0. Introduction

Discourse particles and discourse markers (henceforth DMs) are intriguing objects of study, as they promise the researcher ready access to the very fabric of talk-in-progress. They can occur as lexical equivalents or complements of more elusive gestural or intonational cues that subtly guide and modulate the participants' understanding, or they can saliently signal relations between utterances or larger discourse units. My own fascination with DMs originated in my interest in developing a model of discourse coherence, which I will sketch in section 3. Accordingly, my approach is a radically functionalist one, as I will explain in the present section and in section 1, where I discuss my definition of coherence-oriented DMs. In section 2, I narrow my focus to one type of discourse-structuring function, that of marking transitions between segments. I illustrate how these transitions can be identified without depending on the presence of a DM. I then report an experiment that tested the hypothesis that DMs at discourse transitions guide the listener’s attention.

0.1. Approach

Most studies of DMs focus on one or more lexical items (words or lexicalized phrases) and investigate their functions in various contexts. Against that background and in the context of developing a theory of language, it is natural to strive for a definition of the word class of DMs (see Kerstin Fischer’s introduction to this volume). The difficulties in delineating such a class and its syntactic and semantic properties are discussed in Schourup (1999).

For my investigations of DMs in the framework of developing a theory of discourse, that is, a theory of language use as social action, I advocate a radically functional approach in which the objects of investigation are not lexical items, but contextually situated uses of expressions (Redeker 1991a: 1168f, 2000: 250f).

The discourse-as-action approach has distinctive implications concerning the research questions to be asked, the methods to be used (0.2), and the data to be considered (0.3). First of all, aiming for a coherent functional category strongly suggests a clear distinction between DMs that modulate the interpretation of utterances, and those with discourse-structuring functions, in spite of the fact that various items can fulfill either function. I call the former uses discourse particles and the latter discourse operators (see section 1).
Functionally divergent uses of lexical items, which in a more semasiologically oriented approach will raise the question of polysemy (how can the same word have these different functions?), suggest for a discourse-theoretic approach that the functions under consideration may be related in some systematic way (why can these different functions sometimes be realized by the same expressions?). Consider the case of lexical items that can serve as intra-utterance particles (like hedging, focusing, editing, hesitations etc.) and also occur as coherence-oriented discourse markers (i.e., as discourse operators). Instead of asking how the disparate meanings of an item in those uses can come about, the discourse approach will try to identify functional commonalities between those two classes of uses. A good candidate here is Clark’s (1996: Ch. 8) concept of grounding, which he conceives of as a collateral activity on a separate ‘track’ of the interaction realized mostly by nonverbal or paralinguistic means, but also signaled with lexical devices such as editing expressions in repairs and other disfluencies (262-64, 273f) and discourse markers at discourse transitions (345f). Similarly within the more narrowly defined area of coherence-related functions, the flexibility with which many DMs can fulfill a variety of such functions across instances and within a single instance (see e.g. Redeker 1991a, Schiffrin 1987, 2001) suggests that the different planes, domains or, as I call them, components, should be considered as interrelated parts of one coherence paradigm (see Redeker 2000 and section 3 below).

0.2. Methodology

It is widely acknowledged that the data available to the discourse analyst are not the discourse activities proper, but rather ‘frozen’ records of talk or writing. Sequential and distributional analyses of those material traces can undeniably yield solid evidence for particular hypotheses about the functions of an expression or a construction (see e.g. Schiffrin 1987 and in this volume), especially when the analyses include speech prosody (as e.g. in Ferrara 1997, Hirschberg and Litman 1993, and Horne et al 2001). But the process itself remains elusive, however meticulously we reconstruct what must have happened.

Multiple data sources and research methods are thus called for to provide converging evidence for the empirical claims of discourse theory. Functional claims derived from descriptive and distributional analyses of naturally occurring talk should be tested with the help of participants (for instance by using reader judgments as control variables, see Redeker 1992, 2000: 253-57), with experimentally elicited spoken and written discourse (e.g. Redeker 1986, 1990), and with psycholinguistic experiments to test processing hypotheses (e.g. Bestgen 1998, Bestgen and Vonk 1995, 2000, Fox Tree and Schrock 1999, Redeker 1992, Sanders, Schilperoord, and Spooren 2001; see also section 2 below).

0.3. Data

My main source of data are various collections of spoken and written discourse: experimentally elicited oral narratives in American English (Redeker 1986, 1990), a corpus of descriptive, explanatory, argumentative, and entertaining texts from a
Dutch news magazine (Redeker 1992, 2000), and videotaped interview and discussion programs from Dutch television (Redeker 1992).

In my analyses I have focused mainly on monologic stretches of discourse, as they can be found in and compared across all genres. However, I often use data from interactive genres, as my goal is a discourse theory that will do justice to the fact that all discourse genres can ultimately be seen as originating in face-to-face interaction (see Redeker 2000).

To test some of my processing hypotheses, I have measured naming latencies in a cross-modal priming experiment based on original and manipulated versions of fragments of Dutch television talk (see below).

1. Definition of Coherence-Oriented Discourse Markers

As I explained in 0.1 above, I will not attempt to give a definition of a word class of discourse particles or discourse markers. Instead, I define what I consider a functionally sufficiently homogeneous class of coherence-oriented marker uses, which I have called discourse operators (Redeker 1991a, 2000: 1168; the definition is similar to that of ‘discourse connectives’ in relevance theory, e.g. Blakemore 1987: 72-141).

A *discourse operator* is any expression that is used with the primary function of bringing to the listener’s attention a particular kind of relation between the discourse unit it introduces and the immediate discourse context.

This definition leaves the nature of the discourse context unspecified: it need not be a linguistic context. This allows for inclusion of discourse-initial discourse operators, which mark a relation with the non-linguistic context (for instance, a situationally-given event or state of affairs).¹

The scope of the discourse operator is only partly specified in this definition. The minimal unit under consideration is an intonationally and structurally bounded, usually clausal *idea unit* (Chafe 1980: 14). The stipulation that the relation marked by the operator has to involve ‘the discourse unit it introduces’ allows for more global coherence functions like, for instance, the marking of list items, which can involve items of paragraph or chapter length (see Lenk 1998). It excludes expressions like focus particles or intra-sentential interjections (e.g., *ohh*), whose scope does not exhaust an idea unit. This also excludes anaphoric pronouns and noun phrases. While they may have coherence-relevant functions (especially at episode boundaries, see Vonk et al 1992), they do not primarily function as coherence signals; nor do they suggest a *particular kind of relation*.

Note that my definition of discourse operators is wider than many current definitions of DMs (see, e.g., this volume and Schourup’s 1999 review). Most importantly, discourse operators need not be optional, need not be syntactically or intonationally independent, and may add truth-conditional content. Included are all intersentential connectives, but (contrary to, for instance, Georgakopoulou and
Goutsos 1998) also all clause-combining uses of coordinating and subordinating conjunctions, ranging from simple subordinators and relative pronouns to semantically rich connectives introducing adverbial clauses (because, although, and so forth). The class of discourse operators further includes contrastive uses of indexicals (e.g., now, here, there, today) and other adverbial expressions, for instance the next day; [today...] tomorrow.

2. Markers of Discourse Transitions

Within the class of discourse operators, I distinguish ideational and rhetorical connectives from markers of transitions between discourse segments. I will discuss this model in section 3 below. In the present section, I will discuss the role of discourse operators in the management of attention during the processing of sequentially and hierarchically organized discourse units. Most if not all of the functions I will discuss here have been described in the literature, but usually not as examples of the signaling of discourse transitions. I will first discuss an example that illustrates the segmented structure of spontaneous talk. In subsection 2.1, I will present a wider range of segment transitions with examples from spoken and written genres. I will argue that DMs that signal segment transitions function as cues to direct the listener’s attention. An empirical test of this claim will be presented in subsection 2.2.

Consider example (1) from an experimentally elicited description of a short fragment from a silent movie (Redeker 1986), presented here in a structured format that shows my analysis of the segmental structure.

(1) [SEsmj]²

1 So- the fraulein went into the room where the pilots were
2 and- one of the pilots –
3 who had/ who
4 after- the/ they had made accusations,
5 the one who was feeling very down,
6 was uh v/ uh upset by the whole thing,
7 well, the other pilot was trying to comfort him
8 saying
9 there’s more girls in Vienna,
10 and we can go out to the nightclub tonight
11 and- kind of drink your- your sorrows away.
12 And uh and HE was kind of leading him out the door
13 to make sure he wasn’t feeling so bad.
14 Well, as the fraulein encountered the two men, [...]
Some, but not all of the transitions into and out of these segments are signaled by DMs. So in line 1 marks the beginning of this episode, while well in lines 7 and 14 signals returns after parenthetical discourse units. Note that the inserted episode in lines 2-13 is not initially marked as a parenthetical unit. In fact, the temporal position of those events remains uncertain until the utterance in line 14, when it finally becomes evident that the fraulein was not present during the pilots’ conversation (she meets them as they come out of the room).

Another case in this example where a parenthetical segment is not introduced with a DM is the reported speech in lines 9-11. The speaker here could have used an “enquoting device” (Schourup 1985), for instance, oh, well, or you know. The function of this segment as a quotation (implying, as I will argue in 2.1 below, its parenthetical status), is announced explicitly with the predicate “saying” in line 8. The speaker returns to the story line with And uh in line 12.

The parenthetical segment in lines 3-6 is especially interesting, as it illustrates how speakers can introduce background information – here a lengthy disambiguation of the reference “one of the pilots” – with minimal disruption of the story line (Polanyi 1978 called this kind of sequence a “true-start”). Note that the use of this construction need not be motivated by floor-holding concerns: this example comes from a true monolog (speaker and listener knew that the listener’s microphone was shut off after they had made initial voice contact).

The discussion of this example illustrates my approach to the analysis of discourse structure: I visualize idea units and segmental structure and then determine the most salient relations between the units. This forces me to consider all possible instances of transitions as well as ideational and rhetorical relations between the units (see section 3), regardless of the presence of a DM.

2.1. Paratactic and hypotactic discourse transitions

Units of discourse above the levels of clause, sentence, and turn-at-talk (nicely illustrated and more comprehensively discussed in chapter 3 of Johnstone 2002) have been widely recognized, for instance in conversation analysis (noted already by Sacks 1968-72/92; see also Houtkoop and Mazeland 1985 and various contributions in Ochs, Schegloff, and Thompson 1996), in sociolinguistics (e.g. Labov 1972; Schiffrin 1980, 1987; Polanyi 1989), in text linguistics (e.g. Longacre 1983, Mann and Thompson 1988), in text comprehension research (Van Dijk and Kintsch 1983), and in the cognitive approaches of Chafe (e.g. 1980), who discusses intonational chunking in spoken discourse in analogy to the typographical paragraph structure in writing, and Clark (1996), who conceives of interaction as ‘joint projects’ which can contain subprojects and digressions.

Segment transitions and their signaling have mainly been studied for topic shifts or episodes in narratives, focusing on discontinuities in time, space, or personal reference (for a recent example and references to earlier work see Bestgen and Vonk 2000). In computational linguistics, research on task-oriented dialogues led Grosz and Sidner (1986) to the postulation of an “intentional structure” with transitions
between subtasks. In contrast to narrative discourse, where transitions between topics or events are most often sequential, task-oriented or procedural discourse often involves subordination following from hierarchical relations between subtasks. Dialogs, moreover, also contain clarification sequences which interrupt the ongoing discourse and suspend the current “discourse purpose”. Grosz and Sidner (1986) model the intentional structure as a kind of push-down stack, where only the current discourse unit is accessible, unless an inserted unit gets “popped” off the stack to allow resumption of a previously incomplete unit (see Reichman 1978 and Polanyi and Scha 1983 for similar proposals). I will return to these models in subsection 2.2.

Drawing on this earlier research and on the structures I encountered in various genres of spoken and written discourse, I have developed a preliminary classification of discourse segment transitions (see Table 1). I distinguish **paratactic transitions** between segments that follow each other at the same level, that is, one segment is completed and followed by the next one, and **hypotactic transitions** involving interruption or suspension of an incomplete unit with parenthetical material. Examples of paratactic transitions are lists of topics or subtopics, actions, agenda points, and so forth. DMs can signal these transitions prospectively, marking the beginning of a new segment, or retrospectively, closing off the current segment (cf. Schiffrin’s 1987: 322-25 “textual coordinates”). I call these **next-segment markers** and **end-of-segment markers**, respectively (see Table 1).

![Insert Table 1 here](image)

Parenthetical discourse units, which are bracketed by hypotactic transitions (see Table 1), can vary widely in function and in disruptiveness. The clearest cases of parenthetical segments are **digressions** and **interruptions**, as they are defined in terms of their effect of suspending or disrupting the topic or purpose of the discourse unit that is in progress. **Specifications** and **paraphrases** elaborate on (parts of) an utterance and thus will show some referential overlap with it, while **explication**, **clarification**, **background** and meta-communicative or epistemic **comment** segments can contain any information that might help the listener’s understanding or acceptance of some previously presented material. Similar to comments, but referring indexically to an element of “trouble” in the ongoing talk, are **reparations**, defined here as emendations of (part of) an utterance that suggest that the speaker found the initial formulation incorrect or inappropriate (this latter stipulation distinguishes reparations from paraphrases). **Quotations** are also considered as parenthetical discourse units, as they shift the deictic center of the discourse (Bühler’s 1934 ‘origo’) and refer indexically to the context in which the quoted speech was uttered or is imagined to be uttered. I include here fictive quotes like “I was like ‘I don’t believe this!'”, “[…] as if to say ‘…’,” and generic or collective ones like “Everybody says ‘…’” or “We all went ‘AH!’” (cf. Clark and Gerrig 1990; Redeker 1986: 72-78, 1991b).

Example (2) below, from a talk-show interview with a famous Dutch writer of children’s books, contains a particularly rich variety of transitions (codes preceding the lines indicate the type of transition as introduced in Table 1). DMs at segment transitions (set in bold) include paratactic segmentation signals, ‘push’-markers
signaling the beginning of a parenthetical segment, and ‘pop’-markers signaling the return from a parenthetical segment. Note here that this return need not actually lead to a continuation of a previous segment. Often the previous context is only briefly reinstated with a repetition, sometimes accompanied by an end-of-segment marker, after which the speaker moves on to the next unit.

(2) [from interview with Annie M.G. Schmidt, *Hoe later op de avond* 14 Feb 1989; translated from Dutch]

ns  **BUT!** we had a seamstress. And we were calling her Mietje.

**cm** But I think we were calling everyone Mietje, back in those days **you know**,

**cm** I don’t know why,

**pop** but anyway.

**es** so that was also a Mietje.

**ns** And **uh-** she was from Belgium. And there were- she was a Belgian refugee,

**bg** because in in the war,

**sp** in the First World War

**pop** all those refugees were coming from Belgium, and they were **g/** coming to Zealand then and were looking for work there.

**pop** And so **SHE** was our seamstress, […]

Note that the pop-marker *dus* (translated here as *so*) in the Dutch original occurs later in the utterance (“En **ZIJ** was *dus* huisnaaister bij ons”), illustrating that discourse operators in Dutch need not be utterance-initial or utterance-final. The return function is further expressed with the heavily stressed pronominal reference **SHE**, indicating that a previously introduced referent has not been active in the immediate context and must be retrieved from the discourse record.

In both, examples (1) and (2), storytelling is the speaker’s main purpose. Segmentation and parenthetical embeddings are not limited to narration, however, as the next examples will show.

Example (3), from a discussion of ethical questions about journalists’ paying their sources for news, contains parenthetically introduced background information (bg), a quotation (qu), introduced by an *uh* that might be functioning as a ‘push’-marker, and a commentary (cm) that is parenthetically inserted inside an ongoing clause.

(3) [from the Dutch television news magazine *Nieuwslijn* 1 March 1989]

There was clearly something cooking,

**bg** you know,

the Surinamese ex-president Chin A Sen had said a few months earlier **uh**

**qu** we will be in Paramaribo by Christmas, and then we will have … chased away that Bouterse.

**pop** **Now**, against that background we got information about a group of heavily armed mercenaries
who were going to fight for Brunswijk.
For money,
   because apparently- they not only fight only- for money,
   they also talk only for money,
   did they tell that story.

Note that *because* here does express a semantic causal relation (a reason). The more salient function of *because*, however, is its push-marker function, as it most clearly addresses the question of contextual relevance of the comment (‘why this here?’) by signaling its parenthetical status.

Example (4) contains more instances of lexically marked and unmarked segment transitions. The beginning of this fragment also illustrates a rather frequent phenomenon in (media) interviews: The speaker starts with a comment or with a qualification of the question (analyzed as a parenthetical segment) before beginning his response (marked here with the pop-marker *but*, translated from Dutch *maar*).

(4) [from interview with police inspector in *Rondom Tien* 4 March 1989]

I: Mister Blaauw, (...) there was a lot of criticism of the uh actions of the German police, would you have done it differently?
B: That is very easy uh to say
   if I were to say that at all
certainly when you’re sitting in the front row like this
and watching the pictures from a distance.

*Uhm look*, if ever uh
   uh the disgusting chess game with innocent people
   > *because* that’s what it is about <
   uh has been shown to the public in all its facets
   and also in all its cowardice,
   it was in this case.

*But* there is of course more going on.
because what it is abOUt is the most crucial moment
   in *by the way* any kidnapping or hostage taking,
   that is the answer to the question
   *Mind you,*
   while the kidnapped person,
   the hostage,
   is still in the hands of the kidnappers.=

I: =Yes
B: *After all*, in kidnappings and in hostage situations
   the basic rule is that the life of the victim comes first. …

*But* of course a situation may develop {cough} where,
   if you keep following that view,
   that principle that is absolute,
   it may be necessary that that will then cost the life
   of the one that’s threatening the victim, …

which *by the way* I really don’t- uh
ABsolutely don’t have any problems with.

The question then is, > that is more a tactical question than anything else, <

uhm at which moment do you do that.

Segment transitions abound in spontaneous talk; but they can also be found in edited writing, as the following two fragments show. Example (5), from a long political background article in a Dutch weekly news magazine, illustrates a variety of grammatical, typographic, and lexical means, including DMs, for signaling segmentation in written discourse. Note that Dutch ook (here translated as postposed too) occurs in sentence-initial position in the original.

(5) [translated from Vrij Nederland, 27 June 1987]
The man who perfected this development was Richard Nixon.
He took as Foreign Minister his friend William Rogers,
a rather weak figure who knew little of foreign politics, and assigned Kissinger as National Security Adviser, and even gave him orders (at least that’s what Kissinger has always claimed) to strengthen the Security Service,
which has its seat in the White House, as much as possible.
Kissinger personally maintained the relations with the Russian ambassador, Dobrynin, and also prepared his visit to China in secrecy,
that is, without informing the Foreign Minister.

[...]

Jimmy Carter, too, wanted to play his own role in foreign affairs and took guidance from his Security Adviser, Zbigniew Brzezinski, who took his task seriously.

Example (6), finally, illustrates but (maar in the Dutch original) as a paratactic segmentation signal. Note that there is no semantic or rhetorical contrast here that would combine the segments to form a higher-level unit. But simply marks the shift to a new discourse segment.

(6) [from a book on Dutch culture; translated (reference in appendix)]
[...] Don’t protest, but have a meeting. [...] “In the Netherlands there is no participation, there is over-participation.” We keep having meetings. But where does this propensity for collective chit chat come from?

2.2. Transition markers as attentional cues in processing

Discourse segment boundaries are usually marked prosodically by the intonation contour and shifts in speed, pitch and/or volume (cf. Hirschberg and Litman 1993, Horne et al 2001). Upon encountering such a boundary, listeners will initially assume that the previous focus space is closed and a new one opened (Reichman 1978), that is, they will assume a paratactic transition by default. Discourse
markers, the hypothesis claims, can cue the listener as to the kind of transition: paratactic transition, embedding, or return. Embedding will only suspend the current focus space without closing it off.

This hypothesis was tested with a cross-modal priming experiment. The rationale was as follows. If a focus space is closed, activation of the referents associated with it will cease. If it is only suspended, the referents should remain in the periphery of the listener’s consciousness with a lower, but sustained level of activation. This activation can be tested by presenting the listener with a word that is semantically related to one of the referents. The reaction will be faster if the word is pre-activated. This ‘priming effect’ – activation of one word yielding faster reactions to a semantically associated one – can be explained by the well-supported assumption that activation of a lemma in the semantic lexicon spreads to the lemma’s associates.

To avoid interference with the ongoing aural presentation of the recorded talk, the test word is presented visually on a computer screen (‘cross-modal priming’). The listener’s task is to read the test word aloud as soon as it appears. The time between the appearance of the word and the voice onset (the ‘naming latency’) is shorter if the semantic field of the test word has been pre-activated.

In the experiment, the test words were related to the previous segment. The hypothesis predicts shorter naming latencies for test words in recognized parenthetical segments than for test words appearing after a (putative) paratactic transition. That is, a priming effect should occur when a hypotactic transition is marked with a DM (as compared to the same transition without the marker). Furthermore, it is expected that the presence of a pop-marker will help to re-activate the suspended focus space and should thus also show a priming effect. No priming is predicted for markers of paratactic transitions.

As the test word sometimes occurs within 1000ms of the boundary, there might still be some residual activation of the concepts from the previous focus space. When the marker is present, the distance between test and boundary is increased, allowing a further decrease of the activation. Replacing the marker with a pause in the ‘no marker’ condition (as in two of the experiments on oh reported in Fox Tree and Schrock 1999) would have disrupted the flow of talk, as the markers were often quite long. Note however that the direction of any effect from residual activation would go against the hypothesis, as it would decrease the reaction time in the ‘no marker’ condition and thus decrease the predicted priming effect.

2.2.1. Method

Paratactic and hypotactic transitions between discourse segments were identified in two hours of Dutch television talk from political discussions, talk shows, and news magazines. The choice for media talk as opposed to private conversations was a deliberate one. Media talk is designed for the media audience; the listeners in the experiment were thus intended overhearers or auditors of the talk (for general discussions of audience roles see Clark and Carlson 1982, and Bell 1991: 90-95,
who adds the intermediate category of ‘auditor’ between the categories of participants and overhearers).

Two parallel versions of each sound track were created by digitally removing and adding discourse markers. Each version contained marked and unmarked transitions and original as well as manipulated instances, that is, some DMs had been present in the original and some were inserted digitally, and idem ditto for transitions without a marker. The insertion of DMs copied from elsewhere in the same sound track was a very time-consuming effort, and many carefully tuned instances still had to be excluded because they were detected by listeners in a control study, who were instructed to find anything that sounded strange or manipulated. Using both manipulations was important, though, as it ensured that any differences between presentations with and without the DM would not simply be due to the fact that some manipulation had occurred in one condition.

Twelve fragments of 5 to 13 minutes each, preceded by a short training fragment, were presented to 30 listeners in individual sessions. The listeners had two tasks: listening (checked by occasional comprehension questions) and responding to visually presented words by reading them out aloud as fast as possible (naming task). The test words appeared at varying intervals after segment transitions: far enough into the new segment to allow for some referential processing before the test, yet not so far that the contents would too clearly give away the function of the segment (parenthetical or paratactic). Example (7) illustrates (placement of the test word is indicated by [*]).

(7) [from interview with Annie M.G. Schmidt, repeated from example (2)]
BUT! we had a seamstress. And we were calling her Mietje. But I think we were calling everyone Mietje, back in those days you know, I don’t know why, but anyway, so that was [*] also a Mietje. And uh- she was from Belgium. And there were- she was a Belgian refugee, because in [*] in the war, in the First World War all those refugees were coming from Belgium, and they were g/ coming to Zealand then and were looking for work there. And so SHE was our seamstress. [...] 

The test words in these cases were seamstress (naaister) and shelter (onderdak). The pop marker but anyway (maar uh) and the push marker because (want) were present in one version and absent (cut out) in the other. Example (8) from the same interview contains a push-marker (dus, translated here as you know) that did not occur in the original, but was spliced in for one of the experimental versions. The test word, appearing on screen at the time marked here by [*], was unknown (onbekend).

(8) [from interview with Annie M.G. Schmidt]
Now, I know that I uh, at an earlier time, I/ when I was about 30, [you know] before [*] the war, or maybe at the beginning of the war, that I did make very beautiful- try to make very beautiful verses,

Example (9) contains a spliced-in end-of-segment marker so (dus), which was followed on the screen by the test word taboo (taboe), and an added push-marker (dus, translated as you know), followed by the test word numbers (aantallen).
Overall, there were 180 test points in the twelve fragments, including 52 sites where one version contained a push marker, 39 pop-marker sites, 67 paratactic transitions, and 22 fillers where a test word occurred after an ideational or rhetorical discourse operator.

2.2.2. Results and discussion

Figure 1 shows the naming latencies for the test words at paratactic and hypotactic transitions with and without a marker. As expected, paratactic markers did not facilitate naming; the naming latencies were even slightly longer when the marker was present (678 ms for the versions without the marker and 688 ms with the marker). At hypotactic transition points, however, the presence of a push- or pop-marker did produce facilitation, that is, presumably caused the relevant previous concepts to remain active (in the case of push markers) or to be reinstated more easily (for pop markers). For the 52 push-markers, the average facilitation effect is 36 ms; the mean naming latencies are 693 ms without and 657 with the marker. This effect is statistically significant in the item analysis (t(51) = 2.8, p < .01) and in the subject analysis (t(29) = 2.9, p < .01). For the 39 pop-markers, the facilitation effect is smaller (28 ms) and the difference is statistically significant only in the item analysis, not in subject analysis.

Note that the presence of DMs at paratactic transitions did not produce a facilitation effect, although the lexical items used are often the same as those occurring as push- or pop-markers. The alternative explanation that the attentional effect of those hypotactic markers might have been a direct consequence of their lexical semantics can therefore be ruled out in favor of the discourse-functional explanation proposed here.
3. The Parallel-Components Model of Discourse Coherence

3.1. A sketch of the model

Transitions between discourse segments are one of three components in the model of discourse coherence I have developed (see Redeker 1990, 1991a, 2000). I assume that each new utterance has to be evaluated with respect to its relation to (i) the current contents of the ‘text world’ (to borrow Werth’s 1999 terminology), (ii) the current discourse purpose, and (iii) its sequential relation to the current context space or (in Clark’s 1996 terms) the ongoing ‘joint project’. The first two of these components are widely acknowledged in the literature and correspond to the semantic / pragmatic or representational / procedural distinction (e.g. Van Dijk 1979, Sanders, Spooren and Noordman 1992, Blakemore 1987, and various contributions in this volume; compare also Schiffrin’s 1987 ideational structure and action structure, and Sweetser 1990, whose epistemic and speech act uses of conjunctions would both fall in the second component of my model). Not usually discussed in the literature is the third component, which can be seen as a generalized version of Schiffrin’s (1987) exchange structure – generalized because the sequential structure component encompasses monologic and dialogic segmentation.

Table 2 presents the units and relations in each of the three component structures in a terminology that is inspired by systemic functional linguistics (cf. Bazzanella in this volume).

@@ INSERT TABLE 2 HERE

The model asserts that each utterance will update the discourse in all three components, though I have found in my analyses that there is usually one relation that is most salient in the overall context. Not surprisingly, the relations in the three components tend to be parallel in nature, for instance, a supporting argument (evidence relation) in the rhetorical structure requires an underlying cause, result, or reason relation to hold (to be implied by the speaker) in the ideational structure, and a concession or antithesis presupposes some kind of implicit semantic contrast. Table 3 sketches some of the correspondences between relations in the three components (for a more detailed list and discussion of relations and their correspondences see Redeker 2000: 248f).

@@ INSERT TABLE 3 HERE

The model has been tested empirically with various quantitative distributional analyses of discourse markers and with the experiment reported above. The distributional evidence shows that use of markers with the most salient function in one of the components tends to reduce the need for more explicit marking in the other components. If a narrator uses many pragmatic markers (that is, markers of rhetorical relations and of discourse transitions), she will tend to use fewer markers of semantic (temporal, causal, and so forth) relations; and if the semantic and pragmatic complexity of a range of discourse types is controlled statistically, the
partial correlation between the density of ideational and pragmatic marking is significantly negative, indicating again a trade-off between the components (Redeker 1990, 1992, 2000). I have taken this as support for the treatment of those three components as constituting one identifiable paradigm of discourse coherence.

3.2. Discourse structure and dialogue structure: bridging the gap

My discussion here has focused mainly on turn-internal or monologic transitions, but the parallel-components model is intended to also apply to relations across turn-boundaries. Interactional (cross-speaker) realizations of end-of-segment markers are end-of-turn markers like okay?, right?, no?, whatever, tag questions, trailing off, and so forth. Turn-initial discourse operators like so can signal the beginning of a new segment (paratactic transition), introduce a parenthetical segment (e.g. a clarification or repair sequence), or can pop back to a previous topic (e.g. with but).

Let me illustrate the parallelism of turn-internal (monologic) and turn-initial (interactional) uses for the paratactic and hypotactic uses of but (Dutch maar). The monologic use as next-segment marker was illustrated in examples (4) and (6) above. Example (10) shows a paratactic transition where the new segment is produced by a second speaker. Note that B’s turn is not a speaker return, nor a rejection of S’s contribution. B has been agreeing with S’s point before and is now introducing a new aspect into the discussion.

(10) [from Dutch television discussion program Het Capitool, 26 February 1989]
S:  it becomes evident that there are about 50% refusals and it is very well possible that those 50% do include the group that is HIV positive.
B:     But nobody is asking the question why so many people are withdrawing [...]  

The parallelism between monologic and interactional occurrences is also evident in Schiffrin’s (1987: 152-177) discussion of but as a marker of “speaker return” within as well as across turns, which is quite similar to the monologic pop-marker use illustrated in example (2) above. Example (11) contains an interesting partially interactive occurrence:

(11)[from talk show Op leven en dood 29 July 1989; G has just explained that he has to expose healthy persons to anti-depressant drugs in his clinical trial]

P:  But there are side effects of course.
    A healthy student, twenty years old, he uh  
di    well his diet is bad because he’s a student, but apart from that he’s healthy,
G:  Yes, well, it’s not so much the food, more often the drinking, but he’ll he’ll often eat reasonably well these days, thanks to the canteens.
pop     But it uh, no uhm the people don’t have an illness and still they get treated with something against an illness
and will experience side effects
that a patient might also experience.

Mazeland and Huiskes (2001) present detailed sequential analyses of several truly interactional (turn-initial) occurrences of Dutch *maar* (*but*) as a resumption marker. They identify two “prototypical environments in which resumptions occur” (p.141): after repair sequences and after competing topics. The functions they discuss would be analyzed as pop-marker functions in my model.

Turn-initial and turn-internal uses of resumptive *anyway* (which corresponds to Dutch *maar* or *maar goed*) in narration are discussed by Ferrara (1997). She distinguishes resumptions after ‘teller-triggered’ and after ‘listener-triggered’ digressions and finds the former to account for 74% of the cases. In particular, teller-triggered digressions in her corpus occurred mostly turn-externally, but also across turns (e.g. after word completion by the listener) and listener-triggered cases often involved (listener-initiated) joint laughter, again suggesting close parallels between monologic and interactional uses of the resumptive marker.

4. Concluding remarks

The model of discourse coherence I have discussed here provides a conceptual framework for developing and testing theories about the role of discourse operators in spoken and written, monologic and interactive discourse. I have exemplified this for the subcategory of segment transition markers, which are shown to affect listeners’ attentional processing. The methodology employed in this study combines systematic corpus analysis with psycholinguistic experimentation.

Discourse markers in this approach are considered mainly with respect to the effects on the processing and representation of discourse arising from the presence of a marker in a particular type of context. With Schiffrin (1987), I assume that discourse markers select coherence options. In my model, these options are organized in three parallel components: Each discourse unit is considered to contribute to the ideational, the rhetorical, and the sequential structure, one of which is usually the most salient on any particular occasion.

Distributional and sequential analyses of particular markers in my own research and in many studies by others have been essential in refining the model (Redeker 1990, 1992, and 2000). My focus, however, has been on the fully contextualized interpretation of marker tokens in their sequential context with the purpose of identifying generalized types of functions in the three components, and not on the modeling of individual marker meanings as arising from the interaction of the marker’s semantics with the discourse context. This is why I chose not to address the question of polysemy here and refer the reader to the other contributions in this volume.
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Appendix: Dutch Originals of Examples (2) through (..)

(2) [interview with Annie M.G. Schmidt in *Hoe later op de avond* 14 Feb 1989]
ns Maar! we hadden een huisnaaister.
En die noemden we Mietje.
cm Maar we noemden geloof ik iedereen Mietje,
toen in die tijd hoor;
cm waarom dat weet ik niet.
pop Maar goed.
es dat was ook een Mietje dus.
ns En ehm die kwam uit Belgie.
bg want in in de oorlog,
sp in de eerste wereldoorlog
pop kwamen er allemaal vluchtelingen uit Belgie
en die kwamen dan in Zeeland
en zochten daar werk.
pop En ZIJ was dus huisnaaister bij ons.

(3) [from the Dutch television news magazine *Nieuwslijn* 1 March 1989]
Er broeide duidelijk iets,
bg he, de Surinaamse oud-president Chin A Sen
had een paar maanden daarvoor gezegd eh
qu we staan voor kerstmis in Paramaribo,
en dan hebben we die Bouterse ... verjaagd.
pop Nou, tegen die achtergrond kregen wij informatie
over een groep zwaar bewapende huurlingen,
die aan de kant van Brunswijk eh zou gaan vechten.
Tegen betaling,
cm want kennelijk- vechten ze niet alleen maar
eh- voor geld,
maar praten ze ook alleen voor geld,
pop ehm, hebben ze dat verhaal verteld.

(4) [from interview with police inspector in *Rondom Tien* 4 March 1989]
I: Meneer Blaauw, hoofdcommissaris eh in G- in eh Rotterdam
later in eh Gorkem nu weer Gorkem,
er was veel kritiek op ‘t eh optreden van de duitse politie,
zou u ‘t anders gedaan hebben?
B: Da’s heel erg makkelijk eh gezegd,
cm als ik dat al zou zeggen,
zeker als je zoals hier op de voorste rij zit
een de beelden vanaf ‘n afstand ziet.
s Ehm kijken, wanneer ooit ‘t eh
ehm ‘t lugubere schaakspel om onschuldige mensen,
sp > want daar gaat ‘t om, <
eh in met al ‘n facetten en ook al ‘n lafheid
aan de volke vertoond is
Dan is ‘t wel in deze zaak geweest.

Maar d'r is natuurlijk meer aan de hand <

want waar ‘t om gaat is ‘t meest cruciale moment

in overigens ieder ontvoering of gijzeling,

namelijk ‘t antwoord op de vraag

moet je nu toeslaan ja of nee.

Let wel,

wanneer de ontvoerde,

de gegijzelde

nog in handen van de ontvoerders is. =

I: = ja.

B: **Immers**, bij ontvoeringen en bij gijzelingen

is ‘t uitgangspunt

dat ‘t leven van de ontvoerde voor alles gaat. ...

maar d'r kan zich natuurlijk een situatie ontwikkelen,
{kucht} waarbij,

wanneer je dat standpunt

dat uitgangspunt dat absoluut is,

blijft volgen,

‘t weleens noodzakelijk zou kunnen zijn

dat dat dan wel gaat ten koste van ‘t leven van degene

die de ontvoerde bedreigt,

waar ik ‘t overigens mooi al niet,

eh helemaal niet moeilijk mee heb.

De vraag is dan,

da’s meer een tactische vraag dan nog wat anders, <

ehm op welk moment doe je dat.

[5] [from *Vrij Nederland*, 27 June 1987]

De man die de kroon op deze ontwikkeling zette was Richard Nixon.

Hij nam als minister van Buitenlandse Zaken

zijn vriend William Rogers,

een tamelijk zwakke figuur
die weinig van buitenlandse politiek wist,
en benoemde Kissinger tot National Security Adviser,
en gaf hem zelfs opdracht

(dat heeft Kissinger tenminste altijd beweerd)
die Veiligheidsdienst,
die zijn zetel in het Witte Huis heeft,
zoveel mogelijk te versterken.
Kissinger onderhield persoonlijk de betrekkingen
met de Russische ambassadeur, Dobrynin,
en bereidde ook zijn bezoek aan China in het geheim voor,

dus zonder de minister van Buitenlandse Zaken
erin te kennen.

[...]

Ook Jimmy Carter wilde een eigen rol in de
buitenlandse politiek spelen
en liet zich leiden door zijn Security Adviser, Zbigniew Brzezinski, die zijn taak serieus opvatte.

(6) [from page 15 of Nederland in 20 seconden. Dubbele bodems in de Hollandse moraal by Willem Pijffers (Bloemendaal: Aramith, 1992)]
[...] Rebelleer niet, maar vergader. [...] ‘In Nederland is geen sprake van participatie, er is sprake van overparticipatie.’ We vergaderen wat af. **Maar** waar komt die hang naar collectieve lulkoekerij vandaan?

(8) [interview with Annie M.G. Schmidt in Hoe later op de avond 14 Feb 1989]
Nou, ik weet wel dat ik eh, in vroegere tijd, ik toen ik een jaar of 30 was, [**dus**] nog vóór [*onbekend] de oorlog, of misschien ‘t begin van de oorlog, dat ik wel hele mooie- probeerde hele mooie verzen te schrijven,

(9) [from talk show Op leven en dood 29 July 1989]
En waar men toen over viel was, dat men in die tijd niet gewend was om te praten over fouten binnen de professie. Als d’r al over gepraat werd dan mocht ‘t alleen binnenskamers, met collegae, bij congressen en symposia, maar niet ten aanhore van een groot algemeen publiek. [**Dus**] dat was [*taboe] punt een, en ‘t tweede punt was, dat er over die mortaliteit door mij niet gesproken werd in termen van percentages, van zoveel procent gaat er fout, maar in termen van concrete getallen. [**Dus**] zo veel [*aantallen] honderd mensen gingen d’r dood. En dat kwam veel harder aan dan alleen maar ‘t noemen van percentages.

(10) [from talk show Op leven en dood 29 July 1989]
**P:** Maar d’r zijn bijwerkingen natuurlijk, een gezonde student van 20, di
    nou ja, hij eet verkeerd, omdat ie student is, maar verder is ie gezond.
**G:** Ja nou, ‘t ligt niet zozeer aan ‘t eten, meestal meer aan ‘t drinken, maar hij eet eh hij eet vaak toch wel redelijk tegenwoordig, dankzij de mensa’s.
**pop maar** ‘t eh, nee ehm de mensen hebben geen kwaal en worden toch met iets behandeld tegen een kwaal en ondervinden dan de bijwerkingen die ook een patient zou kunnen gaan ondervinden.

(11) [from television discussion program Het Capitool, 26 February 1989]
**S:** (...) blijkt dus dat er ongeveer vijftig procent weigeraars zijn en het is zeer wel mogelijk dat bij die vijftig procent nou juist de groep zit die seropositief is.
**B:** **Maar** niemand stelt zich de vraag waarom er zoveel mensen zich terugtrekken (...)
Table 1: Turn-internal Discourse Segment Transitions in Spontaneous Talk

<table>
<thead>
<tr>
<th>Id</th>
<th>Segment Transitions</th>
<th>Typical Discourse Markers</th>
</tr>
</thead>
<tbody>
<tr>
<td>es</td>
<td>end of segment</td>
<td>okay?, you know, so</td>
</tr>
<tr>
<td>ns</td>
<td>next segment</td>
<td>okay, so, but, now, well, and</td>
</tr>
<tr>
<td>di</td>
<td>digression, interruption</td>
<td>by the way, you know</td>
</tr>
<tr>
<td>sp</td>
<td>specification, definition</td>
<td>that is, you know, well</td>
</tr>
<tr>
<td>pp</td>
<td>paraphrase</td>
<td>I mean, you know, that is</td>
</tr>
<tr>
<td>ex</td>
<td>explication, clarification</td>
<td>because, you know, I mean</td>
</tr>
<tr>
<td>bg</td>
<td>background information</td>
<td>because, see, well</td>
</tr>
<tr>
<td>cm</td>
<td>comment</td>
<td>you know, I think, I guess</td>
</tr>
<tr>
<td>co</td>
<td>correction, emendation</td>
<td>oh, or, I mean</td>
</tr>
<tr>
<td>qu</td>
<td>quote</td>
<td>you know, like, well, oh</td>
</tr>
<tr>
<td>pop</td>
<td>return</td>
<td>but (anyway), so, now, well</td>
</tr>
<tr>
<td></td>
<td>English</td>
<td>Dutch</td>
</tr>
<tr>
<td></td>
<td>hé?, weet je wel, dus</td>
<td>nou, dus, maar, en</td>
</tr>
<tr>
<td></td>
<td>trouwens, overigens, dus</td>
<td>namelijk, dus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ik bedoel, dus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>want, dus, ik bedoel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>want, namelijk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dus, trouwens, overigens</td>
</tr>
<tr>
<td></td>
<td></td>
<td>oh, of, ik bedoel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>nou, ja, ach, oh</td>
</tr>
<tr>
<td></td>
<td></td>
<td>maar (eh), dus, nou, wel</td>
</tr>
</tbody>
</table>

Table 2: Components of discourse coherence

<table>
<thead>
<tr>
<th></th>
<th>Ideational Structure</th>
<th>Rhetorical Structure</th>
<th>Sequential Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>units:</td>
<td>propositions</td>
<td>illocutions</td>
<td>discourse segments</td>
</tr>
<tr>
<td>relations:</td>
<td>semantic relations that hold in the world described by the discourse</td>
<td>reinforcement or support of one unit by the other</td>
<td>transitions to next unit or to/from parenthetically embedded unit</td>
</tr>
</tbody>
</table>

Table 3: Selected coherence relations in the three parallel components

<table>
<thead>
<tr>
<th>Semantic Relations</th>
<th>Rhetorical Relations</th>
<th>Sequential Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>(addition of information)*</td>
<td>(next speech act)*</td>
<td>(segment continues)*</td>
</tr>
<tr>
<td>temporal relations</td>
<td>contingent act (response)</td>
<td>next segment</td>
</tr>
<tr>
<td>elaboration, enablement</td>
<td>motivation, encouragement</td>
<td>comment, digression</td>
</tr>
<tr>
<td>alternative, contrast</td>
<td>concession, antithesis</td>
<td>paraphrase; return</td>
</tr>
<tr>
<td>cause, reason</td>
<td>justification, support</td>
<td>background segment</td>
</tr>
<tr>
<td>result, effect</td>
<td>conclusion</td>
<td>end of segment</td>
</tr>
</tbody>
</table>

* Simple additive relations are taken to be the default whenever no more specific relation holds in the component in question
Figure 1: Naming latencies in cross-modal priming experiment

![Graph showing naming latencies for different markers: paratactic markers, push-markers, and pop-markers. Each marker is compared between 'marker absent' and 'marker present' conditions. The naming latency (ms) is measured on the y-axis, ranging from 630 to 710. The x-axis represents different marker types.](image-url)
Notes

1 I will not discuss discourse-initial uses in this paper, but point this out here to prevent or correct a misunderstanding evident, for instance, in Schourup (1999: 237, 239), who apparently assumes I meant ‘discourse segment’ where I wrote ‘discourse context’ (Redeker 1991: 1168). In my usage of the term ‘discourse’, language is a necessary ingredient, but context is an equally inalienable part.

2 Examples are presented in a structured format, roughly one idea unit per line (sometimes line breaks become necessary within a long unit) and with minimal intonational annotations. Syllables with exceptional stress are capitalized. Notable differences in speed of talk are marked by enclosing fast speech in angle brackets (< fast speech >). Other punctuation symbolizes: stops (/), lengthening of final syllables (word–), clause-final (comma) and sentence-final (period) intonation, and pauses (...). Indentation shows my interpretation of the discourse segment structure.

3 My description of these categories is rather informal, as there differentiation is not crucial to my main purpose of identifying paratactic and hypotactic discourse transitions. The categorization is intended as a partition (i.e., as exhaustive and non-overlapping). Note that the category of digression, for instance, is therefore taken more narrowly than elsewhere in the literature, e.g. in Ferrara (1997), who includes among digressions ‘orientational detail’ (here: background information) and epistemic comments (here classified as comment segments).

4 In translating examples I have tried to preserve the ‘flavor’ and recreate the idiomaticity of the talk, at times at the expense of literal accuracy. The original Dutch transcriptions are given in the appendix.

5 In the Dutch original, the discourse marker dus (English: thus), here translated by so for idiomaticity, appears in utterance-final position.

6 The research reported in this section was supported by a grant from the Royal Netherlands Academy of Sciences (1989-93) and was carried out in the speech laboratory of the Max Planck Institut für Psycholinguistik in Nijmegen.

7 ‘Overall’ is no gratuitous specification here. In testing the reliability of my classifications, I found that even rather long fragments allowed multiple interpretations of a particular relation much more readily than a complete text. Only analyses that are informed by the full context yield satisfactory intercoder reliabilities (see Redeker 1992, 2000).
Kroon (1998) makes a similar point, when she discusses monological (within-turn) and dialogical (across-turns) uses of Latin connective particles, arguing that the within-turn occurrences of what she identified as interactional functions are licensed by diaphony.