



Denn as a highlighting-sensitive particle

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Abstract

This paper develops an account of the German discourse particle *denn* that captures the meaning contribution of this particle in polar questions, *wh*-questions, and certain conditional antecedents in a unified way. It is shown that the behavior of *denn* exhibits an asymmetry between polar and *wh*-interrogatives, which can be captured by treating the particle as sensitive to the property highlighted by its containing clause, in the sense of Roelofsen and Farkas (Language 91(2):359–414, 2015). In addition, the paper argues that highlighting-sensitivity should be incorporated in the account of another discourse particle, German *überhaupt*, and discusses how the proposed account of discourse particle *denn* may be extended to also cover the use of *denn* as a causal conjunction.

1 Introduction

Discourse particles are small words that are tremendously useful in conversation. They help interlocutors organize and navigate a discourse by overtly signaling what otherwise would have to be inferred by hearers. They can signal how a given utterance fits into the overall structure of the discourse (Rojas-Esponda 2015) or how the content conveyed by an utterance relates to the epistemic states of the interlocutors (Zimmer-

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mann 2011). More generally, we may characterize discourse particles as commenting on the semantic content of their containing utterance by expressing a relation between this content and some property of the discourse or of the interlocutors. Under this view, if we want to describe the meaning of a discourse particle, we need to specify *which* comment the particle makes on the semantic content of its containing utterance. I argue that in addition we have to specify another, often overlooked component, namely, *which notion of semantic content* is the pertinent one here.

Most work in formal semantics has focused on discourse particles occurring in declarative sentences.¹ For these particles, the relevant notion of semantic content is straightforward: declaratives convey information, and this information is classically modeled as a proposition. So, we may think of discourse particles in declaratives as connecting the propositional content expressed by the declarative to some property of the discourse or the interlocutors. A prominent example of a particle fitting this perspective is German *ja*. Roughly, by using *ja* in a sentence with propositional content *p*, the speaker connects *p* to the epistemic states of the interlocutors by indicating that either *p* is already common knowledge of speaker and hearer or it is verifiable on the spot (Kratzer 2004).

This paper is concerned with discourse particles that occur in interrogative sentences. For these particles, identifying a suitable notion of semantic content is less straightforward. Since questions request information, rather than conveying it, they aren't taken to express propositional content. Instead, the meaning of a question is often taken to reside in its *answerhood conditions*—those conditions under which a statement counts as an answer to the question (Hamblin 1958). An influential implementation of this idea can be found in *alternative semantics*, which models the meaning of a question as the set of answers to this question (Hamblin 1973; Karttunen 1977). As a reasonable first attempt, one might therefore treat discourse particles in questions as sensitive to the question's semantic content qua answerhood conditions. For certain particles such as German *wohl* this approach can be successful (Zimmermann 2004, 2008), but we will see shortly that it fails for certain other particles—including the one that is the main subject of this paper, German *denn*.^{2,3}

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

¹ Some notable exceptions are Grosz (2011), Kaufmann and Kaufmann (2012), Rojas-Esponda (2014a), Csipak and Zobel (2014) and Gutzmann (2015).

² Any theory that implements the pre-theoretical notion of answerhood classifies propositions into answers and non-answers. Hamblin (1973) and Karttunen (1977) are mentioned here because readers are likely to be familiar with these works, not because I want to suggest we should adopt their particular division into answers and non-answers. Rather, the point I will try to make is more general: take *any* suitable implementation of answerhood—by 'suitable' I mean that it has to track our intuitions about which propositions resolve a question—and this implementation will be insufficient to capture the semantics of certain discourse particles.

³ The framework of *inquisitive semantics* is closely related to alternative semantics, but adopts a slightly different perspective: it takes the meaning of both declaratives and interrogatives to reside in their *resolution conditions* (Ciardelli et al. 2013, 2015). For the purposes of the current paper, the difference between answerhood conditions and resolution conditions isn't relevant.

(1) **Polar questions:**

- 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) **wh-questions:**

- a. Warum lachst du denn?
Why are you DENN laughing?
- b. Wie schaltet man dieses Ding denn aus?
How does one DENN switch this thing off?

(3) **Conditional antecedents:**

- a. Kritik ist willkommen, wenn sie denn konstruktiv ist.
Criticism is welcome if it DENN is constructive.
- b. Sie kann gewinnen, wenn sie das denn will.
She can win if she DENN wants to.

For now, we will focus on *denn* in questions. Even without going into any details about the semantic contribution of this particle, we can show that *denn* is insufficiently captured by treating it as sensitive to only answerhood conditions. To begin with, observe that in the following scenario *denn* is felicitous in the *wh*-question (4-a), but not in the polar question (4-b).

- (4) [TWO ANNAS: A and B know exactly two people called Anna. One of them lives in Munich, the other one in Berlin. This is commonly known among A and B.]

A: Vorhin hat Anna angerufen.

A: Earlier today, Anna called.

- a. B: Welche Anna meinst du denn?
B: Which Anna do you DENN mean?
- b. B: #Meinst du denn Anna aus München?
B: #Do you DENN mean Anna from Munich?

The scenario in (4) is set up in such a way that the *wh*-question in (4-a) and the polar question in (4-b) have the same answerhood conditions: because there are exactly two Annas and we know that exactly one of them called, either question can be resolved by stating that Anna from Munich called or that she didn't call (in which case it was Anna from Berlin who called). So, if *denn* was only sensitive to answerhood conditions, it wouldn't be able to distinguish between (4-a) and (4-b) and should therefore be felicitous either in both questions or in neither of them. What we find, though, is that *denn* is felicitous in the *wh*-question, but not in the polar question. We conclude that there must be a difference between these two kinds of questions to which *denn* is sensitive.⁴

⁴ Arguments of this format, utilizing the answer-conditional equivalence of a polar question and a *wh*-question, can be found in much recent work in question semantics (e.g., Csipak and Zobel 2014; Iatridou and Tatevosov 2016; Roelofsen 2017).

Indeed, while there are many straightforward examples of polar questions that disallow the use of *denn*, it is difficult (but not impossible) to find examples of infelicitous *denn*-marked *wh*-questions. Intuitively, this is because *denn* in *wh*-questions doesn't seem to add much to the original meaning of the question—an observation reflected in the fact that much previous work ascribes a rather weak meaning contribution to *denn*: many accounts agree that the particle merely marks its containing question as somehow “relevant” for the speaker (e.g., König 1977; Thurmair 1989; Bayer 2012) or, similarly, that it signals a heightened interest of the speaker (Csipak and Zobel 2014).

While these characterizations might be accurate for *wh*-questions, they do not capture the more tangible contribution of *denn* in polar questions. I suggest that the missing piece in accounting for this asymmetry is a suitable notion of semantic content which sets polar questions apart from *wh*-questions. The notion of *highlighted content* by Roelofsen and Farkas (2015) serves this purpose. It models which semantic objects a sentence makes salient. Concretely, Roelofsen and Farkas assume that every sentence—regardless whether it is a declarative, a polar interrogative, or a *wh*-interrogative—highlights an n -place property, where $n \geq 0$ is the number of *wh*-elements in the sentence. Declaratives and polar interrogatives highlight 0-place properties, i.e., propositions, while *wh*-interrogatives highlight n -place properties with $n \geq 1$. For instance, both the declarative in (5-a) and the polar interrogative in (5-b) highlight the proposition that Mary read *Frankenstein*, while the *wh*-question in (5-c) highlights the 1-place property of having read *Frankenstein*.

- (5) a. Mary read *Frankenstein*.
 b. Did Mary read *Frankenstein*?
 c. Who read *Frankenstein*?

I propose that the meaning of *denn* and a range of other particles should be captured by treating them as sensitive to highlighted content.⁵ This way, the observed asymmetry in meaning between polar and *wh*-questions falls out naturally.

The paper is structured as follows. Section 2 introduces the two central properties of *denn*, its discourse anaphoricity and its sensitivity to highlighted content. Section 3 develops an account of *denn* that implements these properties. Section 4 walks us through the predictions that this account makes for various sentence types. Section 5 offers ideas for how to integrate highlighted content in the analysis of another German discourse particle, *überhaupt*. Section 6 extends the account from Sect. 3 to also cover the use of *denn* as a causal conjunction. Section 7 concludes. The paper is organized in a modular way, and readers who are only interested in *denn* as a discourse particle in questions can safely skip Sects. 4.5, 5, and 6.

⁵ The central idea of this approach is similar to that put forward by Csipak and Zobel (2014), but also differs from it in crucial ways, both in the conception of highlighted content and in particular in its assumptions about *denn*. The two accounts will be compared in Sect. 4.4.

2 Properties of 'denn'

This section illustrates two central properties of *denn*, discourse anaphoricity and sensitivity to highlighted content, and discusses their treatment in extant accounts.

2.1 Discourse anaphoricity

It has been known for a long time that whether *denn* is felicitous in a question *Q* depends in some way on the discourse leading up to *Q* (e.g., König 1977; Thurmair 1991). In truly out-of-the-blue contexts, certain *denn*-questions such as (6) are infelicitous. But if we modify the scenario by adding a suitable previous discourse move, as in (7), the same question becomes felicitous.

- (6) [A approaches a stranger on the street.]
 A: Entschuldigen Sie, ist heute (#denn) Montag?
 A: *Excuse me, is it (#DENN) Monday today?*
- (7) [Garbage gets collected on Mondays. A and B, two housemates, are talking over breakfast.]
 A: Kannst du nachher die Mülltonne rausstellen?
 A: *Can you put out the garbage later today?*
 B: Ist heute (denn) Montag?
 B: *Is it (DENN) Monday today?*

For a related example from the literature, consider (8) and (9) by König (1977). König (1977) observes that in the scenario in (8), where A wakes B in the middle of the night, it is infelicitous for A, the waker, to follow her action up by asking (8). By contrast, in the scenario in (9), where it is B that wakes A, it is acceptable for A, the wakee, to ask the same question.

- (8) [EARLY WAKING 1: A wakes B in the middle of the night.]
 A: #Wie spät ist es denn?
 A: #*What is the time DENN?*
- (9) [EARLY WAKING 2: B wakes A in the middle of the night.]
 A: Wie spät ist es denn?
 A: *What is the time DENN?*

According to a common position in the literature (a.o., Franck 1980; Hentschel and Weydt 1983; Thurmair 1991; Kwon 2005; Gutzmann 2015), *denn* indicates that the questioning act is in some way externally motivated. For instance, according to Thurmair (1991, p. 378), *denn* signals that the reason why the speaker is asking the question can be found in the immediate utterance context. Under this view, the question in EARLY WAKING 1 is infelicitous because the context doesn't supply a reason why A would want to know the time. By contrast, the question in EARLY WAKING 2 is felicitous because in that context it is natural to assume that A is looking for an explanation for being woken; learning the time might indeed provide her with such an explanation.

To my knowledge, the only formal implementation of the external-motivation view on *denn* can be found in Gutzmann (2015). Abstracting away from the details of his framework, Gutzmann assumes that *denn* contributes the following felicity condition:

(10) Felicity condition for *denn* by Gutzmann (2015):

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

Under this account, the EARLY WAKING examples receive an explanation similar to the one sketched above: the wakee can't be assumed to know why the waker would want to know the time, whereas the waker can reasonably infer why the wakee wants to know the time. The felicity condition is thus only met if (9) is asked by the wakee.

So, the external-motivation view on *denn* in general and Gutzmann's account in particular capture the basic discourse anaphoricity of *denn*. As we will see in the following section, however, the meaning contribution they assume is too weak: not just *any* reason for asking a question is sufficient for licensing *denn*, even if that reason emerges from the utterance context.

2.2 Sensitivity to highlighted content

For a simple case where the external-motivation account is too permissive, we can turn again to the TWO ANNAS example, the relevant part of which is repeated in (11). The reason why B asks the question is evident: she has problems identifying the intended referent. It's safe to assume that A knows this as well. So, Gutzmann's account, and more generally, any account based on the external-motivation view, would predict *denn* to be licensed.

(11) [TWO ANNAS: A and B know exactly two people called Anna. One of them lives in Munich, the other one in Berlin. This is commonly known among A and B.]

A: Vorhin hat Anna angerufen.

A: *Earlier today, Anna called.*

B: Meinst du (#denn) Anna aus München?

B: *Do you (#DENN) mean Anna from Munich?*

The problem with the external-motivation view is that it takes *denn* to establish a connection between the utterance context and the questioning act *as a whole*. I argue that this view isn't fine-grained enough: what *denn* establishes is a connection between the context and the highlighted content of the question.

For an example that illustrates this point, consider (12). Here, again, the infelicity of the question is due to the presence of *denn*. If *denn* is omitted, B's reply becomes acceptable.

(12) [PARTY: 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. Right now, A and B are talking at a big, difficult to overview party, wondering which of their friends are there.]

A: Da drüben ist Sophie!

A: *Sophie is over there!*

B: Ist (#denn) Peter auch hier?

B: *Is (#DENN) Peter also here?*

Given the scenario in (12), the reason for B's question emerges clearly from the context: A has just spotted Sophie, and A and B both know that, whenever Sophie is there, chances are good Peter will show up as well. So, A knows (i) that B's question continues their discussion about which of their friends might be at the party, and (ii) that this question has been prompted by seeing Sophie. In other words, A knows the motivation for the questioning act. This means that external-motivation accounts, including Gutzmann's account, would predict *denn* to be licensed in (12), contrary to what we find empirically.

It is also worth noting that we find a certain asymmetry here: if A spots Peter instead of Sophie, and B asks about Sophie instead of Peter, *denn* becomes felicitous:⁶

(13) [Same scenario as in (12).]

A: Da drüben ist Peter!

A: *Peter is over there!*

B: Ist denn Sophie auch hier?

B: *Is DENN Sophie also here?*

To foreshadow a bit, we will explain asymmetries like this by assuming that *denn* is sensitive to the content highlighted by the question. B's question in (12) highlights the proposition that Peter is at the party, while B's question in (13) highlights the proposition that Sophie is at the party. Roughly, in these examples, *denn* marks the highlighted proposition as an explanation for the information asserted by A. That is, in (13), it marks Sophie's being at the party as an explanation for Peter's being there. Since, in the given scenario, it is commonly known that Peter only goes to parties if Sophie is there, Sophie's presence would indeed explain Peter's presence. So, *denn* is acceptable in (13). By contrast, in (12), *denn* marks Peter's presence as an explanation for Sophie's presence. Since Sophie's presence is known *not* to depend on Peter's presence, though, Peter's presence can't be construed as an explanation for Sophie's presence and *denn* is not acceptable in (12).

Later, in order to account for a wider range of uses, we will generalize the meaning contribution of *denn* and assume that the particle marks learning the highlighted

⁶ Relatedly, it is felicitous to mark B's question in (6) with *dann* 'then' instead of *denn*, as shown in (i). We won't return to *dann* in this paper; see Biezma (2014) for an analysis of the relevant use of English *then*.

(i) [Same scenario as in (12).]

A: *Sophie is over there!*

B: Ist dann Peter auch hier?

B: *Is Peter also here, then?*

proposition as a *necessary precondition* for what we will call *proceeding in discourse*. In the party scenario, for interlocutor B to proceed in discourse, she has to accept the information asserted by A—and the *denn*-marked question specifies a necessary precondition for doing so. In (13), B expresses that she will have to learn that Sophie is at the party in order to “integrate” the fact that Peter is at the party with her existing beliefs. In this sense, *denn* in (13) marks learning that Sophie is there as a necessary precondition for B to accept the previous utterance.⁷ In the given scenario, it’s warranted to regard learning that Sophie is at the party as a precondition for integrating that Peter is there, whereas it’s not warranted to regard learning that Peter is at the party as a precondition for integrating that Sophie is there. This is why *denn* is acceptable in (13) but not in (12).

Before we make these ideas more precise in the next section, let’s consider one more example to familiarize ourselves with the notion of necessary precondition:

- (14) [FROZEN LAKE: 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 that the lake is frozen.]
- a. A: Schau mal! War es denn diesen Winter kälter als normal?
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?*

Intuitively, *denn* is felicitous in (14-a) because learning that it was unusually cold can easily be seen as a necessary precondition for integrating the information that the lake is frozen.^{8,9} On the other hand, the particle is infelicitous in (14-b) because there is no salient contextual information such that the plan to go ice skating could reasonably

⁷ The notion of a necessary precondition can also be found in Csipak and Zobel’s (2016) work on *denn* in conditional antecedents. Csipak and Zobel (2016) suggest that this kind of *denn* requires, among other things, that the prejacent of the conditional antecedent be “a necessary precondition for the validity of the content of a previous utterance.” (p. 15) However, in that paper, Csipak and Zobel are explicitly not concerned with the meaning of *denn* in questions since they don’t take a unified analysis of conditional *denn* and question *denn* to be possible. We will discuss their arguments in Sect. 4.5.2.

⁸ 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), A would not insist on having to learn that this winter was colder before she can integrate that the lake is frozen.

⁹ Going by PARTY and FROZEN LAKE, the reader might wonder why I talk about the *learning* of an instantiation *p* being a precondition for *accepting* a proposition *q*. Doesn’t this amount to the same as saying *p* is a precondition for *q*? In the examples so far, it does indeed, but more generally, *p* being a precondition for *q* is only one possible way in which learning *p* can be a precondition for accepting *q*. For another way, consider (i). We wouldn’t want to regard fever as a precondition for the flu, but learning that someone has fever might indeed be a precondition for accepting that they have the flu. Often, however, we will discuss examples where *p* is indeed a precondition for *q*, and in those cases I will switch to the easier formulation.

- (i) [Parent after their son unconvincingly announces he can’t go to school today because he has the flu:]
So, so. Hast du denn auch Fieber?
Well, well. Do you DENN have a fever?

be construed as a precondition for integrating this information.¹⁰ However, for both (14-a) and (14-b) it is clear from the context why A is asking the question, which means that Gutzmann's condition would predict *denn* to be felicitous in both questions.

To sum up, we have discussed two important properties of *denn*, its discourse anaphoricity and its sensitivity to highlighted content. In the following section, we will formulate an account of *denn* that implements these properties.

3 A precondition account of 'denn'

We first define the notion of *highlighted content* (Sect. 3.1), and then provide a felicity condition for *denn* (Sect. 3.2). Some concepts used in this condition will require further clarification. We discuss the notion of *proceeding in discourse* (Sect. 3.3) as well as the role that extralinguistic context plays in our model of discourse (Sect. 3.4).

3.1 Highlighted content

Asking a question or making an assertion changes the context in which the subsequent utterance is interpreted. For instance, if the polar question or the assertion in (15) gets answered by *yes*, this conveys that the door is open, whereas if the polar question or the assertion in (16) is answered by *yes*, this conveys that the door is closed. In response to the *wh*-question *Which book did John read?* in (17), *yes* and *no* are meaningless. But if (17) receives the term answer *Middlemarch*, this conveys that John read *Middlemarch*. In response to a polar question or an assertion, by contrast, this term answer is not licensed.

- (15) Is the door open?/The door is open.
 a. Yes. \rightsquigarrow open
 b. No. \rightsquigarrow closed
 c.**Middlemarch*.
- (16) Is the door closed?/The door is closed.
 a. Yes. \rightsquigarrow closed
 b. No. \rightsquigarrow open
 c.**Middlemarch*.
- (17) Which book did John read?
 a.*Yes./*No.
 b. *Middlemarch*. \rightsquigarrow John read *Middlemarch*.

¹⁰ A reviewer suggests that the acceptability of (14-b) improves in the presence of an additive particle and contrastive topic intonation, as in (i). My own intuitions about this are not clear, but if (i) is indeed acceptable, then this fact will have to be addressed in future work.

(i) Sollen wir_{CT} denn auch_F Schlittschuh laufen gehen?
 A: Look! Shall we_{CT} DENN auch_F go ice skating?

One way of modeling these discourse effects is to assume that the utterance of a question or an assertion brings certain semantic objects into salience, which then become available for subsequent anaphoric reference (Groenendijk and Stokhof 1984; von Stechow 1991; Krifka 2001a; Aloni et al. 2007). Here we will use Roelofsen and Farkas's (2015) implementation of this idea, which is applicable to both assertions and questions. Roelofsen and Farkas assume an additional level of semantic representation, dubbed *highlighted content*. The highlighted content of polar interrogatives and declaratives is a proposition, whereas that of *wh*-questions is an n -place property with $n \geq 1$. For example, both the polar interrogative in (18-a) and the declarative in (18-b) are taken to highlight the proposition that Mary read *Frankenstein*, i.e., $\lambda w.R(f)(m)(w)$. The single-*wh*-question in (18-c) is taken to highlight the unary property of having been read by Mary, i.e., $\lambda x.\lambda w.R(x)(m)(w)$, and the multiple-*wh*-question in (18-d) is taken to highlight the binary relation $\lambda y.\lambda x.\lambda w.R(x)(y)(w)$.

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|---------|-------------------------------------|-------------------------------------------------------------|------------------|
| (18) a. | Mary read <i>Frankenstein</i> . | $\rightsquigarrow \lambda w.R(f)(m)(w)$ | 0-place property |
| b. | Did Mary read <i>Frankenstein</i> ? | $\rightsquigarrow \lambda w.R(f)(m)(w)$ | 0-place property |
| c. | What did Mary read? | $\rightsquigarrow \lambda x.\lambda w.R(x)(m)(w)$ | 1-place property |
| d. | Who read what? | $\rightsquigarrow \lambda y.\lambda x.\lambda w.R(x)(y)(w)$ | 2-place property |

Roelofsen and Farkas (2015) generalize over these different cases by viewing propositions as 0-place properties. All of the above sentence types then highlight an n -place property, where $n \geq 0$ is the number of *wh*-elements in the sentence.

The current paper suggests that this way of generalizing over different sentence types supplies a suitable notion of semantic content for the analysis of certain discourse particles, such as *denn*. Though related notions have played a role in recent work on discourse particles (Rojas-Esponda 2014b; Csipak and Zobel 2014), the concepts of highlighting used in these accounts are limited to polar questions. The current proposal relies crucially on a unified conception of highlighted content.

Instantiations of a property In our account of *denn*, we will refer to the *instantiations* of a highlighted property. Given an n -place property f and individuals d_1, \dots, d_n , we call the proposition $f(d_1, \dots, d_n)$ an instantiation of f . What will be important for us is the following contrast. If f is a proposition, i.e., a 0-place property, it has exactly one instantiation, namely f itself. This means that the highlighted property of a declarative or a polar question has exactly one instantiation. By contrast, if f is an n -place property with $n \geq 1$, it has several different instantiations. This means that the highlighted property of a *wh*-question has several different instantiations.

3.2 A felicity condition for 'denn' in questions

We are now ready, at least modulo some conceptual details, to formulate our positive proposal. Following an influential position on the meaning contribution of discourse particles, we assume that what *denn* contributes is expressive or use-conditional content (Kratzer 1999; Potts 2005, 2007; Gutzmann 2015; cf. also McCready 2012; Grosz 2016), which can be specified in the form of a felicity condition.

(19) Felicity condition for *denn*:

Given a salient previous discourse move M_{-1} or a salient piece of contextual information I , it is felicitous for a speaker s to use *denn* in a clause with highlighted property f iff s considers learning an instantiation of f a necessary precondition for herself to proceed from M_{-1}/I .

Parts of this condition need further clarification. I first try to give the reader a quick impression of the concepts used here, then discuss some of them in more depth in the following subsections.

The ‘salient previous discourse move M_{-1} ’. The discourse anaphoricity of *denn* is implemented in the felicity condition by making reference to a salient previous discourse move M_{-1} . The term *discourse move* refers to assertions, questions, and imperatives.¹¹

The ‘salient piece of contextual information I ’. Rather than referring back to the previous discourse move, *denn* can also pick up extralinguistic information from the context. This is discussed in Sect. 3.4.

The ‘clause’. The felicity condition is intended to apply both to *denn* in questions and in conditional antecedents—hence the underspecified term *clause* instead of *interrogative*. The predictions that the condition makes for *denn* in conditional antecedents are discussed in Sect. 4.5.

To ‘proceed from M_{-1}/I ’. In a nutshell, for an interlocutor x to *proceed* from a discourse move M_{-1} is for x to act in line with what M_{-1} has indicated would be a preferred reaction. For instance, if M_{-1} was an imperative, then x has to carry out the given instructions; if M_{-1} was an assertion, x has to accept and integrate the asserted information; and so on. We will have much more to say about this notion of proceeding in Sect. 3.3.

To ‘learn’ an instantiation of a property. An instantiation of a property is a proposition. Hence, to *learn* an instantiation of a property is to learn a proposition.

For a quick illustration, let’s now see how the above felicity condition can account for the TWO ANNAS example from Sect. 1, repeated in (20).

¹¹ A reviewer observes that if *denn* combines with another discourse particle, namely *eigentlich*, no salient discourse move in the current discourse is needed, but *denn* can refer back to previous discourses:

- (i) [A told B that she applied at the University of C. Six weeks later, B runs into A and, after greeting them, starts the conversation by asking:]

Hast du denn eigentlich schon was aus C gehört?

Have you DENN EIGENTLICH already heard back from C?

As far as I can see, this data point in itself doesn’t count against treating *denn* as discourse anaphoric. It could be the contribution of *eigentlich* that makes previous discourses accessible. A detailed discussion of how *denn* and *eigentlich* interact must be left for future work.

(20) [TWO ANNAS: A and B know exactly two people called Anna. One of them lives in Munich, the other one in Berlin. This is commonly known among A and B.]

A: Vorhin hat Anna angerufen.

A: *Earlier today, Anna called.*

a. B: Welche Anna meinst du denn?

B: *Which Anna do you DENN mean?*

b. B: #Meinst du denn Anna aus München?

B: *#Do you DENN mean Anna from Munich?*

First we determine which properties the *denn*-containing clauses highlight. The *wh*-interrogative in (20-a) highlights the unary property f_a of being the referent that A intended:

$$f_a = \lambda x. \lambda w. \text{intended-referent}(x)(w)$$

The polar interrogative in (20-b) highlights the proposition f_b that A meant Anna from Munich:

$$f_b = \lambda w. \text{intended-referent}(\mathbf{munich-anna})(w)$$

While there are multiple possible instantiations of f_a (namely, that A meant Anna from Berlin, that A meant Anna from Munich), there is only one possible instantiation of f_b (namely, that A meant Anna from Munich).

Now, the previous discourse move M_{-1} was A's assertion that Anna called. So, for B to proceed from M_{-1} is to accept that Anna called. In order to do so, however, B first needs to interpret A's assertion—and this B can only do if she knows the referent for 'Anna'. So, what *denn* in (20-a) conveys is that, in order to interpret (and thus ultimately accept) A's assertion, B first has to learn which Anna was the intended referent. In other words, B has to learn a true instantiation of f_a . Since this is in line with the given scenario, *denn* is acceptable in (20-a). By contrast, what *denn* in (20-b) conveys is that to interpret A's assertion, B has to learn that A meant Anna from Munich. This is not in line with the given scenario: if B learned that Anna from Berlin was the intended referent, this would just as well enable her to interpret A's assertion and suitably react to it. In this sense, learning f_b is *not* a necessary precondition for proceeding from M_{-1} . Hence, *denn* is correctly predicted to be infelicitous in (20-b).

We will return to the TWO ANNAS case in Sect. 4.3 when discussing the differences between *wh*- and polar questions. For now, let's try to make a central notion used in the felicity condition more precise, namely, proceeding in discourse.

3.3 Proceeding

So far, we have seen only a relatively narrow range of examples for what proceeding in discourse can amount to. In TWO ANNAS, proceeding amounted to accepting some asserted information. What kept the interlocutor from doing so was her inability to interpret the assertion. In PARTY and FROZEN LAKE, proceeding also meant accepting information—asserted in the former case and demonstrated via contextual evidence in the latter case. But here, 'accepting' was used in a stronger sense: when describing what kept the speaker from proceeding, I resorted to saying that she can't 'make sense

of' some piece of information or that she can't 'integrate' this information. It's now time to (i) give a definition of proceeding that covers a wider range of cases, (ii) get more concrete on what exactly it means to integrate information, and (iii) discuss the role that the extralinguistic context plays in the interpretation of *denn*.

3.3.1 Proceeding from a discourse move

By asking a *denn*-question, a speaker signals that something is keeping her from continuing with the discourse in the most straightforward or most desirable way. We say that something is keeping her from *proceeding*. But what exactly does it mean to continue in the most straightforward way? That depends on the preceding discourse move.¹²

Proceeding Let M_{-1} be the preceding discourse move, h_{-1} the hearer/addressee of M_{-1} and s_{-1} the speaker of M_{-1} .

1. If M_{-1} is an **imperative**, then for h_{-1} to proceed from M_{-1} , h_{-1} has to accept that the felicity conditions of the imperative speech act are met and carry out the given instructions or commit to doing so at a later point.
2. If M_{-1} is a **question**, then for h_{-1} to proceed from M_{-1} , h_{-1} has to accept that the felicity conditions of the question speech act are met, and
 - (a) if M_{-1} is a **wh-question**, h_{-1} has to answer this question,
 - (b) if M_{-1} is a **polar question**, h_{-1} has to answer this question **positively**.
3. If M_{-1} is an **assertion**, then for h_{-1} to proceed from M_{-1} , h_{-1} has to accept that the felicity conditions of the assertion speech act are met and accept the information that is conveyed by M_{-1} .
4. If h_{-1}/s_{-1} transparently **entertains the plan** to perform an action, then, to proceed, h_{-1}/s_{-1} has to carry out this plan.
5. If there is a salient piece of **contextual information** I , then, to proceed from I , h_{-1}/s_{-1} has to accept I .

Observe that proceeding from classic speech acts always involves accepting that the felicity conditions of the speech act are met. These are simply felicity conditions in the sense of Austin (1962) and Searle (1969). For instance, the felicity conditions for an assertion of p are often taken to include the speaker knowing p (Williamson 2002). If a speaker feels that this condition might not be met, he can make this the subject of a *denn*-question like (21). According to our felicity condition for *denn*, what the particle expresses in (21) is that B considers A's knowing the asserted content a necessary precondition for B to accept this content.

¹² The notion of proceeding is defined here in terms of the *form* of a discourse move—imperative, question, et cetera—rather than in terms of the *force* that these moves can have—command, permission, inquiry, et cetera. By doing this, we are essentially assuming that every imperative issues a command, every question raises an issue, and every assertion provides information. This assumption is of course well known to be false (Davidson 1979; Bach and Harnish 1979): an utterance's linguistic form doesn't determine but merely constrains the utterance's force. At the same time, the assumption is pervasive in modern semantic work on discourse dynamics (Roberts 1996; Portner 2004; Farkas and Bruce 2010; Murray 2010), and we won't deviate from it here.

- (21) A: (arbitrary assertion)
 B: Weißt du das denn auch sicher?
 B: *Do you DENN know this for sure?*

More generally, any of the above components of proceeding can be taken up in a *denn*-question with suitable highlighted content. Let's run through a number of examples. If M_{-1} is an imperative, the hearer may signal that she can't carry out the instructions, e.g., because she's missing some information for doing so, as in (22).

- (22) A: Hol heute Nachmittag bitte Karl vom Bahnhof ab!
 A: *This afternoon, please pick up Karl from the station!*
 B: Wann genau kommt er denn an?
 B: *When exactly is he DENN arriving?*

If M_{-1} is a *wh*-question, the hearer may signal that she can't answer the question, e.g., because the answer depends on some information she doesn't yet have. In (23), this missing information is A's income. If M_{-1} is a polar question, the hearer may ask whether a precondition for a positive answer to this question holds. In (24), being younger than eighteen is a precondition for getting a discount.

- (23) A: Welche Steuerklasse habe ich?
 A: *Which tax bracket am I in?*
 B: Wie viel verdienst du denn?
 B: *How much do you DENN earn?*
- (24) [Only people younger than eighteen can buy discounted tickets.]
 A: Gilt die Ermäßigung auch für mich?
 A: *Am I eligible for the discount?*
 B: Bist du denn noch unter achtzehn?
 B: *Are you DENN below eighteen?*

If M_{-1} is an assertion, the hearer may be unable to accept the asserted information because it clashes with her existing beliefs, as in FROZEN LAKE. We will discuss this case in more detail in the next subsection.

If an interlocutor is transparently entertaining a plan, but can't go through with this plan because she is missing some information, she may use a *denn*-question to convey this, as in (25).

- (25) A: Ich schau mal gerade den Weg zu Lisas Party nach.
 A: *I'm just gonna look up how to get to Lisa's party.*
 [Takes out his phone.]
 A: Oh, wo wohnt sie *denn* nochmal?
 A: *Oh, where does she DENN live again?*

Finally, no matter whether M_{-1} is an imperative, a question or an assertion, the hearer can always fail to proceed because she can't interpret M_{-1} , as in TWO ANNAS, or because she refuses to accommodate a presupposition of M_{-1} , as in (26).¹³

- (26) A: Kommt Antons Freundin auch mit?
 A: *Is Anton's girlfriend also coming?*
 a. B: Hat er denn eine Freundin?
 B: *Does he DENN have a girlfriend?*
 b. B: Wieso "auch"? Wer kommt denn noch mit?
 B: *Why "also"? Who else is DENN coming?*

Although the proposed analysis is not implemented in any specific formal model of discourse, there are of course some points of contact with such models. Readers familiar with the Table model by Farkas and Bruce (2010) might prefer to think of proceeding from a question or proceeding from an assertion as reaching one of the states in the *projected set* (a set of privileged possible future common grounds). This view could also be extended to imperatives, e.g., by representing the common ground as a preference order over alternatives (Starr 2016) and letting imperatives project privileged future common grounds. It is less evident, however, how clause 4 in the definition of proceeding (carrying out a transparently entertained plan) and clause 5 in that definition (accepting extralinguistic contextual information) could be translated into the Table model.

¹³ As brought to my attention by Julian Schlöder (p.c.), there is a striking counterexample to the rule that *denn*-questions can be used to request information needed to interpret M_{-1} . Namely, *denn* is infelicitous in the question *What did you say?* when this question is used for re-eliciting the previous utterance:

- (i) Was hast du (#denn) gesagt?
What did you (#DENN) say?

This is unexpected on the proposed account, since knowing what was said is a precondition for proceeding. I believe that to find an explanation we have to pay attention to the focus structure of the question. *What did you say?* in its re-eliciting use is unusual in that focus-marking on the *wh*-element seems to be obligatory although the *wh*-element appears ex situ:

- (ii) a. WAS hast du gesagt?
 b. #Was hast du GESAGT?

As illustrated in (iii), *denn* seems generally incompatible with focused *wh*-phrases, which are characteristic of echo questions (broadly construed), i.e., questions whose answer has been given in the immediately preceding utterance (for a recent account, see, e.g., Beck and Reis 2018). Moreover, if we provide a context for *What did you say?* that allows for focusing a non-*wh*-element, as in (iv), *denn* is acceptable.

- (iii) A: *I invited Maria and Peter.*
 B: *Ich hab gerade nicht zugehört. WEN hast du (#denn) eingeladen?*
 B: *I wasn't listening. WHO did you (#DENN) invite?*
 (iv) A: *Hey there! I'm waiting for an answer.*
 B: *Oh! Was hast du denn GESAGT?*
 B: *Oh! What did you DENN SAY?*

I take these data to suggest that the infelicity of *denn* in (i) stems from a general incompatibility with echo questions. I will leave it for future work to identify the source of this incompatibility.

3.3.2 Integrating information

We still need to clear up what exactly it means to *integrate* information and in how far integrating information is important in a discourse at all. To begin with, consider once more the FROZEN LAKE case, a shortened version of which is repeated in (27).

- (27) [FROZEN LAKE: A and B are walking by a lake that usually doesn't freeze. A notices the lake is frozen.]
 A: Schau mal! War es denn diesen Winter kälter als normal?
 A: *Look! Was this winter DENN colder than usual?*

To explain the felicity of *denn*, I suggested that A can't make sense of the lake being frozen. Adopting our new terminology, we would say that A can't proceed because she can't *accept* the fact that the lake is frozen. Clearly, 'accept' is used in a technical sense here: A doesn't actually doubt the fact that the lake is frozen—after all she can see it with her own eyes. Rather, what is meant is that A can't *integrate* this fact with her existing beliefs. In particular, given her belief that the winters aren't cold enough for the lake to freeze, it's unexpected for A that the lake is frozen. If she tried to update her doxastic state with this fact, this would lead to inconsistent beliefs and trigger belief revision: she would have to drop her belief about the local winter temperatures. What she does is to check whether the current winter has been unusually cold, i.e., whether adjusting her belief would be justified.¹⁴ After learning that it indeed has been unusually cold, A would be able to update her beliefs with the fact that the lake is frozen without this causing belief revision. In this sense, again, learning the highlighted proposition of the *denn*-question is a necessary precondition for proceeding in discourse.¹⁵

However, this understanding of accepting gives rise to a worry. Doesn't it happen quite often that we accept new information without properly making sense of it? In those cases, accepting something doesn't seem to require integrating it. We hence have a tension here: sometimes, not being able to integrate information can keep an interlocutor from accepting, but at other times, integrating seems to be optional for accepting. We will sketch one possible way around this tension, by relating these differences to differences in *conversational tone*.

Conversational tone is a notion proposed by Yalcin (2007, p. 1008) to capture which status the interlocutors ascribe to the propositions in the common ground:

Conversational tone. An attitude is the *conversational tone* of a group of interlocutors just in case it is common knowledge in the group that everyone is to strike this attitude towards the propositions which are common ground.

For instance, if the conversational tone is belief, interlocutors will take the propositions in the common ground to be commonly believed. But the conversational tone could as well be supposition, just-going-along-with-whatever, pretense, ironic non-belief, and so on. Often, the purpose of the discourse will determine the conversational tone. A

¹⁴ Cf. the related observations reported by Bublitz (1978, p. 60) and Kwon (2005, p. 114).

¹⁵ To clarify, this is not meant to suggest that a speaker in this scenario would *have to* ask a *denn*-question, or any question for that matter. She can of course also silently adjust her beliefs, and then accept the fact that the lake is frozen.

theater play might be associated with a conversational tone of pretense and a small talk conversation with a conversational tone of just-going-along-with-whatever, while a scientific discourse should usually have a conversational tone of at least justified belief.¹⁶

Using this notion, we can now give a definition of accepting in terms of conversational tone.

Accepting information. An interlocutor x *accepts* a proposition p just in case:

- (i) x comes to hold the current conversational tone towards p , and
- (ii) condition (i) can be satisfied without making any additional changes to x 's doxastic state.

With this definition, accepting a proposition can be more or less demanding, depending on the conversational tone in use. Let's assume that in the FROZEN LAKE case, for instance, the conversational tone is belief, modeled in a standard doxastic logic which takes doxastic states to be consistent. Then, for x to accept a proposition p , x has to come to believe p (i.e., x 's consistent doxastic state must support p) and, in order to come to believe p , x must not have given up any of her existing beliefs and she must not have added any new beliefs other than p . Because of the consistency requirement, accepting is relatively demanding here. A's belief that it's not cold enough, prevents her from accepting the proposition p that the lake is frozen, since updating with p would lead to inconsistent beliefs. However, once A has come to believe that the current winter is colder than usual, she is able to update with p without causing inconsistent beliefs.

Sometimes interlocutors seem to be even more ambitious in that they don't only want to avoid inconsistencies, but also want new information to follow from or be explained by old information. This is the kind of conversational tone that might be behind *why*-questions with *denn*. These questions, illustrated in (28), can follow virtually any assertion or imperative.

- (28) Warum denn?
Why DENN?

Here, the conversational tone could be something like understanding. Then, for x to accept a proposition p , x has to come to understand p and, in order to come to understand p , x must not have given up any of her existing beliefs and she must not have added any new beliefs other than p .

On the other side of the spectrum, we have less demanding conversational tones such as belief without consistency requirements, which could be modeled in a non-standard doxastic logic (e.g., Levesque 1984). As with ordinary belief, for x to accept a proposition p , x needs to come to believe p . The difference is that now x is allowed to hold inconsistent beliefs. As a consequence, clause (ii) of the definition becomes

¹⁶ There are some shortcomings of this notion. In particular, we wouldn't want to require the conversational tone to stay the same throughout a discourse, and we might want to allow for different interlocutors to adopt different conversational tones. Finally, as discussed in Murray and Starr (2018), assuming that conversational tone has to be common knowledge is problematic. For the current account, we will not pursue any alternative to Yalcin's notion, however.

inconsequential, since without consistency requirements new beliefs can be added at will. Additional adjustments of x 's beliefs in the sense of clause (ii) aren't needed.

Finally, we might find conversations in which the conversational tone is a kind of going-along-with-everything attitude, where interlocutors merely have to acknowledge having heard p in order to accept p . Here, again, clause (ii) is inconsequential, since accepting p doesn't even require interlocutors to make any changes to their doxastic states.¹⁷

We have hence seen that the degree to which integrating new information is necessary for proceeding depends on how closely common ground and private doxastic states are connected. If they are relatively closely connected, they need to stay in sync, which means it's important for the discourse that interlocutors call attention to their problems with integrating new information. Integrating, in this case, is obligatory for proceeding. If, however, common ground and private doxastic states are only loosely connected, it's not as important to keep them in sync. Integrating, in this case, is only optional for proceeding.

3.4 Non-linguistic contextual information

In many cases, whether *denn* is felicitous in a question depends both on the question itself and on the discourse preceding it. We have characterized the use of *denn* in these cases as anaphoric: it picks up the preceding discourse move. However, there are also cases where we may say that *denn* is used *deictically* rather than anaphorically: it doesn't find its antecedent in the linguistic context, but picks up some piece of non-linguistic contextual information.¹⁸

We have already seen an example of deictic *denn*: in FROZEN LAKE, *denn* signals that an unusually low temperature is a precondition for the speaker to make sense of the lake being frozen. The fact that the lake is frozen is something that the interlocutors observe from extralinguistic evidence. For another example, consider (29). Here, *denn* conveys that it being past midnight is a precondition for the speaker to make sense of the fact that a night bus drove by. Again, the interlocutors observe the fact that the bus drove by from extralinguistic contextual evidence.

- (29) [NIGHT BUS: A and B are walking home from a bar, when a bus, clearly recognizable as a night bus, drives by. As both A and B know, night buses run every day from midnight to 6am.]

A: Oh! Ist es denn schon nach Mitternacht?

A: Oh! Is it DENN already past midnight?

¹⁷ However, as a reviewer remarks, speakers still use *denn* in small talk situations. The purpose of *denn* in these conversations often seems to be signaling heightened interest of the speaker (in line with the meaning attributed to *denn* in Csipak and Zobel 2014). To explain this, we have to assume either (i) that the conversational tone can change mid-discourse (cf. Footnote 16), or (ii) that interlocutors can exaggerate: they might, e.g., present getting an answer to their question as a necessary precondition for proceeding, even if it in fact is no such precondition. What an interlocutor achieves by doing this is to signal that getting an answer is especially important to her—in other words, that she is interested.

¹⁸ Authors subscribing to the external-motivation view on *denn* (e.g., Thurmair 1991; Kwon 2005) also generally acknowledge that the external motivation for the questioning act can be supplied by the non-linguistic context.

To implement this sensitivity to extralinguistic information, the felicity condition in Sect. 3.2 allows *denn* to be used if there is a salient piece of contextual information *I* such that the speaker considers learning an instantiation of the highlighted property a necessary precondition for proceeding from *I*. To proceed from *I*, as defined in Sect. 3.3, requires accepting *I*, where, as discussed in the previous section, accepting can amount to different things, depending on the respective conversational tone.

Taking a more general perspective, the deictic use of *denn* is reminiscent of deictic pronoun uses, exemplified in (30).

(30) [A and B are listening to C give a conference presentation.]

A: She is such a great speaker!

How exactly pronouns in utterances like (30) receive their referent and under which conditions they can be used is a complex question that has attracted considerable attention in the literature (a.o., Kaplan 1989; Reimer 1992; Neale 2004). Here, we subscribe to the *intentional* view, on which reference resolution is a pragmatic process that succeeds if the hearer manages to recognize the speaker's referential intention. This view seems to work well for *denn*: speakers can felicitously use *denn* if they can reasonably assume that the hearer will be able to identify the intended referent. This could either be because the referent is already salient (as is, e.g., a loud noise) or because the speaker makes the referent salient by pointing or gazing at it. By contrast, if the speaker has no reason to think that the hearer will recognize her intention, the use of *denn* is degraded. For example, A should not use *denn* in NIGHT BUS if it's unlikely that B noticed the bus or if it's unlikely that B noticed that A noticed the bus.

As a final remark, there are certain uses of *denn* in *wh*-questions that don't seem to require a referent at all, neither in the linguistic nor the extralinguistic context. I will postpone a discussion of these cases to Sect. 4.3.

4 Predictions

While the previous section had a rather conceptual flavor at times, we will now focus on linguistic data, spelling out some predictions that our account makes for *denn* in polar questions (Sect. 4.1), alternative questions (Sect. 4.2), and *wh*-questions (Sect. 4.3). We also compare the proposed account to that by Csipak and Zobel (2014), which uses a notion related to highlighted content (Sect. 4.4). Finally, we turn to the predictions for *denn* in conditional antecedents (Sect. 4.5).

4.1 Predictions for polar questions

To recap, 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. So, according to our felicity condition in Sect. 3.2, *denn* can appear in a polar question just in case the speaker considers learning the highlighted proposition f a necessary precondition for herself to proceed in discourse. But this is just to say that the speaker considers the truth of f itself a necessary precondition for proceeding.

A basic prediction following from this is that, given two polar questions that are indistinguishable in terms of their answerhood conditions, but differ in their highlighted propositions, *denn* might be acceptable in one of them but not the other. This is the case in (31). In (31-a), f is the proposition that B doesn't need a key to open the door. What B conveys by using *denn* is that she can follow A's instruction only if she doesn't need a key. This question is felicitous with or without *denn*. In contrast, by using (31-b), B conveys she has to learn that she *needs* a key. Since this can't reasonably be construed as a precondition for B to open the door, *denn* is degraded in (31-b). Without *denn*, the question is completely fine.

(31) [OPENING DOORS: Only A has keys to open the door.]

A: Mach schon mal die Tür auf! Ich komm' gleich nach.

A: *You go on and open the door! I'm coming in a minute.*

a. B: Brauche ich (denn) keinen Schlüssel?

B: *Do I (DENN) not need a key?*

b. B: Brauche ich (??denn) einen Schlüssel?

B: *Do I (??DENN) need a key?*

Disjunctions and conjunctions of polar questions

We find that if we disjoin two *denn*-marked polar questions, as in (32-a), this results in unacceptability. Omitting both occurrences of *denn* makes (32-a) acceptable, and, if just one of the disjuncts gets asked, as in (32-b), *denn* becomes acceptable too. Moreover, *denn* in conjoined questions like (32-c) is felicitous as well.

(32) A: Hast du schon gehört? Sarah geht nächste Woche auf Weltreise!

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 im Lotto gewonnen?

B: *Has she DENN won the lottery?*

c. B: Hat sie (denn) schon eine Route geplant und hat sie (denn) die Flüge schon gebucht?

B: *Has she (DENN) planned the route yet and has she (DENN) booked the flights yet?*

These observations are correctly predicted by the proposed account in the following way. In (32-a) and (32-c), B asks two *denn*-marked questions with highlighted propositions f_1 and f_2 . By marking both questions with *denn*, B conveys that she considers both f_1 and f_2 necessary preconditions for accepting A's assertion. This itself is not a

problem: there can be several necessary preconditions—and the conjoined questions in (32-c) express just that. However, if a speaker disjoins, rather than conjoins, two questions, as in (32-a), then she indicates that a positive answer to *either* of these questions will be sufficient to satisfy her informational request (Belnap and Steel 1976; Groenendijk and Stokhof 1984).

So, B signals that learning f_1 would be sufficient and learning f_2 would be sufficient. But if B considers either of these sufficient, she can't consider it necessary to learn f_1 and she can't consider it necessary to learn f_2 . This means that neither of the two questions can satisfy the felicity condition for *denn*.^{19,20}

Let's spell this out for example (31). In (31-a), 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 (31-b), B names two preconditions, namely planning the route and booking flights, and indicates that both of them are necessary.

4.2 Predictions for alternative questions

Alternative questions are disjunctive questions with falling intonation on the final disjunct, as in (33). This intonational pattern sets them apart from polar disjunctive questions such as (34), which have a final-rise intonation (Pruitt and Roelofsen 2013).

- (33) Are you arriving on Monday↑ or Tuesday↓?
 (34) Do you have a loyalty card or a student ID↑?

We find that *denn* can appear both in alternative questions, as illustrated in (35), and in polar disjunctive questions, as illustrated in (36).

- (35) A: Kannst du mich vom Bahnhof abholen?
 A: *Can you pick me up from the station?*
 B: Kommst du denn am Montag↑ oder am Dienstag↓?
 B: *Are you DENN coming on Monday↑ or Tuesday↓?*
- (36) [At the ticket counter.]
 A: Ein ermäßigtes Ticket bitte.
 A: *One discounted ticket please.*

¹⁹ 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, hence marking the disjunction as a whole as a necessary precondition. A discussion of this construction must be left for future work.

²⁰ There is an alternative explanation for the data in (32). Krifka (2001b) and, following him, Hoeks and Roelofsen (2018) argue that speech acts in general and question speech acts in particular can't be disjoined. In a sentence like (32-a), Hoeks and Roelofsen would treat only the disjunction as a whole as a ForceP, but not the two individual disjuncts. By contrast, in a conjunction like (32-c), the individual conjuncts are treated as full ForcePs. Now, if we assume that discourse particles can only appear in full ForcePs, this would capture the data in (32) as well.

B: Haben Sie denn eine Kundenkarte oder einen Studentenausweis?
 B: *Do you DENN have a loyalty card or a student ID?*

To account for these data, we have to extend our definition of highlighted content, which so far doesn't cover alternative questions. Following Roelofsen and Farkas (2015), we assume that alternative questions highlight several propositions. By contrast, polar disjunctive questions highlight only a single proposition.²¹ For instance, the alternative question (35) highlights both the proposition that A will arrive on Monday and the proposition that A will arrive on Tuesday. By contrast, the polar disjunctive question (36) highlights the proposition that A has a loyalty card or a student ID.

To generalize over the different sentence types, we will say that every sentence highlights n m -place properties. For alternative questions, $n > 1$, and for all other sentence types, $n = 1$.

We also need to adapt our felicity condition to this extended notion of highlighted content. Rather than presupposing, as we did before, that there is exactly one highlighted property, we now say that *denn* marks learning an instantiation of one of the possibly many highlighted properties as a necessary precondition:

(37) **Felicity condition for *denn* (alternative-question version):**

Given a salient previous discourse move M_{-1} or a salient piece of contextual information I , it is felicitous for a speaker s to use *denn* in a clause with highlighted properties $F = \{f_1, \dots, f_n\}$ iff s considers learning an instantiation of at least one $f \in F$ a necessary precondition for herself to proceed from M_{-1}/I .

This condition predicts *denn* to be felicitous in (35) and (36). The alternative question (36) highlights two propositions (that A will arrive on Monday, that A will arrive on Tuesday). By using *denn*, the speaker conveys that she has to learn one of these propositions before committing to pick up A from the station. The polar disjunctive question (36) highlights the proposition that A has a loyalty card or a student ID. By using *denn*, the speaker indicates that she can only sell a discounted ticket to A after learning that A has a loyalty card or a student ID.

This concludes our treatment of alternative questions. For all other sentence types, the more complex notion of highlighted content and the felicity condition boil down to their simpler versions. For readability, I will therefore use the simpler condition in the remainder of the paper.

4.3 Predictions for *wh*-questions

Let's now take a closer look at *denn* in *wh*-questions, and try to explain why *denn* in these questions can seem so different from *denn* in polar questions. To recap, for a *wh*-question, the highlighted property f is an n -place-property, with $n \geq 1$. So, according to our felicity condition, *denn* can appear in a *wh*-question just in case the speaker considers learning an instantiation of f a necessary precondition for herself to proceed from the previous discourse move.

²¹ Roelofsen and Farkas motivate this difference by appealing to the specific *yes/no*-responses licensed by alternative questions and polar disjunctive questions. The reader is referred to their paper for details.

4.3.1 The asymmetry between polar questions and *wh*-questions

It was mentioned in the introduction that *wh*-questions are much more permissive than polar questions when it comes to licensing *denn*. In fact, it is rather difficult to find infelicitous examples of *denn* in *wh*-questions at all. The only clearly unacceptable cases are set in very sparse, unambiguous contexts such as the first EARLY WAKING context in Sect. 2.1. By contrast, it is relatively easy to find infelicitous occurrences of *denn* in polar questions.

The proposed account provides a natural explanation for this asymmetry. *Denn* in a *wh*-question merely signals that the informational request expressed by the question needs to be satisfied for the speaker to proceed. In a coherent discourse, this doesn't add much to the existing question meaning. By contrast, if a speaker uses *denn* in a polar question, she signals that the truth of a specific proposition is a precondition for proceeding—and this is a very clear addition to the existing meaning of a polar question.

When discussing the TWO ANNAS case in Sect. 3.2, we already saw a concrete example, where the contribution of *denn* in a polar question renders this question infelicitous, while the weaker contribution of *denn* in the corresponding *wh*-question is perfectly acceptable.

4.3.2 'Denn' without antecedent

The permissiveness of *denn* in *wh*-questions goes even further. There are some striking examples, where *denn* is licensed in a *wh*-question although this question doesn't seem to be preceded by any suitable discourse move to which *denn* could be anaphoric:

- (38) [Host asking guest at a dinner party:]
 Welchen Wein möchtest du denn?
Which wine would you DENN like?
- (39) [Someone asking a passerby:]
 Wie komme ich denn von hier zum Bahnhof?
How do I DENN get to the station from here?
- (40) [Katja is a common friend of A's and B's. A to B discourse-initially:]
 Sag mal... warum geht Katja denn nie ans Telefon?
Say... why does Katja DENN never answer her phone?

I suggest that to make sense of data like these, we need to take the not-at-issue meaning contributions of the relevant questions into account. *Wh*-questions are often taken to presuppose that at least one of their answers is true (e.g., Horn 1972; Abusch 2010). For example, (38) presupposes that the hearer wants wine. *Why*-questions additionally have a factivity presupposition (e.g., Katz and Postal 1965): (40) presupposes that Katja never answers her phone. Finally, by asking a *how*-question, such as (39), a speaker often conversationally implicates that she desires the situation described in the question to come true: by asking (39), the speaker implicates that she wants to reach the station.

It seems that the above not-at-issue contributions play a role in providing suitable antecedents for *denn* in various ways. Let's start with example (39). Recall from Sect. 3.3 that one of the ways in which an interlocutor can proceed in discourse is by carrying out a plan that she has transparently been entertaining. We may now say that the speaker in (39)—in particular by implicating that she wants to reach the station—is transparently entertaining the plan of going to the station. What is keeping her from carrying out that plan is her lack of knowledge about how to get there. Hence, here it is the *denn*-question itself that provides a context for the interpretation of *denn*.

In example (38), the presupposition might act in concert with the social protocol of having a dinner party. The host presupposes that the hearer wants wine, and, being the host, she is thus trying to see to it that the hearer gets wine. Again, she is transparently entertaining a plan. What is keeping her from going through with this plan is her lack of knowledge about which exact wine the guest would like to have.

In example (40), it seems to be the information provided by the presupposition itself that gets taken up by *denn*. The speaker draws attention to the fact that Katja never answers her phone, and by asking a *why*-question, she signals that she can't integrate this fact yet. This is somewhat similar to the demonstration acts in FROZEN LAKE and NIGHT BUS. There, the speaker made some particular fact salient and then indicated that she can't integrate this fact. Just as in (40), this doesn't suggest that the speaker fails to *believe* this fact—after all, the fact is observable in FROZEN LAKE and NIGHT BUS and even presupposed in (40).

Why- and *how*-questions might be particularly suited to license *denn* without any contextual help. In part this might be owing to their not-at-issue contributions, in part because their question meaning links in so well with these contributions: *how*-questions seem to say, 'I want to *X*, but I can't proceed because I don't know how to *X*', and *why*-questions, 'I know that *p*, but I can't proceed because I can't make sense of *p*.'

Finally, as brought to my attention by a reviewer, *denn*-marked *wh*-questions in reaction to a preceding assertion are sometimes used to ask for further information, even if this information can't be construed as a precondition for accepting the preceding assertion. In (41), for example, there is no doubt that B has already accepted A's assertion. Hence, learning who is going or where they are going can't be understood as a precondition for B to proceed from A's utterance.

- (41) A: Wir fahren morgen an die Nordsee.
 A: *We are going to the North Sea tomorrow.*
 B: Oh, toll! ...
 B: *Oh, nice! ...*
- a. B: Wie fährt ihr denn dorthin?
 B: *How are you DENN planning to get there?*
- b. B: Wohin genau fährt ihr denn?
 B: *Where exactly are you DENN going?*
- c. B: Wer kommt denn alles mit?
 B: *Who exactly is DENN coming?*

I suggest that what happens in these examples is that B is entertaining a plan—and this could even be just the plan to make some discourse contribution, such as commenting on A's imminent vacation (*Be careful, the traffic might be bad tomorrow, Great place—I've been there before!, So nice to get to spend time with the whole family!, etc.*). In order to make an informed comment, however, B first needs A to fill in more details. We hence see that the notion of entertaining a plan affords a lot of freedom for the proposed account of *denn*: plans don't have to concern discourse-external actions, but can also be about actions the interlocutors are hoping to carry out within the discourse itself. In view of the ease with which *denn* can appear in *wh*-questions almost across the board, though, it seems that this freedom is needed.

4.4 Comparison with Csipak and Zobel (2014)

The current account proposes that *denn* is sensitive to the highlighted content of its containing clause, which, in the case of a polar question, amounts to being sensitive to the question's prejacent. At first sight, this idea might seem similar to an account by Csipak and Zobel (2014) in which they treat certain particles as sensitive to *explicitly mentioned answers*. We will see, however, that on closer examination the two accounts differ in some fundamental aspects.

Csipak and Zobel's main objective is to capture the distribution of a set of German discourse particles: *denn*, *leicht*, *etwa*, and *eh*. The former two can appear in both polar and *wh*-questions, while the latter are only licensed in polar questions:

- (42) a. Hast du denn/etwa/leicht/eh die Seife gefunden?
 Did you DENN/ETWA/LEICHT/EH find the soap?
 b. Was hast du denn/*etwa/leicht/*eh gefunden?
 What did you DENN/*ETWA/LEICHT/*EH find? (Csipak and Zobel 2014, p. 83)

Csipak and Zobel observe that a polar question explicitly mentions an answer, namely its prejacent, which Csipak and Zobel call the *explicitly identified answer (EIA)*. By contrast, *wh*-questions don't have an EIA. In order to account for the differences in (42), Csipak and Zobel assume that the meaning contributions of *etwa* and *eh* make reference to the EIA of the question, while those of *denn* and *leicht* make reference to the question as a whole but not to the EIA. The meaning contributions they assume for *denn* and *etwa*, e.g., are given in (43). On this account, *etwa* can't appear in *wh*-questions as these questions don't have an EIA, whereas *denn* can appear in *wh*-questions as it doesn't require its containing question to have an EIA.

- (43) a. $\llbracket \text{denn} \rrbracket(Q)$: the speaker communicates heightened interest in the answer to Q ²²
 b. $\llbracket \text{etwa} \rrbracket(Q)$: the speaker realized that she mistakenly believed the complement of the EIA of Q to be less likely than the EIA

²² I agree that *denn*-questions can communicate heightened interest. On the account proposed here, though, this is not a part of the lexical meaning of the particle, but rather derives from this meaning. A *denn*-question indicates that something is keeping the speaker from proceeding and asks for the information needed to proceed. Since speakers can be assumed to be interested in proceeding, it follows that they have a heightened interest in the answer to the *denn*-question.

Let's compare Csipak and Zobel's account with the one proposed here. A first observation is that, for polar questions, the notion of EIA and that of highlighted content coincide. For *wh*-questions, however, these notions come apart. While a *wh*-question does not have an EIA, it does have highlighted content. This highlighted content, moreover, is the same kind of formal object as that of a polar question, namely an *n*-place property. In this sense, Roelofsen and Farkas (2015)'s highlighted content is a unified notion, applicable to both polar and *wh*-questions.

This is important because the unified conception of highlighted content allows us to treat discourse particles as both sensitive to the prejacent of polar questions and at the same time able to appear in *wh*-questions. By contrast, on Csipak and Zobel's account it is impossible for a particle to be sensitive to EIAs and also be licensed in *wh*-questions. For them, this is a desirable feature of their account because it predicts the distribution of *etwa*-like particles. I disagree with this view. Particles like *denn* and *überhaupt* (to be discussed in Sect. 5) clearly show that sensitivity to the prejacent of a polar question does not determine distributional restrictions. In order to correctly predict the distribution of *denn*, Csipak and Zobel have to treat this particle as insensitive to EIAs, which means that they can't account for examples such as TWO ANNAS, PARTY, ICE SKATING, or OPENING DOORS.

4.5 Predictions for conditionals

The distribution of *denn* isn't limited to questions. As illustrated by (44), the particle can also appear in certain conditional antecedents (Brauß 1994; Csipak and Zobel 2016).

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

Denn-marked antecedents can also occur as bare antecedents, reacting to the preceding assertion by another interlocutor, as in (45).

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

We see that in both (44) and (45), the material picked up by *denn* precedes the particle. This is in line with the discourse anaphora view on *denn* adopted in this paper. Indeed, a corpus study by Zobel and Csipak (2016) found that most occurrences of conditional *denn* follow this pattern. However, Zobel and Csipak also identified a number of other, significantly less frequent configurations. In particular, they found examples like (46), where *denn* doesn't seem to be anaphoric but rather cataphoric: its referent is provided by the consequent and the consequent comes after the antecedent. Constructions like these show that the question of which material in a discourse can serve as a referent for *denn* is much more complex than assumed in the present paper, and also seems to be subject to syntactic factors.

- (46) Wenn sie denn nicht vermeidbar ist, wie sollte eine Kündigung kommuniziert werden?

If it_i DENN can't be avoided, how should a dismissal_i be communicated?

(Zobel and Csipak 2016, p. 352)

I won't try to give an account of how conditional *denn* finds its referent, but focus on cases like (44) and (45) in which *denn* is clearly anaphoric. However, this still leaves open the question *what kind of* discourse move conditional *denn* is anaphoric to. For simplicity, let's assume that it picks up an assertion of the consequent. The property *f* highlighted by a conditional antecedent is simply the proposition expressed by the antecedent. Our felicity condition then predicts *denn* to be felicitous just in case the speaker considers the antecedent a necessary precondition for accepting the consequent. For example, in (44), *denn* signals that the speaker will only accept that Caro can win if the speaker learns that Caro wants to win. This condition is indeed very close to one of the felicity conditions that Csipak and Zobel (2016) provide for conditional *denn*.

4.5.1 Conditional perfection

The above treatment immediately leads us to an additional prediction: conditional *denn* turns its containing conditional into a biconditional. This happens because *denn* marks the proposition expressed by the antecedent as a *necessary* precondition for the consequent. From the at-issue meaning of the conditional, we already know that the antecedent is a *sufficient* condition for the consequent. So, taken together, this means the antecedent is necessary and sufficient for the consequent—in other words, the conditional is a biconditional. We hence predict *denn* to be a conventional means of expressing conditional perfection.

We find that this prediction is indeed borne out. In (47-a), *denn* is felicitous, while in (47-b), where conditional perfection is canceled, *denn* is infelicitous. Similarly, *denn* is felicitous in (48-a), while in (48-b), where the antecedent is disjunctive, it is infelicitous for *denn* to occur in one or both of the disjuncts.²³ This is because (48-b) supplies two sufficient conditions. If there are two sufficient conditions, neither of them can be necessary.

- (47) a. Kritik ist willkommen, wenn sie denn konstruktiv ist.
Criticism is welcome if it DENN is constructive.
- b. 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.

²³ If *denn* only appears in the first disjunct, the infelicity is less pronounced, presumably because it can be understood as taking scope over the disjunction as a whole. Cf. Footnote 19.

- (48) a. Wir gehen morgen Squash spielen, wenn denn Court 1 frei ist.
We'll play squash tomorrow if DENN court 1 is free.
- b. 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.

As a final note, however, recall that the meaning contribution of *denn* isn't truth-conditional. There also is a truth-conditional way of expressing a biconditional, namely with *only if*. If conditional perfection gets canceled in an *only if* biconditional, the resulting infelicity is more pronounced than that of (47) and (48):

- (49) 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.

4.5.2 Possibility of a unified account

To conclude this section on conditional *denn*, let us try to diffuse an argument that Csipak and Zobel (2016) give against a unified account of *denn* in questions and in conditional antecedents. Csipak and Zobel argue that *denn* in conditional antecedents (henceforth $denn_c$) but not *denn* in questions (henceforth $denn_q$) carries what we might describe as an *epistemic unassertability bias*: if a speaker uses a *denn*-antecedent, she considers the proposition expressed by the antecedent too unlikely to assert it. Csipak and Zobel implement this as a not-at-issue contribution of $denn_c$:

- (50) $\llbracket denn_c \rrbracket(p) : \lambda w. \text{prob}(w, p) < T$, where T is at or below the threshold for assertability

In support of this analysis, they report that the continuation in (51) is infelicitous in combination with *denn*, while without *denn* it is fine.²⁴

- (51) Wir machen morgen ein Picknick, wenn (#denn) die Sonne scheint—und das ist laut Wetterbericht sehr wahrscheinlich.
We are having a picnic tomorrow if (#DENN) the sun is shining—which the weather report says is likely. (after Csipak and Zobel 2016)

On Csipak and 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

²⁴ Notice that (50) doesn't explain the infelicity of (51) though. If we follow Csipak and 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 is likely that it is raining*). Now, according to (50), $denn_c$ contributes the condition that $\text{prob}(w, p) < T$, and the continuation in (51) contributes the condition that $\text{prob}(w, p) > L$. In order to explain the infelicity of $denn_c$ in (51), these conditions would have to be incompatible, but they are not: they are met if $L < \text{prob}(w, p) < T$.

bias is part of the 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 (52).

- (52) [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 in (52) and no unassertability bias is conveyed. If this is right, the bias 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.

The oddness observed with the picnic example in (51) might stem from the fact that the antecedent (*if the sun is shining*) and the continuation (*which is very likely*) stand in a contrastive discourse relation. Standing in a contrastive discourse relation isn't the same as being inconsistent, though. If we insert a suitable contrastive discourse marker like *but*, the acceptability of *denn* improves:

- (53) Wir machen morgen ein Picknick, wenn denn die Sonne scheint—aber das ist laut Wetterbericht sehr wahrscheinlich.

We are having a picnic tomorrow if DENN the sun is shining—but the weather report says that that's likely.

Interestingly, in the absence of a contrastive discourse marker, a similar kind of oddness seems to arise if we use an *only if* conditional:

- (54) Wir machen morgen (??nur dann) ein Picknick, wenn die Sonne scheint—und das ist laut Wetterbericht sehr wahrscheinlich.

We are having a picnic tomorrow (??only) if the sun is shining—which the weather report says is likely.

I take these observations to indicate that the epistemic effect we can observe with conditional *denn* might be derivable from the discourse effect of asserting a biconditional.

5 Highlighting in the analysis of ‘überhaupt’

So far, we have seen how an analysis of one specific discourse particle, namely *denn*, can profit from assuming that this particle is sensitive to the highlighted content of its containing clause. This assumption allowed us to capture a certain asymmetry between *denn* in polar and *wh*-questions. There are some other particles, such as German *überhaupt* and closely related English *even*, that can appear in both polar and *wh*-questions and that show a similar asymmetry in meaning. Here, I focus on *überhaupt*, offering some ideas for how highlighting might be useful in the analysis of this particle. I will not, however, work out a full account of *überhaupt*.

5.1 Rojas-Esponda (2014a)

German *überhaupt* comes in a stressed and an unstressed version. Here, I focus on the unstressed version because it is most similar to *denn*. This kind of *überhaupt* can appear in polar interrogatives, as illustrated in (55), and *wh*-interrogatives, as illustrated in (56). In both cases it can be translated as *even*. The polar question in (55) roughly translates as *Do you even drink alcohol?* and the *wh*-question in (56) as *Where are we even?*

- (55) A: Möchtest du ein Glas Wein? A: *Would you like a glass of wine?*
 B: Nein, danke. B: *No, thank you.*
 A: Hättest du gerne ein Bier? A: *Would a beer appeal to you?*
 B: Nein. B: *No.*
 A: TRINKST du überhaupt Alkohol? A: *Do you ÜBERHAUPT DRINK alcohol?*
 (Rojas-Esponda 2014a, p. 5)

- (56) [A and B are tourists in NYC, travelling on the subway.]
 A: In welche Linie müssen wir gleich umsteigen?
 A: *Which train do we have to change to?*
 B: Hmm... Wo SIND wir überhaupt gerade?
 B: *Hmm... Where ÜBERHAUPT ARE we right now?*

Überhaupt is also licensed in declaratives, as shown in (57), where the *überhaupt*-statement roughly translates as *I actually don't drink alcohol.*²⁵

- (57) A: Möchtest du ein Glas Wein? A: *Would you like a glass of wine?*
 B: Nein, danke. B: *No, thank you.*
 A: Hättest du gerne ein Bier? A: *Would a beer appeal to you?*
 B: Nein. Ich trinke überhaupt B: *No. I drink ÜBERHAUPT no alcohol.*
 keinen Alkohol. (Rojas-Esponda 2014a, p. 3)

²⁵ In order to get the reading corresponding to this translation, it's important that *überhaupt* doesn't bear any stress. If it was focused (*Ich trinke ÜBERHAUPT keinen Alkohol*), then the statement would mean *I don't drink any alcohol at all*. See Rojas-Esponda (2014a).

Rojas-Esponda (2014a) gives an elegant unified account of *überhaupt* in polar interrogatives and declaratives, both in its stressed and unstressed version. Her account is formulated in terms of a certain kind of *Question under Discussion* tree (QUD tree), which represents hierarchical relations between questions: more general questions are higher in the tree, whereas more specific questions are lower. Simplifying from the details of her account, Rojas-Esponda analyzes unstressed *überhaupt* as a marker of *doubting moves*. These are moves which show that the current QUD (a higher node in the tree) is not answerable or which ask whether this QUD is answerable. For instance, (55) asks whether the QUD *What is the alcohol you want?* is answerable, and (57) shows it is not answerable.

Rojas-Esponda's account has two main shortcomings. First, it doesn't account for *überhaupt* in *wh*-questions.²⁶ Second, it misses certain facts about highlighting in polar questions. I suggest that both problems can be solved by treating *überhaupt* as sensitive to highlighted content.

5.2 Highlighting-sensitivity

Let's first take a look at the restrictions that *überhaupt* imposes on highlighted content. In example (55), repeated in (58-a), the *überhaupt*-marked polar question highlights the proposition that B drinks alcohol. Note that *überhaupt* isn't felicitous if instead the proposition that B doesn't drink alcohol gets highlighted, as in (58-b). Crucially, though, the given context supplies contextual evidence for B not drinking alcohol, and does therefore license highlighting the negative alternative (Büring and Gunlogson 2000). This is evidenced by the felicity of (58) without *überhaupt*. We conclude that it must be the presence of *überhaupt* that dictates the conditions on highlighting here.

(58) [Same beginning of the discourse as in (55).]

a. A: Trinkst du überhaupt Alkohol?

A: *Do you ÜBERHAUPT drink alcohol?*

b. A: Trinkst du (#überhaupt) keinen Alkohol?

A: *Do you (#ÜBERHAUPT) drink no alcohol?*

Now, how should we approach a highlighting-sensitive semantics of *überhaupt*? I suggest that the contributions of *denn* and unstressed *überhaupt* in questions are actually very similar. Intuitively, *überhaupt* is something like a QUD-sensitive version of *denn*: from the perspective of *denn*, discourse seems to be merely a linear list of utterances, whereas from the perspective of *überhaupt* discourse is organized hierarchically. More concretely, I propose the following felicity condition for *überhaupt* in questions. It doesn't capture the contribution of *überhaupt* in assertions. Therefore, it isn't intended to replace Rojas-Esponda's full account, but just to give a quick impression of how highlighted content could be integrated.

²⁶ The reason is that *wh*-questions don't fit the concept of doubting moves: they don't ask whether the QUD is answerable, nor do they show that it is not answerable. Rather, they ask for information that is missing in order to answer the QUD.

(59) **Felicity condition for *überhaupt* (building on Rojas-Esponda 2014a):**

It is felicitous for a speaker *s* to use *überhaupt* in a question with highlighted property *f* iff *s* considers learning an instantiation of *f* a necessary precondition for answering the current QUD.

This condition is almost exactly like the one for *denn*, the only difference being that it talks about a precondition for answering the QUD rather than for proceeding in discourse. It predicts that *überhaupt*-marked polar questions ask whether the precondition for answering the QUD holds—that is, whether the QUD is answerable. The condition also captures *überhaupt* in *wh*-questions. *Überhaupt* in (56), for example, is predicted to signal that learning the location is a precondition for answering the QUD. This is in line with our intuitions for (56).

Finally, let's check whether our felicity condition predicts the correct highlighting patterns. I think it's helpful at this point to observe that the felicity condition for *denn* and that for *überhaupt* sometimes coincide. They do so exactly if proceeding in discourse (as defined in Sect. 3.3) is the same as answering the current QUD. This again is the case whenever the QUD gets explicitly asked in the preceding discourse move, as in (56) or (60). In discourses like that, *überhaupt* and *denn* can—modulo a slight difference in tone—be used interchangeably or even co-occur.²⁷ For instance, in (56) the question *Which train do we have to change to?* is both the QUD and the preceding discourse move. Hence, knowing where A and B are can be construed as a precondition both for proceeding in discourse and for answering the QUD. Similarly with (60), where Peter's having kids is a precondition both for answering the QUD and for proceeding.

(60) A: Wie heißen Peters Kinder?

A: *What are Peter's kids called?*

B: Hat er denn/überhaupt/denn überhaupt Kinder?

B: *Does he DENN/ÜBERHAUPT/DENN ÜBERHAUPT have kids?*

However, proceeding in discourse and answering the QUD don't always coincide. They can come apart whenever the QUD is not explicitly asked in the preceding discourse move. This is the case in (55), where the QUD is *What is the alcohol you want?*, whereas the preceding discourse move is B's assertion of *No (= I don't want a beer.)*. We find that *überhaupt* but not *denn* is acceptable in A's final question, as shown in (61-a). This is correctly predicted by our felicity condition, since B drinking alcohol can be construed as a precondition for answering the QUD, but not for accepting the assertion that B doesn't want a beer. By contrast, if the polar question highlights the negated alternative, as in (61-b), the pattern is reversed: *denn* but not *überhaupt* is acceptable. This is also predicted by our felicity condition: B not drinking alcohol is not a precondition for answering the QUD, but can be construed as a precondition for integrating the fact that B turned down A's offers of wine and beer.

²⁷ I thank a reviewer for pointing out that *denn* and *überhaupt* can co-occur in these cases.

- (61) [Same beginning of the discourse as in (55).]
 a. A: Trinkst du überhaupt/#denn Alkohol?
 A: *Do you ÜBERHAUPT/#DENN drink alcohol?*
 b. A: Trinkst du #überhaupt/denn keinen Alkohol?
 A: *Do you #ÜBERHAUPT/DENN drink no alcohol?*

This concludes our discussion of discourse particles in general and discourse particle *denn* in particular. In the remainder of the paper, we will turn to the use of *denn* as a causal conjunction.

6 Causal conjunction ‘denn’

Discourse particles often lead double lives as members of other word classes. For instance, the German discourse particle *ja* is homonymous with a response particle; the English discourse particle *even* is homonymous with a focus particle; and there are many more examples. 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 of this kind of *denn* is the (archaic) conjunction *for*. In this section we will explore how our account of discourse particle *denn* can be extended to also cover causal conjunction *denn*.

6.1 Data

In many contexts, causal *denn* is synonymous with the standard causal conjunction *weil* ‘because’:

- (62) 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.

However, if *weil* introduces a verb-final clause (the standard word order of *weil*-clauses in formal German), it can only express a smaller range of semantic relationships than *denn* (which introduces verb-second clauses). In particular, *denn*-clauses but not verb-final *weil*-clauses can be used to provide justifications for assertions, as in (63), and to express a precondition relationship, as in (64).²⁸

²⁸ As noted by a reviewer, if *weil* introduces a verb-second clause, which is common in spoken German, it has a wider interpretive range, as illustrated in (i). As a first stab, this might suggest that the lexical semantics of *weil* permits a wide range of semantic relationships, and it is a property like word order or prosodic integration which limits this interpretive range in *weil*-clauses like (63-b) and (64-b) (for a discussion, see, e.g., Antomo and Steinbach 2010; Reis 2013).

- (i) a. Es hat geregnet, weil die Straße ist ganz nass.
It rained WEIL the street is wet.
 b. ?Das Streichholz entzündete sich, weil es war genügend Sauerstoff in der Luft.
?The match lit WEIL there was enough oxygen in the air.

- (63) 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)
- (64) a. Das Streichholz entzündete sich, denn es war genügend Sauerstoff in der Luft.
 b.#Das Streichholz entzündete sich, weil genügend Sauerstoff in der Luft war.
The match lit DENN/#WEIL there was enough oxygen in the air.

Finally, different from *weil*-clauses, *denn*-clauses can't answer *why*-questions:

- (65) *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 relationship conveyed by *denn* as a conventional implicature and that expressed by *weil* as asserted.²⁹

6.2 Predictions for causal conjunction 'denn'

With our treatment of question *denn*, we have already made some headway towards a unified account. We took *denn* to signal that the speaker considers learning an instantiation of the highlighted property *f* a necessary precondition for proceeding in discourse. Among other things, this can mean that an instantiation of *f* is an explanation for the preceding discourse move: in this case, by using a *denn*-question, a speaker demands an explanation before she is willing to proceed (cf. the discussion in Sect. 3.3). The most general example of this are *denn*-marked bare *why*-questions:

- (66) Warum denn?
Why DENN?

Overall, this perspective seems to fit well with the fact that causal conjunction *denn* can also convey that its prejacent is an explanation or a cause for the content expressed by the preceding sentence. If we look more closely, though, there are still a few issues to solve.

6.2.1 Interrogative flip

Recall that with question *denn*, the speaker considers learning an instantiation of the highlighted property *f* a precondition *for herself* to proceed. On the other hand, with causal conjunction *denn*, the speaker doesn't ask for information, but rather provides information *for the hearer*, in the hope that this will convince her. We can capture this role reversal by treating *denn* as subject to so-called *interrogative flip* (Fillmore 1975; Mitchell 1986).

²⁹ For a similar observation and treatment of English *since*, see Charnavel (2017).

Table 1 Connections between hearer/speaker and recipient/source roles

Move	Speaker	Hearer/addressee
Question	Recipient	Source
Assertion	Source	Recipient

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/addressee. But if we focus on the direction of information transfer, we arrive at the roles of *recipient* and *source*, where the source is the interlocutor providing information and the recipient the interlocutor receiving information. If the speaker asks a question, she is the recipient, while the hearer/addressee is the source. On the other hand, if the speaker makes an assertion, she is the source, while the hearer/addressee is the recipient. These connections between the different roles are summarized in Table 1.

Perspective shifts that depend on illocutionary force are not uncommon in natural language: there are many perspective-dependent expressions that make the speaker the relevant perspective-holder when they occur in assertions, and make the hearer/addressee the relevant perspective-holder when they occur in questions. For example, whereas illocutionary adverbs like *honestly* are anchored to the speaker in assertions, in questions they are anchored to the hearer (Faller 2006).

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

This perspective shift is usually called *interrogative flip* or *evidential flip* (Fillmore 1975; Mitchell 1986). It has also been observed with the German discourse particle *wohl* (Zimmermann 2004, 2008, 2011). If this particle occurs in an assertion, it signals that the speaker is uncertain about the asserted content, while in a question it indicates that the addressee may be uncertain about the answer.

- (68) a. Peter kommt wohl auch.
Presumably Peter is coming too.
 b. Kommt Peter wohl auch?
What do you think: is Peter coming too?

Adopting the distinction between recipient and source, we arrive at the below felicity condition, which is applicable to both question *denn* and causal conjunction *denn*. It predicts that with question *denn*, it is the speaker who needs to learn an instantiation of *f*, whereas with causal conjunction *denn* it is the hearer.

(69) **Felicity condition for *denn* (interrogative-flip version):**

Given a salient previous discourse move M_{-1} or a salient piece of contextual information I , it is felicitous for a speaker s to use *denn* in a clause with highlighted property f iff s considers learning an instantiation of f a necessary precondition for the recipient to proceed from M_{-1}/I .

6.2.2 Necessary precondition versus possible explanation

There is (at least) one remaining problem when we try to apply this felicity condition to causal conjunction *denn*. Given two sentences with the same highlighted proposition *f*, our felicity condition would predict that *denn* is either felicitous in both sentences or in neither sentence. This isn't always the case, however. For instance, *denn* is felicitous in the assertion in (70) but not in the corresponding polar question in (71) (unless B believes that selling drugs is the only possible explanation for why Karl has to go to jail).

(70) Karl muss ins Gefängnis, denn er hat Drogen verkauft.

Karl has to go to jail, DENN he sold drugs.

(71) A: *Karl has to go to jail.*

B: #Hat er denn Drogen verkauft?

B: #Did he DENN sell drugs?

Intuitively, *denn* in (71) is unacceptable because Karl having sold drugs can't be construed as necessary in the relevant sense—there could have been other reasons for him going to jail. On the other hand, Karl having committed a crime can easily be understood as a necessary precondition, as shown by the felicity of *denn* in (72). The problem then seems to be that question *denn* marks learning an instantiation of *f* as necessary, while causal conjunction *denn* introduces explanations that are often merely possible, not necessary.

(72) B: Hat er denn ein Verbrechen begangen?

B: *Did he DENN commit a crime?*

In order to capture this difference, we introduce one more level of modality into the felicity condition: instead of requiring that the speaker considers learning an instantiation of *f* necessary, we now only require that the speaker considers it *possible* that learning an instantiation of *f* is necessary.

(73) **Felicity condition for *denn* (modalized interrogative-flip version):**

Given a salient previous discourse move M_{-1} or a salient piece of contextual information I , it is felicitous for a speaker s to use *denn* in a clause with highlighted property f iff s considers it possible that learning an instantiation of f is a necessary precondition for the recipient to proceed from M_{-1}/I .

In a modal logic, this nesting of modalities would be expressed as $\diamond_S \Box_R \varphi$ (it is possible for the speaker S that it is necessary for the recipient R that φ). The effect of \Box_R depends on whether the recipient R is the speaker or the hearer.

In questions, the speaker is the recipient. This means that for questions the above felicity condition requires the speaker to consider it possible that learning an instantiation of f is a necessary precondition *for herself* (= recipient) to proceed in the discourse. That is, $\diamond_S \Box_R \varphi$ amounts to $\diamond_S \Box_S \varphi$. We make the natural assumption that agents are fully introspective with respect to their own preconditions for proceeding in discourse (i.e., we assume that $\diamond_x \Box_x \varphi \Leftrightarrow \Box_x \varphi$ for all x and φ). Under this assump-

tion, considering it possible that f is a precondition for oneself simply boils down to considering f a precondition. It follows that for questions the new, modalized felicity condition simply boils down to the old one.

Let's now turn to assertions. In assertions, the hearer is the recipient. This means that for assertions the above felicity condition requires the speaker to consider it possible that learning an instantiation of f is a necessary precondition *for the hearer* to proceed. That is, $\diamond_S \Box_R \varphi$ amounts to $\diamond_S \Box_H \varphi$. While we do assume that agents are introspective with respect to their own preconditions for proceeding, we don't assume that they are introspective with respect to other agents' preconditions for proceeding. This means that we cannot reduce the felicity condition any further. There is, however, an intuitive way of understanding the nested modalities here. We may think of a speaker who makes a *denn*-marked assertion as preemptively answering a *denn*-marked polar question that she thinks the hearer might ask.

This perspective 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, f could explicitly reconfirm a presupposition, as in (74), or some other precondition, as in (75). Moreover, f could be a cause as in (70) above and in (76) below; it could be a justification for an assertion as in (63) above or a justification for an order as in (77) below.

- (74) 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.
- (75) Geh schon mal vor! Denn du kennst ja den Weg.
You go ahead! DENN you know the way.
- (76) Der See ist gefroren, denn es war diesen Winter kälter als normal.
The lake is frozen. DENN this winter was colder than usual.
- (77) Ich gebe Ihnen ausdrücklich den Befehl, es so und so zu machen, denn ich bin Ihr Vorgesetzter.³⁰
I explicitly order you to do so-and-so, DENN I'm your superior.

To wrap up, this section identified a common semantic core of causal *denn* and particle *denn*. We have seen what the main semantic parallels and differences between them are, and how they might be captured in a unified account.

7 Conclusion

This paper developed a unified semantic account of the German discourse particle *denn* that captures the use of this particle in polar questions, *wh*-questions and certain conditional antecedents. The starting point was the observation that *denn* exhibits an asymmetry in meaning, depending on whether it appears in polar questions or *wh*-questions. I argued that we can naturally capture this asymmetry by treating *denn* as sensitive to the property highlighted by its containing clause. More specifically,

³⁰ Example from <https://dict.leo.org/forum/viewUnsolvedquery.php?idThread=1149521>, accessed on March 1, 2019.

I suggested that *denn* connects this highlighted property to the preceding discourse: it expresses that learning an instantiation of the highlighted property is a necessary precondition for the speaker to proceed in discourse.

Finally, this paper offered some ideas for how highlighting-sensitivity might be used in the analysis of *überhaupt*, and extended the account of discourse particle *denn* to also cover the use of *denn* as a causal conjunction.

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