]\!]^{\sigma[a!\phi]} = 1$.
  - $T_{\sigma[a!\phi]}(a) = T_\sigma(a)$, except $[\![\phi]\!] \in T_{\sigma[a!\phi]}(a)$, and $\forall q \in T_\sigma(a) : [\![\phi]\!] \cap q = \emptyset \Rightarrow q \notin T_{\sigma[a!\phi]}(a) \wedge q \cup \{w \in [\![\phi]\!] : w$ is $\preceq_{T_\sigma(a)\setminus\{q\}}$-minimal$\} \in T_{\sigma[a!\phi]}(a)$
    That's to say, we (i) add $[\![\phi]\!]$, and (ii) weaken conflicting elements q of the ordering-source by adding ϕ-worlds to q that are least reprehensible with respect to $T_\sigma(a)\setminus\{q\}$.

Obviously, we need at least as much structure as individual-indexed TDLs provide to have a general account of imperative force.

But it's unclear if that's *enough* structure to handle CIs and DIs.

- What do $[(\mathit{if}\,\phi)(!\psi)]$ / $[Qx!\phi]$ do to a TDL?
- If we're Lewisians (as I'll tentatively assume we ought to be), we say that $[\![(\mathit{if}\,\phi)(\Box\psi)]\!]^{\sigma[(\mathit{if}\,\phi)(!\psi)]} = 1$ and $[\![a\Box\phi]\!]^{\sigma[a!\phi]} = 1$.
- Q1: are TDLs sufficiently structured to make these predictions about CIs and DIs? (No!)
- Q2: does making TDLs sufficiently structured lead to tensions with the standard account? (Yes!)

Standard accounts have two choices for $[(\mathit{if}\,\phi)(!\psi)]$.

- Deferred update/narrow-scoping (Portner, Potts): $[!\psi]$ is conditioned on ϕ. E.g. $[(\mathit{if}\,\phi)(!\psi)] = [!\psi] \cap \{\langle\sigma,\tau\rangle : [\![\phi]\!]^\sigma = 1\}$
  - Problem: even when both σ and $\sigma[(\mathit{if}\,\phi)(!\psi)]$ fail to verify ϕ, we will *typically* have $(\mathit{if}\,\phi)(\Box\psi)$ true at $\sigma[(\mathit{if}\,\phi)(!\psi)]$. This is not predicted by this account. (Note: even by Portner's lights, imperatives *defeasibly* introduce corresponding obligations.)
  - So: we need an update on σ that is performed *regardless of the antecedent's status* at σ.
- Immediate update/wide-scoping: $[(\mathit{if}\,\phi)(!\psi)] := [!\chi]$, for some χ. E.g. $[(\mathit{if}\,\phi)(!\psi)] := [!(\phi \supset \psi)]$
  - I suspect no one is tempted by this. There are empirical problems (I can elaborate in Q&A). Also, wide-scoping seems like the wrong route for CQs; why would it be right for CIs?

Conclusion: CIs push us away from the standard model.

The Modal Account. Schwager (2006) notices we have an off-the-shelf *semantics* for CIs, if we analyze ! as $\Box$ and use Kratzer's (1981) restrictor semantics for COs.

- Step 1. $! := \Box$
- Step 2. $[\![(if\,\phi)(a\Box\psi)]\!]^\sigma = 1 \Leftrightarrow$
  $\{u \in [\![\phi]\!] : \forall v \in [\![\phi]\!](v \preceq_{T_\sigma(a)} u \Rightarrow u \preceq_{T_\sigma(a)} v)\} \subseteq [\![\psi]\!]$

Problems:

- If imperatives express propositions, why do they lack non-performative interpretations?
  - Schwager: imperatives bear presuppositions that force a performative interpretation. But that is unsatisfactory, for reasons I won't get into here (Charlow 2009, Portner 2007).
- We're after a theory of imperative force. Schwager offers no account of what sort of speech act a CI is mapped by $[\cdot]$ to.
  - More strongly, it's not clear what a semantics for CIs *actually explains*, if it illuminates nothing about their force.

Standard accounts lack an account of the force of certain DIs.

1. Have the orchestra play Beethoven's Fifth
   $:= addr!make\text{-}play(orch, 5^{th}, addr)$
2. Play Beethoven's Fifth (together) $:= orch!play(5^{th}, orch)$
3. Everyone play her part $:=$???
4. Play your part [Conductor addressing orch] $:=$???

Note: that is not because the Lewis and Portner accounts have no account of what the last two DIs do to a state. For Lewis, they introduce an obligation, for each addressee. For Portner, they add something to the TDL, for each addressee.

- The problem is that the standard algebra of speech acts is composed of operations like *introducing an obligation* (Lewis) or *adding to a TDL* (Portner).

For both CIs and universally quantified-subject DIs:

- We have a pretty good idea of what speech act they are supposed to express.
- But those speech acts cannot, it seems, be represented in a manner consistent with the standard account.
- In the next part of the talk, we will try something else.

Standard illocutionary syntax.

Let Δ be the standard account's regimented illocutionary metalanguage: the language in which imperative "LFs" are given. Δ is constructed from the speech act operator !, a first-order language $\mathcal{L}$, and a set of individual constants $\mathcal{A}$ and variables $\mathcal{V}$.

Δ is defined as the smallest set such that:

- $\phi \in \mathcal{L}, x \in \mathcal{V} \Rightarrow x!\phi \in \Delta$
- $\phi \in \mathcal{L}, a \in \mathcal{A} \Rightarrow a!\phi \in \Delta$

Non-standard illocutionary syntax. Standard illocutionary syntax isn't rich enough. So we'll enrich it. We begin with a set of basic speech acts (about which more below) Π. We will also add:

- A pairing device $\langle \cdot, \cdot \rangle$
- The regular operators ';' (sequencing) and '+' (relationalizing). ';' expresses relation-composition ($\circ$), while '+' expresses relation-union ($\cup$).

The new regimented metalanguage Δ^* is the smallest set s.t.:

- $\Pi \subseteq \Delta^*$
- $\phi \in \mathcal{L}, \alpha \in \Pi \Rightarrow \langle \phi, \alpha \rangle \in \Delta^*$
- $\alpha, \beta \in \Delta^* \Rightarrow \alpha; \beta \in \Delta^*$ and $\alpha + \beta \in \Delta^*$

Finally, we define the operators $\bigwedge$ and $\bigvee$. Let $\Sigma(s)$ be an environment in which the string s occurs. Then, if $\Sigma(s) \in \Delta^*$:

- $\bigwedge_{F(s)} \Sigma(s) = \Sigma(s_1); ...; \Sigma(s_n)$ iff $F(s_j)$, $1 \leq j \leq n$.
- $\bigvee_{F(s)} \Sigma(s) = \Sigma(s_1) + ... + \Sigma(s_n)$, iff $F(s_j)$, $1 \leq j \leq n$.

Semantics. There are two salient tasks.

- Give the semantics for Δ^*
- Say how OIs, CIs, and DIs map onto elements of Δ^*

The key semantic ingredient remains the *state*. We'll treat states as primitive here, assuming that, for any state σ, there is a To-Do List function T_σ defined for each individual.

- $[\cdot]$ is, as before, a relation on states
- For each individual a, $T_\sigma(a)$ is a *contingency plan*: a function from contingencies (situations) to sets of propositions.

Basic speech acts: a basic imperative imperative tells someone *what to do in a specific contingency*.

- OIs say what to do in *any relevant* contingency, so they are represented as sequences of basic imperatives
- CIs say what to do in *a subset* of the relevant contingencies, so they too are represented as sequences of basic imperatives

Complex speech acts: more formally, letting $[\langle \phi, a \amalg \psi \rangle]$ be the operation of either (i) altering a specified contingency plan for a (the one holding in the situation fully characterized by ϕ) so that ψ is obligatory with respect to that plan (Lewis), or (ii) adding ψ to the specified contingency plan for a (Portner):

- $a!\phi := \bigwedge_{[\![\psi]\!] \subseteq W} \langle \psi, a \amalg \phi \rangle$
- $(if\, \phi)(a!\psi) := \bigwedge_{[\![\chi]\!] \subseteq [\![\phi]\!]} \langle \chi, a \amalg \psi \rangle$

What are contingencies? That is complicated. For our purposes, contingencies are world-independent *bodies of information* (subsets of W) (cf. Charlow 2009), so:

$$T_{\sigma[(if\, \phi)(a!\psi)]}(a) = T_{\sigma[\langle \chi_i, a \amalg \psi \rangle]...[\langle \chi_n, a \amalg \psi \rangle]}(a),$$
$$\text{for all } 1 \leq j \leq n \text{ such that } [\![\chi_j]\!] \subseteq [\![\phi]\!]$$

Things to note:

- Unconditional imperative force is a special, *restricted* variety of conditional imperative force. (Cf. Kratzer 1981, on modal conditionals, and Isaacs & Rawlins 2008, on CQs.)
- Affinities with the Isaacs & Rawlins (2008) account of CQs, which has CQs performing the basic interrogation operation (partitioning) on hypothetical contexts enriched by the antecedent's information. We, too, have CIs performing the basic directive operation (whether Lewisian or Portnerian) on bodies of information (indeed, a series thereof) enriched by the antecedent's information.

A different problem: predicting the desired interactions with the corresponding deontic conditionals requires revision of the Kratzer (1981) semantics, so that the *if*-clause supplies the relevant contingency. I have in mind something like:

$$[\![(if\,\phi)(a\Box\psi)]\!]^{\sigma} = 1 \Leftrightarrow$$
$$\{u \in [\![\phi]\!] : \forall v \in [\![\phi]\!](v \preceq_{T_\sigma(a)([\![\phi]\!])} u \Rightarrow u \preceq_{T_\sigma(a)([\![\phi]\!])} v)\} \subseteq [\![\psi]\!]$$

Informally, $(if\,\phi)(a\Box\psi)$ says the **best-on-the-supposition-that-**ϕ ϕ-worlds, given a's obligations, are ψ-worlds.

Independent motivation for the revision (**skippable!**). Kolodny & MacFarlane (2010): ten miners are all trapped in a shaft (A or B, but which?) and threatened by waters. We can block one shaft or neither, but not both. If we block the shaft they're in, all are saved. If we guess wrong, all die.

On the Kratzer semantics, unless (i) ordering-sources are information-sensitive and (ii) *if*-clauses 'shift' the ordering-source for a modal, (M1), (M2), and (M3) are provably inconsistent. (For discussion and proofs, see Charlow 2009, 2010.)

(M1) *If they're in A, should block A* $\approx (if\ in\_A)(\Box bl\_A)$
(M2) *If they're in B, should block B* $\approx (if\ in\_B)(\Box bl\_B)$
(M3) *May block neither* $\approx \neg\Box(bl\_A \vee bl\_B)$

But most informants hear (M1), (M2), and (M3) as, not merely consistent, but *true*.

Representing the force of the DIs that troubled the standard account is trivial. Recall, such DIs (e.g., *everyone play her part*) were troubling because the standard account's regimented metalanguage and algebra of speech acts provided no way of building complex speech acts (e.g., the introduction of obligations on a series of addressees) from more basic speech acts. But that is exactly what our account provides.

Supposing that the "context" σ provides a set of addressees A_σ, a universally quantified-subject imperative expresses sequencing along two dimensions:

$$\forall x!\phi := \bigwedge_{a\in A_\sigma} \bigwedge_{[\![\psi]\!]\subseteq W} \langle \psi, a\,\amalg\,\phi\rangle$$

We've covered lots of ground. And the last section of the talk was quite involved and technical. To end, I want to circle back to more general issues. Here are the important takeaway points.

- CIs and DIs show the standard account needs serious revision.
- It is extremely methodologically suspect to begin, as *nearly every major reference in speech act theory has chosen to do*, with a theoretically attractive account of the algebra of speech acts, and try to design a theory of linguistic meaning around that.
- Adding a sequencing operation to our regimented illocutionary metalanguage allows us to handle phenomena that trouble the major extant accounts (namely, CIs and DIs).
- Like Kratzer's (1981) treatment of modalized conditionals, the correct treatment of CIs forces a new understanding of the cases we once thought basic; bare modals and OIs, respectively, are seen as special cases of a more general linguistic phenomenon.

- Contra Schwager (2006), accounting for the meanings of the various kinds of imperative constructions does not require giving up on a force- or speech-act-theoretic account of their meanings.
- In a similar vein: the general sort of formal approach we've devised avoids any sort of radical claims about natural language syntax. Krifka (2001), e.g., suggests that representing the meanings of pair-list readings of question demands we allow *natural language quantification/conjunction* to out-scope speech act operators (hence, demands speech act operators be syntactically realized).
  - Maybe there are reasons to think speech act operators are syntactically realized, but our account takes no stand either way. Thus: a compositional account of the meanings of a pretty wide class of natural language imperatives requires no substantive syntactic commitments. (I think that's nice.)

- Nor have we committed ourselves to any particular picture of the semantics/pragmatics interface. In particular, I've not claimed that there is no theoretically interesting static dimension to imperative meaning. In fact, I think there is. (Happy to say more about this.)
- Nearly all of the points I've made here are independent of the specific formalization offered by my own "non-standard account." It strikes me as one plausible way of modeling what I want to model, but I am not really wedded to it.

Relationalizing? If there are, in fact, conventionalized devices for expressing speech act sequencing in natural language, are there also devices that correspond to speech act relationalizing?

- Are there, in other words, natural language devices that must be represented in our illocutionary metalanguage using devices that relationalize update-functions (hence, whose formalization requires making use of $+$ and $\bigvee$)?

Krifka (2001) has adduced independent evidence (having to do with pair-list readings of questions) for introducing ';' into our metalanguage. He judges the evidence for a relationalizing operation to be thin. (Krifka 2004 is, however, less circumspect.)

- I'm in tentative agreement with Krifka (2001). I know of no examples of constructions that might plausibly conventionally express relationalized speech acts. [Note 1: I am happy to discuss the data I find unpersuasive.] [Note 2: there are general reasons to think state-update must actually be *deterministic*, ruling out non-functional update potentials ex ante.]

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