Choice offering imperatives in inquisitive and truth-maker semantics

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Imperatives: worlds and beyond
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Part I

Setting the stage

- How can we understand the meaning of an imperative sentence?
- In the case of a declarative sentence, there is a traditional answer: truth-conditions.
- Semantics comes in the form of a truth relation $w \models \varphi$ defined between "possible worlds" and sentences.
- Let $|\varphi| := \{w \mid w \models \varphi\}$
- Then, a declarative can be seen as partially describing a possible world by locating it inside the set $|\varphi|$.

Natural hypothesis: imperative meaning = compliance conditions.

Let us try to implement this idea in a basic setting: propositional logic.

Action formulas: $\varphi ::= a \mid \neg\varphi \mid \varphi \wedge \varphi \mid \varphi \vee \varphi$

- $a \quad \rightsquigarrow \quad$ calling Alice
- $\neg a \quad \rightsquigarrow \quad$ not calling Alice
- $a \wedge b \quad \rightsquigarrow \quad$ calling Alice and calling Bob
- $a \vee b \quad \rightsquigarrow \quad$ calling Alice or calling Bob

Imperatives are formulas of the form $!\varphi$, for φ an action formula.

- We take compliance conditions to be assessed relative to a conduct.
- Intuitively, a conduct encodes what actions the relevant agent has performed over the relevant stretch of time.
- Formally, a conduct is just a valuation function $c : \mathcal{A} \to \{0, 1\}$. $c(a) = 1$ if the agent performed some a-actions, $c(a) = 0$ otherwise.

Execution conditions

- $c \models a \iff c(a) = 1$
- $c \models \neg\varphi \iff c \not\models \varphi$
- $c \models \varphi \wedge \psi \iff c \models \varphi$ and $c \models \psi$
- $c \models \varphi \vee \psi \iff c \models \varphi$ or $c \models \psi$

Compliance conditions

- $c \models !\varphi \iff c \models \varphi$

Compliance set: $|\varphi| := \{c \mid c \models \varphi\}$

Intuition: like a declarative describes a possible world, an imperative describes a conduct by locating it within $|\varphi|$.

Imperative entailment

$!\varphi \models !\psi \iff \forall c: \; c \models !\varphi \;\Rightarrow\; c \models !\psi$

Prediction: the logic of imperatives is classical

$!\varphi \models !\psi \iff$ φ entails ψ in classical logic.

If this were right, the difference between the two kinds of sentences would lie only in what they describe: states of affairs vs. ways to act.

However, this prediction seems contradicted by basic examples.

Problem I: Ross's paradox

As Ross ('41) observed, the entailment $!a \models !(a \vee b)$ fails for imperatives. When told (1-a), one is not entitled to infer (1-b).

(1) a. Post this letter.
    b. Post this letter or burn it.

Yet, complying with (1-a) implies complying with (1-b)!

The contrapositive entailment $!\neg(a \vee b) \models !\neg a$ does seem valid. From (2-a), one is entitled to infer (2-b).

(2) a. Do not post or burn this letter.
    b. Do not post this letter.

Problem II: Veltman's puzzle

Imagine that a patient consults two doctors about the same problem and obtains the following two prescriptions.

(3) a. Drink milk or apple juice.
    b. Don't drink milk.

- Intuitively, the doctors are disagreeing, and cannot both be trusted.
- In terms of compliance, though, the prescriptions are consistent. Our patient should simply draw the conclusion: drink apple juice.
- We would like our account to explain why (3-a) and (3-b) are perceived as conflicting, though it is possible to comply with both.

Part II

The basic account

Why does (4-a) not entail (4-b)?

(4) a. Post this letter.
    b. Post this letter or burn it.

Common intuition:
if I tell you to post the letter, I'm not giving you the option to burn it.

- We take this intuition seriously as the starting point of our proposal.
- To make sense of this as an explanation of the non-entailment, we have to assume that (4-b) does grant an option to burn the letter.
- The meaning of (4-b) has a permission component that is not present in (and in fact is contradicted by) the content of (4-a).
- This explains why (4-a) is not stronger than (4-b).

The same intuition explains Veltman's puzzle.

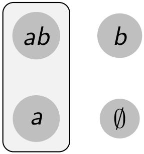
(5) a. Drink milk or apple juice.
    b. Don't drink milk.

The doctors are disagreeing because:

- (5-a) implies that milk is an option;
- (5-b) implies that milk is not an option.

From conducts to option sets

- In order to implement this free-choice intuition, we can no longer maintain that an imperative describes a unique, specific conduct.
- Rather, we will regard it as describing a set of conducts, where the conducts in the set are the options available to the addressee.
- We will refer to a set of conducts as an option set.



The meaning of an imperative

An imperative $!\varphi$ conveys two things about the option set s:

- all options in s execute φ in some way;
- for any way of executing φ there is a corresponding option.

To formalize this, need a semantics for action formulas that tells us what the ways of executing a given action formula.

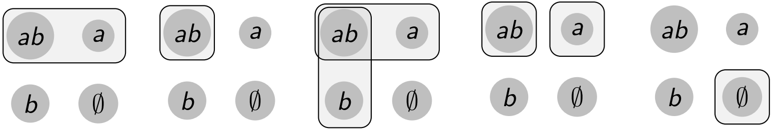
We move from compliance-conditional semantics to inquisitive semantics

Inquisitive semantics for action formulas

The meaning of an action formula is given by support at an option set. We can read $s \models \varphi$ as: φ is executed uniformly in all the conducts in s.

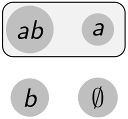
- $s \models a \iff c(a) = 1$ for all $c \in s$
- $s \models \varphi \vee \psi \iff s \models \varphi$ or $s \models \psi$
- $s \models \varphi \wedge \psi \iff s \models \varphi$ and $s \models \psi$
- $s \models \neg\varphi \iff s \cap t = \emptyset$ for all $t \models \varphi$

Let $\mathrm{Alt}(\varphi)$ be the set of maximal option sets that support φ.

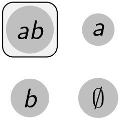


a $\quad$ $a \wedge b$ $\quad$ $a \vee b$ $\quad$ $a \wedge (b \vee \neg b)$ $\quad$ $\neg(a \vee b)$

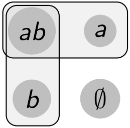
Definition:
we call $!\varphi$ a basic imperative if $\mathrm{Alt}(\varphi)$ is a singleton,
and a choice imperative if it contains multiple elements.



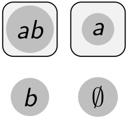
a



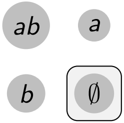
$a \wedge b$



$a \vee b$



$a \wedge (b \vee \neg b)$



$\neg(a \vee b)$

Fact 1: $c \models \varphi \iff \{c\} \models \varphi$

Fact 2: $|\varphi| = \bigcup \mathrm{Alt}(\varphi)$

Semantics of imperatives:
Writing $s \between t$ for $s \cap t \neq \emptyset$, we let:

$$s \models !\varphi \iff \begin{array}{ll} (i) & s \subseteq |\varphi| \\ (ii) & s \between \alpha \ \text{ for all } \alpha \in \mathrm{Alt}(\varphi) \end{array}$$

Semantics of imperatives, restated:

$$s \models !\varphi \iff \begin{array}{ll} (i) & \forall c \in s \quad \exists \alpha \in \mathrm{Alt}(\varphi): \ c \in \alpha \\ (ii) & \forall \alpha \in \mathrm{Alt}(\varphi) \quad \exists c \in s: \ c \in \alpha \end{array}$$

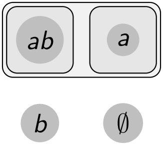
Imperative entailment and equivalence:

- $!\varphi \models !\psi \iff \forall s: \ s \models !\varphi \Rightarrow s \models !\psi$
- $!\varphi \equiv !\psi \iff !\varphi \models !\psi$ and $!\psi \models !\varphi$

Predictions I: basic imperatives

(6) Call Alice. $\rightsquigarrow$ $!a$

- Atomic imperatives are basic: $\mathrm{Alt}(a) = \{|a|\}$
- $s \models !a \iff s \subseteq |a|$ and $s \between |a| \iff s \subseteq |a|$ and $s \neq \emptyset$



Prediction: (6) conveys that all options are conducts in which A is called.

Predictions I: basic imperatives

What we just saw for atomic imperatives extends to all basic imperatives.

- Let φ be a basic imperative, i.e., $\mathrm{Alt}(\varphi) = \{|\varphi|\}$.
- $s \models !\varphi \iff s \subseteq |\varphi|$ and $s \neq \emptyset$

Prediction: $!\varphi$ conveys that all options are conducts that execute φ.
The meaning of $!\varphi$ is fully determined by the execution conditions of φ.

Prediction: $!\varphi \models !\psi \iff |\varphi| \subseteq |\psi| \iff \varphi \models_{CPL} \psi$
The logic of basic imperatives is classical.

Predictions II: disjunctive imperatives

(7) Call Alice or Bob. $\rightsquigarrow$ $!(a \vee b)$

- $\mathrm{Alt}(a \vee b) = \{|a|, |b|\}$.
- $s \models !(a \vee b) \iff s \subseteq |a \vee b|$ and $s \between |a|$ and $s \between |b|$

Prediction: (7) conveys that

1. in all the available options, either A or B is called;
2. there is an option in which A is called, and one in which B is called.

Predictions II: Ross's observation accounted for

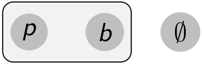
- Prediction: $!a \not\models !(a \vee b)$

  If $c(a) = 1$ and $c(b) = 0$, then $\{c\} \models !a$ but $\{c\} \not\models !(a \vee b)$
  Hence, the inference from (8-a) to (8-b) is predicted as invalid.

  (8) a. Call Alice.
  b. Call Alice or Bob.

- In the Ross scenario, moreover, posting and burning are exclusive. Taking this into account, $!p$ and $!(p \vee b)$ are in fact inconsistent.

$!p$



$!(p \vee b)$

- Thus, far from following from the imperative *Post this letter*, the imperative *Post this letter or burn it* contradicts it.

Predictions III: conjunctive imperatives

(9) a. Call Alice and Bob. $!(a \wedge b)$

b. Call Alice, and call either Bob or Charlie. $!(a \wedge (b \vee c))$

- (9-a) is a basic imperative: $\mathrm{Alt}(a \wedge b) = \{|a \wedge b|\}$
- Prediction: (9-a) conveys an obligation to call both.
- Notice that (9-a) is correctly predicted to entail both $!a$ and $!b$.

- (9-b) is a choice imperative: $\mathrm{Alt}(a \wedge (b \vee c)) = \{|a \wedge b|, |a \wedge c|\}$.
- $s \models !(a \wedge (b \vee c)) \iff s \subseteq |a|$ and $s \subseteq |b \vee c|$ and $s \between |b|$ and $s \between |c|$
- Prediction (9-b) conveys that:
  - every option is a conduct in which A is called;
  - every option is a conduct in which at least one of B and C is called;
  - there is an option in which B is called, and one in which C is called.

Predictions IV: negative imperatives

(10) a. Don't post this letter. $!\neg p$
b. Don't post or burn this letter. $!\neg(p \vee b)$

- Negative imperatives are always basic: $\mathrm{Alt}(\neg\varphi) = \{\overline{|\varphi|}\}$
- Prediction: a negative imperative $!\neg\varphi$ conveys that every option in s is a conduct in which φ is not executed.

- (10-b) is correctly predicted to entail (10-a): $!\neg(p \vee b) \models !\neg p$. This because both imperatives are basic and $\overline{|p \vee q|} \subseteq \overline{|p|}$.
- Thus, our observations about Ross's example are accounted for.

Predictions IV: Veltman's puzzle accounted for

(11) a. Drink milk or apple juice. $!(m \vee a)$

b. Don't drink milk. $!\neg m$

- These two imperatives are indeed inconsistent:
  - if $s \models !(m \vee a)$, then $s \between |m|$
  - but if $s \models !\neg m$, then $s \subseteq \overline{|m|}$
  - no s can satisfy both conditions
- This explains the feeling that the prescriptions are conflicting, in spite of the fact that it is possible to comply with both.

Taking stocks

- We have proposed an account in which an imperative describes a set of options for action.
- In particular, we have assumed that an imperative $!\varphi$:
  - provides an obligation to comply with φ;
  - offers a choice between alternative ways to comply.
- We have shown that this offers a natural explanation of two interesting puzzles concerning the logic of imperatives:
  - Ross's paradox
  - Veltman's puzzle

Part III

Exhaustivity

Hurford's constraint

- Hurford (1974) observed that disjunctions in which one disjunct entails the other are generally infelicitous:

(12)
a. #John is an American or a Californian.
b. #The number x is greater than 6 or different from 6.
c. #Alice came, or Alice came and Bob didn't.

- This is commonly referred to as Hurford's constraint.

- Hurford's constraint is also at play in imperatives:

(13)
a. #Hire an American or a Californian.
b. #Take a number greater than 6 or different from 6.
c. #Call Alice, or call Alice and don't call Bob.

Why Hurford's constraint?

(14) #Hire an American or a Californian.

- Hurford's constraint has been explained in terms of a more general ban against LFs which contain redundant operators.
  (Katzir and Singh 2013, Simons 2001, Meyer 2013)

- Our account allows us to extend the explanation to imperatives:
  - if $\psi \models \varphi$, then in inquisitive semantics $\varphi \vee \psi \equiv \varphi$;
  - as a consequence, the Hurford disjunctive imperatives in (14) contain structural redundancy, and are predicted to be deviant.

- There are cases that seem to violate Hurford's constraint:

(Gazdar 1979)

(15) a. Alice called Bob, Charlie, or both.
b. Alice took two or three cards.

- The situation is analogous for imperatives:

(16) a. Call Bob, Charlie, or both.
b. Take two or three cards.

- How to account for these cases?

- To deal with these cases, in AC13 we used a semantics in which $\mathrm{Alt}(p \vee q) = \{|p|, |q|\}$ even when $|q| \subseteq_c |p|$.
- *Mutatis mutandis*, the same holds for Fine's truth-maker account.
- However, this solution creates two other problems.
- First, in these systems $\varphi \vee \psi \not\equiv \varphi$ even when $\psi \models \varphi$.
  So, we lose our explanation for the oddness of (17-a,b).

  (17) a. #Hire an American or a Californian.
  b. #Call Alice, or call Alice and not Bob.

- We would like a theory that explains the difference between "good" and "bad" Hurford disjunctions.

- Moreover, consider the following sentences:

(18) a. Call Alice, or call Alice, Bob, and Charlie.
     b. Take two cards or four cards.

- Intuitively, calling just Alice and Bob is a contravention to (18-a), and taking exactly three cards is a contravention to (18-b).

- But both our AC13 account and Fine's account wrongly predict such conducts to be (entirely) compliant.

- To solve both problems at once we adopt the explanation proposed by Chierchia, Fox and Spector (2009) for declaratives.

- Observation:
  the felicitous disjunctions are those in which the weak disjunct admits an exhaustive interpretation that breaks the entailment.

(19) a. Call Alice $\rightsquigarrow$ not Bob, Charlie, ...
b. Take two cards $\rightsquigarrow$ not three

(20) a. Hire an American $\not\rightsquigarrow$ not Californian
b. Call Alice $\not\rightsquigarrow$ not (Alice and not Bob)

- Proposal:
  this strengthening can sometimes occur in embedded positions.

- Concretely, this happens by means an optional operator exh, which amounts to a silent *only*.

Good Hurford disjunctions

(21) Call Alice, Bob, or both.

- Hurford's constraint rules out the LF $a \vee b \vee (a \wedge b)$
- however, we also have the LF $\text{exh}(a) \vee \text{exh}(b) \vee \text{exh}(a \wedge b)$
- under natural assumptions this is $(a \wedge \neg b) \vee (b \wedge \neg a) \vee (a \wedge b)$
- this LF no longer violates Hurford's constraint;
- since it has a suitable LF, (21) is felicitous.

Bad Hurford disjunctions

(22) #Call Alice or call Alice but not Bob.

- HC rules out the LF $a \vee (a \wedge \neg b)$
- we also have the LF $\text{exh}(a) \vee \text{exh}(a \wedge \neg b)$
- under natural assumptions, this amounts to $(a \wedge \neg b) \vee (a \wedge \neg b)$
- however, this LF still violates Hurford's constraint;
- since (22) has no suitable LF, (22) is infelicitous.

Exhaustification: definitions

The exh operator

$s \models \text{exh}(\varphi) \iff s \subseteq \text{exh}(\alpha, |RA(\varphi)|)$ for some $\alpha \in Alt(\varphi)$.

Where:

- $|RA(\varphi)| = \{|\psi| \mid \psi \in RA(\varphi)\}$
- $\text{exh}(\pi, \Pi) = \pi - \bigcup\{\pi' \in \Pi \mid \pi \not\subseteq \pi'\}$
- The set $RA(\varphi)$ is defined recursively as follows:

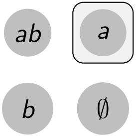
$$\begin{array}{rcl} RA(a) & = & \{a\} \cup C_a \\ RA(\varphi \vee \psi) & = & RA(\varphi) \cup RA(\psi) \\ RA(\varphi \wedge \psi) & = & RA(\varphi) \cup RA(\psi) \\ RA(\neg\varphi) & = & \{\neg\psi \mid \psi \in RA(\varphi)\} \\ RA(\text{exh}(\varphi)) & = & \{\text{exh}(\psi) \mid \psi \in RA(\varphi)\} \end{array}$$

where C_a is a set of contextually relevant alternatives to a.

Illustration: atomic imperatives

(23) Call Alice.

- $\text{exh}(a) \equiv (a \wedge \neg b)$ $\qquad C = \{a, b\}$



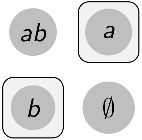
- Prediction: ambiguity

(24) a. $!a$ $\qquad \not\Rightarrow !\neg b$
b. $!\text{exh}(a)$ $\qquad \Rightarrow !\neg b$

Illustration: disjunctive imperatives

(25) Call Alice or Bob.

- $\text{exh}(a \vee b) \equiv \text{exh}(a) \vee \text{exh}(b) \equiv (a \wedge \neg b) \vee (b \wedge \neg a)$ $\qquad C = \{a, b\}$



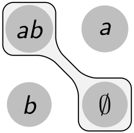
- Prediction: ambiguity

(26)
a. $!(a \vee b) \quad \not\Rightarrow \quad !\neg(a \wedge b)$
b. $!\text{exh}(a \vee b) \quad \Rightarrow \quad !\neg(a \wedge b)$

A problem: exh under negation

(27) Don't call Alf or Bea.

- $\neg \text{exh}(a \vee b) \equiv \neg((a \wedge \neg b) \vee (b \wedge \neg a))$ $\qquad C = \{a, b\}$



(28) a. $!\neg(a \vee b)$ [call neither]
b. $!\neg\text{exh}(a \vee b))$ [don't call exactly one]

- Wrong Prediction!

Constraints on the application of exh

- The application of exh is optional, but constrained:

(29) exh can only apply when it creates a stronger meaning or is needed to avoid violations of pragmatic constraints.

- Consequence: only (30) is ambiguous

(30) Call Alf or Bea.

a. $!(a \vee b)$
b. $!\text{exh}(a \vee b)$

(31) Don't call Alf or Bea.

a. $!\neg(a \vee b)$
b. $\#!\neg\text{exh}(a \vee b) \quad \rightsquigarrow \quad$ ruled out by (29)

Distinguishing good and bad Hurford's cases

- Local exh can obviate Hurford's violations:

(32) Call Alice, or Bob, or both.

a. $!(a \vee b \vee (a \wedge b))$ [violation]

b. $!(\text{exh}(a) \vee \text{exh}(b) \vee \text{exh}(a \wedge b)) \equiv$
$!((a \wedge \neg b) \vee (b \wedge \neg a) \vee (a \wedge b))$ [ok]

- But this does not always succeed:

(33) #Call Alice or call Alice but not Bob.

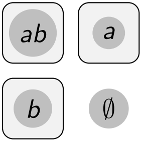
a. $a \vee (a \wedge \neg b)$ [violation]

b. $\text{exh}(a) \vee \text{exh}(a \wedge \neg b) \equiv$
$(a \wedge \neg b) \vee (a \wedge \neg b)$ [violation]

Interpreting good Hurford imperatives

(34) Call Alice, or Bob, or both. $C = \{a, b\}$

- The only acceptable logical form for (34) is:



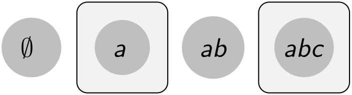
$$\mathrm{exh}(a) \vee \mathrm{exh}(b) \vee \mathrm{exh}(a \wedge b)$$

- Prediction: (34) conveys a strong free choice:
  - Calling only A is an option.
  - Calling only B is an option.
  - Calling both is an option.

Predicting compliance gaps

(35) Call Alice, or call Alice, Bob, and Charlie. $C = \{a, b, c\}$

- The only acceptable logical form for the action formula in (35) is:



$$\text{exh}(a) \vee \text{exh}(a \wedge b \wedge c)$$

- Prediction:
  - Addressee must either call only A, or call A, B, and C.
  - There is an option to call only A.
  - There is an option to call A, B, and C.

- In particular, we predict (35) $\models$ *not only Alice and Bob*.

Wrapping up

- We complement our base theory with an optional, but constrained, exhaustification operator.
- This gives us a principled explanation of the difference between:

(36) a. Take one or two cards.
b. #Take a card or an ace.

- Predicts subtle facts on the interpretation of Hurford imperatives:

(37) Take one or three cards.
$\rightsquigarrow$ not exactly two

Part IV

Discussion

Imperatives in inquisitive and truth-maker semantics

	CA16	AC13	Fine15
free-choice	yes	yes	yes
hyperintensional	yes	yes	yes
semantic primitives	conducts	conducts	actions
kind of semantics	inexact	exact	exact
exhaustivity	local	global	none
entailment	standard	standard	analytic
FC atoms	no	no	yes
FC negations	no	no	yes
de Morgan	invalid	invalid	valid

Can atomic imperatives be choice-offering?

- In our semantics, we chose to make atomic imperatives basic.
- In Fine15, atomic imperatives may be choice offering.
- If we take atoms to stand for logically simple imperative sentence, this is an interesting empirical issue.
- This issue teases apart two hypotheses on the sources of free-choice:
  - ontic: choice stems from the existence of multiple compliant actions;
  - grammatical: choice is introduced by certain linguistic devices.
- To clarify this, we can try to simulate a disjunctive imperative by an atomic one which is intuitively as close as possible to the disjunction.

Can atomic imperatives be choice-offering?

(38) a. Come visit us in the weekend.
b. Come visit us on Saturday or Sunday.

In spite of having (apparently) the same compliant actions, we think that only (38-b), but not (38-a), is choice-offering.

Argument 1

(39) MOTHER Come and visit us next Saturday or Sunday.
FATHER Don't come on Sunday.
SON But mom told me I *could* come on Sunday.

(40) MOTHER Come and visit us next weekend.
FATHER Don't come on Sunday.
SON ??But mom told me I *could* come on Sunday.

Argument 2

(41) Come visit us next Sunday!

When told (41), (42-a) seems a truthful report, but (42-b) is dubious.

(42) a. They invited me to visit them next weekend.
b. ?They invited me to visit them next Saturday or Sunday.

Assuming that a report of ψ is truthful only if ψ follows from the original imperative, this indicates that (43-b) follows from (43-a).

(43) a. Come visit us next Saturday.
b. Come visit us next weekend.

This is predicted is (43-b) is basic, but not if it is a choice imperative.

This suggests that, even when "disjunctive" in nature, atomic imperatives cannot be choice-offering, and that choice has a grammatical source.

Can negative imperatives be choice-offering?

- In our semantics, negative imperatives are always basic.
  There is only one way to realize $\neg\varphi$: abstain from realizing φ.
- In Fine15, instead, negative imperatives may be choice offering.
- In particular, a negation of a conjunction like (44-a) is choice-offering, and equivalent to (44-b).

  (44) a. Don't drink and drive.
  b. Don't drink or don't drive.

- So, is (44-a) choice-offering?

- We think this is not the case:

(45) a. Don't drink.
b. So, don't drink and drive.

(46) a. Don't drink.
b. ??So, don't drink or don't drive.

- This supports our prediction that only (46-b) is choice-offering, while (45-b) is basic and has classical logical properties.
- This supports the view that negative imperatives are always basic.

Conducts vs. actions

- We believe that negative imperatives also expose an advantage of a semantics based on conducts as opposed to actions.
- It is not clear what action is to count as exactly complying with (47).

(47) Don't talk to Alice.

- It seems that one complies with (47) not by performing some action, but rather by not performing any action of a certain kind.
- In other words, compliance with (47) is not a property of any one action in a conduct, but rather a property of the conduct as a whole.
- On our approach, the meaning (47) is simple: (47) conveys an obligation to keep one's conduct among those in which there is no action of talking to Alice.
- We believe that this is important to assess the theory's predictions.

Idempotency

- Both AC13 and Fine15 make conjunction not idempotent:

  (48) a. Take a card. $\not\equiv$

  b. Take a card and take a card.

  (48-b) conveys an obligation to take at least a card, and a permission to take any card and to take any two cards.

- In CA16, conjunction is idempotent, and so the oddness of (48-b) is explained by the ban on structural redundancy.

- In AC13 and Fine15, the conjunction in (48-b) is not redundant, and one is left wondering why (48-b) is not usable instead of (49).

  (49) Take a card or take two cards.

Mereological entailment

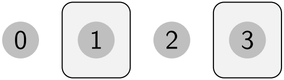
- Fine15 accounts for imperative entailment by a mereological notion.
- However, this notion is vulnerable to a version of Ross's paradox: (50-a) is predicted to entail (50-b).

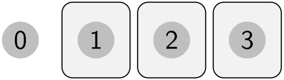
  (50) a. Take one or three cards.
  b. Take one, two, or three cards.

- In fact, the opposite entailment holds as well, which shows that in this approach, logical equivalence does not guarantee synonymy.

In our account, the only LF for these sentences involves exh:

(51)
a. Take one or three cards. $\rightsquigarrow$ $\text{exh}(1) \vee \text{exh}(3)$
b. Take one, two, or three cards. $\rightsquigarrow$ $\text{exh}(1) \vee \text{exh}(2) \vee \text{exh}(3)$





Neither entailment is valid:

- $(a) \not\models (b)$ since (a) does not give permission to take exactly two;
- $(b) \not\models (a)$ since (b) does not forbid taking exactly two.

Conclusions

- We have proposed that imperatives describe sets of options.
- They do not just specify restrictions on the available conduct, but can also convey the existence of certain options.
- Key features of our theory:
  - an inquisitive semantics of action formulas;
  - an alternative-sensitive imperative operator !;
  - optional exhaustification operator.
- The theory provides natural explanations for a number of puzzles concerning the logic of imperatives.

Further work

- Conditional imperatives.
- Free choice stemming from indefinites (take any card).
- Connection with deontics.


THANK
YOU
GRACIAS
ARIGATO
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SUKSAMA
EKHMET
GRAZIE
MEHRBANI
KOMAPSUMNIDA
GOZAIMASHITA
EFCHARISTO
JUSPAXAR
PALDIES
BOLZÏN
MERCI
BIYAN
SHUKRIA
TINGKI
MAAKE