The precondition particle:
Towards a unified analysis of German *denn*

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1   Introduction

– German has a rich system of **discourse particles**—expressions that help speakers with organizing and "navigating" a discourse (Zimmermann, 2011).

– With few exceptions (Rojas-Esponda, 2014; Csipak and Zobel, 2014; Gutzmann, 2015), the formal semantic literature has focused on discourse particles occurring in **declarative sentences**, e.g., *ja*.

– These particles are commonly treated as indicating something about the **status of the information** conveyed by the declarative (McCready, 2012).

– For example, by using *ja* in a sentence with truth-conditional content p, the speaker indicates that p is either common knowledge of speaker and hearer or is verifiable on the spot (Kratzer, 2004).

– This perspective doesn't straightforwardly extend to particles that appear, either predominantly or exclusively, in **interrogative clauses**, since questions don't primarily convey information.

– *Denn* is one such particle. It is licensed in **polar interrogatives** like (1) and in ***wh*-interrogatives** like (2) (König, 1977; Thurmair, 1989):

(1) a. Kann Tim denn schwimmen?
         Does Tim DENN *know how to swim?*
     b. Ist dir denn gar nicht kalt?
         Are you DENN *not cold at all?*

(2) a. Warum lachst du denn?
         Why are you DENN *laughing?*
     b. Wie schaltet man dieses Ding denn aus?
         How do I DENN *switch off this thing?*

– Moreover, *denn* can appear in a **conditional antecedent**, preferably if the antecedent comes after the consequent and certain other conditions are met (Brauße, 1994; Csipak and Zobel, 2016):

(3) a. Kritik ist willkommen, wenn sie denn konstruktiv ist.
         Criticism is welcome if it DENN *is constructive.*
     b. Die Veranstaltung zeigte, dass Literatur politisch sein kann, wenn sie das denn will.
         The event has shown that literature can be political if it DENN *wants to be.*

– Finally, discourse particle *denn* is homonymous with a **causal conjunction**:

(4) Die Straße is nass, denn es hat geregnet.
     The street is wet, DENN *it rained.*

– I will try to account for these uses of *denn* in a **unified way** (quite confidently in the case of discourse particle *denn*, more tentatively for conjunction *denn*).

> **Outline**
>

2   *denn* in questions

2.1   Previous work

– There is little agreement, either in the descriptive or in the formal literature, about what exactly *denn* contributes to the meaning of a question. It has been suggested that:

  (a) *denn* does not contribute anything at all (Thurmair, 1991),

  (b) it expresses the speaker's expectation that the hearer knows an answer to the question (Helbig, 1988),

  (c) it conveys that learning the true answer to the question is in some way "relevant" for the speaker (König, 1977; Thurmair, 1989; Grosz, 2005; Kwon, 2005; Bayer, 2012),

  (d) it signals heightened interest of the speaker (Csipak and Zobel, 2014),

  (e) it signals that the question "has been pondered about" (Romero, 2017), and

  (f) it is only felicitous if the hearer knows the reason why the speaker is asking the question (Gutzmann, 2015).

– The problem with many of these proposals is that they describe the properties of a **typical utterance situation** in which *denn* is used rather than specifying its **conventional meaning contribution**.

– As a consequence, they cannot predict the distribution of *denn*. For instance, the speaker's expectation that the hearer knows an answer is **not a necessary felicity condition** for the use of *denn*:

  (5)   Das weißt du wahrscheinlich auch nicht, aber wer ist denn das da drüben?
         You probably don't know this either, but who's DENN *that person over there?*

– (It is **not a sufficient condition** either, but I won't show this here.)

– The fact that these accounts don't allow us to predict the distribution of *denn* is not generally considered a problem: the contribution of this particle is often assumed to be so **bleached out** that it is licensed in virtually *any* (**information-seeking**) **question**.

– However, this is not what we find! There *are* in fact infelicitous uses of *denn*.

2.2   Data: infelicitous uses of *denn*

2.2.1   Discourse-anaphoricity and Gutzmann's account

– As already observed by König (1977), if *A* wakes *B* in the middle of the night, it is **infelicitous** for *A* to follow this up by asking (6).

  (6)   [*A* wakes *B* in the middle of the night.]
         A: #Wie spät ist es denn?
         A: #What is the time DENN?

– By contrast, it is **felicitous** here for *B* to react to being woken up by asking (6) (König, 1977).

– König takes (6) to show that *denn* cannot appear in a totally **out-of-the-blue context**.

– However, the described scenario is **not** a totally out-of-the-blue context. Rather, the **waking action** has taken place prior to the utterance of (6), and we can consider this waking action a **discourse move**.

– Below, I will propose that *denn* is **anaphoric** to the previous discourse move, broadly construed, and that it imposes certain restriction on the relation between the previous discourse move and the content of the *denn*-marked question.

– To my knowledge, the only formal analysis that takes the discourse anaphoricity of *denn* seriously is Gutzmann (2015). He accounts for examples like (6) by letting *denn* contribute the following condition.

> It is only felicitous for a speaker to utter a *denn*-question Q if the **hearer knows the reason** why the speaker is asking Q.

– This correctly **rules out** (**6**) and many other cases, but it still **overgenerates**: not just *any* **reason** for asking a question is sufficient for licensing *denn*, as we will see now.

2.2.2 Sensitivity to highlighted content

– A non-discourse-initial, information-seeking question that **doesn't license** *denn*:

(7) [Peter is very fond of Sophie but not so fond of parties: usually, he only goes to a party if she goes as well. Peter's feelings aren't returned by Sophie, though. So, she won't go to a party just because Peter is there. All of this is commonly known. A and B are talking at a party, wondering which of their friends are there.]
A: Sophie is over there!
B: Ist (#denn) Peter auch hier?
B: Is Peter (#DENN) also here?

– Also note that if the **roles were reversed** (if Sophie was very fond of Peter), *denn* would be **acceptable** in (7).

– **Gutzmann's predictions:** due to the discourse participants' common knowledge, A clearly **knows why B would ask** the question. Hence, Gutzmann's account would wrongly predict (7) to be felicitous.

– **NB:** In contrast, using *dann* 'then' instead of *denn* is **acceptable** here, just as it would be in English (for an account of English *then*, see Biezma, 2014):

(8) B: Ist dann Peter auch hier?
B: Is Peter also here, then?/So, is Peter also here?

Preview of the account I will give below:

- *denn* is **sensitive** not only to the question as a whole, but to the **proposition that gets highlighted** by the question (pace Csipak and Zobel, 2014).[1]

- In (7), this is the proposition p that **Peter is at the party**.

- By using *denn* in (7), B conveys that she **needs p confirmed** before she can integrate/accept the fact that Sophie is there.

- In this sense, we will call p a **necessary precondition** for integrating/accepting that Sophie is there.[2]

- However, Sophie's going to parties **doesn't depend** on Peter's going there.

- Hence, it isn't obvious why B would need p confirmed to make sense of Sophie's being at the party.

- For this reason the *denn*-question in (7) is **infelicitous**.

- On the other hand, *dann* in (8) expresses a **consequence relation** between the information asserted by A and p (roughly: Sophie is at the party, **hence** Peter must be there).

- It is easy to find **more examples** in which *denn* is infelicitous because the highlighted proposition does not stand in a precondition relation to some piece of contextual information:

(9) [*A* really likes ice skating, and *B* knows this. *A* and *B* are walking together by a lake that usually doesn't freeze. *A* notices the lake is frozen.]
   a. A: Schau mal! War es denn diesen Winter kälter als normalerweise?
      A: Look! Was this winter DENN colder than usual?
   b. A: Schau mal! Sollen wir (#denn) Schlittschuh laufen gehen?
      A: Look! Shall we (#DENN) go ice skating?

- In both (9-a) and (9-b), it is **clear why A is asking** the question. Gutzmann's condition would thus predict both questions to be felicitous.

- However, we find that only (9-a), but not (9-b) is felicitous. On our account this will be predicted: **low temperature** is a precondition for frozen lakes; but there is no salient contextual information for which the **suggestion to go ice skating** could reasonably be construed as a precondition.

- Before we turn to the proposal, a brief **aside**. It might seem from the ice skating example that what *denn* contributes to a polar question is a **positive evidential bias** (i.e., that there must be contextual evidence for the highlighted proposition). However, the party example shows that this condition is not sufficient (there is positive evidence, yet (7) is infelicitous).

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[1] I use the term *highlighting* in the sense of Roelofsen and Farkas (2015). It will be defined in Sec. 3.1
[2] That *denn* establishes a "necessary precondition" relationship has also been suggested by Csipak and Zobel (2016), but only for conditional *denn*, not for *denn* in questions, and without exploring the predictions that this approach makes.

3 Proposal

– We have now seen how *denn* behaves in polar questions. Let us use these observations to formulate a felicity condition for *denn*. Afterwards we will see how this condition holds up for other sentence types, i.e., *wh*-questions and conditional clauses.

– But first: some auxiliary notions…

3.1 Auxiliary notions

3.1.1 Highlighting

– The notion of **highlighting** is used to capture the **semantic objects that a sentence makes salient** (see Roelofsen and Farkas 2015). For example:

(10)   a.   Ann watched Psycho. $\rightsquigarrow \lambda w.W(p)(a)(w)$ 0-place property
       b.   Did Ann watch Psycho? $\rightsquigarrow \lambda w.W(p)(a)(w)$ 0-place property
       c.   What did Ann watch? $\rightsquigarrow \lambda x.\lambda w.W(x)(a)(w)$ 1-place property
       d.   Who watched what? $\rightsquigarrow \lambda y.\lambda x.\lambda w.W(x)(y)(w)$ 2-place property

– To **generalize** over these different cases, we view propositions as 0-place properties. A sentence then highlights an ***n*-place property**, where $n \geq 0$ is the number of *wh*-elements in the sentence.

3.1.2 Discourse events

– Essentially, the notion of a **discourse event** gives us a **wider notion of a discourse move**.

– A discourse event can be an **utterance**, i.e. an assertion, question or imperative, or any **other event** through which some piece of contextual evidence becomes salient (e.g., a discourse participant pointing at an object, thereby making it salient; or a bus driving by, thereby becoming salient).

3.1.3 Proceeding in discourse

– Intuitively, for A to **proceed in discourse** is for A to act in line with:

   (a) what the **previous discourse event** has indicated would be a preferred action, or

   (b) with the **plans** that A is publicly entertaining.

– For instance:

   – if the previous discourse event E was an **imperative**, A has to accept this imperative and carry out the given instructions;

   – if E was an **assertion** or the presentation of **contextual evidence**, A has to accept both E and the new information;

   – if E was a **question**, A has to accept this question and answer it; and

   – if A announces or otherwise indicates that she wants to **perform some action**, then, to proceed in the above sense, she has to actually perform this action.

– In all the above cases, *accepting* information goes **beyond a mere belief update:** it also includes **integrating** the new information with existing beliefs, ideally even being able to **explain** the new information.

3.2 A felicity condition for *denn*

> It is felicitous for a speaker c_S to use *denn* in a sentence with highlighted property f iff c_S considers learning an instantiation of f a necessary precondition for herself to proceed in the discourse.

– This condition allows f to be one of several things. For example:

  – a precondition that is based on **world knowledge** (above: ice skating example):

  (11) A: *Anton signed up for a ballroom dancing course.*
        B: Hat er denn Rhythmusgefühl?
        B: *Does he DENN have a sense of rhythm?*

  – a **presupposition** of the previous assertion:

  (12) A: *I can't see Peter's car anywhere.*
        B: Hat Peter denn ein Auto?
        B: *Does Peter DENN have a car?*

  – a piece of information that is missing in order to even **interpret** the previous utterance:
  (13) [*A* and *B* know two Anna's, one from Hamburg and one from Munich.]
        A: *Earlier today, Anna called!*
        B: Welche Anna meinst du denn?
        B: *Which Anna do you DENN mean?*

  – a piece of information that is missing in order to **carry out the given instructions**:

  (14) A: *When you next go to the supermarket, could you get me some biscuits?*
        B: Ja, klar. Was für Kekse möchtest du denn?
        B: *Yeah, sure. What kind of biscuits do you DENN want?*

– This is a conservative account in the sense that it **derives** the characterizations made by some other accounts:

  – learning the highlighted answer is **relevant** for the speaker (cf. König 1977, a.o.) etc. because only by learning this answer she can proceed;

  – the **heightened speaker interest** (cf. Csipak and Zobel 2014) derives from the same reason;

  – *denn*-questions often inquire about a precondition for accepting the previous discourse move, i.e., a discourse move made by the hearer; it is natural to assume that in these cases, the **hearer knows the answer** to the question (cf. Helbig 1988).

4 Predictions

4.1 Predictions for polar questions

4.1.1 Basic predictions

> For polar questions, the highlighted property f is a 0-place property, i.e., a proposition. Learning an instantiation of this proposition thus amounts to **learning the proposition itself**.

– For example, in (15), f is the proposition that the door is open. B is conveying that she first has to learn that the door is open before she can follow A's instruction to go ahead.

(15)   *A: You go ahead! I'm coming in a minute.*
    B: Ist die Tür denn offen?
    B: Is the door DENN open?

4.1.2 Further predictions: disjunctions and conjunctions of questions

> A further prediction: *denn* is acceptable in **conjoined** but not in **disjoined** questions.

(16)   *A: Did you hear? Sarah is going on a world trip next week!*
    B: #Hat sie denn im Lotto gewonnen **oder** hat sie denn reich geerbt?
    *B: #Has she DENN won the lottery **or** has she DENN come into a big inheritance?*

– (16) is predicted to be infelicitous because *denn* marks learning f as **necessary** for the speaker to proceed.

– But by **disjoining** two questions with highlighted propositions f_1 and f_2, a speaker signals that **answering either** of them is **sufficient**.

– If answering either question is sufficient, though, this means that neither learning f_1 nor learning f_2 can be **necessary**.

– What is predicted to be acceptable on the other hand:

– just one of the *denn*-marked disjuncts **individually**:

(17)   B: Hat sie denn im Lotto gewonnen?
    B: Has she DENN won the lottery?

– *denn* in **conjoined** questions (as there can of course be **several necessary preconditions**):

(18)   B: Hat sie denn schon eine Route geplant **und** hat sie die Flüge denn schon gebucht?
    *B: Has she DENN planned the route yet **and** has she DENN booked the flights yet?*

– **Complication:** in (16), **both** questions are ***denn*-marked**. If *denn* is present in **only one of the disjuncts**, the resulting sentence is still predicted to be infelicitous. The judgements, however, become less clear in this case:

(19)   a.   Hat sie (?**denn**) im Lotto gewonnen oder hat sie reich geerbt?
    b.   Hat sie im Lotto gewonnen oder hat sie (?**denn**) reich geerbt?

(20)   [A's and B's watches show different times. A suggests setting them to the same time.]
    a.   B: Geht **denn** meine Uhr falsch oder geht deine falsch?
        B: Is DENN my watch wrong, or is yours wrong?
    b.   B: Geht meine Uhr falsch oder geht (#**denn**) deine falsch?
        B: Is my watch wrong, or is DENN yours wrong?

– It might be possible to explain the improved acceptability of (19-a) and (20-a) (*denn* only in first disjunct) if we assume that the particle gets interpreted as **taking wide scope**.

– In those cases where *denn* only in the second disjunct is acceptable, the second disjunct might be interpreted as a **correction or afterthought**.

4.1.3 Disjunctive polar questions and alternative questions

> We find that *denn* can appear both in **disjunctive polar questions** (final-rise intonation), and in **alternative questions** (falling intonation on final disjunct).

(21)   B: Hat sie denn im Lotto gewonnen oder reich geerbt↑?   [**disjunctive PQ**]
       B: Has she DENN *won the lottery or come into a big inheritance↑?*

(22)   *A: Can can pick me up from the station?*   [**alternative question**]
       B: Kommst du denn am Montag↑ oder am Dienstag↓?
       B: Are you DENN *coming on Monday↑ or Tuesday↓?*

– A disjunctive PQ is taken to highlight one (disjunctive) property (Roelofsen and Farkas, 2015). So, that *denn* can be acceptable in these questions is not surprising.

– An alternative question is taken to highlight **several** properties (Roelofsen and Farkas, 2015). Hence, the fact that *denn* can appear in alternative questions isn't captured by our felicity condition.

– We will adapt it by saying that *denn* signals that learning **one of these properties** is a necessary precondition.

> It is felicitous for a speaker c_S to use *denn* in a sentence with highlighted properties $F = \{f_1, \ldots, f_n\}$ iff c_S considers learning an instantiation of at least one $f \in F$ a necessary precondition for herself to proceed in the discourse.

– For all other sentence types, this more complex condition boils down to the simpler old condition. So, for readability, I will stick to the simpler condition in what follows.

4.2 Predictions for *wh*-questions

4.2.1 Basic predictions

– In the case of a single *wh*-question, the highlighted property f is a **1-place property**; in the case of a multiple *wh*-question, it is an ***n*-place property** with $n \geq 2$.

– For example, in (23), $f = \lambda x.\lambda w.\text{called-anna}(x)(w) \wedge \text{intended-referent}(x)(w)$.

(23)   [*A* and *B* know two Annas, one from Hamburg and one from Munich.]
       A: Earlier today, Anna called!
       B: Welche Anna meinst du denn?
       B: Which Anna do you DENN *mean?*

– Here, *B* conveys that in order to be able to **interpret** (and thus ultimately to accept) *A*'s assertion, he needs to learn which of the *Anna*s *A* intended as a referent.

4.2.2 Asymmetry between polar questions and *wh*-questions

– Observe the **asymmetry** between *wh*-questions and polar questions:

   – it is **acceptable** for B to ask *which* Anna A was talking about, as in (23),

   – it is **not acceptable** to inquire about a *specific* Anna using a *denn*-marked polar question, as in (24):

   (24)   B: Meinst du (#denn) Anna aus Hamburg?
          Do you (#DENN) mean Anna from Hamburg?

– This is predicted because in the case of a *wh*-question there are **several instantiations** of the highlighted property f. In (23), learning *some* **instantiation** of f is indeed necessary for B to interpret A's utterance.

– On the other hand, in the case of a polar question there is only **one instantiation** of f, namely a proposition. In (24), this is the proposition that A was referring to Anna from Hamburg. Learning this proposition cannot be construed as necessary for B because there are **several possible referents**.

4.2.3 The ease of accommodating *denn* in *wh*-questions

– **A comment** is in order here. *Denn* in *wh*-questions is much more permissive than in polar questions: it is difficult to find infelicitous examples of *denn*-marked *wh*-questions.

– Speakers often ask *denn*-marked *wh*-questions **out of the blue**, and when they do, the hearer is usually able to **accommodate** that the speaker needs the inquired information to proceed with what she is trying to do:

   (25)   [Someone asking a passerby:]
          Wie komme ich denn von hier zum Bahnhof?
          How do I DENN get to the station from here?

– Here we might say that learning the way to the station is a necessary precondition for the speaker to proceed with their (either publicly entertained or deducible) plans of going to the station.

– In other cases, it is possible to deduce which plans someone is entertaining from certain social protocols, e.g., during a dinner:

   (26)   Welchen Wein möchtest du denn?
          Which wine would you DENN like?

– Why I believe our analysis is on the right track, even given the almost universal permissibility of *denn* in *wh*-questions:

   – There are contexts in which *denn*-marked *wh*-questions are clearly infelicitous, namely very **sparse, unambiguous contexts** that allow for little accommodation such as König's middle-of-the-night example;

   – The **asymmetry** between polar and *wh*-questions mentioned above might **help explain** why *wh*-questions are so much easier to accommodate than polar questions: request for information (*wh*-questions) vs. marking a proposition as a necessary precondition (polar questions)…

5   *denn* in conditional antecedents

5.1   Data

- **Recall:** *denn* can also appear in certain conditional antecedents.

  (27)   a.   Kritik ist willkommen, wenn sie denn konstruktiv ist.
             Criticism is welcome if it DENN is constructive.
         b.   Die Veranstaltung zeigte, dass Literatur politisch sein kann, wenn sie das denn will.
             The event has shown that literature can be political if it DENN wants to be.

- More specifically, Csipak and Zobel (2016) observe that:

  - *denn* is licensed in **hypothetical conditionals**, but not in **temporal conditionals** like (28) or **factual conditionals** like (29):

    (28)   Wir fangen an, wenn es (#denn) dunkel wird.
           We'll start when it (#DENN) gets dark.

    (29)   A: Peter kommt auch.
           B: Ah, ok. Wir sollten mehr Spaghetti kochen, wenn (?denn) Peter auch kommt.
           A: Peter is coming too.
           B: Ah, okay. We should make more spaghetti if (?DENN) Peter is coming too.

  - antecedents containing *denn* usually **follow** the consequent and **don't precede** it
  - antecedents containing *denn* can also occur as **bare antecedents**:

    (30)   A: Sie hätte gewinnen können.
           B: Wenn sie das denn gewollt hätte!
           A: She could have won.
           B: If she DENN had wanted to!

5.2   Predictions for conditional *denn*

5.2.1   Basic predictions

- If *denn* appears in a conditional antecedent, the **highlighted property** f is a proposition, namely the **proposition expressed by the antecedent.**

- Since *denn*-marked antecedents usually **follow** their consequents and not **precede** them, I will assume that the consequent acts as the **previous discourse event.** I will leave *denn*-marked antecedents that don't follow this pattern for future work.

> Our felicity condition predicts conditional *denn* to be felicitous just in case the speaker considers the proposition expressed by the antecedent a **necessary precondition** for (accepting) the consequent.[3]

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[3]This is very much in the spirit of one of the further felicity conditions that Csipak and Zobel (2016) give for conditional *denn*. They don't consider the further predictions resulting from this condition, though.

5.2.2   Further predictions: conditional perfection

> *Denn* conventionalizes **conditional perfection**: since it marks the antecedent as **necessary**, it turns its containing conditional into a **biconditional**.

– This prediction seems to be borne out:

(31)   Kritik ist willkommen, wenn sie (#denn) konstruktiv ist—und auch wenn sie nicht konstruktiv ist.
Criticism is welcome if it (#DENN) is constructive—and also if it isn't constructive.

(32)   Wir gehen morgen Squash spielen, wenn (?denn) Court 1 frei ist oder wenn (#denn) Court 2 frei ist.
We'll play squash tomorrow if (?DENN) court 1 is free or if (#DENN) court 2 is free.

– Note that the biconditional interpretations of (31) and (32) stem from a **non-truth-conditional meaning contribution**, though. The infelicity of (31) and (32) is **less pronounced** than that of a corresponding *only if* conditional like (33).

(33)   Kritik ist (#nur) willkommen, wenn sie konstruktiv ist—und auch wenn sie nicht konstruktiv ist.
Criticism is welcome (#only) if it is constructive—and also if it isn't constructive.

5.3   Previous work: is a unified account possible?

5.3.1   Unassertability bias of conditional *denn*

– [Csipak and Zobel](2016) provide a formal account of conditional *denn* (*denn$_C$*), arguing that a **unified analysis** of *denn$_Q$* and *denn$_C$* is **impossible**.

– They base this on the assumption that *denn$_C$* but not *denn$_Q$* conveys an **epistemic unassertability bias**: if a speaker uses a *denn*-antecedent, she considers the proposition expressed by the antecedent too unlikely to assert it.

– In support of this analysis, they report that the continuation in (34) is infelicitous in combination with *denn*, while without *denn* it is fine.

(34)   Wir machen morgen ein Picknick, wenn (#denn) die Sonne scheint—und das ist laut Wetterbericht sehr wahrscheinlich. (after [Csipak and Zobel])
We are having a picnic tomorrow if (#DENN) the sun is shining—which the weather report says is likely.

– [Csipak and Zobel] implement the unassertability bias as a non-truth-conditional meaning contribution, encoded in the **lexical entry of denn$_C$**:

(35) $[\![denn_C]\!](p) : \lambda w.\mathrm{prob}(w, p) < T$, where T is at or below the threshold for assertability

– But note that (35) **does not explain the infelicity** of (34) unless the threshold T for assertability is the same as the threshold for "being likely" (let's call the latter L):

  – *denn$_C$* contributes the condition that $\mathrm{prob}(w, p) < T$,

  – the continuation in (34) contributes the condition that $\mathrm{prob}(w, p) > L$.

  – It's natural to assume that $L < T$, though, which means that these two **conditions are compatible**.

– In order to account for (34), we might assume that *denn*$_C$ carries a **stronger bias**, namely a **negative epistemic bias** (i.e., prob$(w, p) < 0.5$). But this again seems **too strong**:

(36)   A: *Tim's birthday party is gonna be great!*
B: Wenn er denn feiert. Also klar, wahrscheinlich feiert er, aber er hat halt einfach noch nichts darüber gesagt.
B: *If he's* DENN *having a birthday party. Well, sure: he probably is having a party, it's just that he hasn't said anything about it yet.*

– So, let's stick with the weaker unassertability bias for a bit.

5.3.2   Does this bias need to be part of the conventional meaning of *denn*?

– By standard Gricean reasoning, if a speaker uses a conditional, then she already **conversationally implicates** that she considers the antecedent proposition **unassertible**.

– Hence, what *denn*$_C$ does on this account is to **conventionalize** an unassertability bias that is also conversationally implicated.

– To confirm/disconfirm the existence of this conventional bias, we try to **cancel the conversational implicature** and see whether we still find an unassertability bias. If so, we found support for it being conventional; otherwise, it cannot be conventional.

(37)   [Little Tina just learned that there is a minimal age for becoming the German federal president. Now she wants to know which family members are old enough to become federal president.]

Tina: Kann Opa Erich Bundespräsident werden?
Vater: Ich weiß die Antwort, aber ich möchte, dass du selbst darauf kommst. Immerhin weißt du ja ungefähr, wie alt Opa Erich ist. Also denk gut nach: Opa Erich kann Bundespräsident werden, wenn er **denn** mindestens 40 Jahre alt ist.

Tina: *Can Grandpa Erich become federal president?*
Father: *I know the answer, but I want you to come up with it yourself. After all you roughly know how old Grandpa Erich is. So, think about it: Opa Erich can become federal president if he* DENN *is at least 40 years old.*

– As far as I can see, *denn* is **felicitous** in (37), and the context makes it clear that the father **could actually assert the antecedent**, he just chooses not to for pedagogical reasons.

– This means the unassertability bias **cannot be conventional**.

5.3.3   Is it a more general pragmatic inference?

– Recall the picnic example:

(38)   Wir machen morgen ein Picknick, wenn (#denn) die Sonne scheint—und das ist laut Wetterbericht sehr wahrscheinlich. (after Csipak and Zobel)
*We are having a picnic tomorrow if (#*DENN*) the sun is shining—which the weather report says is likely.*

– Interestingly, a **similar kind of infelicity** seems to arise for an *only if* conditional:

(39)   Wir machen morgen (??nur dann) ein Picknick, wenn die Sonne scheint—und das ist laut Wetterbericht sehr wahrscheinlich.
We are (#only) having a picnic tomorrow if the sun is shining—which the weather report says is likely.

– Similarly, we seem to find a related infelicity with (repeated) **bare antecdents** that have **verum focus** on the *if* (which also seems like a way of expressing a bicondtional).

(40)   A: Wenn wir im Frühling endlich die Mehrheit im Stadtrat kriegen, können wir mehr Fahrradwege bauen lassen.
A: If/when we get the majority in the city council next spring, we can finally have more bike lanes built.

    a.   B: WENN wir die Mehrheit kriegen, (#und das ist sehr wahrscheinlich).
       IF we get the majority, (#which is very likely.)
    b.   B: Wenn wir denn die Mehrheit kriegen, (#und das ist sehr wahrscheinlich).
       If we DENN get the majority, (#which is very likely.)

– If these observations are correct, this indicates that whatever epistemic effect we can observe with conditional *denn* is **not part of the conventional meaning-contribution** of *denn*, but in some way follows **pragmatically** from the discourse effect of **asserting a biconditional**.

5.3.4   What is the problem with an unassertability bias for *denn* questions?

– **Recall:** the argument is that a unified account is impossible because $denn_C$ carries a conventional unassertability bias, while $denn_Q$ doesn't.

– I tried to argue that $denn_C$ does **not** carry a conventional bias.

– But **suppose that I'm wrong**, and that in fact it does.

– Then, **what would be the problem** with assuming the same bias for $denn_Q$?

– When a speaker asks a question about p, she normally also conversationally implicates that she considers p unassertible.

– That means that if we assume the above unassertability bias for $denn_Q$, it would also merely conventionalize an effect we already get from a conversational implicature.

In sum, I conclude that a **unified account** is in principle **possible**, but more work is needed to see whether the observed epistemic effect can be derived pragmatically.

6   Causal conjunction *denn*

- Discourse particles often lead **double lives** as members of other word classes. For instance, the discourse particle *ja* is homonymous with a polar particle, the discourse particle *etwa* is homonymous with an adverb meaning *approximately*, and so on.

- Discourse particle *denn* is homonymous with a **conjunction** that expresses, roughly, a causal or precondition-like relationship between two sentences (Pasch *et al.*, 2003). The closest English equivalent is (archaic) *for*.

6.1   Data

- In many contexts, *denn* is synonymous with *weil* 'because', but it can express a **wider range of semantic relationships** than the latter. In particular, *denn*-clauses but not *weil*-clauses can be used to provide **justifications for speech acts**:

  (41)   a.   Es hat geregnet, denn die Straße ist ganz nass.
          b.   #Es hat geregnet, weil die Straße ganz nass ist.
                It rained DENN/#WEIL the street is wet.   (Scheffler, 2005)

  (42)   a.   Die Straße ist ganz nass, denn es hat geregnet.
          b.   Die Straße ist ganz nass, weil es geregnet hat.
                The street is wet DENN/WEIL it rained.

  (43)   a.   Peter muss zuhause sein, denn das Licht in seiner Wohnung ist an.
          b.   #Peter muss zuhause sein, weil das Licht in seiner Wohnung an ist.
                Peter must be home DENN/#WEIL the light in his flat is on.

  (44)   a.   Ist vom Mittag noch etwas übrig? Denn ich habe schon wieder Hunger.
          b.   ?#Ist vom Mittag noch etwas übrig? Weil ich schon wieder Hunger habe.
                Are there lunch leftovers? DENN/#WEIL I'm already hungry again. (Scheffler, 2005)

- Also, and this is relevant for us, *denn* can be used to express a **precondition relationship**, whereas *weil* can't:

  (45)   a.   Das Streichholz ist angegangen, denn es ist genügend Sauerstoff in der Luft.
          b.   #Das Streichholz ist angegangen, weil genügend Sauerstoff in der Luft ist.
                The match lit DENN/#WEIL there is enough oxygen in the air.

- Moreover, different from *weil*-clauses, *denn*-clauses can't be used to answer *why*-questions:

  (46)   *Why is Sophie relieved?*
          a.   Weil sie ihre letzte Prüfung hinter sich hat.
          b.   *Denn sie hat ihre letzte Prüfung hinter sich.
                *WEIL/*DENN she is done with her last exam.*

- Scheffler (2005) explains this last contrast by treating the causal relationships conveyed by *denn* as a **conventional implicature** and that expressed by *weil* as asserted.[1]

6.2   Predictions for causal conjunction *denn*

- We have already made some headway towards a unified account:

- *Denn* contributes the condition that the speaker has to consider learning f a necessary **precondition for proceeding in discourse**.

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[1]For a similar observation and treatment of English *since*, see Charnavel (2017).

- Among other things, this can mean that f is an **explanation** for the preceding discourse event: in this case, by using a *denn*-question, a speaker demands an explanation before she is willing to proceed.

- The most general **example** of this:

  (47) Warum denn?
        Why DENN?

- This seems to fit well with the fact that causal conjunction *denn* can also convey that its prejacent is an **explanation/cause** for the content expressed by the preceding sentence.

- But there are still a number of issues.

6.3 Issue 1: evidential flip

- Recall that in questions and conditional antecedents, the speaker considers learning an instantiation of the highlighted property f a precondition **for herself** to proceed.

- With causal conjunction *denn*, however, the speaker doesn't ask the hearer for information that will help her (i.e., the speaker) proceed. Rather, she herself **provides information for the hearer**, in the hope that it will convince the hearer.

- To capture this in the felicity condition of *denn*, we will need a certain kind of **flip**.

- **Background:** in a discourse, there are several ways of assigning roles to interlocutors. If we assign them based on who makes a discourse move, the roles are those of **speaker and hearer**. But if we take a more evidential perspective, we arrive at the roles of of **interrogator and witness**:

move	speaker	hearer
question	interrogator	witness
assertion	witness	interrogator
antecedent[2]	either?	either?

- **Perspective shifts** that depend on illocutionary force are not uncommon: many perspective-dependent expressions make the **speaker** the relevant perspective-holder when they occur in **assertions**, and make the **hearer** the relevant perspective-holder when they occur in **questions**.

- For example, **illocutionary adverbs** are anchored to the speaker in assertions, while in questions they are anchored to the hearer (Faller, 2006).

  (48) a. Honestly, it was Mary who ate the biscuits.
        b. Honestly, who has eaten the biscuits?

- This phenomenon is sometimes called **interrogative flip** or **evidential flip** (Fillmore, 1975; Mitchell, 1986).

- If we adopt the distinction between interrogator and witness, our felicity condition for *denn* is the following:

  > It is felicitous for a speaker c_S to use *denn* in a sentence with highlighted property f iff c_S considers learning an instantiation of f a necessary precondition for **the interrogator** to proceed in the discourse.

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[2]Bylinina *et al.* (2014, 2015) note, albeit in a slightly different context, that in conditional antecedents perspective shifting is optional.

– That is, in questions, it is the speaker who has to learn, while in assertions it is the hearer.

6.4 Issue 2: necessary precondition vs. possible explanation

6.4.1 The problem

– If discourse particle *denn* makes the **same meaning contribution** as causal conjunction *denn*, we would expect them to accept the **same prejacents**.

– However, this is not always the case: the *denn*-assertion (49) is **acceptable**, but the corresponding *denn*-question (50) is **not acceptable**:

(49)   Karl muss ins Gefängnis, denn er hat Drogen verkauft.
Karl has to go to jail, DENN he sold drugs.

(50)   A: *Karl has to go to jail.*
B: #Hat er denn Drogen verkauft?
B: *#Did he DENN sell drugs?*

– This is because Karl having sold drugs is not **necessary** in the relevant sense; there **could have been other reasons** for him going to jail.

– In contrast, him having committed a crime is necessary:

(51)   B: Hat er denn ein Verbrechen begangen?
B: Did he DENN commit a crime?

– So, the problem is: particle *denn* marks learning f as **necessary**, but the explanations that conjunction *denn* introduces are typically **not necessary**.

6.4.2 A possible fix

– We introduce one more level of modality into the felicity condition:

> It is felicitous for a speaker c_S to use *denn* in a sentence with highlighted property f iff c_S **considers it possible** that learning an instantiation of f is a necessary precondition for the interrogator to proceed in the discourse. ($\Diamond_S\Box_I$)

– **In questions: interrogator = speaker** ($\Diamond_S\Box_S\varphi \Leftrightarrow \Box_S\varphi$)

…the speaker **considers it possible** that learning an instantiation of f is a necessary precondition **for herself** to proceed in the discourse.

– We assume that agents are fully **introspective** w.r.t. what preconditions they have for proceeding.

– Then, considering it possible that f is a precondition for oneself simply **boils down** to considering f a precondition.

– That means, for questions, the new felicity condition just boils down to **the old one**.

– **In assertions: interrogator = hearer** ($\Diamond_S\Box_H\varphi \nLeftrightarrow \Box_H\varphi$)

…the speaker **considers it possible** that learning an instantiation of f is a necessary precondition **for the hearer** to proceed in the discourse.

> Intuitively, we can think of this as the speaker **preemptively answering** a *denn*-marked polar question that she thinks the hearer might ask.

- This potentially allows f to be **any proposition that a hearer might need confirmed** in order to accept a discourse move or a piece of information. For instance:

  - a **precondition** (oxygen example above):

    (52) Ist dir gar nicht aufgefallen, dass du viel zu schnell fährst? Denn das tust du.
    Haven't you noticed that you are driving way too fast? Denn you are.

  - a **cause** (jail example above):

    (53) Der See ist gefroren, denn es war diesen Winter kälter als normalerweise.
    The lake is frozen. Denn this winter was colder than usual.

  - a **justification of an epistemic statement** (rain example, light example above):

    (54) Es muss diesen Winter kälter sein als normalerweise. Denn der See ist gefroren
    This winter must be colder than usual. Denn the lake is frozen.

7   Conclusion

- I have proposed a unified account of:

  - **discourse particle** *denn* in polar questions, *wh*-questions and conditional antecedents, and
  - **causal conjunction** *denn*.

- Although some details remain to be worked out, I have argued that *denn* **connects** the **highlighted content** of its containing clause to the **preceding discourse** by expressing a **precondition-like relationship**.

- The particle thereby helps interlocutors with **navigating a discourse**: it provides speakers with a means to signal that something is a precondition for continuing with the discourse in the desired way.

- There are numerous loose ends for future work, e.g.:

  - nonstandard questions: rhetorical questions, biased questions
  - *denn* in counterfactual antecedents
  - relation to other particles (*überhaupt*)

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