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How primary school children address reading problems in dialogic reading

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In dialogic reading during inquiry learning settings in primary school, pupils read, think and talk together about text fragments for answering their research questions. In this process, pupils may encounter reading problems, regarding word identification or meaning. Conversation analysis is used to demonstrate how these reading problems are collaboratively addressed. Word identification

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problems are mostly signalled implicitly during the genuine reading activity and are in most cases immediately corrected by the co-participant, to continue the reading activity as smooth as possible. Meaning problems are displayed more explicitly, by use of requests for information, that are explicit about the purpose, but not always explicitly addressed to the other participant. Therefore all participants, including the text in a principal role, can assist.

Introduction

In collaborative inquiry learning settings, dialogic reading is a common practice in which pupils use texts to answer shared research questions. We speak of dialogic reading when participants are involved in interactions in which they actively read, think, and talk together (Maine, 2015). In this study, we demonstrate how children collaboratively address emerging reading problems while involved in such interactions in Dutch primary school. During inquiry learning projects, pupils work collaboratively to answer their own research questions (Littleton & Kerawalla, 2012) within a given theme. 'Why does your heart beat faster while doing sports?' is an example of such a question within the theme 'sports and activities'. To answer their questions, pupils search through books, magazines, and the Internet, and they discuss their understanding of these texts and their usefulness to their shared goal. When discussing their comprehension of these texts, pupils also talk about emerging reading problems, such as difficulties with pronouncing certain words or with the meanings of specific words or phrases.

In the literature on reading processes, the importance of interaction for reading comprehension has been acknowledged (Nystrand, 2006), but most literacy studies focus on the effects of collaboration on individual reading comprehension without paying attention to what readers actually do in these interactions. However, examining what pupils spontaneously do with texts and how their understanding is shaped by these interactions will reveal important aspects of reading comprehension (Maybin & Moss, 1993; Maybin, 2013). Yet, a detailed analysis of how students do this during collaborative reading is still lacking. Analysing instances where pupils address emerging reading problems provides us with a better understanding of how readers actually process text. Our conversation analytical

study of talk in dialogic reading contexts aims to describe how primary school students (ages 7–12) share their problems with reading by soliciting assistance and how they try to solve those problems collaboratively.

Problem solving in collaborative reading activities

Earlier research on collaborative reading from a conversation analysis (CA) perspective addresses teacher-pupil interaction focused on pupils' text comprehension (Van der Westhuizen, 2012), classroom interaction during shared picture book reading in kindergarten (Gosen, Berenst & de Glopper, 2015a) and whole-class discussions on history textbooks (Willemsen et al., 2018; Willemsen et al., 2019), and peer interaction around student-initiated picture book reading (Melander & Sahlström, 2009) and a question-answering task after reading a story (Szymanski, 2003). Some CA studies on collaborative and shared reading have focused specifically on problem-solving. For example, Gosen, Berenst and de Glopper (2015b) examined how young children (ages 4–5) talk about a (fictional) book character's problems and explore several possible solutions during a shared reading activity led by the teacher. Other studies observed the problems that the readers themselves might encounter during a reading activity. These problems may concern the meaning of different textual components or the decoding of words.

Two CA studies by Jakonen (Jakonen, 2015; Jakonen & Morton, 2015) are of special interest because he explored the practices of addressing emerging knowledge gaps (such as knowledge of the form and meaning of unknown words or of the spelling of a word) during group work in a content-based language classroom in secondary school. In his first study (Jakonen & Morton, 2015), Jakonen reports how participants (ages 14–15) collaborate to close knowledge gaps after one of them requests information. In the second study, Jakonen (2015) explored how learning materials, such as texts, are used interactionally to construct and handle information requests. Johnson (2017) examined collaboration for solving reading difficulties on the decoding level in a study of young children (ages 5–6) learning to read new words aloud in shared reading activities. Johnson found that after requests for help, correction was cooperatively constructed.

This orientation to successful problem-solving during collaborative reading was also present in studies that approached mathematics lessons in a multicultural classroom from a socio-cultural discourse perspective.

Elbers and De Haan (2005) studied how L1 and L2 Dutch speaking pupils (ages 10–12) address problems with the meaning of words in their mathematics book during group work on a mathematics assignment. They concluded that discussion patterns with negotiations of meaning seem to be valuable for learning both a second language and mathematics. However, how younger, primary school children collaboratively discuss issues of meaning and decoding in their interactions and how they collaboratively solve problems in a functional reading context, such as inquiry learning, has yet to be studied in detail.

Addressing reading problems as a form of recruitment

In order to obtain more insight on how children in the specific context of dialogic reading address different types of reading problems, we now turn to CA research on *requests* in different contexts, because a starting point for many problem-solving interactions in educational reading settings are pupils' requests for *some form of assistance* both in peer interactions (Jakonen, 2015; Jakonen & Morton, 2015; Johnson, 2017) and teacher–pupil interactions (Kääntä, 2017; Tanner, 2017; Van der Westhuizen, 2012). There are a number of CA studies regarding this kind of request for assistance (or *recruitments*) in other contexts (Couper-Kuhlen, 2014; Curl & Drew, 2008; Drew & Couper-Kuhlen, 2014; Kendrick & Drew, 2016; Rossi, 2014; Mondada 2014). In the recent study on the *organization of assistance*, Kendrick and Drew (2016) distinguished different *recruitment* practices, from explicitly to implicitly seeking assistance. These practices differ in how the issue for which the assistance is needed is made apparent to the other party. Kendrick and Drew distinguished five types of recruitments: *request*, *report*, *alert*, *display* and *project*. Although they reserved the term *recruitment* for assistance regarding 'quite material, here-and-now matters' (ibid., p. 2), their framework may function as an adequate heuristic for the analysis of the practices of asking for assistance during dialogic reading. In a critical response to this study, Zinken and Rossi (2016) pointed out that people do not always recruit *help*, but rather a *contribution* to a shared project that both participants are already committed to. It is not always one person's problem for which assistance is recruited, but it is often a shared problem that participants need to solve together. As we will demonstrate in our analysis, this is exactly what is at stake in the context of dialogic reading. In inquiry learning, both participants are committed to the broader

project of finding relevant information, and both share responsibility for the actions taken in a dialogic reading context that lead to this larger shared goal. Therefore, we will follow Zinken and Rossi in our analysis by widening the concept of *recruitments* to '*contributing* to a shared course of action, rather than assisting' (ibid., p. 26). Using this framework, we will show both that the practice of signalling a reading problem depends on the type of reading problem, and that pupils are strongly oriented to the successful continuation of their shared project.

Data and method

Data were collected in a larger research project on *Cooperation and Language Proficiency* (Berenst, 2011) that involved inquiry-learning projects twice a year at six Dutch primary schools between 2012 and 2014. A total of five projects were monitored by the researchers. Pupils (grades 2–6, ages 7–12) worked in small groups of two to four children. The groups were heterogeneous in terms of age, grade, and ability level, since the majority of the participating schools were small and had children from different grades in a single classroom. Pupils worked during a period of three weeks on their shared research questions, using information from online sources or physical books to answer these questions. The teacher was available to assist the groups if necessary. During each project, group work was videotaped at least three times. Additionally, in each classroom, at least two small groups were followed throughout the project. For this study, we used a selection of the videos in which pupils discussed informative text in the process of answering their research questions. These videos were transcribed in the manner described by Jefferson (Jefferson, 2004) for the purpose of a detailed analysis informed by (applied) CA (Ten Have, 2007; Sidnell & Stivers, 2013). From this dialogic reading database, first, we made a collection of approximately 50 video extracts (each lasting from approximately 20 seconds to 8 minutes) that comprised interactions in which different types of emerging reading problems were observed. The reading problems that were observed in this analysis regarded pronunciation, intonation, decoding, and comprehension issues, both addressed and self-corrected, but all were signalled by one of the readers with some kind of discontinuation in the reading activity itself (e.g. a hesitation or a question about meaning). In the initial exploration of the data, we did not find any problems that were only signalled by non-verbal actions. However,

we did include the embodied actions in our collection to augment verbal actions. Some video extracts comprised several cases of emerging reading problems. Because we are interested in how children address different types of reading problems in dialogic reading settings, we only focused on the cases in which some form of *assistance* or *contribution* (Zinken & Rossi, 2016) followed signalling the problem. This resulted in a collection of 41 specific cases of 'recruitments', which we analysed in detail to gain insight into how participants in the group activity assist with different types of reading problems. We analysed how the recruitments are constructed in the dialogic reading context by signalling a reading problem, and how the following assistance or contribution is accomplished. Examples of hesitations and reading faults that were not treated as recruitments were not included in our collection.

Findings

In dialogic reading activities, pupils may come across problems regarding the identification or meaning of words or text fragments. In our study, we focus on the instances in which readers interrupt their reading activity and topicalize the text component or word that caused the issue. In the primary exploration of the data, we observed different practices for signalling a reading problem that were followed by some type of assistance, and thus are treated as recruitments. In Table 1, we present a range of examples from our data.[1]

These examples vary from very implicit and maybe even unintended displays of trouble (example 1) to very explicit requests for action (example 5). In example 1, the reader *displays* (Kendrick & Drew, 2016) the reading problem when he *hesitates* while reading aloud, and the co-participant treats it as a recruitment when he helps the reader by reading the word that is causing the issue. In example 2, the reader first hesitates while reading and then *repeats* the trouble word with a rising intonation. Example 3 may be characterized as a *report*, because the reader reports what the precise trouble is (ibid.), namely not knowing the meaning of the word. In example 4, an *information request* (Jakonen & Morton, 2015) is used, and the following assistance was focused on solving the information gap, in this case the reader's knowledge of a word's meaning. In example 5, the reader explicitly addresses the other participant with a direct *request for action* (Kendrick & Drew, 2016) to help with an unknown word.

Table 1 Examples of signalling a reading problem.

		Example				Dutch original
1	→	A	**sluices. (.) with <hi↑->**	→	A	**sluizen. (.) met <hui↑->**
		B	**sliding (.)**		B	**schuif (.)**
		A	**sliding doors**		A	**schuifdeuren**
2		A	**Australia is a very special country and there are animals like I ne- ver (.)**		A	**Australië is een heel bijzonder land en er komen dieren zoals ik die ner- gens (.)**
	→		nev<u>er</u>?	→		nerg<u>en</u>s?
		B	nevur		B	nerguns
3		B	**street dance has its origin in the djettos of America**		B	**streetdance vindt zijn oorsprong in de djetto's van Amerika**
	→	A	I don't know what djettos is but I guess you know it (I)	→	A	ik weet niet wat djetto's is maar jij weet het vast wel (I)
		B	djetto's,		B	djetto's,
4		A	there from there to **food waste**		A	daar van daarna tot **voedselverspilling**
		B	*((is reading the same text))* yes		B	*((leest dezelfde tekst))* ja
	→	A	and what does this mean?	→	A	en wat betekent dit nu?
		B	that (.) that actually that you to eh eh it means that the food actually		B	dat (.) dat eigenlijk dat je naar eh eh het betekent dat het voedsel eigenlijk
5		A	**even the Dutch food and product authority formerly the inspectorate of producers of products confirms it for**		A	**zelfs de Nederlandse voedsel en warenautoriteit vroeger de keuringsdienst van waarde van waren bevestigt het voor**
	→		**sarty-** Dolf can you help for a moment there's a word I don't understand (.) Dolf	→		**sartief-** Dolf kun je effe helpen ik snap een woord niet (.) Dolf

By analysing the sequences of these recruitments, two main types of problems were found in the data: problems regarding the meaning of a word or a small text fragment (23 cases) and problems regarding word identification (18 cases). Word identification problems are mostly marked implicitly during the genuine reading activity and are followed by an immediate correction by the participant in most cases. Meaning problems are marked more explicitly. What is remarkable is that who provides the assistance or contribution can be the participant, the initiator of the recruitment, or the text itself, represented by one of the participants.

In the next sections, we will further explore recruitment practices in dialogic reading, regarding the types of reading problems related to the types of assistance.

Addressing word identification problems

In 18 cases in the collection, the reader encountered a problem with identifying a word while reading. These difficulties occur when the reader does not recognize a word, which is signalled, for example, by a hesitation while they read aloud, an unexpected pause, or by pronunciation issues, which are all practices for *displaying* a reading problem. These cases are treated as recruitments since, in the uptake, the participant contributes to solving the problem that caused the hesitation, pause, etc. In the following examples, we will present different practices of signalling *word identification problems* in relation to practices for providing assistance.

The first extract demonstrates how the reader *reports* that she is not certain about the pronunciation of a word. A report explicitly mentions the type of problem. Three girls are trying to find information about the origin of World Animal Day, and Irene is reading silently until she encounters a pronunciation problem with the Italian name Assisi, which she signals in a complex first pair-part, comprising a report (line 101) and a possible solution (line 102). Note the emphasis on the first syllable.

Extract 1: 'Franciscus from Assisi', grades 3–4

```
100  Irene:   ((reads and points, shows paper to Kim))
101           ik denk dat je dit (.) uitspreekt ((wijst op woord))
              i think that you pronounce this (.) ((points at word))
102           Francis:cus: van à (.) si (.) sis:
              Francis:cus: from à (.) si (.) sis:
103  Kim:     ((kijkt in de tekst)) à (.) si (.) sis
              ((looks in the text)) à (.) si (.) sis
104  Irene:   [ja
              [yes
105  Sylvia:  [Assisis
              [Assisis
106  Kim:     °Assisis=
              °Assisis=
107  Irene:   =Assisis: ja dat ga ik voorle-
              =Assisis: yes i will rea-
108  Kim:     Franc↑iscus van Assisis (.) oké e:h ((staat op))
              Franc↑iscus from Assisis (.) okay e:h ((stands))
```

By saying 'I think that you pronounce this ...' (line 101), while showing the text to Kim and pointing at the word, Irene *reports* the word identification problem as a pronunciation issue. Her showing the text to Kim (by pointing) indicates that she addresses her report of the problem to Kim. Kim treats it as a *recruitment*, giving her assistance by reading aloud the difficult word with emphasis on the first syllable (line 103), and by doing this, she confirms Irene's presumption. Irene accepts the solution in line 104 ('yes'). Simultaneously, the third girl, Sylvia, who is sitting across the table and cannot see the text, also repeats the word (line 105). Then Kim confirms again with another repetition (line 106). Subsequently, Irene explicitly accepts Kim's assistance by saying that she is going to read 'A̲ssisis' (line 107), thereby demonstrating her orientation to the progressivity of the reading aloud activity. Finally, Kim repeats the entire name with clear emphasis on two syllables, demonstrating that she is satisfied with how Irene accepted her assistance, and ending the recruitment session with 'okay' and an embodied move (line 108) that indicates the closing of the discussion.

Word identification problems are often easy for the other participant to solve, as we can observe in Extract 2. While reading aloud, Petra encounters a problem with the word 'busy' ('bezig'), which is displayed by a hesitation in her reading (line 5): she reads a word incorrectly and then repeats it. This type of reading problem is a word identification problem because Petra does not recognize the word while reading it and she replaces it with another word she probably does know ('burst', in Dutch 'bezorgd').

Extract 2: 'busy', grades 2–3

```
4   Petra: ((points with finger in text))
5          dr bezorgd druk bezorgd
           ar burst are burst
6   Bente: bezig
           busy
7   Petra: bezig zijn de eigenaar in dezelfde
           busy with the owner in the same
8          on- d- er- deel die allemaal druk bezig zijn
           p- ar - t who all are busy
```

Bente may have been alerted by Petra's hesitation to notice that she has a word identification problem and therefore may need some help; additionally, because she is reading along with Petra, she may have noticed the reading mistake ('bezorgd' instead of 'bezig'). She treats this as a recruitment

because she immediately gives Petra her assistance by reading the correct word aloud (line 6). Petra then accepts this *correction* by repeating the corrected word and continues reading (lines 7–8). Her assistance seems to have solved the problem because, afterwards, Petra is able to read the word correctly. This does not mean that Petra now knows the meaning of the word (note the emphasis on the wrong syllable in the correction by Bente in line 6), but for the *practical purpose* of the reading aloud activity, the problem is temporarily solved.

Readers indicate most identification problems by displaying difficulties while reading a passage aloud (with hesitations or repetitions, but without explicitly mentioning their difficulty). This *try-marking* (Sacks & Schegloff, 1979) is then treated as a recruitment, as is apparent from the direct assistance of the other participant. Other practices of displaying a problem include a *longer pause* when reading aloud and a *remarkable change in intonation*, as demonstrated in Extract 3, in which Kim and Sylvia are reading a text about the origin of street dancing.

Extract 3: 'continuously', grades 3–4

```
26  Kim:     oké dat hoeft niet, (.)
             okay we don't need that, (.)
27           streetdance verandert hierdoor eigenlijk
             street dancing chances because of this actually
28           (1)
29  Kim:     continu:?
             continuously:?
30  Sylvia:  continu:
             continuously:
31  Kim:     continu:.
             continuously:.
```

Kim is reading aloud, and she encounters the word 'continuously' ('continu'). The pause and questioning intonation (line 28–29) alert Sylvia that Kim has a reading problem. Kim try-marks the word with the emphasis on the wrong syllable, which is what the following assistance by Sylvia is about: she repairs the accent pattern (line 30) by correcting Kim. Note that the correct emphases in Dutch ('continu') and English ('continuously') are on different syllables. In line 31, Kim accepts the correction by repeating the repaired pronunciation. For the practical purpose of continuing the reading session, the problem seems to be solved. The reading problem may be caused by a meaning problem, but because the meaning does not seem to be the issue for the girls, we consider this a word identification problem.

In the previous examples, we demonstrated how displayed word identification problems immediately induced assistance from the other participant and that after the problem was solved, the reading activity could continue. The pupils seem to be oriented to continue the reading activity after the sequence of recruiting assistance for word identification problems, which can be characterized as follows:

A signalling the problem;
B giving assistance;
A accepting assistance.

The *acceptance of assistance* can be more explicit (Extract 1) or less explicit by repeating the corrected pronunciation of the word (Extract 3) or with a word correction and continuing the sentence (Extract 2), but in all cases, pupils are driven to continue the reading aloud activity.

In addition, when word identification problems are *not solved*, the participants' orientation is nevertheless the continuation of the reading activity as a shared responsibility. In Extract 4, Ella and Mariel are using the Internet to find information about the 'tongue' ('tong'). While reading aloud, Mariel encounters a difficulty with the word 'extrinsic' ('extrinsiek'), and a complex first pair-part of a recruitment follows:

Extract 4: 'extrinsic', grades 5–6

```
17   Mariel: de menselijke tong bestaat voornamelijk uit spieren. (.)
             the human tongue consists mainly of muscles. (.)
18           door de- pff ((wijst op beeldscherm)) wat staat er,
             by the- pff ((points to screen)) what's right there,
19   Ella:   #door ex:tree- ja nee geen idee
             #by ex:tre- yeah no no idea
20   Mariel: #((looks at Ella))
21   Mariel: oké
             okay
22           (2)
23   Ella:   eh: de tong is op een met onderkaak (.) ((klikt))
             eh: the tongue is on a with lower jaw (.) ((clicks))
```

Mariel signals her identification problem with a combination of a problem *alert* ('pff') (Kendrick & Drew, 2016) and an embodied action (pointing) (Jakonen, 2015) – which in this context are both practices of *displaying a problem* – along with an explicit *request for information* that refers to the problem of not being able to identify what is written ('what's right there') (line 18). Ella treats it as a recruitment because she immediately begins to

assist, or contribute, by reading the problematic word aloud too. However, she does not manage to identify the word either, and she interrupts her effort and then answers the request ('no no idea', line 19) to indicate that her attempt failed. Mariel accepts this failure (line 21), and Ella then continues the reading, which also indicates their shared responsibility for the reading activity. What is remarkable is that for the practical purpose of continuing the reading aloud activity, this withdrawal of assistance is not indicated as an issue for either of the participants.

In summary, these results indicate that the problems with word identification that occur during reading activities in dialogic reading sessions (a) are mostly signalled rather implicitly by displays during the reading process, (b) are repaired immediately by the other participant through a correction of the pronunciation of the word or an attempt to assist, and (c) repairs are accepted implicitly in most cases by the participant who indicated the problem. In all cases, whether the problem is solved or not, the most important point for the participants seems to be that the oral reading activity is smoothly continued after the recruitment sequence; this kind of assistance may therefore be characterized as 'contributing' to the shared responsibility of the progressivity of the reading activity.

Addressing meaning problems

In this section, we will explore the practices of *recruiting* and *giving assistance* for meaning problems. Our data collection set comprises 23 cases of problems related to the meaning of words or phrases. These problems may be marked by readers when comprehension obstructs them from continuing the reading or when the problematic word or phrase seems important for obtaining the needed information from the text. These meaning problems are marked more explicitly than word identification problems by using *reports* (9 cases) and *requests* (14 cases) (based on the characterizations of Kendrick & Drew, 2016). Examples of *reports* are utterances like:

- yes (.) there was something about eh food and product authority but I don't really get it
- I don't know for example what his (.) to (.) ry is.

Two types of *requests* are found in the data. Firstly, *information requests* (Jakonen & Morton, 2015) are questions about meaning, shown in utterances like:

- yes, but what is a dollin down or something?
- what does this mean?

The second type are *requests for action*, in which the reader directly addresses the participant to help them, found in utterances like:

- how shall we translate this?

Sometimes these two practices are combined in one turn to accomplish the recruitment, for example when a girl says to her co-worker:

- Dolf can you help for a sec, there's a word I don't understand

The explicit request for action is followed here by a report, which may also function as a specification for the request. Together they accomplish the recruitment action. However, the most common practice for marking a meaning problem in our data is a request for information about the meaning of a word or phrase.

Whereas with word identification problems the assistance follows immediately after the recruitment and the reading activity is continued after the assistance, in cases of recruiting assistance or corroboration with meaning problems, direct assistance from the other participant is very rare in our data. In most cases, the other participant does not know the meaning of a problematic text component either, so other work approaches must be used to solve the problem. In the process of shared meaning-making, participants can rely on different sources – such as external sources, the text itself, and their own knowledge by use of inferences – to solve the meaning problem. We will argue that participants are oriented to solving meaning problems and will demonstrate how different sources are involved in this interactional process.

Referring to an external source

Sometimes problem solving is accomplished by referencing an external source of information, such as a dictionary, a teacher, another pupil, or the Internet. This is demonstrated in Extract 5, in which Klaar and Dolf are reading a text on a computer screen. Klaar directly addresses Dolf with an *information request* about the meaning of the word 'charity' ('charitatieve', line 184). Dolf responds with a form of assistance, or a contribution, in which he suggests how to solve the problem (line 185). Note that the incorrect pronunciation is not an issue for either participant, so for them, there is no word recognition problem.

Extract 5: 'charity', grades 5–6

```
184  Klaar:  ((tegen Dolf)) Dolf wat betekent sjarrietatieve
             ((to Dolf)) Dolf what does sjarity mean
185  Dolf:   dat kun je op computer opzoeken
             you can look it up on the computer
186  Klaar:  ja nee dat heb ik net gedaan lieft- dadigh- wat was het nou
             yes no I just did that philan- trop- what was it
187  Dolf:   liefta-
             philan-
188  Klaar:  ((typt)) goed hè
             ((types)) good isn't it
189  Dolf:   ja dies handig
             yes that's practical
190  Klaar:  lieft- de liefdadigheid beoefent (.) wa beteken ta,
             philan- the philantrophy practices (.) wha mean tha,
191  Dolf:   zullen we t even aan Henk vragen,
             shall we ask it to Henk,
```

This type of procedural assistance is a second pair-part that we often found after the first pair-parts of marking a problem. It occurs when the other participant does not give a direct solution but is still willing to help solve the problem, for example, because he or she does not know the meaning of the requested word either. Here, the preferred solution may have been if Dolf had explained the meaning of 'charity'. Note that Klaar rejects Dolf's assistance (line 186) in her reply that she already looked the meaning up. Her question to Dolf and her problem with producing the synonym 'philanthropy' ('liefdadigheid') indicates that the computer did not help her. In line 190, Klaar repeats her recruitment with a reading-out-loud utterance and an information request, to which Dolf then responds with another suggestion to consult another external source, namely a peer (line 191). This again demonstrates the children's orientation to solving the emerging problems during their dialogic reading activity.

The role of the text in solving a meaning problem

While in Extract 5 the participants were seeking the solution to the meaning problem outside the text (by referring to the computer and a peer), sometimes the text itself becomes a source for the problem solving, as we will demonstrate in the next example. This is interesting because it also reveals something about the strategies children use when they encounter difficulties while reading. Two extracts (6A and 6B) are presented in which Bas and Fien are reading and talking about how sluices work. During the

whole activity, there is no assigned reader and Bas and Fien seamlessly alternate between the role of reader. This may indicate that the reading activity itself is also a shared activity that both participants take responsibility for and that they are both oriented to its progress. In Extract 6A, Bas signals an identification problem with the word 'polder' (line 206). His hesitation in reading the word is treated as a recruitment by Fien, and she reads the word along with him (line 207) as if she had already been contributing to the reading activity in the previous lines (201–205).

Extract 6A: 'polder', grades 3–4

```
201  Bas:  <die> (.) <regelen> (.)
           <these> (.) <adjust> (.)
202  Fien: de hoeveelheid (.)
           the quantity (.)
203  Bas:  de hoeveel·h heid °water° (.) in (.) een rivier of,
           the quan ·h tity °water° (.)  in (.) a river or,
204        (0.5)
205  Fien: in (.) een (.)
           in (.) a (.)
206  Bas:  in een pro- [pol:-  ] der. (.)
           in a pro-  [pol:-  ] der. (.)
207  Fien:            [polder:]
                      [polder:]
208  Bas:  wat is dat eigenlijk, (.)
           what is that actually, (.)
209  Fien: °hmm weet ik niet.°
           °hmm i don't know.°
210        (0.4)
211  Fien: daar zijn,(.)
           there are, (.)
```

Once the identification problem is solved, a new recruitment follows when Bas explicitly asks for the meaning of the word (line 208) in an information request, which may address Fien's knowledge. However, Fien does not know the meaning either and her reaction is an answer to the question, but she does not provide assistance. The 'hmm' (line 209) and pause (line 210) before she continues reading again may indicate her preference for continuing the reading activity and be a method for solving the problem, namely reading ahead to see if the meaning will become clear in the subsequent context. Moreover, the meaning problem does not obstruct the practical purpose of their reading for the moment. After a while (see Extract 6B), it turns out that the text itself contributes to the solution because it gives more information on the concept of 'polder' (lines 283–287), which Fien

recognizes in an explicit claim of understanding (line 289) (Koole, 2010). The precise moment where the actual assistance starts is remarkable and typical for the dialogic reading context, that is, when the text 'talks' in line 286–287, performed – or 'animated' (Goffman, 1981) – by Bas and Fien together.

Extract 6B: 'polder', grades 3–4

```
283   Fien:  het is een sluis die zorgt dat ergens water uitgaat
             it is a sluice that makes the water goes out
284          #(1.5)
286          #((Bas reads along in silence))
286   Bas:   °<water uit komt  [meestal>° is dat een polder
             °<water comes out [mostly>° that is a polder
287   Fien:                    [meestal is dat een polder
                               [mostly that is a polder
288          (0.5)
289   Fien:  oh nu weten we wat een polder is. (.)
             oh now we know what a polder is. (.)
290          >dat wisten we eerst niet he?<
             >we didn't know that before did we?<
291          (.)
292   Bas:   nee. (.)
             no (.)
293   Fien:  >(dat wist ik niet)< een polder is een- ja!
             >(I didn't know that)<  a polder is a- yes!
294          stuk land dat v-vroeger onder water lag. oké?
             piece of land that u- used to be under water. okay?
295          (1.8)
296   Fien:  hmm. dat wist ik niet. (.)
             hmm. I didn't know that. (.)
```

Fien explicitly claims that they now know what 'polder' means (line 289), and her use of the personal pronoun 'we' confirms that it is a solution to a shared problem that was still there in the *dialogic space* (Wegerif, 2013). After this, she checks this change in their shared knowledge state by asking Bas ('we didn't know that before, did we?' line 290), which Bas confirms (line 292). Then, Fien demonstrates their new knowledge by reading aloud the definition from the text (line 293–294), which confirms her epistemic *authority* on the matter by presenting the *source* of the knowledge (Enfield, 2011) by reading aloud from the text. Finally, she shares her individually altered state of knowledge ('I didn't know that', line 296).

Moreover, in this example, the special role of the text in dialogic reading is demonstrated: the text and its content are not only the topic of discussion,

but they also contribute to the interactional project of resolving a knowledge problem (a problem that is also triggered by the text). The text may be seen here as a resource, whose *voice* (Bakhtin, 1981) is represented in the participants' interaction, and therefore 'speaks' in a certain way. This presence of the text in the interaction is reflected in the 'oh' at the start of Fien's turn (line 289) as an expression of discovery in response to the information that is provided by the text read aloud by both Bas and Fien (lines 283–287). The specific contribution of a text in assisting in dialogic reading settings is even more evident in Extract 7, in which the text takes the role of problem solver after the other participant (Jelmer) ignores a request for assistance. Jelmer and Niek are searching for information on the Internet about Dutch Traffic Rules.

Extract 7: 'moped', grades 4–5

```
163   Jelmer: eehm: ((opent website))
              eehm: ((opens website))
164           #(11)
165           #((Niek reads silently, Jelmer reads mumbling))
166   Niek:   ##wat is een snorfiets?
              ##what is a moped?
167           ## ((looks at screen))
168           (1)
169   Jelmer: °kinderen onder de acht jaar moeten
              °children under eight years have to
170   Niek:   #oh, het is gewoon een bromfiets
              #oh, it is just a motor driven bicycle
171           #((looks at screen))
172           (1)
173   Niek:   ja ehm:
              yes ehm:
```

After reading in silence, Niek poses a question about the meaning of a word (line 166). This question could be an information request addressed to Jelmer because they are working together. However, Jelmer seems to *ignore* the question (Elbers & de Haan, 2005) because he continues to read in a mumbling voice, as if reading to himself. Additionally, Niek continues to look at the screen. Jelmer does not treat the question as a recruitment, at least not as one he has to respond to immediately. Then, Niek provides the assistance, using what he just discovered about the meaning of the word while looking at the text ('oh, it is just …', line 170), and immediately accepts the assistance as well ('yes ehm'). The 'oh' at the start of his turn

may indicate that Niek just discovered the meaning of the word through the text. Thus, we can say that during the silent reading (line 168) when Niek is reading individually, the text provides the information that he needs to solve his knowledge problem. His utterance in line 170 may be seen as a response to both his own recruitment and to the answer provided by the text (line 168), and here we can see the dialogue between text and reader (Bakhtin, 1981) at work.

Normally, after a recruitment in the first pair-part, the preferred second pair-part is some form of assistance or contribution by the other participant, but in this case, it is Niek himself who assists after his own information request. The text seems to take on the role of assistant in providing the information that Niek needed to solve his knowledge problem, which we also found in other cases in our data. Of course, the text itself cannot speak and does not have an active role in the interaction, but Goffman's theory about 'footing' (Goffman, 1981) may be helpful to understanding what is happening. We could say that Niek treats the text as a *principal* (the one whose ideas or words are told) and thus as a participant in the interaction. Niek is the one who collects the information from the text, and then in response to what he reads in the text, he formulates that information. The potential role of the text as a contributor to problem solving seems to be confirmed by Niek's gaze, because while making his information request (line 4), he keeps his eyes on the computer screen, so there is no embodied sign of him addressing the request to Jelmer. Thus, in the context of dialogic reading, initiating a recruitment does not address the other participant per se but may also be addressed to the text as a source of the possible solution as an utterance while 'thinking aloud'. So, in the words of Baktin (1981), the voice of the text is reflected in the interaction.

To summarize, in dialogic reading, the text is not only the source of meaning problems when pupils encounter passages that are not familiar to them, but it may also be involved in solving these meaning problems. Recruitments regarding meaning problems in the context of dialogic reading may be the mentioning of a problem to all possible contributors, including oneself and the text. In cases where another participant does not give immediate assistance for whatever reason, the text may become a productive participant in the interaction, in the role of principal, by providing the requested information as performed by one of the pupils.

Inferences in the collaborative construction of meaning

Another practice we observed in the data regarding the construction of shared knowledge of the meaning of words and phrases was using *inferences* based on the participants' own knowledge and experiences, or as Enfield stated in the context of the demonstration of knowledge: 'If I know about something, then I can say things about it' (Enfield, 2011). In theories on reading comprehension, making inferences (between different parts of the text or using prior knowledge) is supposed to be essential for text comprehension (Oakhill, Cain & McCarthy, 2015; Perfetti & Stafura, 2014). In dialogic reading, making inferences may be a practice of demonstrating understanding of a meaning. In Extract 8, we present an example of such inferencing in a dialogic reading session with two girls who are researching the question 'why does your heart beat faster while doing sports?' They encounter the phrase 'cooling down' in a book; it seems to be an important expression to them, and they decide to determine the meaning of it. Prior to the extract, the girls were already involved in a negotiation of meaning, but apparently, they are still not sure about the exact meaning of the phrase (line 123).

Extract 8: 'cooling down', grades 5–6

```
123  Anne:    maar ze zeggen niet echt wat een kooling down is.
              but they don't say really what a kowling down is.
124  Marijke: eh volgens mij ehm een beetje (.) afkoelen.
              eh I think ehm a bit (.) to cool down.
125  Anne:    is een cooling down belangrijk. dat=
              is a cooling down important. that=
126  Marijke: ((schrijft)) =na het sporten is een koo (.)  [li:ng
              ((writes))   =after exercising is a kow- (.) [li:ng
127  Anne:                                                 [je gaat-
                                                           [you go-
128           dat deed ik ook altijd na het
              I always did that after
129           kaatsen dan ging ik altijd eh als ik naar huis rende,
              kaatsen then I always went eh when I ran home,
130           ging ik altijd heel erg: ga ik ging ik in het gras
              I always did a lo:t, I went running on the grass
131           nog eventjes rennen, (.) en dan ging ik langzaam hardlopen
              for a moment, (.) then I started running slowly
132           en dan ging ik de hele tijd zo lopen en dan koel je
              and I continued running for a while and then you cool
133           heel langzaam af. dat moet bij paardrijden ook.
              down very slowly. that's the same with horse riding.
```

```
134             dat is dan voor de paarden.
                then it's for the horses.
135  Marijke:   ja. uitstappen.
                yes. to walk the horse
136  Anne:      hmhm ((knikt))
                hmhm ((nods))
137  Marijke:   eh:
138             (8)
139  Marijke:   een kooling down is ehm na het sporten afkoelen.
                a cooling down is ehm to cool down after exercising
140  Anne:      ja. (1.5) langzaam.
                yes (1.5) slowly.
```

In response to Anne's *report*, Marijke resumes the result of the prior discussion with what she believes the meaning is (line 124). Then, what occurs in lines 127–134 is interesting: Anne makes two inferences in a row while first stating her own experience ('running slowly after kaatsen'[2]) and then comparing it to another situation, namely, 'horse riding'. Both inferences demonstrate that she does understand what 'cooling down' means. The second inference is adopted by Anne when she adds the official Dutch term 'uitstappen' (literally meaning 'stepping out') for cooling down with horses (line 135). Then, after a long pause, they construct a definition together (lines 139–140). First, Marijke refines her definition by adding 'after exercising' (compared to line 124). Anne then confirms and adds another important element, namely, 'slowly', which she also mentioned twice in her inferences (lines 131 and 133). Thus, the inferencing has a function in their shared meaning construction. Only after the two inferences (initiated by Anne, confirmed and elaborated on by Marijke) are they are able to construct a satisfying definition of the phrase 'cooling down'. Making inferences in an elaborate recruitment sequence seems to be important for the participants to jointly construct the meaning of a problematic word.

To summarize, recruitments in dialogic reading regarding the meaning of words and phrases can induce shared knowledge building based on (a) an external source (such as a computer or dictionary), (b) information from the text itself, and/or (c) information from one's own experiences and prior knowledge using inferences. Moreover, these recruitments are always explicit about their purpose (solving a meaning problem) but are not always explicitly addressed to the other participant. The participants are not oriented per se on who is giving assistance but rather on a shared responsibility to solve the problem itself. Therefore, all participants, including the text in a *principal* role, can assist.

Discussion

Practices for addressing reading problems

This study demonstrated how pupils in primary school collaboratively address emerging reading problems – often regarding word identification and meaning of words and phrases – during the process of gathering information from texts in an inquiry learning setting. In this dialogic reading context, we consider reading problems not to be moments for (teachers') corrective feedback, but to be moments where collaborative learning may occur. We found that participants have a shared preference for progressing the reading activity, which means that pupils are (a) oriented to continuing the reading activity as smoothly as possible in cases of word identification problems, and (b) oriented to solving the problem in cases of serious meaning problems. This is in line with the shared educational goals of the activity, namely finding answers to their research questions and how the interaction is constructed to reach that goal efficiently. Thus, all participants take responsibility for this 'shared course of action' (Zinken & Rossi, 2016) and try to contribute to solving emerging reading problems. Interestingly, as we have demonstrated, the text is also attributed a participatory role in the sense that it may contribute to solving a knowledge problem via the pupils who are reading the text. The text's role as a contributor is reflected in the reactions of some pupils, including looking at the text while soliciting assistance.

Orientation to different types of reading problems

The difference between how pupils address the two types of problems is observable in their practices for recruiting and subsequently giving assistance. Word identification problems are usually marked indirectly, mainly by displaying the problem, and preferably the other participant then responds with a correction, which is accepted by whoever initiated the recruitment. After the recruitment sequence for these kinds of problems ends, the reading activity can be resumed smoothly. This is very different in recruitment sequences regarding meaning problems, which are mostly initiated by asking for information or asking for action, while the participants are both oriented to finding a suitable meaning for the problematic text passage. In this problem-solving process, pupils may rely on external sources or on inferences based on their own knowledge and experiences, but we saw how the text itself may also contribute to the shared construction of meaning.

Interestingly, these results correspond with the cognitive psychological ideas about reading processes (e.g. Perfetti & Stafura, 2014) in which word identification and comprehension are considered distinct processing systems in reading. In this view, the word identification process builds on linguistic and orthographic information, while the meaning building process is supposed to build partly on orthographic input, but also on one's own previous knowledge and on the contextual information provided in the text. These different processes became visible in dialogic reading practices for marking reading problems and providing assistance or corroboration in subsequent turns. Pupils turned out to indeed be oriented to distinguishing between identification and meaning, which was observed in their interactions about reading problems. Although some of the word identification problems may have been caused by a lack of worldly knowledge, these identification problems needed to be solved before their meaning could be discussed.

If pupils recruit help with meaning problems, there is always an uptake in which the participants try to solve the problem, often successfully, in the context of their shared goal. Even if there is no successful assistance at first, pupils maintain their orientation to solving the meaning problem. This confirms Jakonen and Morton's findings that 'participants rarely abandon an epistemic search after a first non-answer but instead attempt to find other resources to resolve the knowledge gap' (Jakonen & Morton, 2015, p. 83). We showed that primary school pupils are also inclined to seek out other sources to solve the problem, such as continuing the reading and making inferences. Moreover, this demonstrates their cooperative engagement (Zinken & Rossi, 2016) in their shared course of action because even if the meaning problem is not solved immediately, pupils stay oriented to solving the problem during their next interaction.

Pedagogical thoughts

The data used in our study was comprised of fragments taken from interactions between children that were 7 to 12 years old. Interestingly, this broad age range does not have consequences for the types of problems that children encounter or for the methods that children use to solve their problems. Both identification and meaning problems occur at all ages, although the complexity of the words increases (compare, for example, 'busy' in Extract 2 and 'extrinsic' in Extract 4) in texts for children of different ages. Our results also indicate that even young children are capable of using effective problem-solving practices, but further research is needed

to acquire more insight into the subtle differences between the practices used by children of different ages.

Our study shows that primary school children that work together are goal-oriented readers and can use different techniques to reach their (shared) reading goal. Moreover, these children felt safe enough in this inquiry learning context to ask each other for assistance. From an educational perspective, this shows that putting children in a knowledge-building environment stimulates the shared problem solving during which learning can occur.

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Notes

1 The reading aloud is marked by bold print in all transcripts. Reading and pronunciation faults in the original Dutch transcripts are transferred into the English translations, for example the pronunciation of ghettos as 'djettos' in Table 1.
2 'Kaatsen' is a typical sport in the Dutch province of Fryslân, related to Pelota.

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