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The precondition particle: 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, typically by linking an utterance to the epistemic states of the interlocutors (Zimmermann 2011). For the most part, however, the formal semantics literature has focused on only a subgroup of discourse particles, namely those particles whose distribution is limited to declarative sentences.[1] They are commonly treated as indicating something about the status of the information conveyed by the declarative (McCready 2012). But this perspective doesn't straightforwardly extend to particles that appear, either predominantly or exclusively, in interrogative clauses, since questions, as opposed to assertions, don't primarily convey information but rather request it.

Denn is a particle that appears predominantly in interrogatives. It is licensed both in polar interrogatives like (1) and *wh*-interrogatives like (2) (Thurmair 1989). Moreover, it can appear in certain conditional antecedents like (3) (Brauße 1994, Csipak & Zobel 2016).

(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?*

(3)   a. Kritik ist willkommen, wenn sie denn konstruktiv ist.
          Criticism is welcome if it DENN *is constructive.*

      b. Sie hätte gewinnen können, wenn sie es denn gewollt hätte.
          She could have won if she DENN *had wanted to.*

[1]Some notable exceptions are Kaufmann & Kaufmann 2012, Rojas-Esponda 2014, Csipak & Zobel 2014 and Gutzmann 2015.

I propose a unified felicity condition for *denn* that accounts for the use of this particle across the different sentence types. The paper is structured as follows. Section 2 discusses the existing literature on *denn* in questions. Section 3 presents new data on *denn* in polar questions. Section 4 spells out the positive proposal, and Section 5 discusses the predictions made by this proposal. Section 6 critically examines an argument that has been made against a unified account of question *denn* and conditional *denn*. Section 7 concludes.

2.   Previous work on *denn* in questions

There is little agreement, either in the descriptive or in the formal literature, about what exactly *denn* contributes to the meaning of a question. Among other things, it has been suggested that *denn* doesn't contribute anything at all (Thurmair 1991),[2] that it expresses the speaker's expectation that the hearer knows an answer to the question (Helbig 1988), that it conveys learning the true answer to the question is in some way "relevant" for the speaker (König 1977, Thurmair 1989, Kwon 2005, Bayer 2012), and that it signals heightened interest of the speaker (Csipak & Zobel 2014). The problem shared by these proposals is that they describe the properties of a typical utterance situation in which *denn* is used rather than specifying the conventional meaning contribution of the particle (cf. Karagjosova 2004). As a consequence, they can't predict the distribution of *denn*. E.g., as shown by (4), the speaker's expectation that the hearer knows an answer, which Helbig (1988) proposed as the meaning contribution of *denn*, is not a necessary felicity condition for the use of this particle (and we will see below that it isn't a sufficient condition either).

(4)   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?*

Denn is an extremely frequent particle in information-seeking questions. One may be tempted to conclude from this that its semantic contribution is so bleached out as to make *denn* acceptable in virtually *any* information-seeking question (e.g., Thurmair 1991). Upon closer examination, though, this is not what we find: as we are about to see, there are in fact infelicitous uses of *denn*.

König (1977).   As already observed by König (1977), if *A* wakes *B* in the middle of the night, then it is infelicitous for *A* to follow this up by asking (5). By contrast, it is felicitous for *B* to react to being woken up by asking (5).

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

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[2]Thurmair (1991) actually describes *denn* as a marker of discourse coherence, a characterization that will be refined below. Since, according to her, discourses are coherent by default, though, she concludes that *denn* does not contribute anything.

Contrary to what the accounts from Section 2 would predict, (5) remains infelicitous also if *A* expects *B* to know the time, if knowing the time is relevant for *A*, or if *A* is extremely interested in finding out the time.

What König takes (5) to show is 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 (5), and it can be considered as a discourse move. Below, I will propose that *denn* is anaphoric to the previous discourse move, broadly construed. On this view, *A*'s question in (5) will come out as infelicitous not because *denn* appears discourse-initially, but rather because the given context is so sparse that it provides only one previous discourse move to which *denn* can be anaphoric (namely *A* waking *B*). While this discourse move will satisfy the felicity condition introduced by *B*'s *denn*-question, it won't satisfy the felicity condition introduced by *A*'s *denn*-question.

Gutzmann (2015). To my knowledge, the only formal analysis that takes the discourse anaphoricity of *denn* seriously is due to Gutzmann (2015), who accounts for examples like (5) by letting *denn* contribute the following condition (for a similar idea, see also Kwon 2005).

(6) **Felicity condition for *denn* proposed by Gutzmann (2015):**
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*.

While this correctly rules out (5A) and many other cases, it still overgenerates. As we will see in the next section, not just *any* reason for asking a question is sufficient for licensing *denn*, even when that reason is known to the hearer.

3. New data: *denn* in polar questions

The following is an example of an infelicitous *denn*-question, which is information-seeking and does not appear discourse-initially.

(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 (#DENN) Peter also here?

There are a few things to note about this example. Firstly, its infelicity is only due to the presence of *denn*. If *denn* is ommitted in (7), the resulting question becomes an acceptable reply for *B*. Secondly, we find a certain asymmetry here: if the roles of Peter and Sophie are reversed—that is, if Sophie is the one who is very fond of Peter—then the *denn*-marked

version of (7) is felicitous. Thirdly, there is a closely related particle, namely *dann* 'then', which is acceptable in *B*'s question, as evidenced by (8).

(8)   [Same scenario as in (7)]
      B: Ist dann Peter auch hier?
      B: Is Peter also here, then?

Finally, due to the discourse participants' common knowledge in this scenario, *A* clearly knows why *B* would ask the question in (7). Hence, Gutzmann's account would predict *denn* to be licensed in (7), contrary to what we find empirically.

   One possible explanation of these data, which I will develop below, is the following. Pace Csipak & Zobel 2014, I will assume that *denn* is sensitive not only to the question as a whole, but to the proposition that gets *highlighted* by the question.[3] In (7), this is the proposition that Peter is at the party. While *dann* in (8) expresses a consequence relation between the information asserted by *A* and the highlighted proposition (roughly: Sophie is at the party, *hence* Peter must be there),[4] *denn* in (8) conveys that the highlighted proposition is a *necessary precondition* for "integrating" the information asserted by *A*.[5] Since it is commonly known, however, that Peter's being at a party is *not* a precondition for Sophie's being there, the *denn*-question in (8a) is infelicitous.

   To get more familiar with the notion of necessary preconditions, let's consider another example:

(9)   [*A* loves ice skating and wants to do it as often as possible. *B* knows this. *A* and *B* are walking 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 the given context, we find that (9a) is felicitous—intuitively this is because low temperature can easily be seen as a necessary precondition for frozen lakes.[6] On the other hand, (9b) is infelicitous—intuitively because there is no salient contextual information for which the suggestion to go ice skating could reasonably be construed as a precondition. Note, however, that since for both (9a) and (9b) it is clear from the context why *A* is asking the question, Gutzmann's condition would predict both questions to be felicitous.

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[3]I use the term *highlighting* in the sense of Roelofsen & Farkas (2015). It will be defined in Section 4.1

[4]I won't return to *dann* in this paper. See Biezma (2014) for an analysis of the relevant use of English *then*.

[5]That *denn* establishes a necessary precondition relationship has also been suggested by Csipak & Zobel (2016) as one among several conditions for conditional *denn*, but not for *denn* in questions, and without exploring the predictions that this approach makes.

[6] The notion of necessity that is relevant here—as well as in many other instances of human reasoning—is defeasible. When faced with new evidence (e.g., that somebody is artificially cooling the lake to create an ice rink), *A* would not insist that this winter being colder is a necessary precondition for the lake to freeze.

4. Proposal

We have now gotten an impression of how *denn* behaves in polar questions. In this section, this impression will be made more precise. First, a number of auxiliary notions will be introduced. Then, using these notions, a felicity condition for *denn* will be formulated. In the remainder of the paper, it will be shown how this condition holds up for the other environments in which *denn* appears.

4.1 Auxiliary notions

4.1.1 Highlighting

Highlighted content.   Many accounts of question semantics employ the idea that, when a question is uttered in discourse, this makes salient an *n*-place property, where *n* is the number of *wh*-elements in the question (e.g., Groenendijk & Stokhof 1984, von Stechow 1991, Krifka 2001, Aloni et al. 2007). Here we will use one particular implementation of this idea, due to Roelofsen & Farkas (2015). Roelofsen & Farkas assume an additional level of semantic representation, dubbed *highlighted content*. For instance, both the polar interrogative in (10a) and the declarative in (10b) are taken to highlight the proposition that Ann watched Psycho, i.e., $\lambda w.W(p)(a)(w)$. The single-*wh*-question in (10c) is taken to highlight the 1-place property of having been watched by Ann, i.e., $\lambda x.\lambda w.W(x)(a)(w)$, and the multiple-*wh*-question in (10d) is taken to highlight the relation $\lambda y.\lambda x.\lambda w.W(x)(y)(w)$.

(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

Generalizing over these different cases by viewing propositions as 0-place properties, we see that all of the above sentence types highlight an *n*-place property, where $n \geq 0$ is the number of *wh*-elements in the sentence.

Whenever f is an *n*-place property and $d_1, \ldots, d_n$ are n individuals, we call the proposition $f(d_1, \ldots, d_n)$ an instantiation of f. In particular, this means that if f is a 0-place property, it has only one instantiation, namely f itself. If f is an *n*-place property with $n \geq 1$, it typically has several different instantiations.

Independent motivation.   Highlighting and related notions are motivated by phenomena distinct from the semantics of discourse particles. For example, they are used to model the ability of different sentence types to license *yes*/*no* responses like those in (11)–(12).

(11) The door is open./Is the door open?   (12) The door is closed./Is the door closed?

   a. Yes $\rightsquigarrow$ open   a. Yes $\rightsquigarrow$ closed
   b. No $\rightsquigarrow$ closed   b. No $\rightsquigarrow$ open

Roelofsen & Farkas assume that the objects highlighted by a sentence become available as discourse referents and thus as potential antecedents for subsequent anaphoric expressions. This way, the patterns in (11)–(12) can be captured if we treat *yes* and *no* as propositional anaphors. Similarly, short answers to *wh*-questions, as in (13), can be captured if we assume that such answers anaphorically take up the property highlighted by the question.

(13)   A: What did Ann watch?
       B: Psycho.   ⤳   Ann watched Psycho.

Meaning vs. highlighted content.   Answerhood conditions or resolution conditions don't fully determine what is highlighted. For instance, if we adopt a theory in which the meaning of a question is construed as the set of its answers (Hamblin 1973), then it is possible that two questions have the same meaning but differ in their highlighted content. To see this, consider the context in (14). The *wh*-question in (14a) only has two possible answers, namely the proposition that Aronian played black and the proposition that he played white. Since these are also precisely the possible answers to the polar question in (14b), we find that (14a) and (14b) have the same meaning. They do not have the same highlighted content, though: (14a) highlights a 1-place property, while (14b) highlights a proposition. This contrast will become crucial once we turn to *denn* in *wh*-questions.

(14)   [*A* is curious about the details of the chess world cup final:]

       a. A: Which color did Aronian play in the first game?

       b. A: Did Aronian play black in the first game?

4.1.2   Discourse events

The notion of a *discourse event* gives us a wider notion of a discourse move, including aspects of both linguistic and extralinguistic context. A discourse event can be an utterance, i.e., an assertion, question or imperative, or it can be any other event through which something becomes particularly salient. For instance, if one of the interlocutors points at an object, thus making this object salient, this action will be regarded as a discourse event.

4.1.3   Proceeding in discourse

For an interlocutor *A* to *proceed in discourse* is for *A* to act in line with what the previous discourse event has indicated would be a preferred action. More concretely, I will assume that this amounts to the following. If the previous discourse event *E* was an imperative, then *A* has to accept *E* and carry out the given instructions; if *E* was an assertion, *A* has to accept the information conveyed by *E*; if *E* was an information-seeking question, *A* has to accept *E* and answer the question; if *E* was the appearance or presentation of contextual evidence, *A* has to accept the presented evidence; and finally, if *A* announces or otherwise indicates that she wants to perform some action, then she has to actually perform this action.

Importantly, the term *accepting information* is used in a semi-technical sense above. In order to accept some piece of information φ in this sense, it is sometimes not sufficient to merely come to believe φ. Rather, it can also require *integrating* the new information with existing beliefs, or even being able to explain the new information using existing beliefs.To illustrate what I mean here, recall the frozen lake example in (9): when A sees the frozen lake, this observation is unexpected given her belief that the winters at that location usually aren't cold enough for the lake to freeze. She might now either decide to call attention to her surprise and try to resolve it, or she might let it pass. In (9a) she chooses the former option, by asking whether the current winter has been unusually cold. Learning that it indeed has been would explain the frozen lake and would thus have the effect of dispelling A's surprise.[7] I will treat A's behavior as an instance of not accepting information. Of course, this does not mean that A doubts the fact that the lake is frozen—after all she can see it with her own eyes. It merely means that she hasn't yet integrated this fact.

For a full account, it will be necessary to formally develop the notions of accepting and integrating information, which remain rather vague here. This is left to another occasion.

4.2   A felicity condition for *denn*

We are now ready to formulate a felicity condition for *denn*.

(15)   **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 is relatively flexible in that it allows the highlighted property f to be one of several things: e.g., f can be a precondition that is based on world knowledge, as in the frozen lake example in (9) above, a presupposition of the previous assertion, as in (16), or a piece of information that is needed to interpret the previous utterance, as in (17).

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

(17)   *A: Earlier today, Anna called!*
    B: Welche Anna meinst du denn?
    B: Which Anna do you DENN *mean?*

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[7]What A does here is to come up with an explanatory hypothesis. So, more generally, she is engaging in *abductive* reasoning. The Piercean abduction schema characterizes the frozen lake example rather well:

> The surprising fact, C, is observed.
> But if A were true, C would be a matter of course.
> Hence, there is reason to suspect that A is true.   (Peirce 1974, 5.189)

5.   Predictions

We now take a closer look at the predictions made for *denn* as it appears in various sentence types, starting with polar questions in Section 5.1, then moving on to *wh*-questions in Section 5.2, and conditional antecedents in Section 5.3.

5.1   Predictions for polar questions

5.1.1   Basic predictions

As we saw in Section 4.1.1, if *denn* appears in a polar question, the highlighted property f is a 0-place property, i.e., a proposition. Since there is only one instantiation of a proposition, namely the proposition itself, learning an instantiation of f amounts to learning f itself. For instance, in (18a), f is the proposition that the door is open. What B conveys by using *denn* is that she first has to learn that the door is open before she can follow A's instruction. In contrast, by using (18b), B conveys that she has to learn the door is *closed*. As this cannot reasonably be construed as a precondition for B to follow A's instruction, (18b) is infelicitous. Crucially, (18a) and (18b) only differ in their highlighted content, not in their answerhood or resolution conditions. The contrast between these two replies hence shows that *denn* must be sensitive to highlighted content.

(18)   [Only *A* has keys to open the door.]
    A: You go on in! I'm coming in a minute.

    a. B: Ist die Tür denn offen?   b. B: #Ist die Tür denn abgeschlossen?
         B: Is the door DENN *open?*   *B: #Is the door* DENN *locked?*

5.1.2   Further predictions

We find that if we form a disjunction of *denn*-marked questions, as in (19a), this results in unacceptability.[8] By contrast, a conjunction of *denn*-marked questions can be acceptable, as illustrated in (19b), and asking just one of the disjuncts, such as (20), is acceptable too.

(19) *A: Did you hear? Sarah is going on a world trip next week!*

    a. 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?*

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

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

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[8]Note that (19a) is *not* an alternative question. The alternative question corresponding to (19a) is *Hat sie denn im Lotto gewonnen oder reich geerbt?* 'Has she DENN won the lottery or come into a big inheritance?'. A discussion of alternative questions is omitted here due to space limits.

These observations are correctly predicted by the proposed account. According to the felicity condition, if a speaker uses *denn* in a polar question, she conveys that learning the highlighted proposition f is necessary for her to proceed. However, if a speaker disjoins two questions with highlighted propositions f_1 and f_2, then she indicates that answering either of these questions will satisfy her request for information (Belnap & Steel 1976, Groenendijk & Stokhof 1984). If answering either question is sufficient, though, it cannot be necessary to learn f_1 and it cannot be necessary to learn f_2. This means that neither of the two questions can satisfy the felicity condition for *denn*.[9]

On the other hand, if a speaker conjoins two *denn*-questions, she indicates that learning both highlighted properties is necessary for her to proceed. This is unproblematic since there can, of course, be several necessary preconditions.

Let's spell this out for example (19). In (19a), *B* offers two alternative preconditions for accepting the news about Sarah's world trip, namely a lottery win and a large inheritance. *B* indicates that learning *either* of them would be satisfactory. But this means that neither of them can be necessary, as would be required for licensing *denn* in these questions. By contrast, in (19b), *B* names two preconditions, namely planning the route and booking flights, and indicates that both of them are necessary.

5.2 Predictions for *wh*-questions

5.2.1 Basic predictions

As we saw in Section 4.1.1, if *denn* appears in a single *wh*-question, the highlighted property f is a 1-place property. For example, in (21), f is the property of being called Anna and being the referent intended by *A*. So, $f = \lambda x.\lambda w.\text{anna}(x)(w) \wedge \text{intended-referent}(x)(w)$. What *B* conveys by using *denn* is that, in order to be able to interpret (and thus ultimately to accept) *A*'s assertion, she needs to learn which of the Annas *A* intended as a referent.

(21)   [*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?*

5.2.2 Polar questions vs. *wh*-questions

We find an asymmetry between *denn* in *wh*- and polar questions: while it is acceptable for *B* to ask which Anna was meant using a *denn*-marked *wh*-question, as in (21), it is not acceptable to inquire about a specific Anna using a *denn*-marked polar question, as in (22).

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[9]If *denn* is present not in both disjuncts but only in the first one, this seems to improve acceptability. This might be explained if we assume that in that case *denn* takes wide scope over the disjunction. A discussion of this construction is left for future work.

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

This asymmetry is correctly predicted by the felicity condition. Recall that a polar question highlights a proposition, and that a proposition only has a single instantiation, namely itself. In (22), this is the proposition that *A* meant Anna from Hamburg. *B* conveys that learning that *A* meant Anna from Hamburg is necessary for her to interpret *A*'s assertion. However, in the given context, this cannot be construed as necessary because there are *several* possible referents. So, if *B*, instead of learning that it was Anna from Hamburg, learns that it was Anna from Munich, this will equally enable her to interpret *A*'s assertion.

In contrast, a *wh*-question highlights an *n*-place property, with $n \geq 1$, and such a property has not only one but *several* instantiations. In (21), learning one of these several instantiations is indeed necessary: in order to interpret *A*'s assertion, *B* necessarily has to learn either that it was Anna from Hamburg or that it was Anna from Munich.

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

When it comes to licensing *denn*, *wh*-questions are much more permissive than polar questions. In fact, it is rather difficult to find infelicitous examples of *denn* in *wh*-questions—the only clearly infelicitous cases occur in very sparse, unambiguous contexts like König's middle-of-the-night example in Section 2. Whenever the context allows for it, accommodating the use of *denn* in *wh*-questions seems extremely easy for interlocutors. Speakers even ask *denn*-marked *wh*-questions out of the blue, and when they do, the hearer usually accommodates that the speaker needs the inquired information to proceed with what she is trying to do. This is the case in (23), e.g., where learning the way to the station is construed as necessary for the speaker to go through with their deducible plans of going to the station.

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

In other cases, interlocutors might use certain social protocols to accommodate the use of *denn*. E.g., (24) could be a question posed to a guest at the beginning of a dinner party.

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

There are two reasons why I believe the proposed theory is on the right track, even given the almost universal permissibility of *denn* in *wh*-questions. Firstly, as already noted, there are also contexts in which *denn*-marked *wh*-questions are clearly infelicitous. What distinguishes König's middle-of-the-night context from the contexts in (23) and (24) is that the former makes only one discourse move salient, with the consequence that *denn* unambiguously picks up this move. By contrast, in (23) and (24), there seems to be room

for accommodation since there is no unambiguous previous discourse move. Secondly, the proposed account brings out the asymmetry between polar and *wh*-questions discussed in Section 5.2.2: *denn* in *wh*-questions merely signals that an information request needs to be satisfied (hence, in most contexts, it does not add much to the existing question meaning), whereas by using *denn* in a polar question the speaker signals she has to learn that some specific proposition holds true (and this is a very clear addition to the meaning of a polar question).

5.3   Predictions for conditional *denn*

5.3.1   Basic predictions

If *denn* appears in a conditional antecedent, as in (25), the highlighted property f is a proposition, namely the proposition expressed by the antecedent. For instance, in (25), the antecedent highlights the proposition that Caro wants to win.

(25)   Caro kann gewinnen, wenn sie das denn will.
        Caro can win if she DENN *wants to.*

Zobel & Csipak (2016) find that *denn*-marked antecedents significantly more often follow their consequents than precede them. *Denn*-marked antecedents also occur as bare antecedents, reacting to the preceding assertion by another interlocutor, as in (26).

(26)   *A: Caro can win.*
        B: Wenn sie das denn will.
        B: If she DENN *wants to.*

For simplification, I will assume that the consequent or, in the case of bare antecedents, the preceding assertion acts as the previous discourse move. I will leave cases that don't follow this pattern for future work.[10] Given this assumption, the proposed analysis predicts *denn* to be felicitous just in case the speaker considers the proposition expressed by the antecedent a necessary precondition for accepting the consequent. This condition is very close to one of the felicity conditions that Csipak & Zobel (2016) provide for conditional *denn*.

5.3.2   Further predictions

The above condition immediately gives rise to another prediction: *denn* in conditional antecedents turns its containing conditional into a biconditional. This is because *denn* marks the antecedent as *necessary* for the consequent, and, from the truth-conditional content of

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[10]In principle, there would be two possible configurations for those cases: either the proposition expressed by the antecedent is a precondition for the consequent (in which case, the proposed analysis would have to be revised) or it is a precondition for the preceding discourse move made by another interlocutor.

the conditional, we already know that the antecedent is *sufficient* for the consequent. A *denn*-marked antecedent is thus presented as a necessary and sufficient condition for the consequent—or, in other words, *denn* conventionalizes conditional perfection.

We find that this prediction is indeed borne out. Both (27) and (28), where conditional perfection is canceled, are only acceptable if *denn* is omitted.

(27) 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.

(28) 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.

6. Is a unified analysis possible?

In their account of *denn* in conditional antecedents, Csipak & Zobel (2016) argue that a unified analysis of *denn* in questions (henceforth *denn*$_Q$) and *denn* in conditional antecedents (henceforth *denn*$_C$) is impossible. They base this on the assumption that *denn*$_C$ but not *denn*$_Q$ conveys what I will call an *epistemic unassertability bias*: if a speaker uses a *denn*$_C$-marked antecedent, she considers the proposition expressed by the antecedent too unlikely to assert it. Csipak & Zobel (2016) implement this as a not-at-issue contribution of *denn*$_C$:

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

In support of this analysis, they report that the continuation in (30) (*which. . . likely*) is infelicitous in combination with *denn*$_C$, while without *denn*$_C$ it is fine.[11]

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

On Csipak & Zobel's account, *denn*$_C$ conventionalizes a meaning contribution that is already present as a conversational implicature: if a speaker uses a conditional, then, by standard Gricean reasoning, she conversationally implicates that she considers the antecedent proposition unassertible. In order to find out whether this unassertability bias is part of the

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[11]Notice that (29) doesn't explain the infelicity of (30) though. If we follow Csipak & Zobel in assuming a threshold T for asserting a proposition, then it also makes sense to assume a threshold for calling a proposition likely. I will refer to the latter as L. It is natural to assume that $L < T$ (otherwise we would make undesirable predictions; e.g., *It is raining* would be predicted to follow from *It it likely that it is raining*). Now, according to (29), *denn*$_C$ contributes the condition that $\mathrm{prob}(w, p) < T$, and the continuation in (30) contributes the condition that $\mathrm{prob}(w, p) > L$. In order to explain the infelicity of *denn*$_C$ in (30), these conditions would have to be incompatible, but they are not: they are met if $L < \mathrm{prob}(w, p) < T$.

conventional meaning of *denn*, we have to consider contexts in which the conversational implicature is suspended. If using *denn* in these contexts is acceptable and doesn't convey an unassertability bias, we know that the unassertability bias can be canceled and is thus pragmatic in nature. Otherwise, the bias can't be canceled and is semantic. Consider (31).

(31) [5-year-old Tina just learned there's a minimal age for becoming German president. Now she wants to know which relatives are old enough to become president.]
Tina: Can Grandpa Erich become 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:

Er kann Bundespräsident werden, wenn er denn mindestens 40 Jahre alt ist.
He can become president if he DENN *is at least 40 years old.*

The context makes it clear that the father *could* assert the antecedent; he chooses not to for pedagogical reasons. To me it seems that *denn*$_C$ is felicitous here and no unassertability bias is conveyed.[12] The bias hence can't be part of the conventional meaning of *denn*$_C$. I conclude that a unified account of *denn*$_C$ and *denn*$_Q$ is in principle possible.

7.   Conclusion

I proposed a unified account of the discourse particle *denn* in polar questions, *wh*-questions and conditional antecedents, arguing that *denn* connects the highlighted content of its containing clause to the preceding discourse by expressing a precondition-like relationship.

There are many loose ends for future work. Firstly, the conceptual underpinnings of the proposed analysis need to be made more precise: what exactly does it mean to *accept* information? How defeasible is the relevant notion of necessity? Secondly, a wider range of linguistic constructions should be taken into account: how does the analysis fare for *denn* in counterfactual antecedents, rhetorical questions or epistemically biased questions? Finally, what is the relation of *denn* to similar particles such as German *überhaupt* or English *even*?

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[12]But further empirical work would be needed to test this judgement.

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