Biscuit Conditionals as Anticipatory Speech Acts

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Goals of this talk

- Establish difference and subtypes of conditionals:
  Biscuit Conditionals (BC) – Hypothetical Conditionals (HC)
  - semantic
  - syntactic
- A syntactic proposal for options for BCs and for HCs
- Semantic interpretation for BCs and HCs
- Compared to presentation at the Hamburg workshop,
  slides heavily reworked and supplemented
  - Thanks to the audience of the workshop!

SUBTYPES OF CONDITIONALS

- Two widely recognized classes of conditionals:
  - Hypothetical conditionals (HC)

    If John went shopping, there is beer in the fridge.
  - Biscuit conditionals (BC) (Austin 1956):

    If you are thirsty, there is beer in the fridge.
- The basic definitional distinction:
  - In HCs, truth of the consequent treated as dependent on truth of antecedent.
  - In BCs, truth of consequent holds independent of truth of antecedent
- Two types of biscuit conditionals
  - Relevance conditionals (RCs) (problem-solving, Csipak 2015)

    If you are thirsty, there is beer in the fridge.
  - Speech act conditioning (SC) (discourse structuring, Csipak 2015)

    If I am honest / if you want to hear the truth, you look weird.
- Problems for the analysis of BCs:
  - Pragmatics: Why is there an antecedent to begin with?
  - Semantics: How should this relevance be semantically modeled?
  - Syntax: Are there syntactic differences between HCs and BCs (RCs, SCs)?

Syntactic differences: some observations

- Conditional *then*
  - In BCs, cconditional *then* excluded or degraded (Iatridou 1991)

    *If I am honest (*then) you are looking weird.*

    If you are thirsty (? then) there is beer in the fridge.
  - But *then* can occur if several options are named (Zakkou 2017)

    If you are not into Whiskey then there is a shop and cafe to grab a coffee. (Tripadvisor)

    If you want me to lie, you look great. But if I can be honest, then you are looking weird.
- Realization in V2 languages (Dutch, German)
  - In V2 languages, HCs do not allow for V3 structures (Iatridou 1991)

    *Wenn John einkaufen war, (gibt es) / *(es gibt) Bier im Kühschrank.*
  - but RC with V2 appear only slightly degraded (Csipak 2015), contrary to widespread assumption (e.g. Iatridou 1991, Scheffler 2008)

    Wenn du durstig bist, es gibt / ?(gibt es) Bier im Kühlschrank.

    Wenn ich ehrlich bin, du schaust / ??(schaust du) komisch aus.
  - however, order can differentiate between RC reading and HC reading (Scheffler 2008)

    Wenn du mich brauchst, ich bin den ganzen Tag zuhause.

    Wenn du mich brauchst, bin ich den ganzen Tag zuhause.
  - with necessarily true consequents, V2 is nearly impossible with BCs:

    *Wenn es dir hilft, die Wurzel aus 144 ist 12 / *ist die Wurzel aus 144 12.*

    **Wenn es dir hilft, dann ist die Wurzel aus 144 12.*

Syntactic differences: binding

- Binding from *if*-clause
  - o.k. for RCs (verb second)

    Wenn jemand ein Bier mitgebracht hat, kann er es jetzt trinken.
  - restricted for BCs to verb second

    ??*Wenn jemand Durst hat, es steht für ihn Bier im Kühlschrank.*

    Wenn jemand Durst hat, steht für ihn Bier im Kühlschrank.
- Binding into *if*-clause, German for lack of weak crossover (Ebert e.a. 2014)
  - Only in HCs, not in BCs:

    Wenn man sie$_i$ gut pflegt, (dann) blüht jede Orchidee$_i$.

    **Wenn du etwas über sie$_i$ wissen willst, jede Orchidee$_i$ blüht.*

    **Wenn er durstig ist, es steht für jeden Gast ein Bier im Kühlschrank.*
  - But not in all HCs:

    Wenn er erkältet ist, hat jeder Säugling geschwollene Augen.

    **Wenn er geschwollene Augen hat, ist jeder Säugling erkältet.*
- Different kinds of HCs (cf. Franke 2009, Frey 2015 for causal clauses)
  - Epistemic conditionals (ECs): *if*-clause as **reason for belief** that main clause is true

    If the boy has swollen eyes, he may have a cold.
  - Causal/Predictive conditionals (CCs): *if*-clause as a **cause** that main clause is true

    If the boy has a cold, he has swollen eyes.

Syntactic differences: some observations

- Frequency adverbials binding if-clause only with HCs (Haegeman 2003)

  John sometimes drinks beer if he is thirsty.

  There is sometimes beer in the fridge if you are thirsty. (only HC reading)

- BCs embed under speech act verbs (*say, remind...*),
  not attitude verbs (*believe, suspect...*)
  (Iatridou 1991, Bhatt & Pancheva 2006, Siegel 2006):

  *John said / *believes that if you're thirsty there is beer in the fridge.*

  John said / believes that if Bill went shopping there is beer in the fridge.

- Conditionals without *wenn* in German

  Hat Hans eingekauft, (dann) gibt es Bier im Kühlschrank.

  ??Hast du Durst, es steht Bier im Kühlschrank.

A SYNTACTIC PROPOSAL FOR HCs / BCs

- Different attachment sites, cf. Haegeman 2003, 2010, Frey 2015, here discussed for German as a V2 language
- RCs and DCs but not HCs can be attached to ForceP
  - *[$_{ForceP}$ [*wenn John eingekauft hat*] [$_{ForceP}$ *es gibt Bier im Kühlschrank*]]
  - [$_{ForceP}$ [*wenn du durstig bist*] [$_{ForceP}$ *es gibt Bier im Kühlschrank*]]
  - [$_{ForceP}$ [*wenn ich ehrlich bin*] [$_{ForceP}$ *du siehst komisch aus*]]
- HCs can occur in SpecForceP, RCs and DCs are degraded
  - [$_{ForceP}$ [*wenn John eingekauft hat*] [$_{Force'}$ [*gibt* [$_{TP}$ *es Bier im Kühlschrank* _]]]
  - ?[$_{ForceP}$ [*wenn du durstig bist*] [$_{Force'}$ [*gibt* [$_{TP}$ *es Bier im Kühlschrank* _]]]
  - ?[$_{ForceP}$ [*wenn ich ehrlich bin*] [$_{Force'}$ [*siehst* [$_{TP}$ *du komisch aus* _]]]]
- *dann* as anaphoric element in SpecForceP, leading to similar judgements
  - [$_{ForceP}$ [*wenn John eingekauft hat*]$_1$ [$_{ForceP}$ *dann*$_1$ [$_{Force'}$ [*gibt* [*es Bier im K.* _]]]]]
  - ?[$_{ForceP}$ [*wenn du durstig bist*]$_1$ [$_{ForceP}$ *dann*$_1$ [$_{Force'}$ [*gibt* [*es Bier im Kühlschrank* _]]]]
  - ?[$_{ForceP}$ [*wenn ich ehrlich bin*]$_1$ [$_{ForceP}$ *dann*$_1$ [$_{Force'}$ [*siehst* [*du komisch aus* _]]]]]

A syntactic proposal for HCs and BCs

- Why is [$_{\text{ForceP}}$ [*if* …] [$_{\text{ForceP}}$ …]] a good option for BCs?

  Wenn du durstig bist, es gibt Bier im Kühlschrank.

  The *if*-clause expresses a condition for a speech act, a ForceP
- Why is [$_{\text{ForceP}}$ [*if* …] [$_{\text{ForceP}}$ …]] not an option for HCs?

  The *if*-clause does not express a condition for a speech act, but an epistemic condition.

  **Wenn John eingekauft hat, es gibt Bier im Kühlschrank.*
- To be explained:
  - Why is [$_{\text{ForceP}}$ [*if* …] [$_{\text{Force'}}$ …]] also an option for BCs?
  - Why is [$_{\text{ForceP}}$ [*if* …] [$_{\text{Force'}}$ [$_{\text{IP}}$ …]]] a good option for HCs?

Syntactic structure for speech acts

- Suggested structure, following and elaborating Krifka (2015):
  - ForceP consists of two subprojections: ActP, CommitP

    $[_{ActP}\ [_{Act'}\ [_{Act^o}\ .\ ]\ [_{ComP}\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}$ *es Bier im Kühlschrank gibt*$]]]]]$
  - Filling of positions by head movement:

    $[_{ActP}\ [_{Act'}\ [_{Act^o}\ .\ ]\ [_{ComP}$ *es*$_1$ $[_{Com'}\ [_{Com^o}$ *gibt*$_2$ $\vdash]\ [_{TP}$ t$_1$ *Bier im Kühlschrank* t$_2$$]]]]]$
- Analysis of questions as requested commitments
  - Analysis of polarity question and wh-question in German:

    $[_{ActP}\ [_{Act'}\ [_{Act^o}$ *gibt*$_2$? $]\ [_{ComP}\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}$ *es Bier im Kühlschrank* t$_2$$]]]]]$

    $[_{ActP}$ *wo*$_3$ $[_{Act'}\ [_{Act^o}$ *gibt*$_2$? $]\ [_{ComP}\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}$ *es Bier* t$_3$ t$_2$$]]]]]$
  - Question layer visible in English, as movement to Act^o restricted to AUX

    $[_{ActP}\ [_{Act'}\ [_{Act^o}\ [_{ComP}\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}$ *John bought beer*$]]]]$ (Assumption: no V2)

    $[_{ActP}\ [_{Act'}\ [_{Act^o}$ *did*$_2$ $]\ [_{ComP}\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}$ *John* t$_2$ *buy beer*$]]]]$

    $[_{ActP}$ *what*$_1$ $[_{Act'}\ [_{Act^o}$ *did*$_2$ $]\ [_{ComP}\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}$ *John* t$_2$ *buy* t$_1$$]]]]$
- In overt syntax in German, only one layer (ActP or CommitP) can be filled

The position of conditionals

- if-clause may fill Spec of CommitmentP or ActP
  - HCs: *if* clause fills SpecCommitP; consequently: V2

    $[_{ActP}\ [_{Act'}\ [_{Act^o}\ .\ ]\ [_{ComP}\ \ [_{CP}$ *wenn Hans eingekauft hat*$]\ [_{Com'}\ [_{Com^o}$ *gibt*$_2$ $\vdash]\ [_{TP}$ *es Bier* $t_2]]]]]$
  - For BCs: *if* clause fills SpecActP; V2 as only one Spec position can be filled.

    $[_{ActP}\ \ [_{CP}$ *wenn du durstig bist*$]\ [_{Act'}\ [_{Act^o}\ .\ ]\ [_{ComP}\ [_{Com'}\ [_{Com^o}$ *gibt*$_2$ $\vdash]\ [_{TP}$ *es Bier* $\ t_2]]]]]$
- For BCs: if-clause may also be a modifer of ActP
  - Only for BCs: If Condition is satisfied, effect of speech act holds

    $[_{ActP}\ \ [_{CP}$ *wenn du durstig bist*$]\ [_{ActP}\ [_{Act'}\ [_{Act^o}\ .\ ]\ [_{ComP}$ *es*$_1\ [_{Com'}\ [_{Com^o}$ *gibt*$_2$ $\vdash]\ [_{TP}\ t_1$ *Bier* $t_2]]]]]$
  - This is the only option for wh-questions, as wh element has to occupy SpecActP

    $[_{ActP}\ \ [_{CP}$ *wenn ich durstig bin*$]\ [_{ActP}$ *wo*$_3\ [_{Act'}\ [_{Act^o}$ *gibt*$_2$? $]\ [_{ComP}\ [_{Com'}\ [_{Com^o}\ t_2$ $\vdash]\ [_{TP}$ *es Bier* $t_3\ t_2]]]]]$
- Emerging picture:
  - CommitmentP conditionals for HCs
  - SpecActP or Modifier ActP conditionals for BCs
  - SpecActPs for BCs slightly degraded, as it leads to the same form as for HCs
- Sometimes judgements are more crips, e.g. impersonal passive *es*:

  $[_{ActP}\ \ [_{CP}$ *wenn es dich interessiert*$]\ [_{ActP}\ [_{Act'}\ [_{Act^o}\ .\ ]\ [_{ComP}$ *es* $[_{Com'}\ [_{Com^o}$ *wurde*$_2$ $\vdash]\ [_{TP}$ *getanzt* $\ t_2]]]]]$

  $[_{ActP}\ \ [_{CP}$ *wenn es dich interessiert*$]\ [_{Act'}\ [_{Act^o}\ .\ ]\ [_{ComP}\ [_{Com'}\ [_{Com^o}$ *wurde*$_2$ $\vdash]\ [_{TP}$ **(*es) getanzt* $\ t_2]]]]]$

  $[_{ActP}\ [_{Act'}\ [_{Act^o}\ .\ ]\ [_{ComP}\ \ [_{CP}$ *wenn getrunken wurde*$]\ [_{Com'}\ [_{Com^o}$ *wurde*$_2$ $\vdash]\ [_{TP}$ *(*es) getanzt* $t_2]]]]]$

The position of conditionals: *dann*

- Cases with *dann* allow for adjunction of antecedent if-clause
  - For HCs:

    $[_{ActP}\ [_{CP}$ *wenn Hans eingekauft hat*$]_1$

    $[_{ActP}\ [_{Act'}\ [_{Act^o}\ .\ ]\ [_{ComP}$ *dann*$_1$ $[_{Com'}\ [_{Com^o}$ *gibt*$_2$ ⊢$]\ [_{TP}$ *es Bier* $t_2]]]]]$
  - For BCs:

    $[_{ActP}\ [_{CP}$ *wenn du durstig bist*$]_1$

    $[_{ActP}$ *dann*$_1$ $[_{Act'}\ [_{Act^o}\ .\ ]\ [_{ComP}\ [_{Com'}\ [_{Com^o}$ *gibt*$_2$ ⊢$]\ [_{TP}$ *es Bier* $t_2]]]]]$
  - For BCs with questions: No preposed *dann*, as SpecActP only filled by +wh

    **Wenn ich durstig bin, dann (wo) gibt es Bier?*

    $[_{ActP}\ [_{CP}$ *wenn ich durstig bin*$]_1$

    $[_{ActP}$ (*wo*$_3$) / *dann*$_1$ $[_{Act'}\ [_{Act^o}$ *gibt*$_2$? $]\ [_{ComP}\ [_{Com'}\ [_{Com^o}\ t_2$ ⊢$]\ [_{TP}$ *es Bier* $t_3\ t_2]]]]]$
  - However, *dann* may occur in middle field:

    Wenn ich durstig bin, (wo) gibt es dann Bier?

Postposed conditionals

- Postposed *if*-clauses by adjunction to CommitP or ActP
  - Hypothetical conditional

    $[_{ActP}\ [_{Act'}\ [_{Act^o}\ \cdot\ ]\ [_{ComP}[_{ComP}$ *es*$_1$ $[_{Com'}\ [_{Com^o}$ *gibt*$_2$ $\vdash]$ $[_{TP}$ t$_1$ *Bier im Kühlschrank* t$_2$]]]
    $[_{CP}$ *wenn Hans eingekauft hat*]]]]
  - Biscuit conditional

    $[_{ActP}\ [_{ActP}\ [_{Act'}\ [_{Act^o}\ \cdot\ ]\ [_{ComP}$ *es*$_1$ $[_{Com'}\ [_{Com^o}$ *gibt*$_2$ $\vdash]$ $[_{TP}$ t$_1$ *Bier im Kühlschrank* t$_2$]]]
    $[_{CP}$ *wenn du durstig bist*]]]]
- Binding phenomena
  - Binding from Spec position o.k., but not from modifier position problematic:

    $[_{ActP}\ [_{CP}$ *wenn jemand*$_1$ *durstig ist*]
    $[_{Act'}\ [_{Act^o}\ \cdot\ ]\ [_{ComP}\ [_{Com'}\ [_{Com^o}$ *gibt*$_2$ $\vdash]$ $[_{TP}$ *es für ihn*$_1$ *Bier im Kühlschrank* t$_2$]]]]]
    $^{??}[_{ActP}\ [_{CP}$ *wenn jemand*$_1$ *durstig ist*]
    $[_{ActP}\ [_{Act'}\ [_{Act^o}\ \cdot\ ]\ [_{ComP}$ *es*$_1$ $[_{Com'}\ [_{Com^o}$ *gibt*$_2$ $\vdash]$ $[_{TP}$ t$_1$ *für ihn*$_1$ *Bier im Kühlschrank* t$_2$]]]]]
  - Binding into *if*-clause for causal conditionals that originate from within IP o.k.:

    $[_{ActP}\ [_{Act'}\ [_{Act^o}\ \cdot\ ]\ [_{ComP}\ \ [_{CP}$ *wenn er*$_4$ *erkältet ist*]$_3$
    $[_{Com'}\ [_{Com^o}$ *hustet*$_2$ $\vdash]$ $[_{TP}$ [*jeder Säugling*]$_4$ [t$_2$ t$_3$]]]]]]

Mapping syntax to interpretation

- Suggested interpretation, following Krifka (2015), to be revised:
  - Tense Phrases are interpreted as propositions:
    $[\![[_{TP}$ *es Bier im Kühlschrank gibt*$]]\!]^{sp,ad}$ = λi[beer in the fridge at i]
  - Commitment Phrases are analyzed as expressing commitments by speaker:
    $[\![[_{ComP}\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}$ *es Bier im Kühlschrank gibt*$]]]]\!]^{sp,ad}$
    = λi[at i, sp is committed to the truth of λi[beer in the fridge at i]]
    = λi[sp⊢i λi[beer in the fridge at i]]
  - Act Phrases analyzed as expressing speech acts, changing Common Ground CG
    $[\![[_{ActP}\ [_{Act'}\ [_{Act^o}\ .]\ [_{ComP}\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}$ *es Bier im Kühlschrank gibt*$]]]]]]\!]^{sp,ad}$
    = S changes CG so that CG contains λi[sp ⊢i λi[beer in the fridge at i]],
    with conversational implicature that CG also contains λi[beer in the fridge at i]
- if-clauses realized in SpecComP:
  - HCs: refer to conditions under which sp commits to the main clause proposition
- if-clauses realized in SpecActP or as modifiers of ActPs:
  - BCs: Refers to conditions under which sp performs the main clause speech act

A DYNAMIC VIEW OF SPEECH ACTS

- The traditional view of speech acts
  - Semantics: Reference and Truth Conditions
  - Pragmatics: Speech acts, governed by rules of conversation
    - Stenius (1967): "Produce a sentence in indicative mood only if it is true"
  - Consequence: Expressions that denote speech acts cannot be embedded
    - the "Frege point", cf. Geach 1965, Green 2000
- But there are many cases of apparent speech-act embedding
  - Adverbials (Davison 1973): *Quite frankly, the boss is a moron.*
  - Quantifiiers (Krifka 2001): *With which document did each guest check in?*
  - Particles (Sauerland & Yatsuhiro 2014): *What's your name again?*
  - Embedded root clauses: *We regret we don't serve alcohol here.*
- Options:
  - Deny that there propositions and speech acts are all that different;
    - syntactic version: Performative Hypothesis, Ross 1970, Sadock 1974;
    - semantic version: Lewis 1970, Vanderveken 1990.
  - Assume that they are different, but accept speech acts as objects of semantics.

Why relevant for BCs?

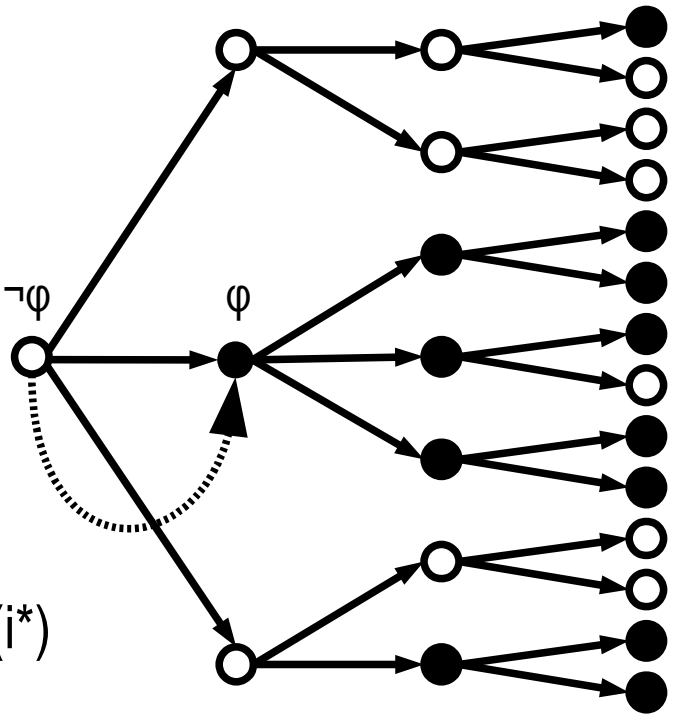
- RC have often been characterized as conditional speech acts
  - Rutherford 1970, Davison 1983, Sweetser 1990, van der Auwera 1986, Iatridou 1991, DeRose & Grandy 1999, Siegel 2006, Scheffler 2008, Predelli 2009 …
  - captures the fact that main clause can express different speech acts (assertions, questions, commands, exclamatives...)
  - van Dijk 1979: “specifies the condition (…) under which a speech act should count”
  - Siegel 2006: BCs express “hypothetical speech acts”
- Problems of the conditional speech act account:
  - Normally, we do not perform actions conditionally (Franke 2009)
    - But: “Vorratsbeschluss”, anticipatory resolution of a committee as a resolution that is in effect only if a certain condition holds.
  - With a BC, wie do not seem to perform multiple speech acts (Franke 2009)
  - It is also not clear what “hypothetical speech acts” should be
  - Proponents often do not provide for an explicit theory or model
- Goals of the remainder of this talk:
  - Provide a formal account of speech acts that allows for conditional speech acts
  - formulating a semantics for BCs and HCs in this theory
  - respecting the syntactic differences between BCs and HCs

The nature of speech acts

- Szabolcsi (1982), “Model theoretic semantics of performatives”:
  - A proposition is true or false at an index, “leaves the state of affairs (...) untouched”
  - Speech acts “should denote changes in the models”.
    - They specify “how the world would change if the sentence were uttered (under appropriate circumstances)”.
    - Example: Promise puts speaker under an obligation to behave in a certain way.
- Hence:
  - Speech acts are functions, “transitions from one state of affairs into another”
  - Felicity conditions are presuppositions, i.e. conditions on the input state.
- Two types of changes:
  - Speech acts that change legal situation at large:
    - Declarations: *I hereby pronounce you husband and wife.*
  - Speech acts that change commitments of participants:
    - Assertions: Commitment of speaker to truth of proposition
    - Commissives: Commitment of speaker to perform an action
      Directives: Commitment of addressee, other persons to perform an action
    - Expressives: Commitment to an attitude towards an entity, a proposition
  - Cf. the three transcendentals: Truth, Goodness, Beauty

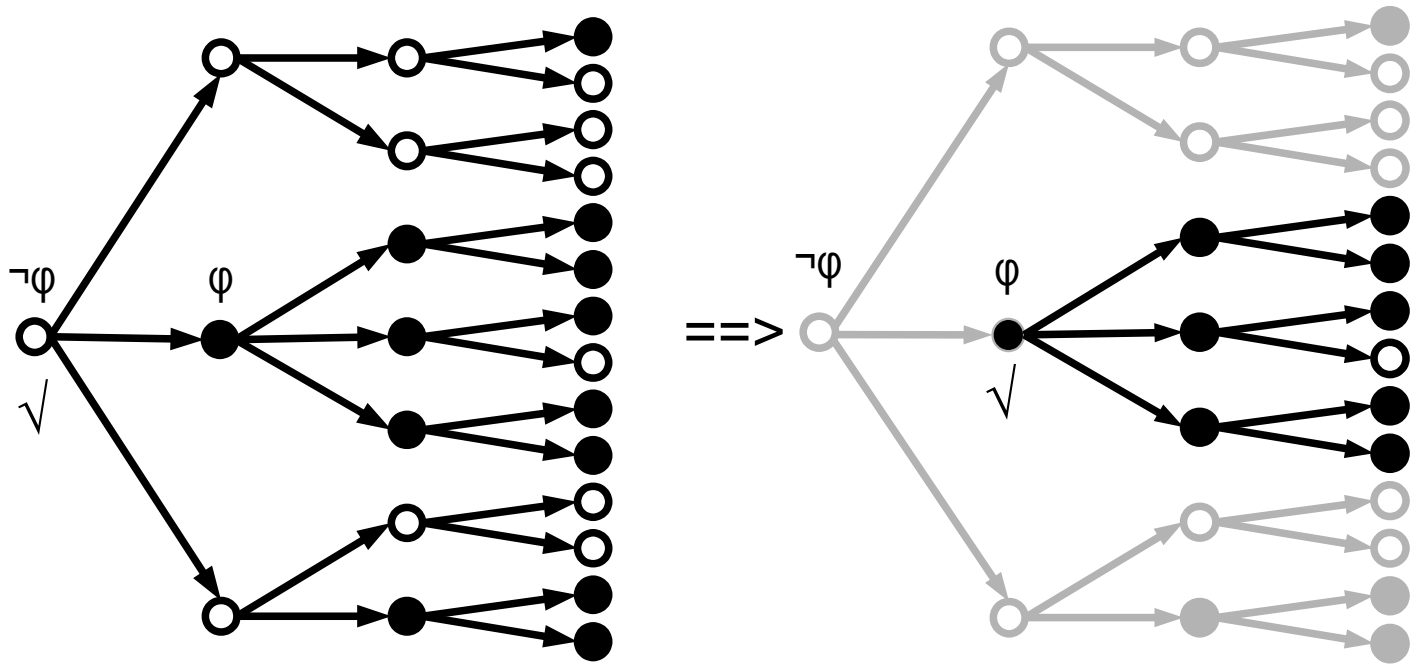
A Model for Speech Acts as Index Changers

- Cf. Krifka 2014, Embedding Illocutionary Acts
- Model structure:
  - Types: **e**: entities and events, **t**: truth values, **s**: indices
  - If σ, τ are types, then (σ)τ is the type of functions from σ-entities to τ-entities
  - Set of world/time indices I ordered by future-branching relation ≤
    ≤ is a discrete, where $i' <_s i$ stands for: i is an immediate successor of i'
- Propositional and actional meanings
  - Propositions φ: type **st**, true/false at indices
  - Actions $\mathfrak{A}$: type **ss**
    function from input index to output index
- Minimal index change:
  - i + φ = i'
    where i' = i if φ(i) = 1
    else i' = that i*, $i <_s i^*$, such that φ(i*) = 1
    and for all logically independent ψ, ψ(i) = ψ(i*)
- Persistency of speech act updates:
  - Normally, speech act updates are persistent,
  - but we should allow for the possibility of revoking updates.



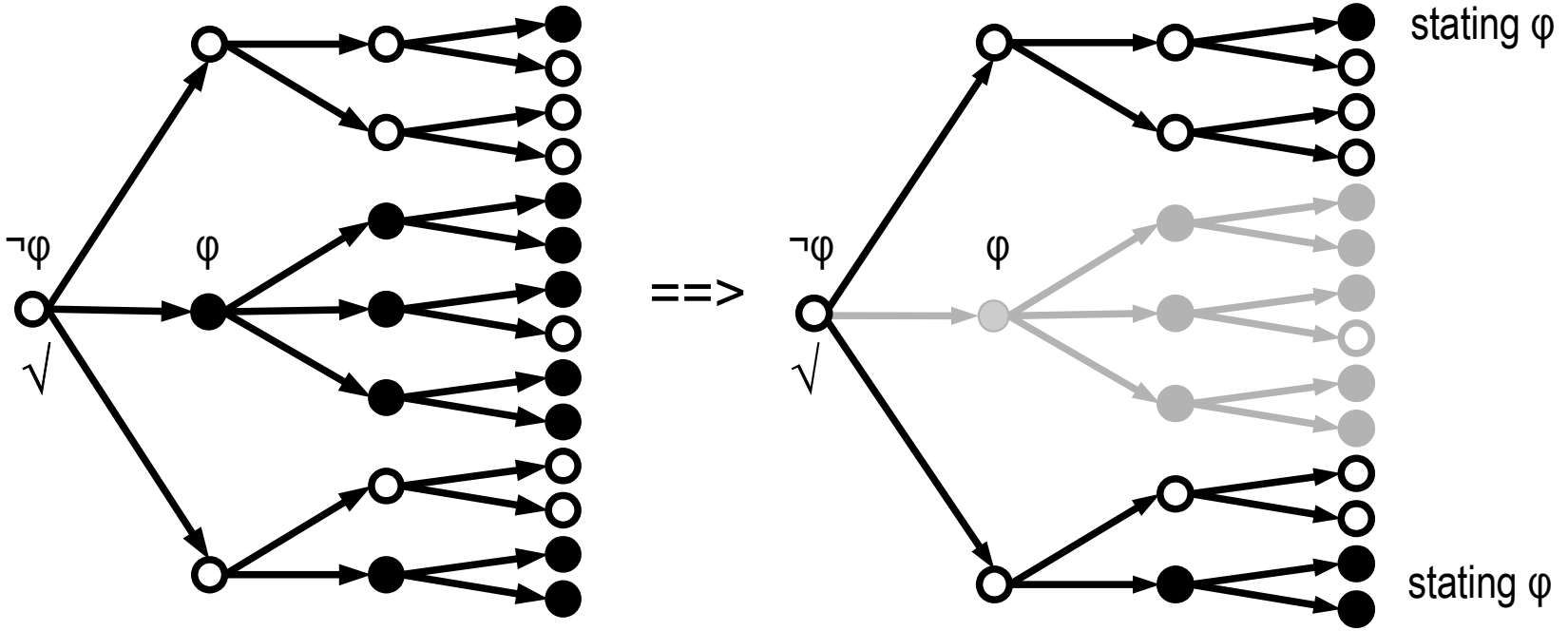
Speech acts as Index Space Changers

- Modeling of speech acts in terms of changes of **sets** of indices, representing the current index and its possible continuations
- Modeled by rooted index spaces, type **st**
  - sets of indices I that are intervals, i.e. $\forall i,i' \in I \wedge i \leq i'' \leq i \rightarrow i'' \in I$
    and that contain a unique smallest element, the **root** $\surd I$ with $\surd I \in I$ and $\forall i \in I[\surd I \leq i]$
- Minimal Index Space change, type **(st)st**:
  - $I + \varphi = I'$,
    where I': the greatest rooted Index Space with $I \subseteq I'$ and $\surd I + \varphi = \surd I$



Why Index Spaces?

- Denegation (Searle 1969, Hare 1970)
  - *I don't promise to come.*
    sp refrains from promise to come
- Interpretation by set complement (cf. Cohen & Krifka 2014, Krifka 2014):
  - I + ~ φ = I – [I + φ]]
  - Root stays the same (no new obligations),
    but output index space does not contain the immediate option of stating φ
  - But φ might be stated in the future (revision)



Propositional and actional meanings

- Propositional meaning of tense phrase (TP):

  $[\![[_{TP}$ *there was beer in the fridge* $]]\!]^{sp,ad}$

  $= \lambda i \exists i''[i'' < i \wedge$ there is beer in the fridge at $i'']$, type **st**

- Propositional meaning of commitment phrase (example: assertion):

  $[\![[_{ComP} [_{Com'} [_{Com^o} \vdash] [_{TP}$ *there was beer in the fridge*$]]]]\!]^{sp,ad}$

  $= \lambda i[sp \vdash_i \lambda i \exists i''[i'' < i \wedge$ there is beer in the fridge at $i'']]$, type **st**

  at i, speaker is committed to the truth of the proposition at i

- Actional meaning of assertion:

  $[\![[_{ActP} [_{Act'} [_{Act^o} \cdot] [_{ComP} [_{Com'} [_{Com^o} \vdash] [_{TP}$ *there was beer in the fridge*$]]]]]]\!]^{sp,ad}$

  $= \lambda I [I + \lambda i[sp \vdash i \lambda i \exists i''[i'' < i \wedge$ there is beer in the fridge at $i'']]]$, type **(st)st**

  the index space I is changed minimally such that the speaker is committed to the truth of the proposition that there was beer in the fridge.

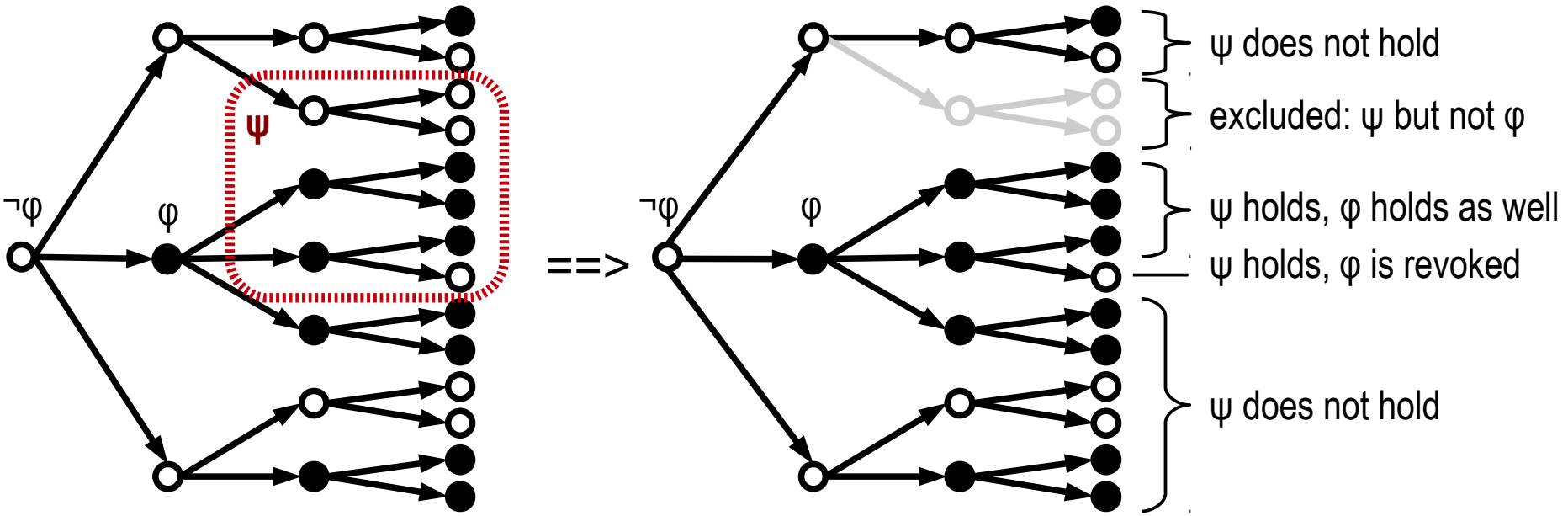
- Wen sp utters this sentence at a particular context index space I_0,

  I_0 is changed to $I_0 + \lambda i[sp \vdash i \lambda i \exists i''[i'' < i \wedge$ there is beer in the fridge at $i'']]]$,

  the index space I_0 is changed minimally to I, where at I the speaker is committed to the truth of the proposition that there was beer in the fridge.

Modeling of Biscuit Conditionals

- Basic idea: BCs guarantee that in the output index space, whenever an index satisfies the *if*-clause, the effect of the speech act expressed by the main clause holds.
- Schematic interpretation, *if*-clause in ActP modifier position
  - $[\![[_{ActP}\ [_{CP}\ \textit{if}\ [_{TP}\ \psi]\ ]\ [_{ActP}\ \varphi]]]\!] = \lambda I[\{i \in I' | [\![[_{TP}\ \psi]]\!](i)=0\} \cup [\![[_{ActP}\ \varphi]]\!](I)]$
    $= \lambda I\ [\{i \in I' | \psi(i)=0\} \cup [I + \varphi]]$
  - Changes input index space I' minimally so that the *if* proposition does not hold or the main clause speech act is in effect
  - Reminiscent of equivalence $\psi \rightarrow \varphi \Leftrightarrow \neg\psi \vee \varphi$



Modeling of biscuit conditionals

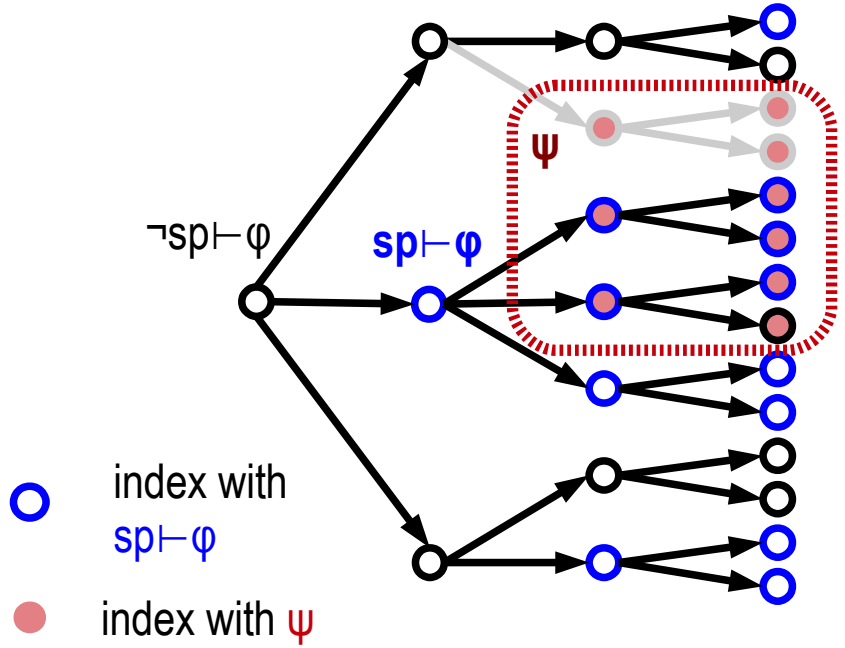
- Example, here: BC as ActP modifier, similar for BC in SpecActP
  - $[\![[_{ActP}\ [_{CP}$ *wenn du durstig bist*$]$
    $[_{ActP}\ [_{Act'}\ [_{Act^0}\ .]\ [_{ComP}\ es_1\ [_{Com'}\ [_{Com^0}\ gibt_2\ \vdash]\ [_{TP}\ t_1$ Bier $t_2]]]]]]]\!]^{sp,ad}$
  - $= \lambda I\ [\{i \in I \mid [\![[_{TP}$ *du durstig bist*$]]\!]^{sp,ad}(i)=0\} \cup$
    $[\![[_{ActP}\ .\ [_{ComP}\ es_1\ [\ [gibt_2\ \square]\ [_{TP}\ t_1$ *beer* $t_2]]]]]\!]^{sp,ad}\ (I)]$
  - $= \lambda I\ [\{i \in I \mid$ [ad is thirsty in i]$=0\} \cup$ [I + λi[sp $\vdash_i \lambda i$[there is beer at i]]]]
  - changes input index space I so that in all indices of output index space, addressee is not thirsty or speaker is committed to existence of beer
- Comments:
  - as speaker does not have control over whether addressee is thirsty or not, speaker is better committed to existence of beer in general.
  - speaker conveys the information for which situation the commitment is relevant by communicating that indices are excluded at which addressee is thirsty but there is no commitment of the speaker that there is beer.
  - the speaker in fact performs the assertion that there is beer, this is neither a “multitude” of speech acts nor a “hypothetical” speech act
  - it is a speech act that anticipates that the condition could hold, cf. anticipatory resolution, “Vorratsbeschluss”

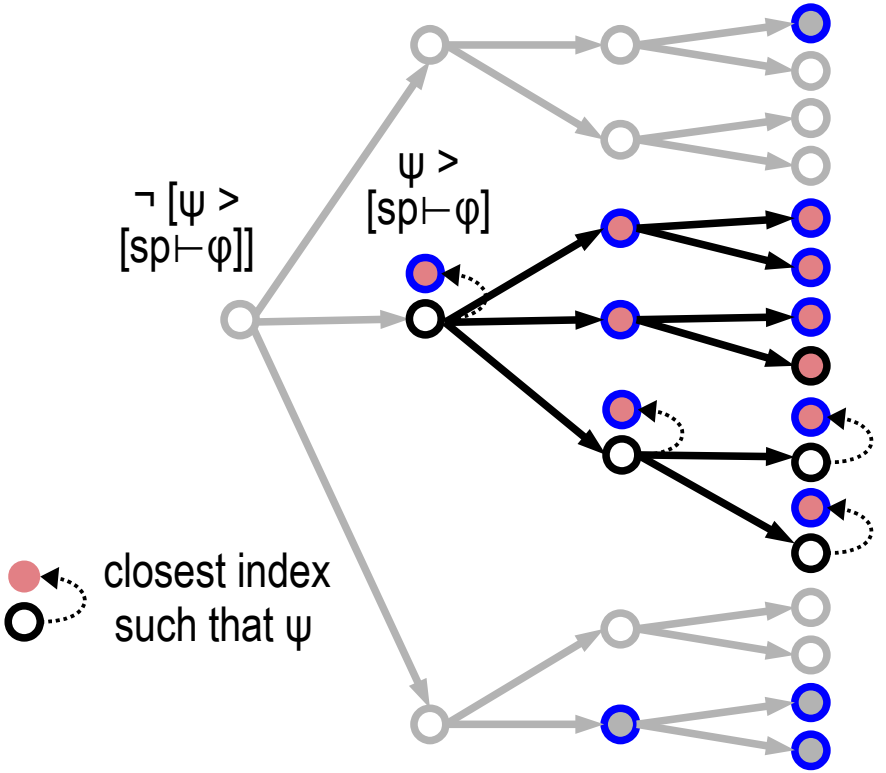
MODELING HCs

- One option: interpret HCs at the propositional level
  - On the level of IP:
    - $[_{IP}\ [_{CP}$ *if John went shopping*$]\ [_{IP}$ *there is beer in the fridge*$]]$
    - $\lambda i[\psi >_i \varphi]$, where $>_i$: a propositional conditional operator,
    - e.g. Stalnaker (1968): $\lambda i[\varphi(\text{maxsim}(i, \psi))]$,
      where $\text{maxsim}(i, \psi)$: the index i' maximally similar to i such that $\psi(i') = 1$
  - On the level of ComP:
    - $[\![[_{ComP}\ [_{CP}$ *if John went shopping*$]\ [_{Com'}\ [_{Com^0} \vdash]\ [_{IP}$ *there is beer in the fridge*$]]]]]\!]^{sp,ad}$
    - $\lambda i[\psi >_i \lambda i[sp \vdash_i \varphi]]$,
      at the indices maximally similar to i for which ψ, sp is committed to φ
- Options for interpretatoin of hypothetical conditional:
  - $[\![[_{ActP}\ [\ .\ [_{ComP}\ [\ \vdash\ [_{IP}\ [_{CP}\ \textit{if}\ \psi]\ [_{IP}\ \varphi]]]]]]]\!]^{sp,ad} = \lambda I\ [I + \lambda i[sp \vdash_i [\psi >_i \varphi]]]$,
    changes I to that Index Space I' that differs minimally from I insofar as in (the root of) I', the speaker is committed to the proposition that if ψ then φ
  - $[\![[_{ActP}\ [\ .\ [_{ComP}\ [_{CP}\ \textit{if}\ \psi]\ [\ \vdash\ [_{IP}\ \varphi]]]]]]]\!]^{sp,ad} = \lambda I\ [I + \lambda i[\psi >_i \lambda i[sp \vdash_i \varphi]]]$,
    changes I' to I such that I differs minimally from I' insofar as in (the root of) I, the proposition holds that if ψ then speaker is committed to ψ

Difference HCs / BCs

- BCs express a conditional speech act,
  no requirement to look up closest indices. where the conditional does not
  - $[\![[_{ActP}\ [_{CP}\ \textit{if}\ \psi]\ [_{ActP}\ .\ [_{ComP}\ \vdash\ [_{IP}\ \varphi]]]]]\!]^{sp,ad}$
- In HCs the speech act is uttered unconditionally,
  but it has a conditional content that requires to consider closest indices
  - $[\![[_{ActP}\ [_{ActP}\ .\ [_{ComP}\ \ [_{CP}\ \textit{if}\ \psi]\ [\ \vdash\ [_{IP}\ \varphi]]]]]]\!]^{sp,ad}$





A fresh look at HCs

- HCs have standardly been analyzed as assertions of conditional propositions (Stalnaker, Lewis, Kratzer)
- However, there is a line of thought taking them to be conditional assertions (Quine 1950, Vanderveken 1990, Edgington 1995, Starr 2010)
  - Restricted embeddings under propositional operators
    - Disjunction (cf. Barker 1995, Edgington 1995, Abbott 2004, Stalnaker 2009)
    - Negation (Barker 1995, Égré & Politzer 2013, Punčochář 2015)
    - Conditional antecedents (Gibbard 1981, Edgington 1995)
  - Non-assertional hypothetical conditionals
    - *If John will be at the party, will the party be fun? / how fun it will be!*
- Stalnaker 2009: CP or CS?

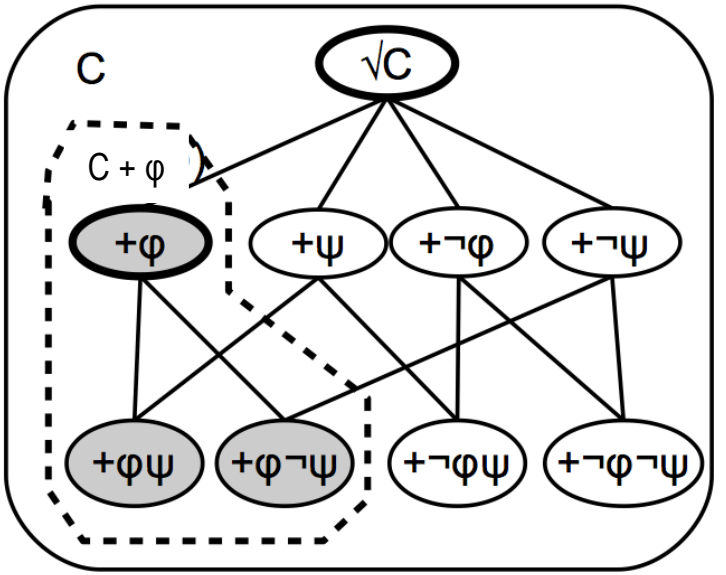
  "While there are some complex constructions with indicative conditionals as constituents, the embedding possibilities seem, intuitively, to be highly constrained. (...) The proponent of a non-truth-conditional [CA] account needs to explain what embeddings there are, but the proponent of a truth-conditional [CP] account must explain why embedded conditionals don't seem to be interpretable in full generality."

Modeling of HCs in Common Grounds

- HCs as hypothetical updates of the common ground CG:

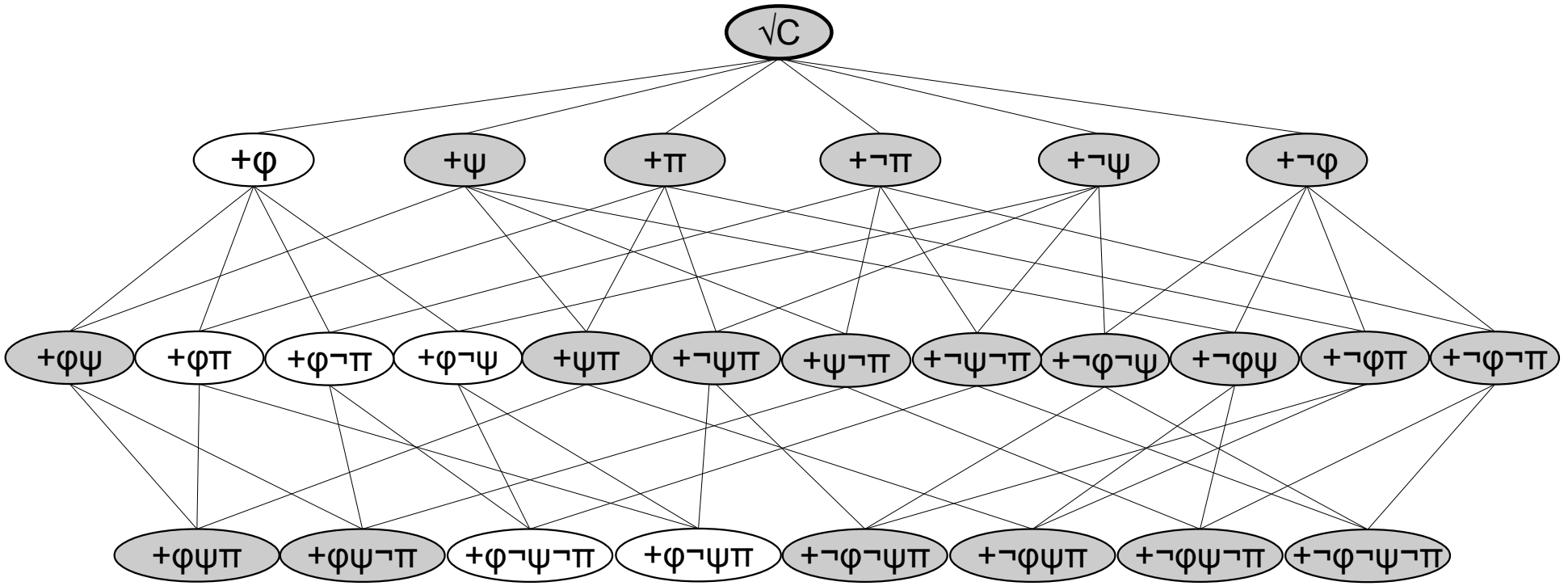
  "If two people are arguing 'If p, will q?' and are both in doubt as to p, they are adding p hypothetically to their stock of knowledge, and arguing on that basis about q (Ramsey [1929] 1990, p. 155)

- Modeling of CG in terms of Commitment Spaces CS (Krifka 2015, in prep.)
  - **commitment states** c: sets of propositions that interlocutors consider mutually accepted for the purpose of communication; type **(st)t**
  - update of c with a proposition:
    $c + \varphi = c \cup \{\varphi\}$, if result is consistent
  - **commitment spaces**: commitment states with possible future developments, modelled as a set C of commitment states, typically with a unique root √C (smallest commitment state), type **((st)t)t**
  - Update of C with a proposition:
    $C + \varphi = \{c \in C \mid \varphi \in c\}$



Conditional update on a CS

- $C + [\varphi \Rightarrow \psi] = \{c \in C \mid \varphi \in c \rightarrow \psi \in c\}$
- Explanation why conditionals do not easily allow for negation, disjunction, conditional antecedents: cf. Krifka in prep.



INDEX / COMMITMENT SPACES COMBINED

- Goal: a model that allows for both
  - index changes, initiated by biscuit conditionals
  - commitment changes, initiated by hypothetical conditions
- Assume combinations of index + commitment, **index-cum-commitment**
  - $j = \langle i, C \rangle$, where i: a world-time index, C: a Commitment Space, type $\langle \mathbf{s, (st)t)t} \rangle$
  - representing an index with the current common ground of a conversation
- Update of an index-cum-commitment j with a proposition φ:
  - $\langle i, C \rangle + \varphi = \langle i, C + \langle \varphi, i \rangle \rangle$,
    where $C + \langle \varphi, i \rangle = \{c \in C \mid \langle \varphi, i \rangle \in c\}$,
    where $\langle \varphi, i \rangle$ is the information that φ is true at index i
  - example: $\langle i, C \rangle + \lambda i[sp \vdash i\ \varphi] = \langle i, \{c \in C \mid \langle \lambda i[sp \vdash i\ \varphi], i \rangle \in c\} \rangle$
    - i does not change,
    - C contains information that sp is committed at i to the truth of φ
- Order relation for index-cum-commitments:
  - Temporal orders of indices: $i \leq i'$, i' equal or later than i
  - Information increase: $C \subseteq C'$, C' contains at least as much information as C
  - $\langle i,C \rangle \leq \langle i',C' \rangle$ iff $i \leq i'$ and $C \subseteq C'$

Modeling combined IS / CS changes

- index-cum-commitment **spaces** J:
  - **sets** of index-cum-commitments ⟨i, C⟩, type ⟨**s, (st)t)t**⟩**t**
  - that form rooted intervals with respect to i:
    - $\forall\langle i,C\rangle, \langle i',C'\rangle \in J\ \forall i''[i \leq i'' \leq i' \rightarrow \exists C''[\langle i'',C''\rangle \in J]]$
    - $\exists\langle i,C\rangle \in J\ \forall\langle i',C'\rangle \in J\ [i \leq i']$, the smallest $\langle i,C\rangle = \sqrt{J}$, the root of J
  - for regular monotonic conversational updates:
    - $\forall\langle i,C\rangle,\langle i',C'\rangle \in J\ [\ i \leq i' \rightarrow C \subseteq C']$
- Update with proposition:
  - $J + \varphi = \{\langle i,C\rangle \in J \mid \sqrt{J} + \varphi \leq \langle i,C\rangle\}$
    $= \{\langle i,C\rangle \in J \mid \forall c \in C[\langle \varphi, i_{\sqrt{J}}\rangle \in c]\}$, where $i_{\sqrt{J}}$ = the index of $\sqrt{J}$

    restricts J to those index-cum-commitments where the information that φ is true at the index of the root of J is established in the commitments
  - $J + [\![[_{ActP} \cdot [_{ComP} \vdash [_{TP}\ \varphi\ ]]]]\!]^{sp,ad} = \{\langle i,C\rangle \in J \mid \forall c \in C[\langle \lambda i[sp \vdash_i \varphi], i_{\sqrt{J}}\rangle \in c]\}$

    restricts J to those index-cum-commitments where the information that sp is committed to the truth of φ at the index of the root of J is established in the commitments.

HCs in combined IS / CS models

- HCs express conditional CS changes:
  - $J + [\![[_{ActP} \cdot [_{ComP} [_{CP}\ \textit{if}\ \psi] [_{C'} \vdash [_{TP}\ \varphi\ ]]]]]\!]^{sp,ad}$

    $= \{\langle i,C\rangle \in J \mid \langle \psi, i_{\surd J}\rangle \in \surd C \rightarrow \forall c \in C[\langle \lambda i[sp \vdash_i \varphi], i_{\surd J}\rangle \in c]\}$
  - restricts the index-cum-commitments of J to those that guarantee
    - whenever the information that ψ is true at $i_{\surd J}$ is in the root of a CS
    - then the information that sp is committed at $i_{\surd J}$ to the truth of φ is also in the CS
- Example:
  - $J + [\![[_{ActP} \cdot [_{ComP} [_{CP}\ \textit{wenn}\ [_{TP}\ \textit{Hans eingekauft hat}]] [_{C'} [_{C^o}\ \textit{gibt}_2 \vdash] [_{TP}\ \textit{es Bier}\ t_2]]]]]\!]^{sp,ad}$

    $= \{\langle i,C\rangle \in J \mid \langle \lambda i \exists i'[i'<i \wedge J \text{ goes shopping at } i'], i_{\surd J}\rangle \in \surd C \rightarrow$

    $\forall c \in C[\langle \lambda i[sp \vdash_i \lambda i[\text{there is beer at } i], i_{\surd J}\rangle]]\rangle \in c]]\}$
  - restricts the index-cum-commitments of J to those that guarantee
    - whenever the information that John has gone shopping at the index of the root of J is accepted in the commitments C at any index i
    - then the information that the speaker is committed at the index of the root of J to the truth of the proposition that there is beer is also part of the commitments
  - Note: the commitment holds for $i_{\surd I}$, sp not responsible if e.g. beer is later taken away.

BCs in combined IS / CS model

- BCs express conditional index-cum-commitment changes:
  - $J + [\![[_{ActP}\ [_{CP}\ \textit{if}\ \psi]\ [_{ActP}\ .\ [_{ComP}\ \vdash\ [_{TP}\ \varphi]]]]]\!]^{sp,ad}$
    $= \{\langle i,C\rangle \in J \mid \psi(i) \rightarrow \forall c \in C[\langle \lambda i[sp \vdash_i \varphi], i_{\sqrt{J}}\rangle \in c]\}$
  - J is restricted to those index-cum-commitments ⟨i,C⟩ in J such that
    - if ψ is true at i,
    - then the speaker is committed at the root of J to the truth of φ.
- Example:
  - $J + [\![[_{ActP}\ [_{CP}\ \textit{wenn}\ [_{TP}\ \textit{du durstig bist}]]$
    $[_{ActP}\ [_{Act'}\ [_{Act^o}\ .]\ [_{ComP}\ es_1\ [_{Com'}\ [_{Com^o}\ \textit{gibt}_2\ \vdash]\ [_{TP}\ t_1\ \textit{Bier}\ t_2]]]]]]\!]^{sp,ad}$
    $= \{\langle i,C\rangle \in J \mid [\text{ad is thursty at i}] \rightarrow \forall c \in C[\langle \lambda i[sp \vdash_i \lambda i[\text{there is beer at i}], i_{\sqrt{J}}\rangle \in c]\}$
  - J is restricts to those index-cum-commitments in J such that
    - if addressee is thirsty at i,
    - then the speaker is committed at the root of J to that there is beer.
  - Note that commitment refers to the root of J –
    sp is not to be blamed if later, someone took away the beer.

Compositional interpretation

- Simple sentence, derivation of ComP
  - $[\![[_{TP}\ \varphi]]\!]^{sp,ad} = \varphi$, a proposition: $\lambda i[...]$
  - $[\![[_{C^o}\ \vdash]]\!]^{sp,ad} = \lambda p \lambda i \lambda C[\forall c \in C[\langle \lambda i[sp \vdash_i p], i\rangle \in c]]$
  - $[\![[_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}\ \varphi]]]\!]^{sp,ad} = \lambda i \lambda C[\forall c \in C[\langle \lambda i[sp \vdash_i [\![[_{TP}\ \varphi]]\!]^{sp,ad}], i\rangle \in c]]$
  - $[\![[_{ComP}\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}\ \varphi]]]]\!]^{sp,ad}$ =same
- Simple sentence, derivation of assertive ActP
  - $[\![[_{Act^o}\ \cdot\ ]]\!]^{sp,ad} = \lambda R \lambda J\{\langle i,C\rangle \in J \mid R(i_{\surd I})(C)\}$
  - $[\![[_{Act'}\ [_{Act^o}\ \cdot\ ]\ [_{ComP}\ [_{Com^o}\ \vdash]\ [_{TP}\ \varphi]]]]\!]^{sp,ad}$
    $= \lambda J\{\langle i,C\rangle \in J \mid [\![[_{ComP}\ \ldots\ ]]\!]^{sp,ad}(i_{\surd I})(C)\}$
    $= \lambda J\{\langle i,C\rangle \in J \mid \forall c \in C[\langle \lambda i[sp \vdash_i [\![[_{TP}\ \varphi]]\!]], i_{\surd J}\rangle \in c]\}$
  - $[\![[_{ActP}\ [_{Act'}\ [_{Act^o}\ \cdot\ ]\ [_{ComP}\ [_{Com^o}\ \vdash]\ [_{TP}\ \varphi]]]]]\!]^{sp,ad}$ = same

Compositional interpretation: HCs and BCs

- HC conditionals:
  - $[\![[_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}\ \varphi]]]\!]^{sp,ad} = \lambda i \lambda C[\forall c \in C[\langle \varphi, i\rangle \in c]]$
  - $[\![[_{CP}\ [_{C^o}\ \textit{if}]\ [_{TP}\ \psi]]]\!]^{sp,ad} = \lambda R \lambda i \lambda C[\exists c \in C[\langle [\![[_{TP}\ \psi]]\!]^{sp,ad}, i\rangle \in c] \rightarrow R(i)(C)]$
  - $[\![[_{ComP}\ [_{CP}\ \textit{if}\ [_{TP}\ \psi]]\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}\ \varphi]]]]\!]^{sp,ad}$
    $= \lambda i \lambda C[\exists c \in C[\langle [\![[_{TP}\ \psi]]\!]^{sp,ad}, i\rangle \in c] \rightarrow [\![[_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}\ \varphi]]]\!]^{sp,ad}(i)(C)]$
    $= \lambda i \lambda C[\exists c \in C[\langle \psi, i\rangle \in c] \rightarrow \forall c \in C[\langle \varphi, i\rangle \in c]]$
  - $[\![[_{Act'}\ [_{Act^o}\ .]\ [_{ComP}\ [_{CP}\ \textit{if}\ [_{TP}\ \psi]]\ [_{Com'}\ [_{Com^o}\ \vdash]\ [_{TP}\ \varphi]]]]]\!]^{sp,ad}$
    $= \lambda J\{\langle i,C\rangle \in J \mid \exists c \in C[\langle \psi, i_{\sqrt{J}}\rangle \in c] \rightarrow \forall c \in C[\langle \lambda i[sp \vdash i\ \varphi], i_{\sqrt{J}}\rangle \in c]\}$
- BC conditionals:
  - $[\![[_{ActP}\ .\ [_{ComP}\ \vdash\ [_{TP}\ \varphi]]]\!]^{sp,ad} = \lambda J\{\langle i,C\rangle \in J \mid \forall c \in C[\langle \lambda i[sp \vdash i\ \varphi], i_{\sqrt{J}}\rangle \in c]]$
  - $[\![[_{CP}\ [_{C^o}\ \textit{if}]\ \psi]]\!]^{sp,ad} = \lambda \underline{J} \lambda J\{\langle i,C\rangle \in J \mid [\![[_{TP}\ \psi]]\!]^{sp,ad}(i) \rightarrow \underline{J}(J)\}$
  - $[\![[_{ActP}\ [_{CP}\ [_{C^o}\ \psi]]\ [_{ActP}\ .\ [_{ComP}\ \vdash\ [_{TP}\ \varphi]]]]\!]^{sp,ad} = \{\langle i,C\rangle \in J \mid \psi(i) \rightarrow \forall c \in C[\langle \lambda i[sp \vdash i\ \varphi], i_{\sqrt{J}}\rangle \in c]\}$
- The same operation, in different types:
  - $[\![[_{C^o}\ \textit{if}]]\!]$ for HCs: $\lambda p \lambda R \lambda i \lambda C[\exists c \in C[\langle p, i\rangle \in c] \rightarrow R(i)(C)]$
  - $[\![[_{C^o}\ \textit{if}]]\!]$ for BCs: $\lambda p \lambda \underline{J} \lambda J\{\langle i,C\rangle \in J \mid p(i) \rightarrow \underline{J}(J)\}$

BC and HC conditionals

What we have done:

- Discuss syntactic differences between BCs and HCs, insights:
  - BCs modify ActPhrases, leading to conditional acts
  - HCs modifiy CommitPhrases, leading to conditional commitments
- Discuss semantic effects of BCs and HCs and suggest models:
  - Dynamic theory for ActPs as index changers
    and of BCs as conditional index changers
  - Dynamic theory for CommitPs as commitment changers
    and of HCs as conditional commitment changers
- Resulting analysis:
  - BCs ensure that for all indices into which the current index can develop
    that satisfy the antecedent, the consequent speech act holds;
    this allows for other speech acts, e.g. commands (not analysed here).
  - HCs ensure that for all commitments that can be enriched by the antecedent,
    the consequent commitments hold;
    this allows for speech acts like assertions, but also questions (not analysed here)