Lauer (2013, Ch. 9)
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1 Preliminaries

- Maxims and preferences: decision- and game-based theories understand Gricean maxims as speaker preferences. Implicatures are derived on the assumption that speaker preferences are in place.
- Alternative utterances: Alternative actions should satisfy preconditions (e.g. location) and be *salient* (the floor mopping example) for an agent to consider them in the context.
  - Which alternatives?

  (1) Some students came to the party.
      ↝ a. Not all students came to the party.   (DENY all)
      ↝ b. All students came to the party.   (DENY some but not all)

  Symmetry problem: By uttering (1), the speaker could have uttered the stronger (entailing) alternative "all …" / "some but not all …". Therefore, the speaker doesn't take the stronger alternative to be true.

  - Alternatives considered by the addressee: While the alternatives considered by speaker are fixed before utterance, those considered by the hearer are *automatically* made salient because of cognitive facts.
    - The *some* ↝ *not all* implicature arises because of the strong connection between the members of the scale. This association ensures an utterance with one member makes the other member salient. (How generalized conversational implicatures arise.)

- Two types of preferences
  - Outcome preferences: actions evaluated against a set of constraints $EP_i(w, t)$
    For a given w, t such that $Agt(w, t) = i$, a candidate action a violates a constraint/preference c iff $B_{i,t,w}[a] \not\models c$.
  - Action preferences: Preferences between actions the agent has, independently from the outcome of the actions.

2 Deriving Conversational Implicatures

- Assumption:
  (2) The speaker's pre-utterance belief state:
      $B_{Sp}[utter(Sp, Ad, \phi)] \models \square_{Ad}\phi$
      If the speaker utters ϕ, the addressee will come to believe ϕ.

- Outcome preferences:

(3) *Minimize* (universally present but ranked lowest)

    a. If e is not of the form $utter(\cdot,\cdot,\cdot)$, then $Minimize = 0$.

    b. If e is of the form $utter(\cdot,\cdot,\phi)$, then $Minimize(e)$ is the number of symbols in ϕ.

(4) *Quality* (ranks higher but can be absent in certain contexts)

$\lambda v[v \vDash pb_{Sp}(\phi) \rightarrow \Box_{Sp}\phi]$

The speaker is committed to believe ϕ only if he actually believes ϕ.

(5) *Inform p* (relevance):

$\lambda v[v \vDash p \rightarrow \Box_{Ad}p]$

If p is true, then the addressee believes p.

2.1 A 'relevance' implicature

(6) [Context: *Ad* is standing next to his obviously immobilized car.]

Ad: I am out of petrol.

Sp: There is a garage round the corner.

⤳ *Sp* has no reason to believe that the garage is closed, out of petrol to sell, etc.

- Assume that *Sp* is preferences Quality and Minimize, and *Ad* does not know whether p is *relevant* / *Sp* has the preference *Inform p*.

(7) Three kinds of worlds in B_{Ad}:

    a. Worlds v_{p+rel} such that $\Box_{Sp}p$ is true and

$$EP_{Sp}(v_{p+rel}, t) = \{Quality, Inform\ p, Minimize\}$$

    b. Worlds $v_{p+\neg rel}$ such that $\Box_{Sp}p$ is true and

$$EP_{Sp}(v_{p+\neg rel}, t) = \{Quality, Minimize\}$$

    c. Worlds $v_{\neg p}$ where the speaker does not believe p to be true.

(8) The set of action choices:

$Act_{Sp}(w, t) =$

$\{\bot, utter(Sp, Ad, p), utter(Sp, Ad, q), utter(Sp, Ad, p \wedge q), utter(Sp, Ad, p \vee q)\}$

(9) Outcome of *Opt*

v_{p+rel}	QUALITY	INFORM p	MINIMIZE
$\bot$		*	
☞ utter(p)			*
utter(q)	?	*	*
utter($p \wedge q$)			***
utter($p \vee q$)		*	***

Figure 9.1: Decision in worlds v_{p+rel} where the speaker believes p and takes it to be 'relevant'

Input	QUALITY	MINIMIZE
☞ $\bot$		
utter(p)		*
utter(q)	?	*
utter($p \wedge q$)		***
utter($p \vee q$)		***

Figure 9.2: Decision in worlds $v_{p+\neg rel}$ where the speaker believes p and does not take it to be 'relevant'

(10) a. $Opt(v_{p+rel}) = \{utter(p)\}$

  b. $Opt(v_{p+\neg rel}) = \{\bot\}$

  c. $utter(p) \notin Opt(v_{\neg p})$

• Result: when observing $utter(p)$, *Ad* learns that the speaker takes p to be relevant.

2.2 A scalar implicature

(11) *Ad*: Do you know the current address for John? I need to send him a letter.
 Sp: He is in Europe.
 ⤳ *Sp* does not know where in Europe John is.

(12) *Sp*'s preferences: {*Quality, Inform p, Inform e, Minimize*},
 Sp's action choices: {*utter(p), utter(e),* $\bot$}
 where p: John is in Paris. e: John is in Europe. $p \rightarrow e$

(13) Decision:

$v_{\Box p}$	QUALITY	INFORM p	INFORM e	MINIMIZE
⊥		*	*	
☞ utter(p)				*
utter(e)		*		*

Figure 9.3: Decision in worlds $v_{\Box p}$ where the speaker believes p

$v_{\Box e}$	QUALITY	INFORM p	INFORM e	MINIMIZE
⊥			*	
utter(p)	*			*
☞ utter(e)				*

Figure 9.4: Decision in worlds $v_{\Box e}$ where the speaker believes e, but not p

$v_{\neg\Box Sp e}$	QUALITY	INFORM p	INFORM e	MINIMIZE
☞ ⊥				
utter(p)	*			*
utter(e)	*			*

Figure 9.5: Decision in worlds $v_{\neg\Box e}$ where the speaker believes neither e nor p

$v_{\Box p+\neg rel}$	QUALITY	INFORM e	MINIMIZE
⊥		*	
☞ utter(p)			*
☞ utter(e)			*

Figure 9.6: Decision in worlds $v_{\Box p+\neg rel}$ where the speaker believes e and p, on the assumption that p is not relevant

(14)   a. $Opt\left(v_{\Box p+rel}\right) = \{utter(p)\}$

    b. $Opt\left(v_{\Box p+\neg rel}\right) = \{utter(p), utter(e)\}$

    c. $Opt(v_{\Box e}) = utter(e)$

    d. $Opt(v_{\neg\Box e}) = \perp$

- Observation: The analysis above predicts that $utter(e)$ will let both $v_{\Box p+\neg rel}$ and $v_{\Box e}$ survive, and we don't get the stronger implicature $\neg\Box_{Sp}(p)$.

(15) $B_{Ad}[utter(e)] \not\models \neg\Box_{Sp}(p)$

(16) [Context: *Ad* and *Sp* are in US.]
    Ad: Is John in town?
    Sp: He is in Europe.
    ⤳ *Sp* does not know where in Europe John is.

- Deriving stronger scalar implicatures: It is inadequate to just assume uttering the weaker proposition implies ignorance about the stronger proposition.

(17) *Sp*: John is in Europe.

    ↝ *Sp* does not know where in Europe John is.

- With additional contextual conditions from the 'epistemic step' (Sauerland 2004), we can derive intermediate and strongest implicatures.

(18) a.   *Sp* has an opinion about *p*.
$$\Box_{Sp}(p) \lor \Box_{Sp}(\neg p)$$
    b.   *Sp* is an expert on p.
$$p \Longleftrightarrow \Box_{Sp}(p)$$

(19) Some people came to the party.

    ↝ a. *Sp* does not know that all students came to the party.
    ↝ b. *Sp* believes that not all students came to the party.   (by 18a)
       $B_{Ad}[utter(Sp, e)] \vDash \Box_{Sp}(\neg p)$
    ↝ c. Not all students came to the party.   (by 18b)
       $B_{Ad}[utter(Sp, e)] \vDash \neg p$

2.3 Mandatory Need a Reason (NaR) implicatures

- Optionality of implicatures: the generally accepted idea that conversational implicatures are optional and cancellable is mistaken. From an Optimization point of view, speakers only make utterances that best satisfy their goals and preferences. Cancellations never happen.

(20) Some students came to the party. In fact, all of them did.

    (The cancellation may be because the speaker didn't consider the stronger alternative to be relevant.)

- The ignorance implicature of disjunction: When *Sp* utters sentence containing an unembedded disjunction, the *Ad* is often licensed to conclude that *Sp* doesn't know which disjunct is true. (Zimmermann 2000 *predicts* this to be an entailment.) This implicature can't be cancelled by asserting the alternative to be true.

(21) a.   John is in London or he is in Paris.
    b.   *Sp* does not know that John is in London.
    c.   *Sp* does not know that John is in Paris.

(22)??John is in London or he is in Paris. In fact, he is in Paris.

- Explanation: the speaker has a reason to utter the longer, more complex sentence with less information (unwillingness to share information, etc.).

(23)
1. There is a *ceteris paribus* preference for shorter, less complex forms, hence, everything else being equal, uttering p and uttering q is preferrable to uttering $p \vee q$.
2. $p \vee q$ is asymmetrically entailed by p and by q, hence an utterance of p conveys the information that $p \vee q$ is true.
3. Because of 1 and 2, if the speaker wanted to convey $p \vee q$ and nothing prevented him from asserting p, he would have done so.
4. The speaker just uttered $p \vee q$ instead of p.

2.4 Deriving NaR implicatures in a dynamic pragmatics framework

- Deriving ignorance
  - Assume the following outcome preference ranking:
    For all $v \in B_{Ad}$: $EP_{Sp,v} = Quality > Inform\ p \vee q > Minimize$

(24)

$w_{\neg \Box p \wedge \neg \Box q}$	QUALITY	INFORM $p \vee q$	MINIMIZE
⊥		*	
utter(p)	*		*
utter(q)	*		*
☞ utter$(p \vee q)$			***

Figure 9.9: Decision in worlds $v_{\neg \Box p \wedge \neg \Box q}$ where the speaker knows neither p nor q

$w_{\Box p \wedge \neg \Box q}$	QUALITY	INFORM $p \vee q$	MINIMIZE
⊥		*	
☞ utter(p)			*
utter(q)	*		*
utter$(p \vee q)$			***

Figure 9.10: Decision in worlds $v_{\Box p \wedge \neg \Box q}$ where the speaker knows p but not q

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$w_{\Box\neg p \wedge \Box q}$	QUALITY	INFORM $p \vee q$	MINIMIZE
$\bot$		*	
utter(p)	*		*
☞ utter(q)			*
utter$(p \vee q)$			***

Figure 9.11: Decision in worlds $v_{\neg\Box p \wedge \Box q}$ where the speaker knows q but not p

$w_{\Box\neg p \wedge \Box q}$	QUALITY	INFORM $p \vee q$	MINIMIZE
$\bot$		*	
☞ utter(p)			*
☞ utter(q)			*
utter$(p \vee q)$			***

Figure 9.12: Decision in worlds $v_{\Box p \wedge \Box q}$ where the speaker knows both p and q

(9.40)   a. $\mathsf{Opt}(v_{\neg\Box p \wedge \neg\Box q}) = \{\mathsf{utter}(p \vee q)\}$

               b. $\mathsf{Opt}(v_{\Box p \wedge \neg\Box q}) = \{\mathsf{utter}(p)\}$

               c. $\mathsf{Opt}(v_{\neg\Box p \wedge \Box q}) = \{\mathsf{utter}(q)\}$

               d. $\mathsf{Opt}(v_{\Box p \wedge \Box q}) = \{\mathsf{utter}(p), \mathsf{utter}(q)\}$

- Result: Observing *utter(p ∨ q)*, *Ad* will believe that *Sp* believes neither *p* nor *q* to be true.

- Deriving unwillingness to inform
  - Assume that the addressee is certain that the speaker believes either *p* or *q*, but not both. *Ad* thinks *Sp* has the additional preference *¬Inform p/q*.

(25) $B_{Ad} \vDash \neg\Box_{Sp}(p \wedge q) \wedge (\Box_{Sp}(p) \vee \Box_{Sp}(q))$

(26)   *¬Inform p/q*
           $\lambda v[v \vDash \neg\Box_{Ad}(p) \wedge \neg\Box_{Ad}(q)]$

(27)

	$\Box_{Sp}p$	$\Box_{Sp}q$	ep(¬INFORM p/q)	
$v_{\Box p \wedge \mathrm{ep}(\neg\mathrm{INF})}$	TRUE	FALSE	TRUE	Fig. 9.13
$v_{\Box p}$	TRUE	FALSE	FALSE	Fig. 9.14
$v_{\Box q \wedge \mathrm{ep}(\neg\mathrm{INF})}$	FALSE	TRUE	TRUE	
$v_{\Box q}$	FALSE	TRUE	FALSE	

$v_{\Box p \wedge ep(\neg\text{INF})}$	QUALITY	¬ INFORM p/q	INFORM $p \vee q$	MINIMIZE
$\bot$				*
utter(p)		*		*
utter(q)	*			*
☞ utter$(p \vee q)$				***

Figure 9.13: Decision in worlds where the speaker believes p and has a preference against revealing that

$v_{\Box p}$	QUALITY	INFORM $p \vee q$	MINIMIZE
$\bot$		*	
☞ utter(p)			*
utter(q)	*		*
utter$(p \vee q)$			***

Figure 9.14: Decision in worlds where the speaker believes p and does not have a preference against revealing that

(9.43)   a. $\text{Opt}(v_{\Box p \wedge ep(\neg\text{INF})}) = \{\text{utter}(p \vee q)\}$

      b. $\text{Opt}(v_{\Box p}) = \{\text{utter}(p)\}$

      c. $\text{Opt}(v_{\Box q \wedge ep(\neg\text{INF})}) = \{\text{utter}(p \vee q)\}$

      d. $\text{Opt}(v_{\Box q}) = \{\text{utter}(q)\}$

·   Result: update *Ad*'s belief state with *utter*$(p \vee q)$ leaves will only leave worlds in which *Sp* has the preference ¬*Inform p/q*. Observing *utter*$(p \vee q)$ will let *Ad* conclude that *Sp* prefers to withhold information.

•   Generalizing NaR and more examples

(28) An expression e will give rise to a NaR implicature if:
   a.   There is alternative expression e' which is informationally stronger than e.
   b. e' is salient whenever e is uttered.
   c.   There is a linguistic preference for uttering e' rather than e, all else being equal.

(29) Huitink and Spenader (2004): cancelation-resistant implicatures
   a.   Mr. X's command of English is excellent and his attendance at tutorials has been regular. He is a brilliant philosopher. (ironic statement?)
   b.   Miss X produced a series of sounds that corresponded closely with the score of "Home Sweet Home". She has a beautiful voice.

·   Analysis: If the speaker believes the second utterance, there is no point in saying the first one. (So there has to be a reason.)

(30) Romero and Han (2004): high-negation polar questions

Doesn't John drink?

↝ The speaker believes or at least expects that John drinks.

- Analysis: HNPQs contain a semantic operator that turns the question into a 'meta-conversational move', which should not be used unless necessary. (Need a reason.)