A New Diagnostic for Cyclic Wh-Movement.

Discourse Particles in German Questions

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This article presents novel evidence for cyclic wh-movement. Two experiments show that the Q-sensitive particle denn in German is more readily accepted when occurring in an independent interrogative clause compared to dependent clauses embedded in a wh-question. Importantly, however, acceptance of denn in a dependent clause increases significantly when a wh-phrase has been moved out of that clause. We argue that denn is locally licensed by an interrogative Force head. In dependent clauses, this licensing can be mediated by long wh-movement leaving a transient representation of interrogative Force in SpecCP. Without such a mediating trace in SpecCP, the licensing of the particle fails. In conclusion, denn in a dependent clause indicates cyclic wh-movement.

Keywords: discourse particles, cyclic wh-movement, licensing of functional elements by Force.

1 Introduction

Wh-dependencies can span more than a single clause as is apparent in long wh-movement. While it seems uncontroversial in transformational grammar that movement leaves a trace in the base position, despite arguments in favor of intermediate positions it remains a matter of debate whether intermediate positions play a role at

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all, and if so, which positions are targeted on the way out of an embedded clause. In this article, we argue that Q(uestion)-sensitive discourse particles (DiPs) provide novel evidence for cyclic movement via SpecCP, where SpecCP is seen as the place in which illocutionary force must be syntactically established if it is syntactically established at all. The data rest on acceptability judgments of German wh-questions containing the Q-sensitive DiP *denn* (lit. ‘then’). Given that DiPs lack any overt grammatical reflexes such as morphological agreement or relations to argument/event-structure, their acceptability can only be based on pragmatic appropriateness and syntactic environment. In this sense, acceptability data for wh-questions systematically varying the presence and position of the particle reflect by far subtler judgments than data yielded by overt reflexes of displacement. On the other hand, the fact that Force must be rooted in the C-domain provides direct evidence for the activation of an intermediate position in long wh-movement. Our data show that in wh-questions the DiP *denn* can only occur in a clausal complement X if a long (i.e. trans-clausal) wh-dependency in the sense of cyclic movement connects X with the interrogative Force head of the root clause. If the particle remains in X without a link to the Force head of the root clause, it cannot be licensed. This is the case if wh-movement applies only in the root clause. The contrast is illustrated in (1).

(1) a. Wen meinst du, dass wir denn zu der Tagung einladen sollten?

> who thought you that we DENN to the conference invite should

‘Who did you think that we should invite to the conference?’
As our data show, this contrast is real. We conclude that the occurrence of a Q-sensitive particle in a dependent (non-root) clause emerges as an independent diagnostic of long wh-movement targeting the C-domain on the way out of the dependent clause.

The article is organized as follows: Section 2 gives an introduction to the role of DiPs in German and their licensing by illocutionary Force. The emphasis will be on wh-questions and Q-sensitive DiPs. Section 3 provides a survey of evidence for the involvement of the CP’s left edge in cyclic wh-movement. In section 4, we present two experiments, which provide empirical evidence for the contrast in (1). Based on the finding that denn is licit in a dependent clause only when wh-movement has taken place out of this clause, we conclude that denn can be used as a diagnostic for cyclic wh-movement. Section 5 develops a formal syntactic analysis that rests on cyclic agreement between a Q-feature in the Force projection and a corresponding Q-feature of the particle. Section 6 concludes the paper.

2 Discourse Particles in Wh-Questions

2.1 Properties of Discourse Particles

German is a language with the reputation of having many DiPs (a.k.a. “modal” particles). However, semantically comparable elements occur in almost any language. DiPs are generally polyfunctional elements. The particle denn, for example, which is
at the center of the present study, is also a coordinative conjunction, and in its original shape dann a temporal adverb. Historically it derives from Old High German thanne (‘then’) (cf. Abraham 1991, Wauchope 1991, Wegener 2002). As far as their historical development can be traced back, the status of DiPs is the result of a grammaticalization process by which a lexical item is subject to simultaneous reduction of its phonological and semantic features and its syntactic freedom. DiPs cannot be coordinated or modified, they can usually not bear phonological prominence, they lack proforms, and they are immobile. In a case like Er ist doch schon alt (‘He is, as you should know, already old’), topicalization of doch destroys the ‘as-you-should-know’ reading. In Doch ist er schon alt, doch equals the adverb ‘however’: ‘contrary to expectations, he is already old’. In other words, doch as a DiP cannot be fronted whereas the adverb doch can do so easily. The syntactic properties of DiPs are generally compatible with the view that particles are heads rather than phrases. We assume here without further discussion that at least some DiPs are heads, and that denn belongs to this group. DiPs are sensitive to the clause type. Some occur in declaratives, others in imperatives or in exclamatives, others like denn, which we examine here, in interrogatives. DiPs are prototypical root phenomena because the root clause is an utterance, and only utterances have interpretable illocutionary Force. We will shortly see that this general impression is in need of certain qualifications.

2.2 Discourse Particles in Wh-Questions

Let us concentrate more closely on DiPs that arise in constituent questions. Consider the difference between (2) and (3).
While (2) is a plain information-seeking question which does not reveal any attitude of the speaker, (3) signals that the speaker is in a particular way “concerned” about the proposition that the answer would yield. The particle denn, related to English then, makes reference to some common ground between speaker and hearer beyond the presupposition \( p, p = \text{there is a place } x \text{ such that you live in } x \). No existence of such an additional common ground of shared knowledge is assumed in (2). Denn is a quasi-anaphoric expression, roughly translatable as “under some circumstances known to both of us”.\(^5\) This makes denn unfit for out-of-the-blue questions.\(^6\)

Although we will concentrate here on the particle denn, it should be mentioned that there are other Q-sensitive particles in German which to some degree function along the lines of denn, e.g., nur (lit. ‘only’) or bloß (lit. ‘barely’).

In a wh-question like (4), the DiP signals that the speaker has tried already several times to find an answer. Bayer and Obenauer (2011) refer to such questions as “Can’t-
Find-the-Value-of-x Questions” (CfvQs). Another particle is schon (lit. ‘already’). In wh-questions, schon yields a rhetorical question (RQ).  

(5) Wer zahlt schon gerne Steuern? 

\textit{who pays SCHON gladly taxes} 

‘Who likes paying taxes? (Nobody!’) 

Another one is wohl (lit. ‘well’). Denn and wohl are more general and can easily combine with nur, bloß, schon (see Thurmaier 1989). When combined, these particles appear in a fixed order as familiar from Cinque’s 1999 work on adverbs and the proposed universal adverb hierarchy; for an application to German DiPs see Coniglio 2011. Thus, cases of particle stacking as in (6) are naturally available in German. 

(6) a. Wo hast du denn wohl {nur / bloß} meine Schlüssel hingelegt? 

\textit{where have you DENN WOHL NUR / BLOSS my keys put.down} 

‘Where did you put my keys (I have already looked everywhere)?’ 

b. Wer zahlt denn wohl schon gerne Steuern? 

\textit{who pays DENN WOHL SCHON gladly taxes} 

‘Who likes paying taxes? (Come on, nobody!’) 

2.2.1 Discourse Particles and Illocutionary Force 

Since DiPs are linked to illocutionary Force, a syntactic account suggests they need to access the Force projection in the sense of Rizzi’s (1997) proposal of a split CP. Force is present at the top of the root clause or of a root-like clause. A root-like clause is
formally subordinate but nevertheless counts as quoted speech. Consider the following minimal pair from Bayer 2012 (see also Krifka, to appear):

(7) a. Christine fragte, warum Klaus denn so blass ist.  
   \textit{Christine asked why Klaus DENN so pale is}  
   ‘Christine asked why Klaus is so pale’

b. *Christine weiß, warum Klaus denn so blass ist.  
   \textit{Christine knows why Klaus DENN so pale is}  

In (7a), the attitude of wondering/being concerned is ascribed to Christine and not to the speaker who utters the sentence. Thus, Christine is responsible for the use of \textit{denn}. In (7b), however, due to the verb \textit{wissen}, which does not set up a quotational context, only the speaker who utters (7b) would be available. But the speaker utters a declarative, i.e. a clause type which does not license the particle \textit{denn}. The conclusion must be that the form of the embedded clause alone cannot be responsible for providing Force. It is rather the interpretation conditioned by the matrix verb that renders the embedded clause as reported speech or not.\(^8\)

2.2.2 \textit{Denn} in Dependent Clauses

Despite their association with illocutionary Force, Q-sensitive DiPs can also arise in dependent clauses such as in the following examples.

(8) In welcher Weise meinen Sie, dass er denn ihrer Region besser helfen würde?  
   \textit{in which way think you that he DENN your region better help would}
‘In which way do you think that he would help your region in a better way?’
http://f3.webmart.de/f.cfm?id=1902785&r=threadview&t=3044307&pg=4  18-07-2013

(9) Wie denkst du, dass es denn weitergehen soll mit euch?

how think  you that it  DENN on-go  should with you

‘How do you think that the two of you should carry on?’
http://mein-kummerkasten.de/142829/fremdgehen.html  18-07-2013

(10) Welches Bild glaubst du dass er denn von mir haben könnte?

which  picture  believe you that he DENN of  me  have  could

‘Which picture/impression do you believe he could have of me?’
http://www.marsvenus.de/search.php?search_author=Lola&sid=0fe369faf60ccfd8c76eee167638b51f  17-11-2011

All examples are question. As shown by (11) through (13), the possibility of licensing of denn in non-interrogative contexts can be excluded.

(11) Ich meine, dass er (*denn) ihrer Region besser helfen würde.

I  think  that he  DENN  your  region  better  help  would

‘I think that he would help your region in a better way.’

(12) Er denkt, dass es (*denn) irgendwie weitergehen wird.

he  thinks  that  it  DENN  somehow  on-go  will

‘He thinks that they will carry on in some way.’

(13) Du glaubst, dass er (*denn) ein falsches Bild von mir haben könnte.

You  believe  that  he  DENN  a  wrong  picture  of  me  have  could

‘You believe that he could have a wrong impression of me’
The grammatical cases in (8) through (10) involve complement clauses from which a *wh*-phrase has been extracted. The question is how essential extraction from the complement clause is. Could it be the case that it does not matter as long as *denn* is in a complement clause while the (immediately) dominating root clause has the right illocutionary Force to license the particle? If the latter is the case, the subject-*wh* clauses in (14) through (16) should be fine.

(14) Welche Leute meinten, dass er denn ihrer Region besser helfen würde?

*which people thought that he DENN your region better help would*

‘Which people thought that he would help your region in a better way?’

(15) Wer denkt, dass es denn irgendwie weitergehen wird?

*who thinks that it DENN somehow on-going will*

‘Who thinks that it will somehow go on?’

(16) Welche Leute glauben, dass er denn ein falsches Bild von mir haben könnte?

*which people believe that he DENN a wrong image of me have could*

‘Which people believe that he could have a wrong impression of me?’

According to our intuitions these sentences are degraded, but it is not clear how strong the effect really is. Section 4 presents two experiment that show that the contrast between short *wh*-movement and long *wh*-movement is real.

2.2.3 Apparent Counterexamples

Our search for relevant examples of the short-movement type also yielded sentences like (17) and (18), in which *denn* occurs in a dependent clause that does not involve *wh*-movement out of it.
(17) Wer sagt, dass Klamottenstil denn teuer sein muss?

who says that dress-style DENN expensive be must

Who says that stylish dress must be expensive?’

http://www.team-ulm.de/Forum/1/145700/749 18-07-2013

(18) Wer sagt, dass die denn sitzen?

who says that they DENN sit

‘Who says that they [the astronauts] are actually seated?’

http://www.gutefrage.net/frage/frage-zum-space-shuttle 18-07-2013

All the examples we could find involve the subject wh-pronoun and the verb sagen; and all of them appear in contexts in which the question is interpreted as an RQ. Who says that p? amounts to the polar question Does anyone say that p? and yields the conversational implicature that hardly anyone or even no one says that p. This puts them on par with (19). As a matter of fact, polar questions allow embedded denn under the condition that the embedding predicate is reduced to a marker of evidentiality. 10

(19) Glaubst du, dass dieser Mann denn ernsthaft eine Beziehung führen möchte?

believe you that this man DENN seriously a relation lead wants

‘Do you believe that this man seriously wants to be in a relation?’


Predicates like mögen (‘to want’) and sich vorstellen (‘to imagine’) appear to refuse this interpretive option, although they show long wh-extraction with denn in the embedded CP. 11 The examples in (17) through (19) show that denn may occur in the dependent CP when the question under discussion (a.k.a. ‘main point’, cf. Simons 2007) targets this dependent CP rather than the matrix clause. The matrix predicate is

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backgrounded to such an extent that it functions quasi as an interrogative prefix to the embedded CP. As a result, denn is licit in the CP-complement as it is in corresponding simplex polar questions like *Muss Klamottenstil denn teuer sein?* (‘Must stylish dress be expensive?’) or *Möchte dieser Mann denn ernsthaft eine Beziehung führen?* (‘Does this man seriously want to be in a relation?’). Assume for the sake of the argument that for cases like (17) and (18) there is a reanalysis by which the *wh*-clause *who says* is interpreted as *does anybody say* (with the implicature *nobody says*). In this case, *denn* is licensed as in (19). In this case one could argue that there is no actual semantic embedding, and the question is functionally a simplex clause. *Denn* in the embedded CP with *wh*-extraction, as in (8) through (10) appears to be different though and can hardly escape a syntactic account. As Marga Reis (pc) pointed out, *denn* is licensed in the complement CP even if the embedding predicate is part of the speaker’s question. To see this, consider the following dialogue.

(20) A: Mein Freund hat große Pläne für die Zukunft.

> my friend has great plans for the future

Er glaubt, dass er bald befördert wird, und ins Ausland gehen kann.

> he believes that he soon promoted will be and in the abroad go can

‘My friend has great plans for the future. He believes he will soon be promoted and can go abroad.’

B: Und wie glaubst DU, dass es denn dann mit euch weitergehen soll?

> and how believes you that it *DENN* then with you.PL on go should

‘And how do YOU believe that it will then go on with the two of you?’
The middle link \( t' \) of the chain headed by the \( wh \)-operator \( \textit{wie} \) must have locally licensed the occurrence of \( \textit{denn} \) although the matrix predicate is an essential part of B’s question, i.e. the question cannot be semantically reduced to the question under discussion ‘How will it go on with the two of you?’ Further evidence in this direction will be given in section 5.\(^\text{13}\) So whatever the ultimate analysis for (17) through (19) may be, the occurrence of \( \textit{denn} \) in (8) through (10) seems to rely on the specific syntactic dependency that characterizes long \( wh \)-movement.

The difference between short and long \( wh \)-movement, which appears to be contradicted by examples like (17) and (18) can be further clarified if we shift our attention to the elements \( \textit{schon} \) and \( \textit{nur} \), both of which may function as DiPs in \( wh \)-questions but – unlike \( \textit{denn} \) – not in polar questions. Consider the interpretive difference between the pairs in (21) and (22).

\begin{itemize}
\item[(21)] a. An welche Regierung glaubst du, dass man schon gerne Steuern zahlt?

\textit{to which government believe you that one SCHON gladly taxes pays}

‘To which government do you believe one is fond of paying tax? (to none at all)’

b. Wer glaubt, dass man an unsere Regierung schon gerne Steuern zahlt?

\textit{who believes that one to our government already gladly taxes pays}

‘Who believes that one is already fond of paying tax to our government?’

\item[(22)] a. Von wem glaubst du, dass der Junge das nur abgeschrieben haben könnte?

\textit{from who believe you that the boy this NUR copied have could}

‘From who on earth do you believe the boy could have copied this?’
\end{itemize}
b. Wer glaubt, dass der Junge das nur abgeschrieben haben könnte?

*who believes that the boy this only copied have could*

‘Who believes that the boy could have only copied this?’

While (21a) yields the interpretation as an RQ without any effort, the rhetorical interpretation is very hard if not impossible to get in (21b). Despite the fact that *schon* appears in a *wh*-question, the preferred interpretation is one according to which *schon* is a regular adverb, and as such neutral about the type of its embedding sentence. The contrast in (22) may be even clearer. (22a) yields the CfVQ interpretation very naturally; the speaker signals that he or she has so far unsuccessfully tried to find an answer. The only interpretation of (22b) is, however, that the speaker wants to know who believes that the boy could have done nothing else to a certain text but copy it. The only reading of *nur* here is the focus particle interpretation. In both of these cases, the interpretive distribution corroborates a syntactic account that attributes it to the fact that the distant DiP can be locally licensed under long movement but not under short movement.

It may be worthwhile to mention here that German allows for another type of long-distance dependency which does not involve a C-headed but rather a V+T headed complement. It is standardly understood as extraction from a verb-second clause as in *Wie1 [C: denkst du [CP v’1 soll es t1 weitergehen mit euch]]*? (‘How do you think it should go on with you?’). Interestingly, Q-sensitive DiPs can freely occur in such complements, and no markedness effect obtains.
(23) Wie₁ [denkst du [t₁ soll es denn t₁ weitergehen mit euch]]?

How think you should it DENN go.on with you

‘How do you think it should go on with you?’

Reis (1995, 1996) proposed to reanalyze the purported matrix clause as a “Verb-first Integrated Parenthetical” (VIP). According to Reis, denkst du in (23) is a VIP which may be inserted in a root wh-question. Her reasoning turns (23) into (24).

(24) Wie₁ [denkst du] soll es denn t₁ weitergehen mit euch?

If she is right, the occurrence of denn is unsurprising. The particle can access Force like in any simplex wh-question, i.e. without consideration of an intermediate trace of the wh-operator.¹⁴ The fact that VIPs are optional and can “float” in the clause as in Wie₁ soll es [denkst du] denn t₁ weitergehen mit euch? is compatible with the VIP’s potential role as an evidential marker. The wh-questions considered in the present work are different. They are complex structures in which the wh-operator must have moved out of the dependent CP. This does, of course, not preclude the role of a semantic factor by which the matrix predicate may in fact attain properties of an evidential marker. The bridge construction denkst du in (9) and the VIP denkst du in (24) appear to play the very same semantic role in the two cases, but the syntax is different. Licensing of denn in a VIP-modified question is as local as in any simplex wh-clause whereas licensing of denn in the bridge construction must be achieved by an extra syntactic step, namely creation of an intermediate trace in the left periphery of the embedded CP. Sentences like (17) through (19), (21b) and (22b) are superficially similar to (8) through (10), (21a) and (22a) but lack this extra step. As a result, Q-
sensitive DiPs are unlicensed in their complement. A formal analysis will be given in section 5.

2.2.4 Intermediate Summary

In German, DiPs are distributed roughly like adverbs, they lack morphological agreement, and they do not interfere with argument/event structure. Thus, the evaluation of their role in the clause must be derived from nothing else but their pragmatic appropriateness and their syntactic environment. This distinguishes DiP licensing from gap licensing, in which Case, argument/event structure and s-selection provide important clues for the computation of the dependency. The licensing of DiPs in *wh*-questions requires access to the C/Force-domain. Exactly this constellation is provided by *wh*-movement through the embedded C/Force-projection. If our reasoning is on the right track, the acceptability of *Q*-sensitive DiPs would constitute an important new diagnostic for cyclic movement across the CP-phase. The particle’s dependency is superimposed on the familiar A-bar dependency and is thus crucially related to the intermediate landing site of *wh* (the C/Force-projection). As such it opens up a new line of research and testing.

3 Existing Evidence for Cyclic Wh-Movement

One of the most widely known pieces of evidence for successive cyclic *wh*-movement is the fact that in Irish the complementizer changes from the regular form *go* to a special form *aL* when a *wh*-operator has passed through its specifier.
(25) Creidim gu-r inis sé bréag.

\[\text{believe.1SG GO-past tell he lie}\]

‘I believe that he told a lie’

(26) Cé acu ceann a dhíol tú?

\[\text{which one aL sold you}\]

‘Which one did you sell?’

(27) An t-ainm a hinnseadh dúinn a bhi ar an áit.

\[\text{the name aL was.told to.us aL was on the plate}\]

‘The name that we were told that it was on the plate’

See McCloskey 2002, where the examples come from, for discussion of the Irish facts in connection with general questions of successive cyclic movement. Overt morphological effects of successive cyclic movement have also been reported in Chamorro by Chung (1982) and following work. Vestiges of cyclic movement have also been identified in Malay and in Bahasa Indonesia by Saddy (1991), Cole and Hermon (2000), and Sabel (2000), and for the Bantu language Kinande by Schneider-Zioga (2009). Widely discussed examples come from connectivity effects as first investigated by Barss (1986). (28a) is ambiguous as shown in (28b).

(28) a. Which pictures of himself did John think (that) Fred liked?

b. [Which pictures of himself\(_{ij}\)]\(_{1}\) did John\(_{i}\) think [t\(_{1}\’) (that) [Fred\(_{j}\) liked t\(_{1}\)]]?

If the trace in the lower SpecCP is a copy that contains […] himself, the anaphor can be bound by the next accessible subject, which is John. Similar examples that provide an argument for an intermediate trace/copy could be given for German.
Various languages with overt cyclic *wh*-movement have been found to employ strategies by which the moved element or part of the moved element appears overtly on the clausal edges of the CPs involved. These constructions have become known as PARTIAL MOVEMENT and COPY MOVEMENT. Partial movement as seen in (29) has next to German been found in colloquial Dutch (Barbiers 2014), Frisian (Hiemstra 1986), Hungarian (Horvath 1997, Lipták and Zimmermann 2007), Iraqi Arabic (Wahba 1992), Romani (McDaniel 1989), Hindi (Mahajan 1990, Dayal 1994), Bangla (Bayer 1990, 1996); see also the collection of articles in Lutz, Müller and von Stechow 2000. Here is an example from German.

(29) Was glaubst du, was Gerda meint, wem wir vertrauen können?

*what believe you what Gerda thinks whom we trust can*

‘Who do you believe Gerda thinks we can trust?’

In partial movement, the lower clause shows standard *wh*-movement while the scope of this *wh*-operator is recursively extended into the immediately dominating clause by the unmarked *wh*-pronoun *was*. Copy movement as shown in (30) has been found at least in German, Frisian, colloquial Dutch, Afrikaans, and Romani. For an overview and references see Felser (2004), for a recent account see Pankau (2013).

(30) Wem glaubst du, wem Gerda meint, wem wir vertrauen können?

*whom believe you whom Gerda thinks whom we trust can*

‘Who do you believe Gerda thinks we can trust?’

Copy movement shares with partial movement at least the surface effect by which a *wh*-pronoun appears in each dominating clause and thus extends the scope of the *wh*-
element of the lowest cycle. In the copy construction, it is, roughly speaking, the primary \textit{wh}-element itself which is repeated in SpecCP. As Felser 2004 and Pankau 2013 show, partial movement, as in (29), differs in various ways from overt movement and also from copy movement, as seen in (30), while the latter two have more properties in common. With Experiment 2 we will extend our investigation to partial movement, and we will also discuss its relation to copy movement. For the time being it should suffice to notice that in each of these cases an overt reflex of the \textit{wh}-dependency is spelled out in the CP’s edge position, which syntactic theory has traditionally claimed to host an intermediate A-bar trace in cyclic movement.\footnote{In the processing literature, the assumption of traces in general and of intermediate traces in particular is controversial (Pickering and Barry 1991; Phillips and Parker, 2014). Priming effects at purported in-situ trace positions, for instance, can be explained without reference to traces, e.g. as effects of simple lexical association. It is therefore desirable to search for ways of testing long distance dependencies in a way that is not related to argument structure and other ingredients of event structure for the interpretation of the input. DiPs provide exactly such a testing ground. They are independent of the clause’s argument/event structure. In fact, they belong to the “expressive dimension” (Potts 2005). Their acceptability in an embedded non-interrogative complement would require local access to the C/Force-projection. This amounts to a new and independent way of exploring the presence of intermediate traces.}

4 Experimental Investigations

In the following we present an empirical investigation of speaker judgments about German \textit{wh}-questions containing the DiP \textit{denn}. The corpus examples discussed in
section 2 suggest that *denn* can not only occur in root *wh*-questions but also in dependent clauses when licensed by *wh*-extraction out of a *that*-clause. However, we found only a small number of corpus examples – possibly because DiPs mainly occur in less formal spoken registers – so that firm conclusions are not possible so far. With the aim of clarification, we designed two experiments examining the acceptability of *denn* in dependent clauses.

The experiments were run with the help of a questionnaire using the method of Magnitude Estimation (ME), a method which was originally developed in psychophysics (cf. Stevens 1975) and has later been adapted for collecting linguistic judgments (cf. Bard, Robertson and Sorace 1996, Cowart 1997, Sorace 1992). ME has been successfully applied to study a wide range of syntactic phenomena, including extraction (Cowart 1997, Featherston 2005a,b, McDaniel and Cowart 1999). In an ME-experiment, participants are first confronted with a so-called “reference stimulus” and then have to evaluate all further stimuli relative to this reference stimulus. They assign numerical values according to two constraints: (i) the numerical value can be arbitrarily small but must be greater than zero. (ii) The ratio between reference value and item value should reflect the perceived acceptability ratio between the reference stimulus and the current stimulus. ME yields judgments on a continuous scale and is therefore suitable to standard statistical procedures. Some of the underlying theoretical assumptions of ME have been questioned (e.g., Featherston 2008, Sprouse 2011, Weskott & Fanselow, 2011), but this does not diminish its usefulness as a method for gathering fine-grained acceptability judgments (see Schütze and Sprouse 2014).
4.1 Experiment 1

Experiment 1 investigates the acceptability of *denn* in main and embedded clauses, depending on whether a sentence initial *wh*-word originated in the main clause (dubbed “short movement”) or in the embedded clause (dubbed “long movement”). A sample sentence involving short movement is provided in (31). *Denn* is licensed in the main but not in the embedded clause. Acceptability ratings should therefore be high in the former and low in the latter case.

(31) Short Movement

Wer, berichtete ihr (*denn*), dass die Einbrecher (*denn*) gefasst wurden?

*Who told her that the burglars *Denn* caught were*

‘Who told her that the burglars were caught?’

Short-movement sentences are contrasted with long-movement sentences in which the sentence-initial *wh*-phrase relates to a variable in the embedded clause.

(32) Long Movement

Wen, vermutete er (*denn*), dass die Polizei (*denn*) festgenommen hat?

*Who assumed he *Denn* that the police *Denn* arrested has*

‘Who did he assume that the police arrested?’

In (32), *denn* is licensed in the main as well as in the embedded clause. It should therefore be equally acceptable in both positions. Overall, however, sentences with long movement should be less acceptable than sentences with short movement, given the well-known problematic status of long extraction for (some) speakers of German
(Paul 1919, Kvam 1983). To control for this effect, the experiment includes sentences with the sentence-type neutral temporal adverb *damals* (‘back then’) in place of *denn*.

4.1.1 Method

**Participants.** 97 students from the University of Konstanz completed a questionnaire for course credit or payment. All participants were native speakers of German and naïve with respect to the purpose of the experiment.

**Materials.** Experiment 1 had a three-factorial design. The first factor was the between-items factor Movement (short vs. long wh-movement). One set of 16 sentences involved short wh-movement as in (31) and a second set of 16 different sentences involved long wh-movement as in (32). We decided to realize the factor Movement as a between-items factor because this imposed less severe constraints on the lexical materials used in the sentences. Each of the total set of 32 sentences appeared in four versions resulting from crossing the two factors Particle (*denn* vs. *damals*) and Particle Position (main clause vs. embedded clause). Table 1 gives a complete set of stimuli. All experimental sentences consisted of a matrix clause and an embedded clause. The matrix clause always began with a wh-phrase which originated either in the matrix clause (short wh-movement) or in the embedded clause (long wh-movement). Short wh-movement always involved the subject wh-pronoun *wer* (‘who’), whereas long wh-movement involved various wh-words, both arguments (*wem* ‘who.DAT’ and *wen* ‘who.ACC’) and adjuncts (*wie* ‘how’, *wo* ‘where’, *woran* ‘whereby’/‘at what’ and *wohin* ‘here to’). Each sentence contained either the clause type sensitive DiP *denn* or the clause type neutral adverbial *damals* (‘back then’) which occurred either in the main clause or in the embedded clause.
The experimental sentences were distributed over four lists according to a Latin Square Design. Each list contained each sentence only in one of its four versions and an equal number of sentences in each condition. Finally, three versions of each list were constructed by randomizing the order in a list. The resulting twelve lists were then transformed into questionnaires. In total, each questionnaire contained 108 sentences – 32 experimental items and 76 filler items. About half of the filler items served as experimental items in an unrelated experiment investigating argument-structure alternations. Filler items were structurally related to the experimental items insofar as they also contained embedded clauses. Some of them were *wh*-questions (short and long *wh*-movement) while others were declaratives. Filler items comprised both grammatical and ungrammatical sentences. Ungrammatical fillers involved various kinds of violations such as island violations, Case violations, agreement errors, lexical deviations and a few morphological errors. The strength of the violations was expected to range from very subtle to very strong.

**Procedure.** The experiment was run as a paper questionnaire. To familiarize participants with the procedure, the questionnaire began with a training in which participant had to judge the length of lines relative to a reference line. First, an instruction was given together with an example. Next, seven lines were given together with a box to their left. The first line served as the reference item and was assigned the value 50. The participants’ task was to estimate the length of the subsequent lines relative to the reference line and write down a value in the box. The next page of the questionnaire contained an instruction for the estimation of sentence acceptability together with an example. The actual experiment began on the third page. On top of this page and all
subsequent pages the reference sentence in (33) appeared together with the reference value 50.

(33) Ich glaube, dass den Bericht der Chef in seinem Büro gelesen hat.

‘I think that the boss read the report in his office.’

The reference sentence in (33) is adapted from the reference sentence that Keller (2000) used for his experiment 2. The sentence is grammatical but exhibits scrambled, i.e. non-canonical, word order. In the absence of any discourse licensing of the object-before-subject order, sentences like (33) are usually perceived as somewhat degraded (cf. Keller 2000, Pechmann et al. 1994). The experimental sentences occurred below the reference sentence, each flagged by a box to their left into which the participants had to write their numerical judgment. The first eleven sentences were filler items.

4.1.2 Results

Before analysis, the ratings obtained in Experiment 1 were normalized by applying the z-transformation. For each participant, the participant’s mean rating was subtracted from each individual rating, and the resulting value was divided by the participant’s standard deviation. Positive values indicate ratings above the average value; negative values indicate ratings below the average. The averaged normalized ratings obtained in this way are shown in Figure 1. They were analyzed by means of linear mixed-effect modeling using the R-package lme4 (Bates, Maechler, and Bolker, 2012). The experimental factors were coded in such a way that all contrasts reported below test whether differences between means are significant. Following the advice
given in Barr et al. 2013, we first computed a model containing the full factorial design in the random slopes. Since this model did not converge, we simplified the random effect specification by removing the three-way interaction from the random item factor. Table 2 shows the estimated contrasts, their standard error and the resulting t-value. Since an exact p-value cannot be computed, we consider contrasts with an absolute t-value greater than 2 as significant (see Barr et al. 2013).

----Insert Table 2 about here ----

Table 2 shows that all main effects as well as all interactions are significant. In order to explore the data in more detail, we first computed separate statistical models for sentences with short and sentences with long movement. The results of the two-factorial mixed-effect models are shown in Table 3, the exact acceptability scores and t-values for pairwise comparisons are given in Table 4.

--- insert Table 3 about here ---

-- insert Table 4 about here ---

Figure 1 shows an interaction between Particle and Particle Position for both types of movement. This interaction is significant in both cases (see Table 3). The source of the interaction, however, is very different for the two types of movement. For sentences with short movement, pairwise comparisons (see Table 4) show that the acceptability of sentences with damals does not depend on the position of the adverb (|t| < 2). For sentences with denn, in contrast, the position of the particle has a strong effect (|t| > 2). When contained in the main clause proper, denn is as acceptable as damals. When denn is part of the embedded clause, however, acceptability is much reduced, not only compared to denn in the main clause but also compared to damals in the embedded clause.
For sentences with long movement, a rather different picture emerges. For these sentences, the position of the particle has no significant effect on \textit{denn} but a significant effect on \textit{damals}. When \textit{damals} is contained in the main clause, acceptability is reduced. The drop in acceptability is, however, not as strong as for \textit{denn} in the embedded clause of sentences with short movement. When contained in the embedded clause, \textit{denn} and \textit{damals} do not differ, whereas acceptability of \textit{damals} is reduced in the main clause.

When we finally compare short movement sentences with long movement sentences, we see that long movement sentences are judged as less acceptable than short movement sentences, with one exception: When they contain \textit{denn} in the embedded clause, short movement sentences are less acceptable than long movement sentences.

To summarize, Experiment 1 shows a general penalty for long \textit{wh}-movement and, more importantly, interactions of Movement Type, Particle and Particle Position. The temporal adverb \textit{damals} is disliked in the main clause of sentences with long \textit{wh}-movement, while the DiP \textit{denn} is disliked in the embedded clause of sentences with short \textit{wh}-movement.

4.1.3 Discussion

Let us first explain the result that the temporal adverb \textit{damals} in sentences with long \textit{wh}-movement is less acceptable in the main clause than in the embedded clause. We think there are two reasons for this unexpected effect. First, the application of the temporal adverb affects the bridge condition of the attitude verbs that were used in this condition. Long \textit{wh}-movement is maximally unmarked in the context of pure
bridge verbs (cf. Erteschik-Shir 1973). The temporal adverb reduces the bridge property of the matrix predicate; but so does the DiP denn. This brings us to the second reason. Obviously it is semantically sound but in the absence of an appropriate context nevertheless poorly motivated to modify an attitude predicate with this adverb; why should someone think or believe back then (instead of right now) that p? Although merger of denn affects the bridge property in a comparable way, it does not have a comparable semantic effect. In the short wh-movement condition, the matrix verbs were mainly verbs of communication, i.e. eventive verbs. Neither merger of the adverb damals nor merger of the particle denn is expected to cause any awkwardness. The reduced acceptance of the adverb damals in the main clause of sentences with an epistemic matrix verb and long wh-movement must therefore be seen as a confound due to the way in which the materials for Experiment 1 were constructed.

The most important finding of Experiment 1 is the asymmetry observed for denn. In root clauses, denn is as acceptable as damals. This is expected because root clauses have a layer of structure which encodes illocutionary Force. In dependent non-root clauses, denn received substantially lower ratings and clearly so in clauses which lack interrogative Force. Crucially, however, denn is more acceptable in dependent clauses from which wh-movement has taken place. Our claim is that the licensing of denn is achieved by the intermediate trace/copy of wh in SpecCP. If this reasoning is on the right track, the acceptability of denn provides independent evidence for the creation of intermediate traces/copies in cyclic movement.

Before accepting this conclusion, we have to address a potential complication of Experiment 1. This complication has to do with the fact that long movement across the complementizer dass is not a preferred option in many varieties of German. As al-
ready noted by Paul (1919:321f.), who speaks of *Satzverschlingungen* (‘sentence intertwinnings’), there are regional differences with respect to the acceptability of extraction from *dass*-complements (see Kvam 1983 and Lühr 1988). The facts are still not totally clear. Prescriptive grammar bans it while in practice it appears here and there. It seems to be more current in South German dialects and regiolects than in varieties spoken in Northern Germany. In a sentence completion study, Fanselow and Weskott (2010) observe that speakers from southern regions produced in fact more long *wh*-extractions than speakers from northern regions. However, it can be doubted that this difference rests on a parameter.\(^{22}\)

Participants in Experiment 1 had a bias against *wh*-extraction out of *dass*-clauses. Acceptance of long *wh*-extraction was relatively low. We might therefore wonder whether the lack of an additional penalty for *denn* in the embedded clause of long-extraction sentences is just a floor effect. Two arguments speak against this potential caveat. First, in an ME experiment it is always possible to assign a value below the lowest values assigned so far. Second, lower values were assigned in several cases. The mean ratings in two conditions are lower than the mean ratings for long *wh*-extractions with *denn* in the embedded clause: long *wh*-extractions with *damals* in the main clause and short-extractions with *denn* in the embedded clause. Furthermore, many of the ungrammatical fillers received \(z\)-scores lower than the mean for sentences with long *wh*-movement and *denn* in the embedded clause. Hence we can exclude that the lack of a position effect for *denn* in sentences with long *wh*-movement is a floor effect.

Fortunately, German has an alternative construction which yields interpretive effects very similar (albeit not the same) to overt extraction but does not involve long
extraction: partial movement, as illustrated in (34); see Lutz, Müller, and von Stechow 2000, Fanselow to appear, and section 5.3 below.

(34) Was meint Gerda, wem wir vertrauen können?

*what thinks* Gerda *who.DAT* we *trust* can

‘Who does Gerda think that we can trust?’

Partial movement is ‘incomplete’ in the sense that the *wh*-phrase does not reach the actual scope position, which for *s*-selectional reasons must be outside the scope of the attitude verb *meinen*. In (34), *wem* moves, but it moves only to the clause-initial position of the embedded clause. It is, however, interpreted with scope over the matrix clause, i.e. as if occurring in SpecCP of the matrix clause. Nevertheless, DiPs appear to be licit in the dependent clause of partial movement constructions.

(35) Was meint Gerda, wem wir {denn, nur, schon} vertrauen können?

*what thinks* Gerda *who.DAT* we *DENN NUR SCHON* trust can

The *wh*-phrases in (34) and (35) are associated with each other. *Was* in the highest clause marks the scope of the *wh*-phrase in the lowest clause. The exact nature of the dependency is a matter of debate. The debate about this construction is dominated by different approaches to which we will turn in section 5.3. What matters at this point is the partial similarity with overt movement. Q-sensitive DiPs seem to be licensed in CPs whose actual interrogative Force – as signaled by *wh*-scope – is absorbed by the root clause. Importantly, this is achieved without overt *wh*-movement.
4.2 Experiment 2

Experiment 2 replaces long wh-extraction from Experiment 1 by partial wh-movement, as shown in (36). This avoids the complications of long movement which could have jeopardized Experiment 1. Apart from this, experimental design and materials are identical with the ones in Experiment 1.

(36) a. Was vermutete er denn, wen, die Polizei t, festgenommen hat?

*What suspected he DENN who.ACC the police arrested has*

Who did he suspect that the police arrested?

b. Was vermutete er, wen, die Polizei denn t, festgenommen hat?

*What suspected he who.acc the police DENN arrested has*

‘Who did he suspect the police arrested?’

4.2.1 Method

*Participants.* 102 students at the University of Konstanz completed the questionnaire for course credit or payment. All participants were native speakers of German and native with respect to the purpose of the experiment.

*Materials.* The sentence material for Experiment 2 was derived from the sentence material of Experiment 1. Experiment 2 has the same three-factorial design as Experiment 1. All 16 sentences from Experiment 1 involving short wh-movement were imported into Experiment 2 without any change. In the other 16 sentences, long wh-movement was replaced by sentences with partial movement. As in Experiment 1, each of the 32 sentences occurred in 4 versions according to the two within-item factors Particle and Particle Position. A complete stimulus sample is given in Table 5.23
The 32 sentence quadruples were distributed over 4 lists according to a Latin Square Design. Each list was then randomized twice and the resulting 8 lists were interspersed in greater lists containing items from an unrelated experiment on argument-structure alternations and the same 40 genuine filler items as in Experiment 1. Overall, each questionnaire contained 112 sentences.

*Procedure.* The same procedure was used as in Experiment 1. Acceptability judgments were again obtained by using the method of ME in the form of filling out a questionnaire. The reference sentence was the same as in Experiment 1, but this time it was assigned a value of 10, which was also the value for the reference line in the preceding training part. The choice of the reference value (10 as compared to 50 in Experiment 1) did not affect the results.\(^{24}\)

### 4.2.2 Results

As for Experiment 1, we used linear mixed-effects modeling for further statistical analyses. Again, we first computed a model containing the full-factorial design in the random slopes. Since this model failed convergence, we simplified the random effect specification stepwise by removing interactions from the random factors. The maximal converging model contains the addition of the three experimental factors in both the random subject factor and the random item factor. The model summary in Table 6 shows main effects of Particle and Particle Position but no general effect of Movement (short vs. partial). The factor Movement interacts, however, with both Particle and Particle Position. The interaction of Particle and Particle Position is also signifi-
cant. Unlike in Experiment 1, the interaction involving all three factors (Movement, Particle and Particle Position) failed significance in Experiment 2.

--- insert Table 6 about here ---

Figure 2 reveals that something different is going on in sentences with short *wh*-movement and sentences with partial *wh*-movement. To explore this difference, we computed separate models for sentences with short *wh*-movement and for sentences with partial *wh*-movement (cf. Table 7).

---- insert Figure 2 about here ----

--- insert Table 7 about here ---

--- insert Table 8 about here ---

For sentences with short movement, the model (left part in Table 7) indicates main effects of Particle and Particle Position as well as a significant interaction of the two factors. As in Experiment 1, the main effects have to be qualified by the interaction. Pairwise comparisons within a mixed-effects model (see Table 8) show that the main effect of Particle (higher acceptability scores for *damals*) is driven by sentences in which *damals/denn* occurs in the embedded clause. The main effect of Position is driven by sentences containing the DiP *denn*. Only in this case, acceptability is higher when the DiP occurs in the main clause than in the embedded clause. Taken together, acceptability is high in three conditions: *damals* in both main and embedded clause, and *denn* in the main clause. These three conditions do not differ significantly from each other. When *denn* occurs in the embedded clause, however, we see a striking decrease in acceptability.

Sentences with partial movement exhibit a different pattern. The corresponding model (right part in Table 7) attests a significant interaction of Particle and Particle
Position but no main effects. The acceptability of *damals* is higher in embedded clauses compared to *damals* in the main clause. The acceptability of *denn*, in contrast, is higher when *denn* is proper part of the main clause. In the main clause, acceptability of *denn* is higher than acceptability of *damals* whereas the reverse is true when the DiP, respectively the adverb, is contained in the embedded clause.

In summary, the results of Experiment 2 confirm the results of Experiment 1. Overall, *denn* is less acceptable in embedded clauses, but acceptability increases strongly when the embedded clause contains a *wh*-element in its left periphery, whose scope is linked to the root-clause.

4.3 Discussion

Experiment 2 overcomes a potential confound in Experiment 1. Replacing long *wh*-movement, which some speakers of German dislike, by partial *wh*-movement increased acceptability in general. Overall, sentences with partial *wh*-movement are as good as sentences with short *wh*-movement. The crucial difference between the two clause types concerns the acceptability of *denn* in embedded clauses. Sentences with short *wh*-movement received a strong penalty when *denn* occurred in the embedded clause whereas the penalty is reduced in sentences with partial *wh*-movement. Hence, Experiment 2 attests the same asymmetry as the one found in the long *wh*-movement condition of Experiment 1. Although partial movement, in contrast to long *wh*-movement in Experiment 1, does not remove the penalty for *denn* in a dependent clause, it clearly reduces the penalty.

As in Experiment 1, the acceptability of *damals* is degraded when *damals* occurs in the main clause of a sentence with short *wh*-movement. Unlike what is observed for
The penalty for *damals* is quite constant across Experiments 1 and 2, i.e. comparable for long-movement and partial movement. We attribute this difference to the nature of the violation. While the licensing of *denn* depends on the syntactic environment, the acceptability of *damals* depends on the semantic environment. We can generalize that *denn* is sensitive to the syntactic difference between long *wh*-movement and partial *wh*-movement whereas *damals* is not.

Taken together, Experiment 1 and Experiment 2 show that the DiP *denn* results in degraded acceptability when occurring in a dependent clause. Acceptability increases when a *wh*-phrase has been extracted from that clause (long *wh*-movement in Experiment 1) or achieves matrix scope via association with the scope marking *wh*-pronoun *was* (partial *wh*-movement in Experiment 2). Section 5 presents a proposal of how to capture this finding in syntactic theory.

5 Licensing Discourse Particles in *Wh*-Questions

5.1 Local Licensing

At the bottom of our syntactic explanation of the facts seen so far is the assumption of feature sharing between a clause-type specific Force head and a matching DiP. A Force head with the interpretable feature *iQ* can probe in its local domain a DiP with a corresponding unvalued and uninterpretable feature *uQ*. According to Bayer (2012) and Bayer and Obenauer (2011), *denn* is a functional element that heads a particle phrase (PrtP) above *vP*. The relevant phrase structure is as in (37). Prt is often preceded by topics, the aboutness topic as well as discourse topics, but – for so far not well understood reasons – the space between Force and Prt may also remain empty.
It is the Force feature which is interpretable and not the corresponding feature on Prt. This is one of the reasons why we adopt a feature sharing theory rather than the standard minimalistic checking theory. In standard checking theory, the uninterpretable feature is always in the probe while the goal bears an interpretable feature which values and ultimately deletes the probe’s uninterpretable feature. This sort of directionality is abandoned in the feature sharing version of Agree proposed in Pesetsky and Torrego 2007. The novelty of their system is that an interpretable (i) feature can be unvalued, signaled by empty square brackets [ ], and an uninterpretable (u) feature can be valued, signaled by some arbitrary number in square brackets, e.g. [4]. With this in mind, an uninterpretable Q-feature on Prt will be able to value an unvalued interpretable Q-feature on Force.

The unification account requires featural agreement according to which the same feature is present in both locations. In (38), this is expressed by an arbitrary shared value, here the number 4. It is important to see that the particle remains exactly where it is merged. It does not change its scope in the course of the derivation as it would do if it underwent LF-movement or feature movement. The effect of agreement is rather that the particle gains access to Force at a distance and can as such give rise to the fine-tuning of Force without becoming a phrase-structural subconstituent of Force. As shown by Bayer and Obenauer (2011), wh-questions can be turned into special ques-

\[(37) \ [\text{Force}_P \text{Force} \ldots [\text{Prt}_P \text{Prt} \ldots ]]]\]
tions such as RQs, surprise-disapproval questions, CfVQs and the like by merger of different Q-sensitive DiPs in interrogative clauses. Force is prima facie neutral with respect to these shades of meaning. Given that questions can be interpreted in the absence of DiPs, the representation of interrogative Force must exist as such. The semantic enrichment we observe is due to a featural link, the Q-feature in (38), which establishes compositionality between Force and the particle. We assume with Rizzi (1997, 2004) and following work that Force is part of the architecture of the C-domain, and that it is the topmost layer of the clause. Assuming with Chomsky (2000) that CP and vP are phases, and that the Phase Impenetrability Condition holds, probing from Force to Prt will not induce any locality violation.26

5.2 Local Licensing in Embedded Clauses

The challenging question is how to account for DiPs in dependent clauses. The experiments reported in section 4 have shown that in wh-questions with wh and the particle occurring in different clauses, the uninterpretable Q-feature on the particle cannot value its counterpart on the unvalued interpretable Force head unless there has been wh-movement from the complement clause. The same is trivially true for any type of island, see note 15. Obviously, long wh-movement via SpecCP leaves a representation of Q-Force in the intermediate SpecCP which can be valued by the corresponding Q-feature on the particle without any violation of Phase Impenetrability. Sentence (9), which we repeat in (39) for convenience, is then analyzed as in (40).
(39) Wie denkst du, dass es denn weitergehen soll mit euch?

> how think you that it DENN go-on should with you

‘How do you think that the two of you should carry on?’

(40) Wie denkst du [CP wie dass es [PrtP denn wie weitergehen soll mit euch]]?

The Q-Force feature on denn can be probed by Q-Force thanks to the intermediate representation of Q-Force that has been established by cyclic wh-movement. The question is how Q-Force can be established in the intermediate SpecCP given that (i) the matrix verb is a propositional attitude verb which disallows interrogative interpretation of its complement, and (ii) the embedded CP seems to fail as a representative of the relevant speech act altogether.

Pesetsky and Torrego suggest for long-distance wh-movement that an uninterpretable feature uQ[ ] on C is valued by an uninterpretable +interrogative wh-element. Thus C and therefore its projection will be “+wh” but without any interpretive consequence. Otherwise, the CP could not remain in the scope of the verb denken. If so it is easy to see how the particle in the dependent clause can locally agree by virtue of its uninterpretable Q-feature. We propose that the Q-feature on Prt values an uninterpretable Force head. Of course, this head could in principle also be interpretable. This would be the case under merger of a verb like fragen (‘ask’) as in (41) where CP counts as an embedded interrogative speech act.

(41) Jemand fragte [CP wie [C [es [PrtP denn wie weitergehen soll mit euch]]]]

> someone asked how it DENN go-on should with you

‘Someone asked how the two of you should carry on’
Since there is no look-ahead device, there can be no \textit{a priori} determination of the interpretability of Q-Force that goes beyond of what is in the relevant numeration. This is exactly what the liberalized framework of probe-goal agreement guarantees: since interpretability and valuation are separated, there can be agreement between two uninterpretable features, i.e. an unvalued uninterpretable feature of the probe can be valued by an uninterpretable feature of the goal.\textsuperscript{27}

Bayer (2012) and Bayer and Obenauer (2011) suggest as the controller of the DiP a single Force head which involves a specification of clause type (CT) and a related feature for illocutionary Force. We follow here a proposal of splitting up Force into Clause Type (CT) and Speech Act (SA) by Coniglio and Zegrean (2012).\textsuperscript{28} With this atomization of Force in mind, consider now the derivation of (9)/(39) in which the embedded clause has CT but lacks SA.\textsuperscript{29} The particle \textit{denn} has the interrogative CT-feature Q and the SA-feature ILL(ocution). Both are uninterpretable, their interpretable correspondents being located in the root-clause’s left periphery. The complementizer heads a CP, the moved finite verb heads a FinP. For reasons of readability, derivational steps which do not relate to the issue under discussion are left out.

(42) a. \[vP \text{ wie } [vP \text{ wie weitergehen soll mit euch}]]\] \(\Rightarrow\) MERGE \textit{denn} \(\Rightarrow\)

b. \[\text{PrtP } \text{denn}_Q[1], a_\text{ILL}[1] \ [vP \text{ wie weitergehen soll mit euch}]]\] \(\Rightarrow\) MOVE \textit{wh} \(\Rightarrow\)

c. \[\text{CTP CT}_Q[1], a_\text{ILL}[1] \ [CP \text{ wie dass } [\text{TP es } [\text{PrtP } \text{denn}_Q[1], a_\text{ILL}[1] \ [vP \text{ wie } \ldots \text{weitergehen } \ldots ]]]]]\] \(\Rightarrow\) AGREE \(\Rightarrow\)

d. \[\text{CTP CT}_Q[1], a_\text{ILL}[2] \ [CP \text{ wie dass } [\text{TP es } [\text{PrtP } \text{denn}_Q[1], a_\text{ILL}[2] \ [vP \text{ wie } \ldots \text{weitergehen } \ldots ]]]]]\] \(\Rightarrow\) \(\ldots\) \(\Rightarrow\) MOVE \textit{wh} \(\Rightarrow\)
The important points are the following: In (42d) the particle *denn* is locally licensed by agreement for CT as well as for SA. Nevertheless, both CT and SA are uninterpretable because the numeration contains the verb *denken*, and *denken* bans a semantically interpretable *wh*-complement in its scope. On the other hand, *denn* is locally linked so that it stays available during further derivational steps by which *wh* moves higher up. In (42e), i.e. at the root level, CT is interpretable for Q; SA, which shares the feature Q with CT, provides the features which are relevant for the interpretation as an utterance. The link between interpretable Force, i.e. SA and the particle is local in the sense of phase theory and strict cyclicity. Cyclic agreement with the particle’s CT/ILL-features comes about as a consequence of cyclic *wh*-movement and its feature for interrogativity, be it interpretable at a certain stage of the derivation or not (yet). In (42f), the uninterpretable CT-feature on SA is valued by CT’s interpretable Q-feature.  

Den Dikken (2009) argues that *wh*-movement to SpecCP is terminal and can never be transient. If we keep to the split-CP theory according to which Force is represented in the top left clausal periphery, however, we can hardly avoid the conclusion that Force is established via SpecCP, and that the *wh*-phrase having passed through SpecCP is the overt sign of Q-Force. Q-Force, the composition of Q and ILL in (42),
is the locally available probe that agrees with the Q/ILL-feature on the particle *denn.* Assuming that *vP* is a phase, den Dikken’s proposal is that the *wh*-phrase passes through the *vP*-phase but not through the CP-phase; however, *vP* does not qualify as the locus of Force. Given the structure in (37) with the particle projection above *vP,* Force would not even c-command its goal. We see therefore no reason to deviate from the standard assumption of a CP-related intermediate landing site.31

As the experimental results from section 4 have established, licensing of the particle in a dependent clause by means of long *wh*-movement contrasts strikingly with ungrammatical examples like (43), *Wer berichtete *wer* ihr [CP dass die Einbrecher [PnP *denn* gefasst wurden]]? Probe-goal agreement provides a straightforward explanation. *Wh*-movement in these cases is confined to local movement within the matrix clause while the Q-sensitive particle *denn* is in the embedded clause. It does not matter whether the embedded CP has a Force-projection or not. If it lacks such a projection altogether, the uninterpretable Q-feature on *denn* cannot be valued, and the derivation crashes. But even if the embedded CP does have a Force-projection, it would be unsuitable for the valuation of the Q-feature on *denn.* The reason is that the CP would at best have declarative Force.32 Nevertheless, as the derivation of (42) shows, the embedded CP must have seen an uninterpretable interrogative CT-feature in the CP-layer. This feature is obviously responsible for both *wh*-movement to SpecCP and probing the Q-feature on the particle *denn.*

5.3 Local licensing in Partial Movement33

What is subsumed under the established term “partial movement” is a number of rather different proposals. (i) The Direct Dependency Approach (DDA) (see van
Riemsdijk 1983, McDaniel 1989, Müller 1997, Manetta 2011 among others) assumes a syntactic link between a wh-scope marker and the locally moved wh of the dependent clause. The most common version of the DDA assumes that the scope marker is an expletive which is overwritten at LF by the wh-phrase of the subordinate clause. (ii) The Indirect Dependency Approach (IDA) (see Dayal 1994 and much following work) assumes that the wh-scope marker is actually the direct object of the matrix clause. What is coindexed with the wh-scope marker is not the locally moved wh of the dependent clause but the whole wh-CP. In principle, there could be simply two sequential wh-clauses: [What1 do you think?] [Who will show up]?

As indicated in German by V-final word order and binding facts, however, the second clause must be subordinate. Based on properties of Hungarian which are not an issue here, Horvath 1997 suggests that the scope marker is the direct wh-object of the matrix verb, that the dependent wh-clause undergoes LF pied-piping and adjoins to the wh-object. Wide scope results from wh-agreement. Dayal 1994 and various linguists who follow her lead likewise assume that the wh-scope marker is the direct object of the matrix clause, but they propose a purely semantic account of the IDA. The idea is that the wh-object, an existential quantifier ranging over propositions, is semantically restricted by the embedded wh-clause. The latter, being an “open” propositions, is of a matching type, but it is not a question. Consider (34), *Was meint Gerda, wem wir vertrauen können?* (34) does not consist of two questions but of one. A natural answer would be Karl. It translates into the following Hamblin/Karttunen-style logical representation: \( \lambda p \exists q [ \exists x [q = \text{we can trust } x] \& p = \text{thinks (Gerda, q)]} \). By virtue of asking what Gerda thinks (p), the speaker asks about the set of persons x for who the proposition (q), namely that we can trust x, is true.
Of the two approaches, the DDA is immediately compatible with our finding about DiPs in partial movement constructions. Since the DDA is more or less an LF-variant of overt *wh*-movement, an A-bar chain is built between the purported expletive *was* and the locally moved *wh*-phrase. The CT of the dependent clause is interrogative and probes the Q-sensitive DiP *denn*. Being selected by an attitude verb, neither CT nor ILL can be interpretable. Both are interpretable in the root clause (cf. (42e,f)). It is therefore predicted that the DiP enters the expanded semantic composition of Force in the same way as it does under overt *wh*-movement.

Within the IDA, non-subordination can be excluded, not only because of the subordination-indicating V-final word order of the lower CP and other facts but also because Experiment 2 has demonstrated a certain degradedness of the DiP in the second CP. Such an asymmetry would be unexpected if the second clause were simply another root *wh*-question. Assuming syntactic dependency, the IDA must express the relation between interpretable Q-Force in the root clause and the DiP in the dependent CP. According to our proposal, the dependent CP has a CT-head with uninterpretable features for CT and ILL. These are responsible for the local valuation of the corresponding features on the DiP. In partial movement constructions, the dependent CP is overtly of the proper CT. So there can be no doubt about the local licenser of the DiP. The next issue is how to reach an interpretable licenser. Horvath-style CP-adjunction to *was* could do the job, but the operation may not be available under restrictive minimalist assumptions. Within the semantic account of IDA, the embedded CP cannot be a question. Given that in our account neither its CT nor its ILL is interpretable, the presence of their uninterpretable counterparts cannot pose a semantic obstacle. If so, the logical form of a version of (34) with *denn* in the embedded CP, *Was meint Ger-*
da, wem wir denn vertrauen können?, is blind to the fact that the DiP ultimately requires an interrogative context. Assume now that due to its wh-feature the wh-CP may be probed by was before it moves to its ultimate destination. Full interpretation is, however, only reached when CT/ILL become interpretable in the SAP. If we are right, our explanation of the occurrence of DiPs in embedded clauses carries over to accounts of partial movement in terms of the IDA.

At this point one should be aware that partial movement as investigated in Experiment 2 is but one of the alternatives to overt movement. As already mentioned in section 3, German has yet another scoping strategy, namely copy movement. Copy movement, as seen in (30), differs in various respects from partial movement (cf. Felser 2004, Pankau 2013). The copies are something like the featural spell-out of the locally A-bar moved wh-phrase. The semantic mechanics of the IDA are not applicable. Nevertheless, denn in the dependent clause of (44) appears to us as unproblematic as it is in partial movement.

(44) Wen vermutete er wen die Polizei denn festgenommen hat?

\[
\text{who.ACC suspected he who.ACC the police DENN arrested has}
\]

‘Who did he suspect the police has arrested?’

Uninterpretable CT in the lower CP probes the DiP. Interpretable CT and SA of the root clause agree with the relevant features of the embedded CP. Thus, it should be obvious that the DiP connects to the root question and joins the composition of illocutionary Force. Since copy movement was not investigated in the present study, we leave the issue at these remarks.
5.4 Predicting More Data

Since long movement is recursively iterable depending on how much structure is built, it is expected that DiPs which depend on interrogative Force can show up in any pre-vP position along the chain that spans the space between matrix wh and the lowest copy. An example is given in (45a), with the simplified analysis in (45b).

(45) a. Wie denkst du, dass Max denn meint, dass es weitergehen soll mit euch?

   *how think* *you that Max* [DENN *thinks that it* go-on *should with you*]

   ‘How do you think that Max thinks that the two of you should carry on?’

   b. Wie denkst du [CP wie dass Max [PrtP denn meint [CP wie dass es wie weiter-
      gehen soll mit euch]]]

   According to our intuitions, examples of this type are fully grammatical. Under the current account this is expected since the Q-sensitive particle can be probed from the left periphery of the medial CP.\(^{39}\)

   Coniglio (2011) and Thurmair (1989) have shown in detail how German DiPs can be combined, and that under combination they usually occur in a fixed order. In combinations of denn with other Q-sensitive particles such as schon, nur, bloß, wohl, the particle denn always requires scope over the others.

(46) a. Wo wird er sich denn schon versteckt haben?

   *where will he REFL DENN SCHON hidden have*

   ‘Where after all will he be hiding?’ [the answer is clear]
b. Wem könnte man denn dieses Auto nur verkaufen?

\[
\text{who.DAT could one \textit{DENN} this car \textit{NUR} sell}
\]

‘Who on earth could one sell this car to!’ [I found no answer so far]

The orders \(*\text{schon } \rightarrow \text{ denn} \) and \(*\text{nur } \rightarrow \text{ denn} \) etc. are excluded. The interesting point in connection with the present work is that particles can occur in different CPs, and that the order is retained. Consider (47a) with the analysis in (47b).

(47) a. Wo glaubst du, dass Fritz denn meint, dass man hier schon Benzin

\[
\text{where believe you that F. \textit{DENN} thinks that one here \textit{SCHON} gasoline}
\]

kriegt?

\[
\text{gets}
\]

‘Where do you believe that Fritz thinks after all that one can get gasoline here?’ (the answer is: nowhere/hardly anywhere)

b. Wo glaubst du [CP \textit{wo} dass Fritz [PrtP denn meint [CP \textit{wo} dass man hier [PrtP schon \textit{wo} Benzin kriegt]]]]? 

As (47b) shows, the \textit{wh}-operator \textit{wo} moves through the CP cycles targeting in each cycle a Q-Force head by which a DiP can be licensed. Complex examples in which the particles retain their property as Q-sensitive DiPs are hard to construct. To the extent that it is possible, it seems that ordering violations lead to ungrammaticality.

(48) a. Wo glaubst du, dass Fritz denn meint, dass man hier nur

\[
\text{where believe you that Fritz \textit{DENN} thinks that one here \textit{NUR}}
\]

ein Hotelzimmer finden kann?

\[
a \text{hotel.room find can}
\]
'Where do you believe Fritz thinks one can get a hotel room here? (I have so far not found an answer)'

b. *Wo glaubst du, dass Fritz nur meint, dass man hier denn ein Hotelzimmer finden kann?

While (48a) allows the CfVQs interpretation, and while (48b) is grammatical without nur, the ordering *nur > denn leads to a crash. The reading of (47a) with schon as the trigger of the RQ interpretation of the question and the reading of (48a) with nur as the trigger of the CfVQ interpretation show that the lower DiP is probed via successive cyclic wh-movement.

5.5 Scope

DiPs appear under strict scope requirements. The theory which has been developed so far integrates this semantic fact straightforwardly. One classical insight has been that DiPs do not move. If they are part of the functional skeleton of the clause as is the case in our account, this property is captured without stipulations. How do they access what we continue to abbreviate as the “Force-layer” (i.e. what is actually decomposed into CT and SA)? We argued for the adoption of a version of probe-goal agreement. Probe-goal agreement differs from LF-movement in important respects. It enables Force to communicate with the Force-sensitive particle without movement. This is what distinguishes agreement from movement. The dependence of DiPs from illocutionary Force is uncontroversial. The technical implementation of this dependency is not. An account in terms of LF movement has, for instance, been suggested in Zimmermann 2004, 2008. In Zimmermann’s account of wohl, a DiP which may appear in declaratives as well as in interrogatives, the idea of LF-movement rests on the intui-
tion that ForceP “encodes the strength of the propositional commitment”, and that the
strength can be modified by the particle. It is natural to conclude that this modification
is brought about by LF-movement. LF-movement could be a viable solution if
one assumes, as Zimmermann does, that the particle is an adverb, i.e. an XP which
can undergo movement, and if the modification of Force is always clause bound. Ac-
cording to the present account, however, the DiPs under investigation show quite con-
sistently properties of functional heads. Like other functional heads, they are immo-
bile. Bayer (2012) shows that denn naturally turns into a clitic, i.e. an X° element.
Furthermore, our data show that Q-sensitive DiPs do arise in dependent clauses, and if
they do, they must associate with interpretable Force in the root clause. This leads to a
conflict with movement. LF-movement across the CP-boundary is generally not at-
tested. Thus, accounts in terms of LF-movement seem to be in trouble.

Whatever the merits of LF-movement may be, we do not even need to go as far as
theorizing about its pluses and minuses. We simply need to inspect semantic intu-
itions. In order to do so, consider the following minimal pair of RQs which was first
discussed in Bayer 2011.

(49) a. Wo glaubst du, dass man hier nachts um 3 Uhr schon Benzin kriegt?

\[\text{where believe you that one here at-night at three SCHON gasoline gets}\]

‘Where do you believe one can get gasoline here at 3 o'clock in the night
morning?’ (nowhere / hardly anywhere)

b. Wo glaubst du schon, dass man hier nachts um 3 Uhr Benzin kriegt?

\[\text{where believe you SCHON that one here at-night at three gasoline gets}\]

In (49a), the speaker asks about the places x such that the addressee believes that there
is a plausibility ranking of places x according to which one can get gasoline in x at 3
o’clock in the night. In (49b), however, the speaker asks about the places x such that there is a plausibility ranking of the addressee’s BELIEVING that one can get gasoline in x at 3 o’clock in the night. Both questions are semantically well-formed, but (49b) is awkward. The reason must be that a plausibility ranking of places with respect to the believe-predicate that is headed by an attitude verb is pragmatically strange. LF-movement of X reorders X’s scope. Thus, if the interpretation of the particle schon in (49a) would rest on schon taking scope in the root, the interpretations of (49a) and (49b) should be indistinguishable, and (49a) should be as awkward as (49b). Nothing of this is true. (49a) and (49b) are easily distinguishable. The judgments are clear enough and corroborate the account we have developed above. This demonstrates that the DiP as such does not move. It is interpreted exactly where we perceive it in PF. Given the on-going discussion of the contribution of DiPs to the full interpretation of utterances (real speech acts), this is an important clarification. It justifies the claim that the DiP has certain more or less concrete lexical properties which are semantically activated after merger. Further interpretations that have to do with its dependence on Force appear to be largely independent of these lexical properties. The relation to the high left clausal periphery is a matter of formal syntactic licensing by which Force enters a telescoping relation with the particle. As we hope to have shown here, this relation is parasitic on cyclic wh-movement.

6 Summary

Wh-questions constitute the prototypical example for syntactic dependencies that are seemingly unbounded. So far, they have been investigated mainly on the basis of intuitions about displaced and therefore locally missing constituents as definable by
argument and event structure. DiPs in German *wh*-questions offer a fresh look at the topic of trans-clausal dependency. We argued that DiPs provide a new kind of evidence for cyclic movement that is only indirectly dependent on displacement. We have shown here that seemingly “unbounded” dependencies are also in control of the licensing of DiPs by a syntactic exponent of illocutionary Force. Cyclic *wh*-movement appears to license Q-sensitive DiPs across CP-phases. This finding, which has first been reported in Bayer 2012 and in Bayer and Obenauer 2011, rested so far on rather infrequent findings in corpora and on the authors’ individual judgments. The present study clarified the theoretically relevant part of these data with the help of two experiments. These experiments showed that German speakers are sensitive to the syntactic environment in which the Q-sensitive particle *denn* can reshape the question’s illocutionary meaning. Experiment 1 demonstrated that long *wh*-movement has the effect of connecting the particle across the CP-phase to the Force-projection of the root clause while short *wh*-movement in the root clause fails to do so. The interpretation of Experiment 1 was complicated by the fact that many speakers feel uncomfortable with long movement. Therefore Experiment 2 explored the same question by replacing overt movement with partial movement. The results replicated the results of Experiment 1 while removing the problem of the bias against long movement. The results of both experiments are explained by a theory in which an interrogative Force-feature probes a Q-sensitive sub-feature of the DiP *denn*, and in which this can be performed cyclically. The theoretical assumptions underlying this proposal have been made explicit. The Force-projection has been argued to be split into projections of clause type and speech act. *Wh*-movement to SpecCP enables the Force-features to act as probes of uninterpretable clause type and illocutionary features on the DiP. Although the ex-
periments were limited to the particle *denn*, it is quite obvious that other Q-sensitive particles like *schen* behave accordingly. Thus, the licit appearance of Q-sensitive DiPs in clausal complements must be seen as a novel diagnostic of phase-bound movement. The study shows in addition that parts of so-called “expressive meaning” (cf. Potts 2005) which appear to be idiosyncratic to some extent are nevertheless deeply rooted in core grammar and appear to be hard-wired in syntax in hitherto unexpected ways. 41
References


Bates, Douglas M., Martin Maechler, and Ben Bolker. 2012. lme4: Linear mixed-effects models using S4 classes. R package version 0.999999-0.


Reis, Marga. 1996. Extractions from verb-second clauses in German? In On extraction and extraposition in German, ed. by Ulrich Lutz and Jürgen Pafel, 45-88. Amsterdam: John Benjamins.

Reis, Marga. 2000. On the parenthetical features of German was ... w constructions and how to account for them. In Wh-scope marking, ed. by Ulrich Lutz, Gereon Müller, and Arnim von Stechow, 359-407. Amsterdam: John Benjamins.


Riemsdijk, Henk van. 1983. Correspondence effects and the Empty Category Principle. In Studies in generative grammar and language acquisition, ed. by Yukio


Zeijlstra, Hedde. 2012. There is only one way to agree. The Linguistic Review 29:491–539.


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Denn must be seen as a weakened version of dann with vowel reduction and further reduction to *dn* or ’n. Semantically it is reduced from a temporal adverb to a general deictic element which makes reference to the common ground that the speaker shares or purports to share with the addressee.

An apparent exception are examples in which discourse particles form a constituent with a *wh*-phrase and travel along with it as in (i).

(i)  [Wann denn] hat man Zeit zu schreiben, telefonieren und sich zu treffen […]?

> *When after all does one have time to write, to make phone calls and to meet …?*

See Bayer and Obenauer 2011:§4 Struckmeier 2014, and Bayer and Trotzke 2014 for discussion.

See Meibauer 1994 for discussion of their X'-status. Cardinaletti (2011) and Coniglio (2011) argue that discourse particles are not heads but “weak adverbs”, a distinction that will not play a role in the present study; see Bayer and Obenauer 2011 and, for different particle constructions, Cable 2010.

Opinions about the syntactic representation of illocutionary Force differ to some extent, but there is no doubt about its representation in the root clause. Cf. among many others Thurmaier 1989 and more recently Zimmermann 2008, who proposes that ForceP provides an epistemic reference point for the interlocutors. Krifka (to appear) argues for the possibility of embedded speech acts.

An artifact of its presence is that questions of type (3) are often perceived as “more intimate” or “friendlier” than those of type (2), but this is really not more than a consequence of the speaker’s attitude. Questions with denn can certainly cater to all kinds of emotions and registers.

For examples and discussion see Bayer 2012, König 1977 and Wegener 2002. One reviewer objects that a stranger who enters one’s private garden may be asked *Was machen Sie denn da?* (‘What are you doing here?’). However, this question is not context-less. The speaker assumes that the hearer knows that he or she is on someone’s private territory. This common ground suffices to license denn. The particle seems to make reference exactly to this circumstance.

Schon has a range of further applications. For a recent study see Egg 2012.

Analogous examples can be found with the particles schon, nur etc. in embedded clauses and with the same restrictions. For details about embedded root phenomena the reader is referred to Hey-
cock 2005. Neither in these cases nor in those to be considered shortly do we find “double access” to the speaker or to the issuer of the embedded proposition as discussed for German by Meinunger (2004). Meinunger’s focus is on embedded V2-clauses. V2-complements play no role in the present study.

9 What follows in the rest of this section has benefitted from critical questions of one of the reviewers of this article.

10 Examples like (19) are invariably in 2nd person. We could not find a single one in 3rd person. If this reflects a constraint on polar questions, it must be absent in long wh-movement. The materials which were used in the experiments to be reported in section 4 involve 3rd person matrix predicates.

11 Attested examples with wh-extraction are the following:

(i) Was möchtest du, dass deine Tochter zu Schulbeginn denn alles kann?

\[\text{what want you that your daughter at school-start DENN all can}\]

‘What do you want your daughter to master already when she starts school?’


(ii) Wie, Tom, stellst Du Dir vor, dass eine solche Unterstützung denn aussehen sollte?

\[\text{how Tom imagine you REFL PRT that a such support DENN look should}\]

‘Hey Tom, what do you imagine that such support should look like?’


In an informal class room judgment study, 132 speakers rated questions with long wh-extraction from complements under the volitional predicate mögen/möchten (‘to want’) (see Meinunger 2006, 2007 for discussion). The particle denn was either in the matrix or in the embedded clause: (a) An wen möchtest du (denn), dass ich deinen Brief (denn) t1 weiterleite? ‘Who do you want me to pass your letter on to?’

Comparison was made with short wh-extraction as in (b) Wer möchte (denn) t1, dass ich deinen Brief (denn) weiterleite? ‘Who wants me to pass your letter on?’ (b) yielded a sharp difference between denn in the matrix clause and denn in the embedded clause whereas the contrast was almost cancelled in (a). Taking this into account, these results suggest that the difference we see between long extraction in (8) through (10) and short extraction in (16) through (18) holds also for predicates which cannot be understood as evidential markers.
12 *Denn* in the embedded CP is nevertheless far less frequent than *denn* in the root CP.

13 Simons (2007) discusses comparable cases of the variability of the “main point” of a question.


15 They are, of course, also unlicensed in arbitrary islands. Here is an example of an infinitival adjunct; there is no way for *denn* to access the illocutionary Force of the root clause.

(i) *Warum ist Hans [ohne denn einen Führerschein zu haben] Auto gefahren?*

> why is Hans without *DENN* a driver’s license to have car driven

‘Why did Hans drive a car without having a driver’s license?’

16 While it is uncontroversial that a *wh*-filler must be associated with a trace position in order to satisfy restrictions of Case, argument structure etc., it has remained controversial which positions elements cycle through on their way out. There was an early agreement that SpecCP must be involved (Chomsky 1973). In the Barriers framework (Chomsky 1986), *wh*-movement also had to pass through a position adjoined to VP. In the Minimalist Program (Chomsky 1995, 2001), this has led to the suggestion of vP as a phase in addition to CP.

17 See Den Dikken 2009 for arguments against this standard view. See also section 5.2 below.

18 For ease of reference we subsume the particle *denn* and the adverb *damals* under the label “particle” although the two must not be confused in theory.

19 To see that merger of *denn* blocks the purely evidential interpretation of the attitude verb one can consider Slifting and other VIPs (cf. Reis 2000 and the discussion at the end of section 2.2). Compare (i) with the deviant (ii):

(i) *Wen hat die Polizei (meinst du) festgenommen (meinst du)?*

> who has the police think you caught

‘Who has the police caught, do you think?’

(ii) *Wen hat die Polizei (*meinst du denn) festgenommen (*meinst du denn)?*

Notice that long *wh*-movement in cases like (32), *Wen vermutete er denn, dass die Polizei festgenommen hat?* is grammatical. This shows that the matrix predicate survives as a bridge even if it cannot be reduced to an evidential marker; see Simons 2007 for pertinent discussion of English.
Recall here that formally subordinate clauses, as for instance signaled by subjunctive mood, are nevertheless able to have root properties. Reconsider the contrast in (7), where we argued that the matrix predicate provides for a quotational context that reports speech.

Notice that the wh-element has to move overtly. LF-movement as assumed in previous theories is insufficient.

(i) Wer sagt, dass Peter (*denn) WEN getroffen hat?

who says that Peter DENN who met has

‘Who says that Peter met who?’

By all criteria, the embedded CP has at no stage of the derivation had an interrogative Force head. The same is true for simplex clauses with wh-in-situ. Although they may be used as some sort of interrogatives (echo- or exam questions), they can never license the particle denn. By formal criteria, they seem to lack interrogative Force altogether.

(i) Peter hat (*denn) WEN getroffen?

Peter has DENN who met

‘Peter met who?’

According to Reis (1991) and Trissler (1999), such “questions” fail to be questions in any syntactic sense.

Wh-extraction can be found in literary texts which are not of South German origin, e.g.

(i) Welchen wollet ihr, dass ich euch losgebe? Barrabam oder Jesum, von dem gesagt wird, who want you that I you free.give Barrabas or Jesus of who said is er sei Christus?

he be Christ

‘Which one do you want me to release? Barrabas or Jesus, of who they say he is Christ?’

J. S. Bach, St. Matthew Passion, BWV 244

Because of an error in the materials, two sentences had to be excluded from the analysis.

In fact, the choice was made on purpose in order to test the independence of the method from the reference value. Comparisons of the two experiments show that the reference value did not affect the results. The z-scores (for identical items) are comparable across the two experiments. The mean z-scores
for the 40 genuine filler items are virtually identical ($r = .99$). Thus, as expected given that ME requires relative judgments, it did not matter whether participants worked with a reference value of 10 or of 50.

Zeijlstra (2012) defends a restrictive system in which the interpretable agreeing feature, the goal, is always the upper one, i.e. a version that proposes the reversal of the probe-goal dependency; probing goes upward. In our account, however, the Q-sensitive particle’s Q-feature is not interpretable and can therefore not probe an uninterpretable Q-feature in the C-domain.

This is not to say that there are no problems; see Richards 2012 for discussion. All we want to say here is that given their fixed pre-vP position probing the discourse particle from Force would not necessitate deviation from this assumption.

Languages with nominal agreement such as Latin or German suggest that this is required anyway.

Their account is inspired by Haegeman (2002, 2006) and adopts an improved version of the agreement proposal originally suggested in Bayer 2012 and Bayer and Obenauer 2011. There are, of course, alternatives. According to Lohnstein (2007), for example, there is no motivation for a uniform Force projection, as he takes what he calls “sentential Force” to be determined by different components of the grammatical system.

As already suggested earlier, the embedded CP may also have a layer of SA; see the discussion of (7) and (41) above. German offers challenges which are beyond the scope of the present article. As (i) shows, wh-interrogatives, in which *denn* can occur felicitously, can in addition host particles like *ja* and *doch* although the latter are incompatible with interrogative contexts.

(i) Wo hast du [*DP diesen [*AP ja unwahrscheinlich begabten] Pianisten] denn gehört?

*Where did you hear this indeed incredibly gifted pianist? (I’m wondering)*

As Struckmeier (2014) and Viesel (2014) point out, the DP contains an AP with a clause-like structure. This clause obviously follows the default of an assertive clause type and can as such license a CT-feature on *ja*. On the other hand, the speaker who takes responsibility for the adequacy of *ja* is identical with the speaker who takes responsibility for the adequacy of *denn*. The proposition [*incredibly*}
bly gifted (x)] is presupposed. Given that *ja* requires an SA, this SA must be linked to the SA of the root clause. For further discussion of DiPs in adnominal and adverbial clauses see Hinterhölzl and Krifka 2013.

30 One reviewer argues that one could dispense with the CT-feature because every embedded wh-clause has an uninterpretable ILL-feature which can be valued under agreement with the matrix predicate or an interpretable ILL-feature in root SA. While this may be possible in the core cases, there are many cases in which ILL requires syntactic information from CT. Since German DiPs are formally CT-dependent but at the same time in need of illocutionary interpretation, the independence of CT and ILL seems to be well motivated. For discussion of their role in German see Coniglio and Zegrean 2012.

31 The question of which phases are involved in long-distance extraction is brought up with novel data from the Nilotic language Dinka by van Urk and Richards (2015). The authors show that both the vP and the CP phase are visibly involved in successive cyclic movement.

32 Declarative/assertive appears to be the unmarked value created by the absence of any of the other mood types. As example (i) in note 29 shows, the DiP *ja* can appear in APs which express a predication and can therefore be considered declarative by default.

33 This section has profited from critical questions by two reviewers.

34 See Fanselow and Mahajan 2000 for a general account along these lines that integrates German and Hindi.

35 As it occurs, this may offer an explanation of a long standing problem, namely why in multiple questions the was in wh-in-situ cannot license partial movement, see Bayer 1996: 228, Fanselow and Mahajan 2000: 206. The reason could be that in its underlying position was lacks the relevant interpretable features.

36 The use of a DiP does not raise the embedded wh-CP to a higher logical type. Therefore, the extensions of the IDA as suggested in Sternefeld 2001; 2002 and Lipták and Zimmermann 2014, suggested by one reviewer, do not seem to be relevant here.

37 Consider the following example from the internet.

(i) Wo glaubst du wo wir hier denn hinkommen wenn nun jeder …

*where believe you where we here DENN get if now every ...*
‘Where do you believe we will get if now every …’


38 In fact, we left copy movement out of the empirical studies because it does not appear to be equally available for all speakers.

39 Example (45) is in fact another one in a series of examples which cannot be accounted for by a non-syntactic theory according to which the question under discussion is Wie soll es weitergehen mit euch? If it were, the slifting paraphrase in (i) should be acceptable, contrary to fact.

(i) *Wie soll es weitergehen mit euch, denkst du, dass Max denn meint?

40 The implicature is that the space of the scale that renders „one can get gasoline in x early in the morning“ true is very small or even non-existent.

41 For German this is particularly noticeable because a long tradition of traditional and prescriptive grammar has viewed DiPs as “optional” and more or less “meaningless” parts of speech
<table>
<thead>
<tr>
<th>Movement Type</th>
<th>German Sentence</th>
<th>English Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Movement, particle/adverb in main clause</td>
<td>Wer berichtete ihr denn/damals, dass die Einbrecher gefasst wurden?</td>
<td>‘Who told her DENN/at that time that the burglars were caught?’</td>
</tr>
<tr>
<td>Short Movement, particle/adverb in dependent clause</td>
<td>Wer berichtete ihr, dass die Einbrecher denn/damals gefasst wurden?</td>
<td>‘Who told her that the burglars were caught DENN/at that time?’</td>
</tr>
<tr>
<td>Long Movement, particle/adverb in main clause</td>
<td>Wen vermutete er denn/damals, dass die Polizei festgenommen hat?</td>
<td>‘Who did he assume DENN/at that time that the police arrested?’</td>
</tr>
<tr>
<td>Long Movement, particle/adverb in dependent clause</td>
<td>Wen vermutete er, dass die Polizei denn/damals festgenommen hat?</td>
<td>‘Who did he assume that the police arrested DENN/at that time?’</td>
</tr>
</tbody>
</table>
Table 2. Summary of fixed effects in the mixed-effects model for Experiment 1

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>SE</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>.01</td>
<td>.045</td>
<td>.19</td>
</tr>
<tr>
<td>Movement (short vs. long)</td>
<td>.43</td>
<td>.090</td>
<td>4.82</td>
</tr>
<tr>
<td>Particle (damals vs. denn)</td>
<td>-.14</td>
<td>.046</td>
<td>-3.15</td>
</tr>
<tr>
<td>ParticlePosition (main vs. embedded)</td>
<td>.16</td>
<td>.038</td>
<td>4.14</td>
</tr>
<tr>
<td>Movement*Particle</td>
<td>-.44</td>
<td>.090</td>
<td>-4.89</td>
</tr>
<tr>
<td>Movement*ParticlePosition</td>
<td>.56</td>
<td>.069</td>
<td>8.09</td>
</tr>
<tr>
<td>Particle*ParticlePosition</td>
<td>.47</td>
<td>.066</td>
<td>7.03</td>
</tr>
<tr>
<td>Movement<em>Particle</em>ParticlePosition</td>
<td>-.29</td>
<td>.125</td>
<td>2.29</td>
</tr>
</tbody>
</table>
Table 3. Summary of the fixed effects in the mixed-effects models for Experiment 1, separately for sentences involving short *wh*-movement and sentences involving long *wh*-movement.

<table>
<thead>
<tr>
<th></th>
<th>Short movement</th>
<th></th>
<th>Long movement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>SE</td>
<td><em>t</em>-value</td>
<td>Estimate</td>
</tr>
<tr>
<td>(Intercept)</td>
<td>.23</td>
<td>.067</td>
<td>3.35</td>
<td>-.21</td>
</tr>
<tr>
<td>Particle</td>
<td>-.37</td>
<td>.084</td>
<td>-4.35</td>
<td>.08</td>
</tr>
<tr>
<td>Particle Position</td>
<td>.43</td>
<td>.057</td>
<td>4.67</td>
<td>-.12</td>
</tr>
<tr>
<td>Particle*ParticlePosition</td>
<td>.61</td>
<td>.101</td>
<td>6.07</td>
<td>.33</td>
</tr>
</tbody>
</table>
Table 4. z-scores in Experiment 1 and t-values in mixed-effects models for each contrast (t-values in italics)

<table>
<thead>
<tr>
<th></th>
<th>damals</th>
<th>denn</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Movement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>damals/denn in main</td>
<td>.46</td>
<td>.42</td>
<td>-.80</td>
</tr>
<tr>
<td>clause</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>damals/denn in</td>
<td>.35</td>
<td>-.33</td>
<td>-5.74</td>
</tr>
<tr>
<td>embedded clause</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t-value</td>
<td>-1.80</td>
<td>-9.25</td>
<td></td>
</tr>
<tr>
<td><strong>Long Movement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>damals/denn in main</td>
<td>-.39</td>
<td>-.15</td>
<td>4.58</td>
</tr>
<tr>
<td>clause</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>damals/denn in</td>
<td>-.11</td>
<td>-.19</td>
<td>-1.54</td>
</tr>
<tr>
<td>embedded clause</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t-value</td>
<td>-5.92</td>
<td>-.55</td>
<td></td>
</tr>
</tbody>
</table>
Table 5. Sample Stimuli of Experiment 2.

<table>
<thead>
<tr>
<th>Type</th>
<th>Sample Stimuli</th>
</tr>
</thead>
</table>
| **Short Movement, particle/adverb in the main clause** | Wer berichtete ihr damals/denn, dass die Einbrecher gefasst wurden?  
‘Who told her at that time/DENN that the burglars were caught?’ |
| **Short Movement, particle/adverb in the embedded clause** | Wer berichtete ihr, dass die Einbrecher damals/denn gefasst wurden?  
‘Who told her that the burglars were caught at that time/DENN?’ |
| **Partial Movement, particle/adverb in the main clause** | Was vermutete er damals/denn, wen die Polizei festgenommen hat?  
‘Who did he suspect at that time/DENN that the police arrested?’ |
| **Partial Movement, particle/adverb in the embedded clause** | Was vermutete er, wen die Polizei damals/denn festgenommen hat?  
‘Who did he suspect that the police arrested at that time/DENN?’ |
Table 6. Summary of fixed effects in the mixed-effects model for Experiment 2

<table>
<thead>
<tr>
<th>Effect</th>
<th>Estimate</th>
<th>SE</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>.23</td>
<td>.040</td>
<td>5.72</td>
</tr>
<tr>
<td>Movement (short vs. partial)</td>
<td>-.04</td>
<td>.076</td>
<td>-.47</td>
</tr>
<tr>
<td>Particle (damals vs. denn)</td>
<td>-.21</td>
<td>.039</td>
<td>-5.36</td>
</tr>
<tr>
<td>ParticlePosition (main vs. embedded)</td>
<td>.30</td>
<td>.039</td>
<td>7.77</td>
</tr>
<tr>
<td>Movement*Particle</td>
<td>-.33</td>
<td>.070</td>
<td>-4.64</td>
</tr>
<tr>
<td>Movement*ParticlePosition</td>
<td>.45</td>
<td>.070</td>
<td>6.32</td>
</tr>
<tr>
<td>Particle*ParticlePosition</td>
<td>.77</td>
<td>.049</td>
<td>15.79</td>
</tr>
<tr>
<td>Movement<em>Particle</em>ParticlePosition</td>
<td>.11</td>
<td>.098</td>
<td>1.12</td>
</tr>
</tbody>
</table>
Table 7. Summary of the fixed effects in the mixed-effects models for Experiment 2, separately for sentences involving short \(wh\)-movement and sentences involving partial \(wh\)-movement.

<table>
<thead>
<tr>
<th></th>
<th>Short movement</th>
<th>Partial movement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>SE</td>
</tr>
<tr>
<td>(Intercept)</td>
<td>.21</td>
<td>.066</td>
</tr>
<tr>
<td>Particle</td>
<td>-.37</td>
<td>.054</td>
</tr>
<tr>
<td>Particle Position</td>
<td>.53</td>
<td>.065</td>
</tr>
<tr>
<td>Particle*ParticlePosition</td>
<td>.83</td>
<td>.110</td>
</tr>
</tbody>
</table>
Table 8. z-scores in Experiment 2 and t-values in mixed-effects models for each contrast (t-values in italics)

<table>
<thead>
<tr>
<th></th>
<th>damals</th>
<th>denn</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Movement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>damals/denn in main clause</td>
<td>.45</td>
<td>.42</td>
<td>.88</td>
</tr>
<tr>
<td>damals/denn in embedded clause</td>
<td>.33</td>
<td>-.44</td>
<td>-8.10</td>
</tr>
<tr>
<td>t-value</td>
<td>-1.10</td>
<td>-14.24</td>
<td></td>
</tr>
<tr>
<td><strong>Partial Movement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>damals/denn in main clause</td>
<td>.13</td>
<td>.44</td>
<td>4.30</td>
</tr>
<tr>
<td>damals/denn in embedded clause</td>
<td>.40</td>
<td>-.00</td>
<td>-6.25</td>
</tr>
<tr>
<td>t-value</td>
<td>5.50</td>
<td>-6.03</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1. Acceptability ratings in Experiment 1 (z-scores)
Figure 2. Acceptability ratings (z-scores) in Experiment 2