DIRECT AND INDIRECT SPEECH IN APHASIA

STUDIES OF SPOKEN DISCOURSE PRODUCTION AND COMPREHENSION

RIMKE GROENEWOLD

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CHAPTER 1

GENERAL INTRODUCTION

1.1 Introduction

Aphasia is an acquired language disorder due to a focal brain lesion that occurred after the period of language development. Even though aphasia is unfamiliar to many people, it is not a rare phenomenon. In the Netherlands, around 30,000 people suffer from aphasia, and it is estimated that there are 10,000 new cases of aphasia per year (Bastiaanse, 2010). In this chapter, we first discuss possible causes of aphasia. We then consider how aphasia affects language production and comprehension. Next, we discuss possible ways people with aphasia may be able to compensate for these difficulties. This leads to discussion of the main findings from literature on direct and indirect speech processing, and, more specifically, the use of direct speech in aphasia. Finally, we describe how previous research leads to the formulation of the research questions that will be addressed in this thesis.

1.2 Aphasia

1.2.1 Causes of aphasia

Focal brain damage can be acquired in four possible ways. Each may result in aphasia, depending on the site of the lesion. The most common cause of aphasia is a cerebro-vascular accident (CVA), also known as stroke. A CVA can be the result of a brain hemorrhage (a rupture in one of the arteries supplying the brain) or a brain infarction, caused by a thrombosis (a blood clot in the vein) or an embolus (a blood clot that tears off and blocks smaller arteries). In all cases of CVA, to result in aphasia, the language areas in the brain are insufficiently supplied with oxygen and other vital elements. The second most frequent cause is traumatic brain injury (TBI). In the case of TBI, the damage arises from an outside cause, commonly a traffic accident, violence, a fall,

etcetera. While aphasia due to CVA is usually found in elderly people, aphasia due to TBI is seen more often in younger people. A third type of brain damage that can cause aphasia is a tumour. Irrespective of the nature of the tumour, it needs space and will press on healthy tissue. If this brain tissue is involved in language processing, pressure from the tumour, or damage from its surgical removal can result in aphasia. A final possible cause of aphasia is a brain infection (encephalitis). Since this is an uncommon cause of aphasia, only a limited number of case studies of aphasia after infection are described (Bastiaanse, 2010). Most participants of the studies described in this thesis suffer from aphasia due to CVA, only in a few exceptional cases is the cause an infection or brain tumour. In all studies, the performance of individuals with aphasia is compared to that of healthy (or: non-brain-damaged) individuals, as is common practice in aphasia research.

1.2.2 Symptoms of aphasia

Even though the most salient problems with language emerge in production, individuals with aphasia experience problems with spoken language comprehension as well. Depending on the locus and the extent of the lesion, aphasia severity ranges from difficulties with word finding and understanding complex texts, to being unable to comprehend, speak, read or write. In this thesis, we focus on two of these modalities, that is, production and comprehension of spoken language, in two types of aphasia, (non-fluent) agrammatic aphasia and (fluent) anomic aphasia.

Agrammatic aphasia is characterised by deficits in both sentence production and sentence comprehension. Speech output is described as agrammatic and typically involves reduced complexity of syntactic structure: omission of morphological elements such as auxiliary verbs, personal pronouns, articles, prepositions and tense markers, word order problems and a reduced ability to produce

verbs (Menn, O'Connor, Obler and Holland, 1995). In spontaneous speech, individuals with agrammatic aphasia speak non-fluently and produce telegraphic speech: utterances mainly consisting of content words. Their comprehension is relatively well-preserved, but they find grammatically complex sentences, such as passives and relative clauses, hard to understand.

In contrast to agrammatic aphasic speakers, individuals with anomic aphasia speak fluently. Anomic aphasia is characterised by word finding problems. Words of low frequency and low imageability cause particular difficulty for individuals with anomic aphasia (Ellis & Young, 1988). Sometimes they use circumlocutions (i.e., using a description) for words they cannot retrieve. Even though speakers with anomic aphasia usually produce fluent speech (except for pauses where word finding difficulties occur), their grammatical constructions are not always correct nor as grammatically elaborated as in normal speech (Bastiaanse, Edwards & Kiss, 1996; Edwards & Bastiaanse, 1998). In general, their language comprehension is relatively intact, but they may find complex and long sentences hard to understand.

1.2.3 Compensation for linguistic impairments by people with aphasia

Even though individuals with aphasia experience problems with grammar and word-finding, their conceptual and non-linguistic communicative abilities (Goodwin, 1995, 2003), pragmatic skills and some evaluative language aspects usually remain relatively intact (e.g., Ulatowska & Olness, 2003; Armstrong, Ciccone, Godecke & Kok, 2011). In addition, most people with aphasia can still use body movement (Goodwin, 1995), gaze, prosody, pauses, and gesture in their communication (Lind, 2002). Several studies have shown that many individuals with aphasia make productive use of gesture alongside or instead of verbal communication (e.g., Goodwin, 1995; Wilkinson,

Beeke & Maxim, 2010). Taken together, this set of non-verbal and paralinguistic devices makes individuals with aphasia more competent communicators than one would expect based on their grammatical and lexical capacities alone. In this thesis, we focus on one of the possible ways in which individuals with aphasia can use these devices to compensate for their impaired grammatical and lexical skills, that is, the use of direct speech. Verbal communication can be complemented with the paralinguistic and/or non-verbal cues that often go along with direct speech by a speaker with aphasia and these provide the listener with additional sources of communicative information. Therefore, direct speech may facilitate interaction by individuals with aphasia. In the remainder of this chapter we will further clarify why direct speech may be a way for individuals with aphasia to take advantage of non-linguistic communicative resources that are often still available to them (Wilkinson et al., 2010).

1.3 Direct and indirect speech

1.3.1 The difference between direct and indirect reported speech

Reported speech is a discourse phenomenon in which words spoken in another place or time are quoted or paraphrased. Traditionally, a distinction has been made between two main forms of reported speech: direct and indirect. In direct reported speech, the reporting speaker presents the reported speaker's words as if quoted directly (e.g., John said: "I'm hungry!"). The reporting speaker intends for the hearer to believe that not only the content, but also the form and the non-verbal messages, such as facial expressions and gestures of the reported speech, originate from the reported speaker (Li, 1986). In indirect reported speech, the reporting speaker presents the reported speaker's words as if paraphrased, (e.g., John said that he was hungry). Instead of

playing the role of the reported speaker, the reporting speaker intends for the hearer to believe that only the content of the reported speech originates from the reported speaker.

1.3.2 Veracity of reported speech

Direct speech can also be used for non-reporting purposes. In fact, in many cases 'reported' speech quotes material not spoken aloud in the past (Sams, 2010). For example, in some cases speakers use direct speech to refer to thoughts (e.g., I thought: "no, not again…"), states of mind (e.g., I was like: "boring!"), dialogue using non-human referents (e.g., the dog is begging: "pet me!"), speech representing an instantiation or a summary (e.g., people always complain: "I'm so busy!") or suggestions for what one could say in a hypothetical or future situation (e.g., just tell him: "no, thanks"). Researchers have introduced various terms to refer to these type of constructions when they are used for purposes other than speech reporting, e.g., *constructed dialogue* (Tannen, 1989), *fictive interaction* (Pascual, 2002; 2006), and *hypothetical active-voicing* (Simmons and LeCouteur, 2011). *Enactment* is another term that refers to the use of a wider range of communicative events (beyond speech) to demonstrate rather than describe actions and events in interaction (Goodwin, 1990, Streeck & Knapp, 1992). Apart from direct speech, this term also covers the use of gesture, body movement, and prosody to depict certain aspects of a scene, action or event. The different approaches and the variation in terminology introduced to refer to direct speech show that it concerns a heterogeneous phenomenon with respect to its terminology, anatomy and functions. Throughout this thesis we will use the term 'direct speech' to refer to the phenomenon in its broadest sense, that is, regardless of whether or not it refers to actual former speech.

1.3.3 Pragmatic characteristics of direct speech

Direct speech has often been claimed to be an effective device for

storytelling, because of its dramatising and enlivening effects on narratives (Labov, 1972; Wierzbicka, 1974; Li, 1986; Tannen, 1989; Mayes, 1990; Clark & Gerrig, 1990). As compared to indirect speech, direct speech constructions are usually perceived as being more vivid and perceptually engaging than indirect speech constructions (Yao & Scheepers, 2011). While indirect speech is claimed to be description-like, direct speech is considered to be more demonstration-like (Clark & Gerrig, 1990). These characteristics have possible implications for both language production and comprehension in aphasia. Direct speech may be beneficial for *speakers* with aphasia because it keeps the listener involved (Chafe, 1982; Tannen, 1989), and it may be beneficial for *listeners* with aphasia because the increased liveliness helps them to stay focused and understand the content of the message (Hincks, 2005).

Direct speech may enable aphasic speakers to use paralinguistic and non-verbal rather than syntactic and lexical resources in order to formulate a message. To produce direct speech, speakers can use for example (shifts in) body position, gaze, facial expression, voice quality, tempo, pitch, and loudness (Couper-Kuhlen, 1998; Goodwin, 1990; Holt, 1996; Li, 1986; Lind, 2002; Romaine & Lange, 1991; Streeck & Knapp, 1992; Wilkinson et al., 2010). This means that they can iconically demonstrate how someone might have looked when s/he produced a reported, fictive, or hypothetical action. By demonstrating rather than describing, a speaker can convey a message using very limited lexical and syntactic resources. Previous research has already suggested that direct speech is an economical device in interaction (Holt, 1996). Therefore, in light of limitations in their ability to use verbal descriptions, it may enable aphasic speakers to exploit non-verbal and paralinguistic resources, providing listeners with the maximal amount of information.

1.3.4 Grammatical characteristics of direct and indirect speech in Dutch and English

Indirect speech is a more complex communicative choice than direct speech, because whereas direct speech involves mimicking speech of a reported speaker, indirect speech involves re- or paraphrasing speech of a reported speaker. Since mimicking is simpler than paraphrasing, it is not surprising that direct speech occurs in all languages, whereas indirect speech does not (Li, 1986). Among all languages in which both construction types exist, there are different ways of grammatically marking direct and indirect speech. In this thesis, we focus on Dutch and English.

To address the grammatical differences between Dutch direct and indirect speech constructions we discuss example (1a) and (1b):

(1a) Example and translation of direct reported speech in Dutch:

Dutch:	Jan	zei:	“de	kat	heeft	honger”
English literal gloss:	John	said:	“the	cat	has	hunger”
English translation:	“John said: the cat is hungry”					

(1b) Example and translation of indirect reported speech in Dutch:

Dutch:	Jan	zei	dat	de	kat	honger	had
English literal gloss:	John	said	that	the	cat	hunger	had
English translation:	“John said that the cat was hungry”						

Even though the reported content and the quotation frame (i.e., “John said”), are the same, (1a) and (1b) are grammatically different in several respects. First, (1a) differs from (1b) in verb tense of the reported speech (‘heeft’ (has; present) versus ‘had’ (had; past)). Second, in (1b) the reported speech is embedded in the main clause, as shown by the obligatory complementiser ‘dat’ (that). As a consequence, whereas in (1a) the report remains in the same (verb-second) word order, (1b) involves a change of the word order in the reported clause, resulting in

a verb-final construction. Direct speech constructions (e.g., 1a) do not use such an embedding. Since individuals with (agrammatic) aphasia have been shown to have difficulty producing and understanding embedded sentences (e.g., Abuom, Shah & Bastiaanse, 2013), direct speech may be easier to process than indirect speech for individuals with aphasia.

In English, as in Dutch, indirect speech can be marked through changes in pronouns, verb tense, and/or referents. However, unlike in Dutch, the word order for indirect speech is the same as for direct speech (i.e., subject-verb-object). Furthermore, unlike in Dutch, the complementiser 'that' in English indirect speech is not mandatory (e.g., John said the cat was hungry). In fact, the default construction in English conversation register does not use 'that' (Biber, Johansson, Leech, Conrad & Finegan, 1999; Llinàs-Grau & Martínez-Ferreiro, 2014). A more detailed description of the grammatical characteristics of direct and indirect speech can be found in Chapters 2, 4 and 5.

In both Dutch and English, in constructions that involve direct speech, grammatical relations can be loose. Direct speech can be seen as an example of a topic-comment structure, with the person reference as the topic, and the 'quote' as the comment (e.g., *Mary: "huh?"*). Instead of explicitly indicating grammatical relations between items, using for example a subordinate construction (e.g., *Mary said that she did not understand it*), using direct speech speakers can display an increased reliance on pragmatic relations between items (see also Wilkinson et al., 2010). Given that individuals with aphasia find it difficult to indicate grammatical relations between items in the conventional ways, the increased employment of direct speech may be a way to reduce or avoid grammatically complex structures. While in indirect speech, the content of statements, questions or other utterances are represented in full clauses subordinated to a reporting verb, direct speech introduces

an object 'slot' that may be filled in several linguistic and non-linguistic ways. For example, direct speech can contain 'main clause phenomena', such as discourse particles (e.g., *well*), exclamations (e.g., *oh no!*), and interrogatives (e.g., *huh?*) (Mayes, 1990; Wilkinson et al., 2010). In addition, direct speech can consist of kinesic (e.g., body movement, facial expression) or non-lexical (e.g., sound, onomatopoeia) behavior alone.

1.4 Reported speech in aphasia

Although there is a large body of research on reported speech in 'healthy' interaction, its role in aphasic discourse has received little attention. In addition, there are some important methodological limitations in the research to date. For example, they have almost exclusively focused on English. While, in language production studies, language elicitation was usually limited to one task, and in the case of more in-depth analyses, participant groups were small and/or no control group was included. Furthermore, when addressing direct speech in language comprehension, most studies have used written rather than spoken language. This is particularly surprising, since the distinctive paralinguistic characteristics of direct as compared to indirect speech (e.g., pitch, tempo, and voice quality) only become apparent in spoken language. Moreover, the few studies that have used spoken rather than written narratives relied on auditory rather than audiovisual stimuli, with the consequence that participants could not use visual information (e.g., body movement, gaze, and facial expression). The methodological concerns of previous research will be addressed in more detail in Chapters 2 – 5.

In spite of these limitations, the studies that have been conducted so far provide us with a clear base to build on. All studies show that the

use of direct reported speech is usually preserved in aphasic speakers (Hengst, Frame, Neuman-Stritzel, & Gannaway, 2005; Ulatowska & Olness, 2003; Ulatowska, Reyes, Santos, & Worle, 2011; Wilkinson et al., 2010). Berko-Gleason, Goodglass, Obler, Green, Hyde & Weintraub (1980) demonstrated that individuals with agrammatic aphasia tend to use simplified direct speech in their narratives. They even suggest that "the use of direct speech is *a strategy* employed by the subjects with Broca's aphasia far more frequently than by either of the two other subject groups" (p. 378, our italics). Based on this suggestion and the pragmatic and grammatical characteristics of direct speech discussed above, we hypothesise that the employment of direct speech has potential benefits for both language production and comprehension in aphasia.

1.5 Research questions and structure of the dissertation

In this thesis, the following main research questions are addressed:

1. To what extent do Dutch aphasic and non-brain-damaged (NBD) speakers produce direct speech constructions in spontaneous speech?
2. How does the occurrence of direct speech in Dutch NBD and aphasic speech affect its perceived liveliness and comprehensibility?
3. Is there a difference between the effects of direct and indirect speech constructions on comprehension of narrative discourse in Dutch listeners with and without aphasia?
4. What are the differential effects of direct and indirect speech on discourse comprehension in Dutch and English listeners with and without aphasia?

The research questions are addressed in the four studies described in this thesis. The first study, described in Chapter 2, focuses on the phenomenon of direct speech in spontaneous speech of Dutch individuals with and without aphasia. The relative frequencies of direct speech are determined and compared within and between groups and tasks. Data-driven categories are developed to distinguish and categorise different forms of the phenomenon.

In the second study, based on the results of study 1, we focus on the claims that direct speech contributes to liveliness (Labov, 1972; Wierzbicka, 1974; Li, 1986; Mayes, 1990) and listener involvement (Chafe, 1982; Tannen, 1989). For this study we analyse the effects of the occurrence of direct speech in NBD and aphasic speech on the perception of the listener. This is the first time quantitative evidence will be provided for previous claims of the effects of these factors. The study also extends the scope of research into the effects of direct speech on language perception by focusing not only on 'healthy' but also on aphasic speech.

In addition to these studies on the *production* of direct speech in spontaneous speech by speakers with aphasia and its effects on listener perception, we also conduct two studies focusing on language *comprehension* in listeners with aphasia. In study 3 (reported in Chapter 4), we address the question of whether direct reported speech - when compared to indirect reported speech - facilitates comprehension of spoken language in Dutch individuals with and without aphasia. As yet, the differential effects of direct versus indirect speech on language comprehension have received little attention, and have been investigated only in healthy listeners. Also, most of the studies that have been conducted so far have focused on written rather than spoken language, while it is in spoken language that the distinctive characteristics of direct as compared to indirect speech (i.e.,

paralinguistic and non-verbal aspects) mainly become apparent. For the study that is reported in Chapter 4, we developed the iPad-based DIrect Speech COmprehension (DISCO) test. This test is suitable for both NBD and aphasic listeners, and enables us to compare performance across subgroups (NBD versus aphasia) and conditions (direct versus indirect speech).

In Chapter 5, we build on the study reported in Chapter 4. This study examines whether the findings of Chapter 4 are also valid for English-speaking listeners with and without aphasia. Focusing on a language with different grammatical characteristics for direct and indirect speech enables us to assess the explanations provided for the findings of the Dutch version of the study, and to determine to what extent the findings can be generalised to other languages. To this end, we developed an English version of the DISCO test. To assess the effect of language, we conduct analyses in which the English data are contrasted with the Dutch data, assessing the effects of group (NBD versus aphasia) and condition (direct versus indirect speech).

CHAPTER 2

DIRECT SPEECH CONSTRUCTIONS IN APHASIC DUTCH NARRATIVES[1]

[1]This chapter was adapted from: Groenewold, R., Bastiaanse, R., and Huiskes, M. (2013). Direct speech constructions in aphasic Dutch narratives, *Aphasiology*, *27*, 546-567.

2.1 Introduction

A considerable amount of research has been conducted on the use of reported speech in naturally occurring spoken interaction. Work on this matter has predominantly been carried out in English, and has emerged from a variety of disciplines such as literary theory, philosophy, sociology, and linguistics. A major focus in linguistic studies has been the distinction between direct reported speech and indirect reported speech. These forms are similar, but not the same. Consider examples (1) and (2): both illustrate reported speech, but example (1) employs direct reported speech and (2) employs indirect reported speech:

(1) Semi-spontaneous speech fragment of 52-year-old female control speaker

die	zeiden	**ja**	**wij**	**zijn**	**d'r**	**ook**	**druk**	**mee**
they	said	yes	we	are	there	also	busy	with

'they said, *yes we are also busy with it*'

(2) Adapted version of (1)

die	zeiden	*dat*	*ze*	*er*	*ook*	*druk*	*mee*	*waren*
they	said	that	they	there	also	busy	with	were

'they said *that they were also busy with it*'

Although the pronouns, tenses, and word orders are different, the content of examples (1) and (2) is the same. However, whereas in example (2) the reporting speaker presents the reported speaker's words in paraphrase (only the content of the reported speech originates from the reported speaker), in example (1) the reporting speaker presents the reported speaker's words as if quoted directly. She presents the reported message in such a way that not only the content, but also the form and the non-verbal aspects of the reported speech, such as facial expressions and gestures, originate from the reported speaker. The current speaker "becomes" the reported speaker and can enact all aspects that seem relevant to get a message across.

This is why direct speech is a natural vehicle for vivid and dramatic presentation (Li, 1986). Apart from the differences discussed above, in Dutch there is an additional difference between the two construction types: for indirect speech, an embedded construction is used (e.g., "X zei dat hij naar huis wilde, "X said that he to home wanted"), meaning that the quote is introduced by a complementizer ("dat") and that the verb (or verb complex) is at the end of the clause (in this case: "wilde"). This is not the case for Dutch direct speech constructions. In these constructions the quote is not introduced by a complementiser, and it has main clause word order (e.g., "X zei: ik wil naar huis", "X said: I want to home"). Speakers can use a matrix clause, but this is not obligatory: the quote can also stand on its own. This difference raises the question whether the relatively simple structure of direct speech influences the production of these constructions by aphasic speakers with and without a clear grammatical deficit. Both groups are known to have problems with sentence embeddings (Bastiaanse, Hugen, Kos & Van Zonneveld, 2002; Edwards & Bastiaanse, 1998).

In this study we focus on the production of direct speech constructions by Dutch speakers with and without aphasia. Direct speech can be used not only to report speech, but also to refer to thoughts (e.g., Semino & Short, 2004), and for many other purposes. Moreover, in the case of direct speech the quote can appear without a matrix clause, meaning that speakers can omit the introductory verb. This means that direct speech is a very diffuse phenomenon in both function and form. Consider example (3), which is part of a semi-structured interview between a speech and language therapist (ST) and a healthy 36-year-old male speaker (HK). HK has just told the interviewer about his hobby, which is soccer, and now continues talking about his two children. HK and ST talk about a typically Dutch scenario: on Saturday morning, parents accompany their children to soccer matches and try to motivate them from the sidelines of the football field. The direct speech items are presented in bold type:

(3) Semi-spontaneous speech fragment of 36-year-old male control speaker

1. HK:	de oudste is een jongen dus dat gaat straks beginnen
	the oldest is a boy so that will start soon
2. ST:	precies
	exactly
3. HK:	met een jaar of twee
	within a year or two
4. ST:	dan mag je langs de lijn ((lacht))
	then you may stand on the sidelines ((laughs))
5. HK:	**KOM OP!**
	COME ON!
	'*COME ON!*'
6. ST:	((lacht))
	((laughs))
7. HK:	**BREK 'M DE POAT'N!**
	BREAK HIM THE LEGS!
	'*BREAK HIS LEGS!*'
8. ST:	ja ((lacht))
	yes ((laughs))
9. HK:	((lacht))
	((laughs))
10. ST:	dan krijg je rond 8 jaar dat papa niet meer mee mag
	then around the age of 8 daddy's not allowed to come anymore
11. HK:	nee precies
	no exactly
12. ST:	**want die doet altijd zo raar**
	because that does always so strange
	'*because he always behaves so strangely*'
13. HK:	**ik ga op de fiets pa**
	I go on the bike dad
	'I'll take the bike dad'
14. ST:	ja
	yes
15. HK:	((lacht))
	((laughs))
16. ST:	((lacht))
	((laughs))

In lines 5, 7, 12 and 13, HK and ST talk about the future scenario in which HK supports his son during a soccer competition. Note that it is clear from the time frame explicitly set in line 3, "within a year or two", that the dialogue is offered as an instantiation of a scenario that may take place in the future. Interestingly, HK does not use a reporting verb as a grammatical means of introducing direct speech. However, increasing the volume and shifting to his dialect in lines 5 and 7, he contextualises this utterance as "quoted" speech. HK demonstrates (Clark & Gerrig, 1990) what might be said in this hypothetical future scenario. In this part of the excerpt HK switches from addressing ST to *fictively* (Pascual, 2002) addressing his son. Presenting this stretch of talk as a first-person dialogue rather than a third-person report makes the narration more vivid, as has been observed by several researchers (for an overview, see Tannen, 1986).

This fragment also nicely illustrates other possible functions of "reported" speech in narratives; namely that it is often used at the climax of stories and to convey the point of a narrative (Mayes, 1990). The effects of both functions become clear from the repeated laughs that follow HK's turn (lines 15–16). In line 12 ST uses the interactional strategy of shifting perspectives and presenting HK's son's hypothetical futuristic words in the form of a first-person dialogue as well. This interactional activity of participating in the voicing of a particular figure has been described as "chiming in" (Couper-Kuhlen, 1998, p. 12) and shows that ST has no problem keeping track of the storyline and the distinction between the current and the fictive or reported speaker. Continuing in the same demonstrative mode, in line 13 HK takes over again and completes ST's turn, fictively "quoting" his son and addressing himself.

As illustrated by (3), some "quotations" are of dialogue that has never been spoken and can, pragmatically speaking, become rather complex.

Speakers can shift both time frame and perspective: they can represent themselves or someone else in the past, present, or future. In some cases this alternation of speaking modes takes place without a reporting verb or quotative construction. It has already been noted by several researchers that direct reported speech rarely is an accurate repetition of what has been said originally. Psycholinguistic research has shown that speakers tend to remember the meaning rather than the form of utterances (Lehrer, 1989). Various terms have been introduced to refer to direct speech that is not used to repeat words verbatim. Tannen (1989), for example, argued in favour of the term *constructed dialogue*. Clark and Gerrig (1990) propose that quotations are a type of *demonstration*: reporting speakers are not necessarily committed to reproduce an utterance verbatim but are aiming at getting the recipient to recognize certain aspects of a (not necessarily interactive) situation. Just as speakers are able to demonstrate another person's limp, a tennis service, or the movement of a pendulum, they can also demonstrate what someone did by saying something (Clark & Gerrig, 1990).

A similar approach has been taken by M. H. Goodwin (1990) and Streeck and Knapp (1992). They use the term enactment to refer to grammatical practices by which actions and events in talk are demonstrated rather than described or literally quoted. Enactment refers not only to the employment of direct speech, but also to the entire scale of speakers' use of gesture, body movement, and prosody to depict to recipients certain aspects of a reported scene, action or event (Goodwin, 1990; Streeck & Knapp, 1992). However, these terms do not account for the difference between utterances that are intended to actually report talk such as examples (1) and (2), and utterances that do not imply factual interaction, such as fragment (3).

Introducing *fictive interaction,* Pascual (2002) attracted attention to the latter type of direct speech constructions: those that do not refer to

something that has actually been said. Fictive interaction refers to the phenomenon of reflecting the interactional structure of conversation to think and talk about verbal and non-verbal entities, processes and relations (Pascual, 2002). Another situation in which non-reportive direct speech is used is *hypothetical active-voicing* (HAV), introduced by Simmons and LeCouteur (2011). HAV refers to the situation in which a speaker enacts hypothetical talk that his/her interlocutor might use in a future situation (Simmons & LeCouteur, 2011). It has been shown to be a successful conversational tool for achieving behavioral changes in therapy settings (Simmons & LeCouteur, 2011). Whereas HAV and fictive interaction have in common that the "reported" speech does not consist of quotes, the interactional goals are different: HAV aims at behavioral changes using direct speech that is suggested to be eventually uttered, while fictive interaction is oriented to the "here and now" interaction without long-term goals.

2.1.1 Language production in aphasia

In the current study language production of individuals with Broca's aphasia and individuals with anomic aphasia will be explored and compared to that of non-brain-damaged (NBD) individuals. Aphasia negatively affects lexical diversity, syntactic complexity, and cohesion during discourse production, while conceptual and communicative abilities (Goodwin, 1995, 2003), pragmatic skills and some evaluative language aspects remain relatively intact (e.g., Armstrong, Ciccone, Godecke & Kok, 2011; Ulatowska & Olness, 2003). Individuals with aphasia still use body movement (Goodwin, 1995), gaze, prosody, pauses, and gesture (Lind, 2002), aspects that are of key importance in direct speech constructions.

Speakers with Broca's aphasia speak in grammatically simple sentences and omit free and bound grammatical morphemes (Bastiaanse & Jonkers, 1998; Saffran, Berndt & Schwartz, 1989). They regularly

produce utterances that are syntactically simple, often verbless, and composed of words with little or no grammatical indication of the relations between them (Goodglass, Kaplan & Barresi, 2001). In constructions that involve direct speech, grammatical relations can be loose (Wilkinson, Beeke & Maxim, 2010) or even not explicitly attributed (e.g., fragment 3). Therefore speakers with Broca's aphasia may benefit from using them. Through the use of direct speech, agrammatic speakers can reduce or avoid grammatically complex structures.

Speakers with anomic aphasia usually have fluent speech, but their grammatical constructions are not always correct or as grammatically elaborated as in normal speech (Bastiaanse, Edwards & Kiss, 1996; Edwards & Bastiaanse, 1998). Anomic aphasia is characterized by word-finding problems and empty speech, resulting in a low diversity of nouns and verbs (Edwards & Bastiaanse, 1998), especially when in grammatically complex conditions (Bastiaanse, 2011). They typically have problems finding words with low frequency and low imageability (Ellis & Young, 1988). Anomic speakers may avoid or resolve word-finding difficulties through the use of direct speech. Direct speech constructions may enable them to make abstract matters such as thoughts, attitudes, and scenarios more concrete, and use terms and words that are more operative and frequent when compared to descriptive alternatives (e.g., fragment 3). These factors are known to positively contribute to word retrieval in aphasia (see for example Nickels & Howard, 1995).

In sum, both individuals with Broca's aphasia and individuals with anomic aphasia are expected to benefit from the production of constructions that involve direct speech.

2.1.2 Direct reported speech in aphasia

The use of reported speech in (semi-)spontaneous speech of individuals with aphasia has been considered noteworthy for some time. Several studies showed that the use of direct reported speech is usually preserved in aphasic speakers (Hengst, Frame, Neuman-Stritzel & Gannaway, 2005; Ulatowska & Olness, 2003; Ulatowska, Reyes, Santos & Worle, 2011; Wilkinson et al., 2010). Berko-Gleason et al. (1980) showed that individuals with Broca's aphasia tend to use simplified direct speech in their narratives. They suggest that the use of direct speech is a strategy employed by individuals with Broca's aphasia far more frequently than by individuals with Wernicke's aphasia and NBD speakers (Berko-Gleason et al., 1980). Not only deictic and syntactic, but also lexical, prosodic, and non-verbal cues can be used to contextualise utterances as direct reported speech (Couper-Kuhlen, 1998; Goodwin, 1990; Lind, 2002; Streeck & Knapp, 1992; Wilkinson et al., 2010).

Even though some studies have paid attention to the use of direct reported speech by individuals with aphasia, the relation between the occurrence of direct speech and different types of aphasia is not clear yet. In Table A.1 (Appendices), an overview of the characteristics of the studies on direct speech in aphasia so far is presented. It shows that, with the exception of Lind (2002), all studies were conducted in English. In many cases language elicitation was limited to one task (either picture-based or a narrative task). In the case of more in-depth analyses (e.g., Hengst et al., 2005; Lind, 2002; Wilkinson et al., 2010), participant groups were small and/or no control speakers were included. Lind (2002) examined audio- and video-recorded spontaneous interactions of one aphasic speaker. Describing some aspects of the use and function of pitch variation, she examined how the aphasic speaker contextualised direct reported speech using prosody. Hengst et al. (2005) examined the use of reported speech in the communicative interactions of individuals with aphasia (n = 7) engaging in everyday activities with

routine communication partners. The analysis was limited to explicitly marked forms of reported speech, and made a distinction between direct, indirect, projected, indexed, and undecided reported speech. Wilkison et al. (2010) used Conversation Analysis (CA) to investigate the form and use of enactment by agrammatic speakers in natural interaction. The data came from videotaped recordings of individuals with non-fluent aphasia (n = 4), each talking in bilateral interactions with a spouse, family member, or a speech therapist, either at home or in a clinic. In studies with larger groups (i.e., Ulatowska & Olness, 2003; Ulatowska et al., 2011), no information on the aphasia types is provided. Importantly, most studies (with the exception of Wilkinson et al., 2010) focused on *quotative* direct speech constructions (i.e., direct reported speech).

In the current study the participants are native speakers of Dutch, three elicitation methods were used, different types of direct speech are distinguished, two aphasia types are compared, and speech samples of control speakers are included (see Table A.1, Appendices). Both the depth and the extent of the investigation will be further developed through a profound examination of direct speech constructions in narratives (Menn, Ramsberger & Helm-Estabrooks, 1994) of Dutch aphasic and NBD speakers. To gain optimal understanding of direct speech constructions in aphasia, we will take all instances of direct speech constructions into account. This means that we focus not only on direct speech that refers to something that has been said in the past or will be said in the future, but also on instances that represent prototypical stretches of talk and direct speech constructions that are not supposed or expected to be produced at all. In addition, we will take both direct speech with and direct speech without reporting verb into account. This is feasible because in Dutch direct speech constructions can be identified on the basis of word order only.

The main research question is: *What role do direct speech constructions play in elicited Dutch aphasic narratives?*

In order to provide an answer to this question, the following questions are addressed:

1. To what extent do aphasic and NBD speakers produce direct speech constructions in three types of narrative tasks?
2. Are the forms and relative frequencies of direct speech produced by individuals with aphasia in three types of narrative tasks different from those produced by NBD speakers?
3. Are the forms and relative frequencies of direct speech in three types of narrative tasks produced by individuals with Broca's aphasia different from those produced by individuals with anomic aphasia?

2.2 Methods

Presented here is an analysis of narratives of individuals with aphasia (n = 31) and NBD controls (n = 88), elicited through three semi-controlled tasks, subdivided into two studies. The first study consists of analyses of two narratives elicited by line drawings: (1) Dinner Party and (2) Orchestra. The second study consists of analyses of personal narratives.

2.2.1 Participants

All aphasic speakers (n = 31) were classified by the Dutch version of the Aachen Aphasia Test (Graetz, de Bleser, Willmes, & Heeschen, 1992) as having anomic or Broca's aphasia. They had been aphasic for at least 3 months. All but two suffered from a single stroke in the left hemisphere. The participants in the three studies overlap partially.

Of the individuals with anomic aphasia (n = 18) 10 participated in the Dinner Party task, 12 in the Orchestra task, and 16 in the personal narrative task. Of the individuals with Broca's aphasia (n = 13) 8 participated in the Dinner Party task, 6 in the Orchestra task, and 9 in the personal narrative task. For comparison, 88 NBD speakers were included. Of this group 58 participated in both picture description tasks. For the personal narrative task a different group of NBD speakers (n = 30) participated. The control group was matched to the aphasic group for age and gender. All participants were native Dutch speakers. More details are presented in Table 2.1 and the patients' individual data are presented in Table A.2 (Appendices).

2.2.2 Data collection

Study 1: Picture descriptions

Dinner Party
The Dinner Party is a cartoon that depicts a dinner party where a pet cat steals the fish intended for the dinner guests. The cartoon contains only a few words (i.e., the story title; "8 uur vrijdag eten bij Jansen" ("8 PM Friday dinner at Jansen"), and a cafeteria sign: "Snackbar" ("Cafeteria"), and was adapted from English language learning material (Fletcher & Birt, 1983). Participants were presented with a typical clinical elicitation ("*Together, these pictures constitute a story. Tell me everything you see going on in your own words and as precisely as possible*"). The picture descriptions were originally collected by Jonkers (1998). All audio files were of good sound quality. An overview of the duration, number of words, number of utterances and mean number of words per utterance for the data set is provided in Table A.3 (Appendices).

Table 2.1: Summary information about the participants with aphasia and the NBD speakers.

		PWA	NBD
Dinner Party	Mean age	52	52
	SD	12.2	4.4
	Range	24 -74	44 - 70
	% male participants	61%	48%
	Time post onset (in months)	33	-
	SD	42.7	-
	Range	4-154	-
Orchestra	Mean	54	52
	SD	13.7	4.4
	Range	24 -79	44 - 70
	% male participants	72%	48%
	Time post onset (in months)	24	-
	SD	36.7	-
	Range	3 – 154	-
Semi-spontaneous speech	Mean age	56	51
	SD	14.5	13.2
	Range	24 – 82	27 - 77
	% male participants	60%	57%
	Time post onset (in months)	33	-
	SD	44.9	-
	Range	3 – 154	-

PWA: persons with aphasia; SD: standard deviation.

Orchestra

The Orchestra picture (Jonkers, 1998) constitutes a simple line-drawn image without words, and depicts an orchestra and an audience. There is no storyline or interaction. Participants were presented with a standard elicitation task ("*Tell me everything you see going on in this picture in your own words and as precisely as possible*"). The picture descriptions were originally collected by Jonkers (1998). All audio files were of good sound quality. An overview of the duration,

number of words, number of utterances, and mean number of words per utterance for the data set is provided in Table A.3 (Appendices).

Study 2: Personal narratives

Semi-spontaneous speech
Speech samples were elicited through the semi-structured interview of the Aachen Aphasia Test (Graetz et al., 1992). The interview consisted of the following questions: *(1) Can you tell me what happened when you had your stroke (NBD participants: Can you tell me about your most recent illness)? (2) Can you tell me something about your (former) job? (3) Can you tell me something about your family? (4) Can you tell me something about your hobbies?* Out of the 25 spontaneous speech samples 17 were collected by Jonkers (1998) and the remaining 8 were collected by Bastiaanse, Van den Bergh, Hurkmans and Jonkers (2006). The speech samples collected by Jonkers (1998) were originally transcribed up to 300 words. These transcriptions were checked and the remaining part was transcribed by the first author of the current study. The remaining samples of the individuals with aphasia (n = 8), and the interviews with the NBD speakers (n = 30) were transcribed by the first author. All audio files were of good sound quality. An overview of the duration, number of words, number of utterances, and mean number of words per utterance for the data set is provided in Table A.3 (Appendices).

2.2.3 Analysis

Data preparation
For the analysis the utterances of the interviewer were ignored. Minimal responses with repetition were counted as one word (e.g., “yes yes yes yes” = 1 word). Fillers (e.g., “eh”, “oh”, “hmm”) were excluded. Repetitions (more than 50% of a produced word) were

included and false starts (less than 50% of a produced word) were excluded, following Vermeulen, Bastiaanse, and Van Wageningen (1989). Of the remaining transcription the number of utterances was counted. In order to determine the boundaries of an utterance, the rules of the Analyse voor Spontane Taal bij Afasie (ASTA: Boxum & Zwaga, 2007) were applied: (i) a grammatical unit is an utterance, (ii) a falling intonation pattern indicates an utterance boundary, (iii) a clear pause indicates an utterance boundary. In addition, the following conventions were followed: "and" marks a boundary, unless it occurs in an enumeration (Vermeulen et al., 1989); conjunctions such as "but", "because", and "that" do not mark utterance boundaries; in the case of direct speech, there is no boundary (e.g., "the man says 'I want to go'" is one utterance); and interjections are considered an utterance within an utterance (Boxum & Zwaga, 2007).

Operational definitions of categories

The analytic categories have been derived through a data-driven process. Based on four patterns found in the data, labels were developed that made it possible to identify and categorise instances of direct speech and compare their occurrence within and between groups and tasks. The categories are introduced and illustrated in (A), (B), (C), and (D):

(A) Speech Quotation

Direct speech in the traditional definition was categorised as Speech Quotation. Direct speech constructions were labelled as such if a verb of communication (e.g., *say, tell, ask,* etc.) was used to introduce the "quote".

(B) Thought Quotation

Direct speech constructions were labelled Thought Quotation if a verb of thought (e.g., *to think, to be like,* etc.) was used to introduce the "quote". An example of thought quotation is presented below. In a

response to a question HL explains how he finishes his reading work. The thought quotation in line 1 enables HL to present his reasoning as a first-person dialogue rather than a third-person report:

(4) Semi-spontaneous speech fragment of 55-year-old male NBD speaker

1.	HL:	dus	ik	heb	een	tas	vol	en	dan	denk ik **je**
		so	I	have	a	bag	full	and	then	think I you
		moet	**aan**	**'t**	**eind**	**van**	**de**	**dag**	**moet**	**je**	**leeg**	**zijn**
		must	at	the	end	of	the	day	must	you	empty	be

'so I have a bag full and then I think you have to be empty by the end of the day'

2.		dus dat is aanpoten
		so that takes pains

(C) Bare Quotation

Direct speech constructions were labelled Bare Quotation if they were not introduced by a quotative verb or construction. Consider example (5), in which an individual with anomic aphasia demonstrates a scenario shifting perspectives with a character depicted in the Dinner Party cartoon.

(5) Dinner Party picture description fragment of 52-year-old-male individual with anomic aphasia

Een	mooie	b-	eh	bos	met	bloemen	**nou**	**hartelijk**	**da-**	**we-**	**welkom**
A	nice	b-	eh	bunch	of	flowers	**well**	**heartily**	**tha-**	**we-**	**welcome**

(D) Question-answer Sequence

Sequences of direct speech constructions containing a question and an answer were labelled Question-answer sequence if the speaker asks a

question which is not meant to be answered by the interlocutor, but by the speaker itself. An example is provided below, in which an individual with anomic aphasia describes a scenario depicted in the Dinner Party cartoon:

(6) Dinner Party picture description fragment of 50-year-old-female individual with anomic aphasia

maar	wat	gebeurde d'r?	de	kat van	de familie Pietersen
but	what	happened there?	the	cat of	the family Pietersen

had dus	het eten opgegeten
had so	the food eaten

'so what happened? the cat of family Pietersen had eaten the dinner'

2.2.4 Procedures and inter-rater reliability

The analysis was carried out by the first author, and partly repeated by the last author. An inter-rater reliability analysis using Cohen's kappa coefficient was performed to determine consistency among raters and to test the appropriateness of the categorisation system. For this purpose a randomly selected subset of speech samples was reanalysed independently by the last author of the study. Per task (Dinner Party, Orchestra, and personal narrative), and per subgroup (anomic aphasic speakers, Broca's aphasic speakers, NBD speakers), three samples were randomly selected. In total, 27 speech samples containing 1150 utterances were reanalysed independently by the last author of the study. This means that of the Dinner Party description samples, 30% of all anomic aphasic speakers', 33% of all Broca's aphasic speakers', and 3% of all NBD speakers' utterances were reanalyzed. Of the Orchestra descriptions samples, 27% of all anomic aphasic speakers', 43% of all Broca's aphasic speakers', and 6% of all NBD speakers' utterances were reanalysed. Of the personal narratives, 11% of all anomic aphasic

speakers', 39% of all Broca's aphasic speakers', and 14% of all NBD speakers' utterances were reanalyzed. The inter-rater reliability was high and significant (Kappa = 0.79, $p < .001$).

Quantitative analyses were conducted to calculate and compare the relative frequencies within and between groups. To determine the distribution of direct speech we divided the number of direct speech constructions by the total number of utterances in the transcript. For the analysis and comparison of results of groups with at least 10 individuals, data were tested for normality. In the case of normal distribution, parametric statistical tests were used. For smaller groups ($n < 10$), non-parametric tests were used.

2.3 Results

First, the numbers and percentages of speakers who used direct speech constructions, the average use of direct speech per utterance, and the comparisons between subgroups of speakers are presented for each task. Next, an overview of the relative frequencies of direct speech constructions per subgroup and type of task is presented. Finally, an overview of the distribution over direct speech categories per subgroup and task type is provided.

2.3.1 Quantitative analysis

Study 1: Picture descriptions

Dinner Party
Out of the 18 aphasic speakers, 9 (50%) used direct speech in their description of the Dinner Party cartoon. Among the anomic aphasic speakers ($n = 10$), 6 (60%) produced instances of direct speech and

among the individuals with Broca's aphasia (n = 8), 3 (38%) produced direct speech constructions. Of the 58 NBD speakers, 15 (26%) produced instances of direct speech. Together the aphasic individuals (n = 18) produced significantly more direct speech constructions than the NBD speakers (n = 58) $t(74) = -2.55$, $p = .01$. The individuals with anomic aphasia produced significantly more direct speech constructions than the NBD speakers (see Figure 2.1, MWU: $Z = -2.40$, $p = .02$). The difference between the individuals with Broca's aphasia and the NBD speakers was not significant (MWU: $Z = -0.98$, $p = .33$). There was no difference in frequencies between the individuals with anomic aphasia and the individuals with Broca's aphasia either (MWU: $Z = -0.66$, $p = .51$). The average frequency of direct speech per utterance for the three subgroups is presented in Figure 2.1.

Orchestra

Out of the 18 aphasic speakers, 9 (50%) produced direct speech in their Orchestra picture description. Among the anomic aphasic speakers (n = 12), 5 (42%) produced direct speech constructions, and of the individuals with Broca's aphasia (n = 6), 4 (67%) produced instances of direct speech. Of the 58 NBD speakers, 1 (2%) produced an instance of direct speech. Again, aphasic speakers (n = 18) produced significantly more direct speech constructions than the NBD controls (n = 58) $t(74) = -5.86$, $p = .00$). Both the individuals with anomic aphasia (MWU: $Z = -4.54$, $p = .00$) and the individuals with Broca's aphasia (MWU: $Z = -5.69$, $p = .00$) produced more direct speech constructions than the NBD speakers (see Figure 2.2). There was no difference in frequencies between the anomic aphasic speakers and the individuals with Broca's aphasia (MWU: $Z = -0.80$, $p = .42$). The average frequency of direct speech per utterance for the three subgroups is presented in Figure 2.2.

Study 2: Semi-spontaneous speech

Personal narratives

Of the 25 aphasic speakers, 21 (84%) produced direct speech constructions in their semi-spontaneous speech interview. A total of 14 (88%) of the anomic aphasic speakers, 7 (78%) of the individuals with Broca's aphasia, and 24 (80%) of the NBD speakers produced instances of direct speech. As a group the aphasic individuals produced significantly more direct speech constructions than the control group, $t(53) = -2.73$, $p = .009$). The individuals with anomic aphasia produced significantly more direct speech constructions than the NBD speakers (see Figure 2.3, MWU: $Z = -2.60$, $p = .01$). The difference between the individuals with Broca's aphasia and the NBD speakers was not significant (MWU: $Z = -0.03$, $p = .97$). There was no difference in frequencies between the individuals with anomic aphasia and the individuals with Broca's aphasia (MWU: $Z= -1.45$, $p = .15$). The average frequency of direct speech per utterance for the three subgroups is presented in Figure 2.3.

In Figure 2.4 the relative occurrence of direct speech is presented for each subgroup and each task. This figure shows that direct speech occurred relatively most often in the semi-spontaneous speech of individuals with anomic aphasia, followed by the Orchestra picture descriptions of individuals with Broca's aphasia. Individuals with anomic aphasia also used it relatively often in their Dinner Party picture descriptions. The NBD speakers used direct speech most often for the semi-spontaneous speech task. They also used it for the Dinner Party picture description, but hardly for the Orchestra picture description, where it occurred just once.

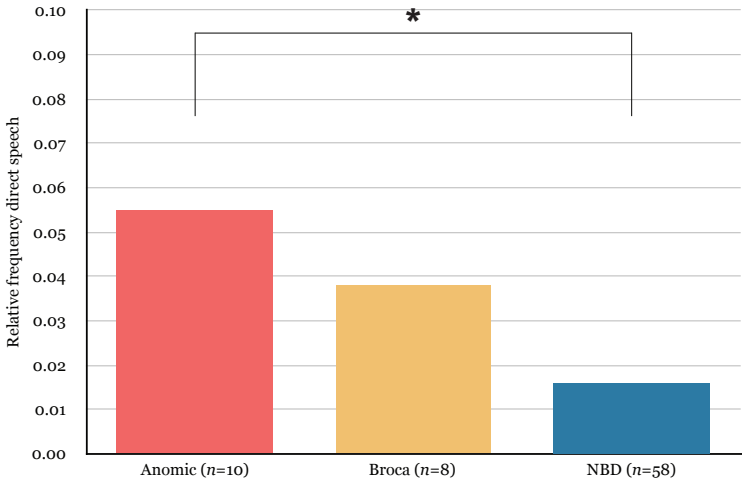

Figure 2.1: Average relative use of direct speech constructions in Dinner Party picture descriptions for individuals with anomic aphasia, individuals with Broca's aphasia, and NBD individuals (#instances/#utterances/speaker).

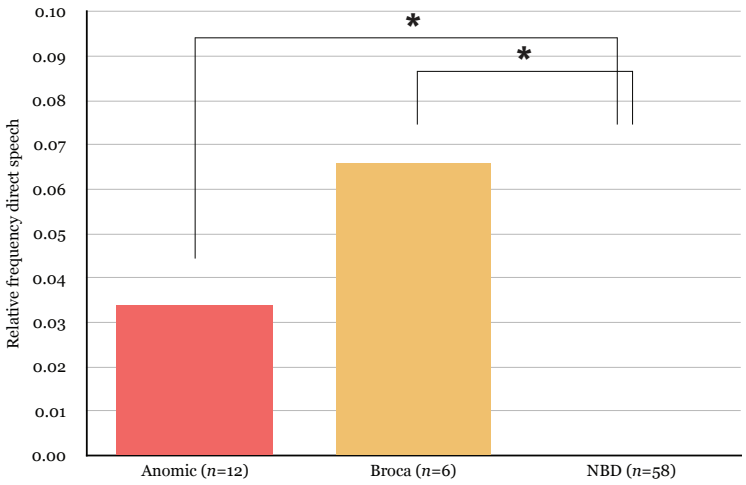

Figure 2.2: Average relative use of direct speech constructions in Orchestra picture descriptions for individuals with anomic aphasia, individuals with Broca's aphasia, and NBD individuals (#instances/#utterances/speaker).

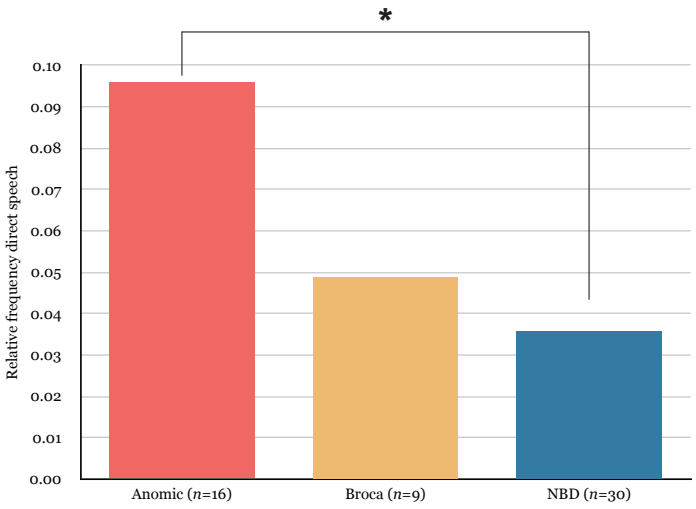

Figure 2.3: Average relative use of direct speech constructions in semi-spontaneous speech for individuals with anomic aphasia, individuals with Broca's aphasia, and NBD individuals (#instances/#utterances/speaker).

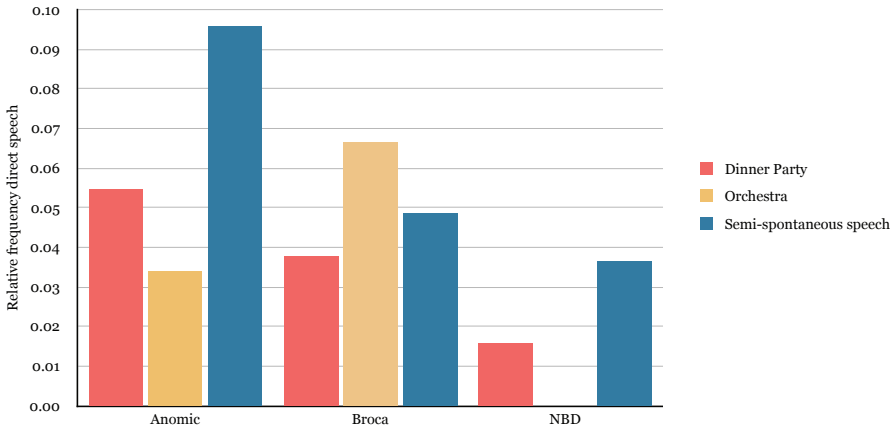

Figure 2.4: The relative use of direct speech constructions by all participating individuals in Dinner Party picture descriptions, Orchestra picture descriptions and semi-spontaneous speech for individuals with anomic aphasia, individuals with Broca's aphasia, and NBD individuals (#instances/#utterances/person).

2.3.2 Qualitative analysis

Study 1: Picture descriptions

Dinner Party
In the case of the individuals with anomic aphasia who produced instances of direct speech (n = 6), the thought quotation is the form that was most frequently produced (see Table 2.2, n = 5; 33%). Also, the bare quotation and the question-answer pattern were produced by individuals with anomic aphasia (both n = 4; 27%). Speech quotation is the category that was produced least often by the anomic aphasic speakers (n = 2; 13%). As shown in Table 2.2, all individuals with Broca's aphasia who produced instances of direct speech (n = 3) made use of bare quotations (n = 9). With regard to the results for the control group, the instances of speech quotation are distributed more evenly amongst the categories. The bare quotation is the most frequently used form (n = 16; 40%), followed by the thought quotation and the question-answer pattern (both n = 9; 23%). Just as is the case for aphasic speakers, the "ordinary" speech quotation type of direct speech construction is the least used (n = 6; 15%).

Orchestra
As is clear from Table 2.2, individuals with anomic aphasia who produced instances of direct speech (n = 5) mainly used thought quotations (n = 6; 55%), followed by bare quotations (n = 3; 27%) and speech quotations (n = 2; 18%). This pattern is comparable to that of the Dinner Party picture description. Individuals with Broca's aphasia that produced instances of direct speech (n = 4) had a preference for bare quotations (80%). This pattern is similar to that of the Dinner Party as well. In addition, two instances of the question-answer pattern (20%) were produced. Just 1 out of 58 NBD speakers used a form of direct speech for the Orchestra picture description, which belongs to the speech quotation subcategory.

Study 2: Semi-spontaneous speech

Personal narratives

As shown in Table 2.2, the type of direct speech construction most frequently produced by individuals with anomic aphasia is speech quotation (*n* = 64; 58%). They also produced thought quotations (*n* = 24; 22%), bare quotations (*n* = 19; 17%) and question-answer sequences (*n* = 3; 3%). Just as in the other two tasks, most direct speech instances produced by Broca's aphasic speakers were bare quotations (*n* = 24; 80%). They also produced question-answer sequences (*n* = 3; 10%), speech quotations (*n* = 2; 7%) and thought quotations (*n* = 1; 3%). Just like the anomic aphasic speakers the NBD group often produced speech quotations (*n* = 42; 46%). They produced thought quotations in 30% (*n* = 28) of the instances. Bare quotations (*n* = 14; 15%) and question-answer sequences (*n* = 8; 9%) were produced less often. Table 2.2 gives an overview of the distribution over categories of the direct speech constructions that were produced by the three groups of speakers for the three tasks.

With regard to the forms of direct speech constructions that were used, a subdivision can be made between the individuals with anomic aphasia and those with Broca's aphasia. In both picture description tasks individuals with Broca's aphasia had a clear preference for direct speech constructions with no reporting verb. Excluding the matrix clause, speakers can avoid producing a (reporting) verb. However, when the quotative is omitted, it is generally hard to determine how the direct speech construction should be interpreted. It can be something that has or should have been said or thought, or, for example, a generic or prototypic opinion or statement. This is why bare quotations, as compared to speech and thought quotations, contain less information on verity or fictivity and, therefore, demand more cooperation and interpretation of the listener.

Table 2.2: Overview of the relative frequency of direct speech construction types per task and subgroup.

Task	Subgroup	Bare quotation	Speech quotation	Thought quotation	Question-answer pattern
Dinner Party	Anomic	26.7%	26.7%	33.3%	26.7%
	Broca	100.0%	100.0%	0.0%	0.0%
	NBD	40.0%	40.0%	22.5%	22.5%
Orchestra	Anomic	27.3%	18.2%	54.5%	0.0%
	Broca	80.0%	0.0%	0.0%	20.0%
	NBD	0.0%	100.0%	0.0%	0.0%
Personal narrative	Anomic	17.3%	58.2%	21.8%	2.7%
	Broca	80.0%	6.7%	3.3%	10.0%
	NBD	15.2%	45.7%	30.4%	8.7%

Contrary to the speakers with Broca's aphasia, anomic speakers' direct speech constructions are distributed more equally over the categories. Just like the individuals with Broca's aphasia, the NBD speakers relied mostly on the direct speech construction type with no reporting verb for one of the two picture description tasks. For the other picture description task only one instance of direct speech was produced by the entire NBD group.

Interestingly the pattern in the personal narratives was different. In this task the individuals with anomic aphasia showed a preference for direct speech with a reporting verb, whereas the individuals with Broca's aphasia again tended to produce direct speech constructions without a reporting verb. Whereas in their picture descriptions the NBD speakers most often produced instances without a reporting verb, and thus behaved similarly to the individuals with Broca's aphasia, in their personal narratives they produced more instances of direct speech constructions with reporting verbs, and thus behaved like the individuals with anomic aphasia. Apparently the frequencies and the types of direct speech that are produced depend not only on the

subgroup, but also on the type of task.

2.4 Discussion

In this study, the role of direct speech constructions in elicited Dutch aphasic speech was analyzed and compared to that in speech of NBD individuals. Previous studies have shown that the relatively intact pragmatic (Berko-Gleason et al., 1980; Hengst et al., 2005; Ulatowska et al., 2011; Wilkinson et al., 2010), conceptual (Goodwin, 1995, 2003), and kinesic, prosodic and paralinguistic (Wilkinson et al., 2010) resources of individuals with aphasia enable them to use direct reported speech in semi-spontaneous speech. The current study provides new insight into the role that direct speech constructions play in aphasic narratives thanks to the combination of large participant groups, comparisons between aphasic and NBD speakers, comparisons between subgroups of aphasic speakers, the use of three different tasks, the Dutch data set, and inherent grammatical characteristics of direct speech constructions, and the distinction between four data-driven categories of direct speech constructions.

Each of the research questions will now be addressed:

1. To what extent do aphasic and NBD speakers produce direct speech constructions in three types of narrative tasks?
   In all three tasks the individuals with aphasia produced direct speech constructions regularly. In two out of the three tasks, the subgroup of NBD speakers produced direct speech constructions repeatedly.
2. Are the forms and relative frequencies of direct speech produced by individuals with aphasia in three types of narrative tasks different from those produced by NBD controls?

Even though this question can be answered affirmatively, a distinction should be drawn between the two subgroups of individuals with aphasia. In the case of the speakers with anomic aphasia there is a noteworthy quantitative difference, whereas in the case of the individuals with Broca's aphasia the qualitative difference is most prominent. The speakers with anomic aphasia differed from the NBD speakers in terms of frequencies by using more direct speech constructions. The group of speakers with Broca's aphasia has a clear preference for bare quotations, whereas for the other two subgroups the distribution over categories is scattered more evenly.

3. Are the forms and relative frequencies of direct speech in three types of narrative tasks produced by individuals with Broca's aphasia different from those produced by individuals with anomic aphasia?

There were no statistically significant differences in frequencies between the individuals with anomic aphasia and the individuals with Broca's aphasia. However, as mentioned above the distribution over categories differed between the two subgroups. A possible explanation for this dissimilarity is associated with the difference in grammatical complexity of the forms of direct speech. A bare direct speech construction differs from a speech or thought quotation in that it lacks at least a (reporting) verb. Since verbs are problematic for individuals with Broca's aphasia (Bastiaanse & Jonkers, 1998; Bastiaanse et al., 2002; Saffran et al., 1989), it is not surprising that they have a preference for this bare quotation type. Even though a bare direct speech construction may be less accurate or informative than the other subtypes, it can be a convenient way to get a message across.

Individuals with anomic aphasia are able to produce different subtypes of direct speech. However, they demonstrated an increased use of direct

speech constructions when compared to NBD speakers. This subgroup of aphasic speakers may benefit from the use of direct speech because it can help them get around word-finding problems. Using direct speech they can demonstrate rather than describe abstract matters such as thoughts, attitudes, and scenarios using more concrete, operative, and familiar constructions: aspects that are known to positively contribute to word retrieval in aphasia (e.g., Nickels & Howard, 1995). In addition they can replace or complete verbal communication with paralinguistic and non-linguistic devices such as body movement, prosody, pauses, and gesture; aspects that are most often relatively intact in aphasia (Goodwin, 1995; Lind, 2002) and frequently of key importance in direct speech constructions.

The tasks and the method of data-driven analysis used here proved to be useful for the identification and categorisation of direct speech constructions, and the inter-rater reliability confirmed the appropriateness of the method. However, a factor that should be taken into account when interpreting the findings of the current study is the nature of the speech samples that were analysed. First, the data consisted of speech samples only in the auditory modality. Although it may be considered a strength that the samples were collected for different studies, an important disadvantage is that there was no visual information available. Even though this characteristic cannot threaten the reliability (since direct speech constructions in Dutch can be established on the basis of word order), it implies that for example facial expressions, gestures, and body movements could not be taken into account in the analysis. Second, the samples consisted of speech that had been elicited in a clinical therapist–patient setting. This is common in aphasia research and allows for reliable comparisons between individuals with aphasia and NBD speakers, but does not reflect real interaction (see for example Beeke, Wilkinson & Maxim, 2003).

Therefore in a follow-up study the occurrence of direct speech constructions in everyday Dutch aphasic interaction will be examined. Such an examination presents a different perspective to traditional approaches within aphasiology that typically account for patterns in aphasic language in terms of damage to particular brain regions, and that have based their accounts primarily on language elicited through experimental elicitation methods elicitation (Wilkinson et al., 2010). Using naturally occurring Dutch interactive talk as the main form of data, future research will provide insight into the interactional functions of direct speech constructions in naturally occurring interactive Dutch conversation in aphasia.

CHAPTER 3

PERCEIVED LIVELINESS AND SPEECH COMPREHENSIBILITY IN APHASIA: THE EFFECTS OF DIRECT SPEECH IN AUDITORY NARRATIVES[1]

[1]This chapter was adapted from: Groenewold, R., Bastiaanse, R., Nickels, L., and Huiskes, M. (2014). Perceived liveliness and speech comprehensibility in aphasia: The effects of direct speech in auditory narratives. *International Journal of Language & Communication Disorders, 49*, 486 - 497.

3.1 Introduction

Two individuals with aphasia can have similar intelligence, similar motivation, a similar type and severity of aphasia, yet differ greatly in communicative effectiveness. A number of investigations concerning communicative competence in aphasia have reported that – especially in severe aphasia – the level of linguistic performance cannot predict the communicative effectiveness (e.g., Feyereisen, 1991). In some cases, people with aphasia 'probably communicate better than they talk' (Holland, 1977: 173). In the current study, we address two aspects of communicative competence in the verbal communication of Dutch people with aphasia, namely the *perceived liveliness* and the *perceived comprehensibility* of narratives. More specifically, we will examine the effects of the occurrence of *direct speech constructions* (e.g., *he said: 'oh, just go ahead'*) on liveliness and comprehensibility.

Previous studies have shown that the use of direct speech is usually preserved in individuals with aphasia (Hengst, Frame, Neuman-Stritzel, & Gannaway, 2005; Ulatowska & Olness, 2003; Ulatowska, Reyes, Santos, & Worle, 2011; Wilkinson, Beeke & Maxim, 2010). Moreover, compared with non-brain-damaged (NBD) speakers, individuals with Broca's and anomic aphasia make even more use of direct speech constructions in elicited narratives (Groenewold, Bastiaanse & Huiskes, 2013). Given this frequent occurrence of direct speech constructions in narratives of individuals with Broca's and anomic aphasia, the effects on the *listener* also deserve attention.

In NBD communication, direct speech has been claimed to be an effective device for telling stories because it dramatizes interaction, making it lively (Labov, 1972; Wierzbicka, 1974; Li, 1986; Mayes, 1990). In addition, direct speech is considered a way of creating *involvement* in a story (Chafe, 1982; Tannen, 1989). In turn, increased

liveliness is argued to keep the listener *focused* and to help the listener to *understand* the content of a message (Hincks, 2005). Even though many claims have been made about increased liveliness, no quantitative evidence has yet been provided. Therefore, in the current study we verify and build on the abovementioned claims using an experimental approach. Moreover, we extend the scope to the role of direct speech constructions in aphasic discourse.

We will first describe several characteristics of direct speech in NBD communication. Next, we will address issues of direct speech that are relevant for aphasic interaction, and discuss studies in which similar phenomena in aphasic interaction were analysed. Finally, we will address and operationalize the concepts of *liveliness* and *comprehensibility*.

Direct speech constructions are often used to provide a quotation of speech as the original speaker uttered it, e.g., *She said: 'I am leaving tomorrow'*. However, direct speech can also be used for other purposes. Some 'quotations' are of dialogue that has never been spoken. Various terms have been introduced to refer to direct speech constructions that are used for purposes different than speech reporting. For example, Tannen (1989) introduced the term *constructed dialogue*, referring to dialogue representing what was not said. Such dialogue can serve as an instantiation or a summary (e.g., *students always complain: 'we're so busy!'*), or refer to inner speech (e.g., *I said to myself: 'not again'*) or dialogue using non-human referents (e.g., *the cat is begging: 'I'm cute, give me food!'*). Another term that refers to direct speech utterances that do not imply interaction that actually occurred (factual interaction) is *fictive interaction* (Pascual, 2002, 2006). This term refers to the use of the basic structure of the conversation as a frame in order to model thought, language, and discourse. Moreover, in some communicative situations, direct speech can be used to enact *hypothetical* talk. In such

situations, the speaker provides the listener with a suggestion for what s/he could say in a hypothetical or futuristic situation. Simmons and LeCouteur (2011) described this conversational tool as *hypothetical active-voicing* (HAV) and showed that it is successful for achieving behavioral changes in therapy settings.

As has been mentioned above, individuals with Broca's and anomic aphasia tend to produce relatively many direct speech constructions in elicited narratives (Groenewold et al., 2013). The abovementioned findings obtained in NBD speakers may also hold for aphasic speakers, and the occurrence of direct speech constructions may therefore be beneficial to the communication of aphasic speakers as well. As noted above, direct speech may increase perceived liveliness, which in turn increases listener focus and this may facilitate listener comprehension. In addition, comprehension may be assisted by the fact that direct speech constructions (e.g., fragment 2, below) are in general grammatically less complex than their indirect speech counterparts (e.g., fragment 1). Moreover, they can easily be simplified even further (e.g., fragment 3) by the use of enactment, body language, gestures, and/or intonation markers in addition to or instead of purely verbal descriptions (Clark & Gerrig, 1990). These additional 'layers' of communication may further facilitate comprehension.

Fragment 1 (Dutch, indirect speech):

Ellen	*zei*	*dat*	*ze*	*dat*	*echt*	*niet*	*ging*	*doen*
[Ellen	said	that	she	that	really	not	did	do]

'Ellen said that she really wouldn't do that'

Fragment 2 (Dutch, direct speech):

Ellen	*zei:*	*dat*	*doe ik*	*echt*	*niet!*
[Ellen	said:	that	do I	really	not!]

'Ellen said: I really won't do that!'

Fragment 3 (Dutch, enactment):
Ellen: (short pause) ((sits up straight, looks away from listener, makes an arrogant facial expression, followed by a small fingertip wave))

In fragment 3, the speaker used a person reference + enactment to construct a small hypothetical scenario. This is an example of how, in light of limitations in the ability to use verbal descriptions, aphasic speakers can iconically demonstrate how a speaker would purportedly look when s/he produced a reported, fictive, or hypothetical action by means such as body posture, movement, gaze, and facial expression. Similarly, using shifts in body position, gaze, pitch, loudness or voice, a speaker can 'warn' the listener that s/he is making a shift in speaker without explicitly mentioning it. This creative use of direct speech or 'enactment' allows speakers with aphasia to exploit resources that are usually still relatively intact (Wilkinson et al., 2010): pragmatics (Hengst et al., 2005; Ulatowska et al., 2011), conceptual resources (Goodwin, 1995, 2003), and kinetic, prosodic and non-verbal skills (Lind, 2002; Wilkinson et al., 2010). Exploiting these resources, aphasic speakers can provide listeners with an optimal amount of information. Previous studies have shown that many individuals with aphasia make productive use of gesture alongside or instead of verbal communication (e.g., Goodwin, 1995; Wilkinson et al., 2010). The complementation or substitution of verbal communication with gesture and other non-verbal forms of communication provides the listener with additional layers of meaning, and may thus facilitate language comprehension.

In order to examine the effects of the occurrence of direct speech constructions on language comprehension, we operationalized and assessed the two aspects under study, namely that of liveliness and comprehensibility.

Liveliness is primarily associated with enthusiasm (Sinclair, 1995). The degree of perceived liveliness is affected by intonational modification of speech, which helps the audience understand the content of a message (Hincks, 2005). A lively voice can be achieved by consciously modifying the three prosodic dimensions of loudness, pitch, and tempo. For example, a speaker can help a listener orient himself in the flow of information by pausing before moving to a new point, and then raising pitch as s/he starts to speak. An important side effect of this modification is the maintenance of listener focus on the message (Hincks, 2005). As mentioned above, direct speech constructions are frequently accompanied by, among other things, shifts in prosody, voice quality, or pitch. Therefore, the occurrence of direct speech constructions is expected to have a positive effect on perceived liveliness.

The effect of direct speech constructions on *comprehensibility* is a question that may be important for both clinical practice and everyday interaction. Comprehensibility can be described as 'a judgment by the listener of how difficult an utterance is to understand' (Derwing & Munro, 2009: 184). Since the current study focuses on fragments rather than utterances, we consider comprehensibility *the listeners' perception of the degree of difficulty in understanding a stretch of talk*. Just like liveliness, comprehensibility involves communication rather than just speech, and is clearly a very important aspect of communicative effectiveness (Derwing & Munro, 2009). As described above, the use of direct speech constructions may provide aphasic speakers with a device to convey a message in an effective and natural way. Therefore, in some communicative situations, by reducing the grammatical complexity without affecting the content of a message, the increased use of direct speech constructions by aphasic speakers may improve the perceived comprehensibility of their speech.

In the current study, the following two research questions are addressed:

- *Is there an effect of direct speech constructions on perceived liveliness of aphasic speech? If yes, in which direction?*
- *Is there an effect of direct speech constructions on perceived comprehensibility of aphasic speech? If yes, in which direction?*

3.2 Methods

In this study, raters are asked to make judgments about voice fragments that have been carefully selected. The stimulus materials were developed from a data set previously collected for another study (Jonkers, 1998), which had no direct relationship to the questions addressed in the current study. The judgment focused on perceived liveliness and ease of comprehensibility.

For the assessment of these characteristics a design that is very similar to the 'matched-guise technique' was used[2].

However, the design of our study differs from the matched-guise design in two ways. First, the stimulus materials were different in nature: the raters listened to fragments of 'real' narratives instead of recordings of passages being read aloud. An important advantage of the materials used in the current study is that they are better representative for everyday interaction, and therefore ecologically more valid than

[2]The matched-guise technique was originally developed to investigate people's attitudes toward social, geographical or ethnic language varieties (e.g., Lambert, Hodgson, Gardner & Fillenbaum, 1960). In matched-guise technique experiments, subjects are asked to evaluate recorded text passages. The subjects do not know that among the passages they are listening to, there are some spoken by the same speaker, who takes on two different guises. By comparing the rater's evaluations of these two samples, the effects of the two varieties can be investigated. For the matched-guise technique it is crucial that the two samples are identical in every respect (except for the language/variety), and thus language/variety is the only factor that affects the listener's evaluations (e.g., Drager, 2013).

recordings of written passages which are read aloud. However, an inherent drawback of our materials is that they vary in more than one way: the recordings do not have the same wording, and are therefore harder to compare. Second, whereas in the 'classic' format of the matched-guise technique the raters are not told that they are going to hear some of the voices twice, in our study they were informed that they would be listening to some speakers twice. Therefore, the design of our study can be considered an 'open-guise technique' (e.g., Soukup, 2013).

3.2.1 Participants

The raters were 37 undergraduate students who were enrolled in a course in clinical language testing at the University of Groningen. All were familiar with aphasic speech, had normal hearing, and all but two were native speakers of Dutch. The two non-native speakers were German (late bilingual) and Chinese (near-native level of fluency).

3.2.2 Development of stimulus materials

The aim of the current study required a careful selection of speech samples. In order to achieve both content and ecological validity, we had to select stretches of talk that were not only natural and representative for a speaker's everyday speech output, but also suitable for assessing and comparing comprehensibility. Naturally occurring speech, such as conversations recorded at home, reflects everyday interaction and is therefore representative of 'real life', but entails important interference effects. Such speech samples are highly influenced by context, topic, conversation partner, context, setting, mood, etc. Controlled production tasks such as repetition of sentences or longer texts allow the researcher to obtain speech samples that are identical in terms of content, and enable one-on-one comparisons between conditions. However, an important drawback of such material is that it lacks naturalness. Therefore, we chose to use elicited narratives, which are

semi structured. The samples were collected by Jonkers (1998) for his study on verb production. Jonkers elicited the samples following the procedures for the semi-structured interview of the Aachen Aphasia Test (Graetz, de Bleser & Willmes, 1992). The interview consisted of the following questions:

- Can you tell me what happened when you had your stroke (NBD participants: Can you tell me about your most recent illness)?
- Can you tell me something about your (former) job?
- Can you tell me something about your family?
- Can you tell me something about your hobbies?

This data elicitation technique is commonly used in aphasia research, and allows for reliable comparisons (Prins & Bastiaanse, 2004). Since the fragments originate from real interviews with mildly to moderately impaired aphasic speakers, the utterances included were not all well-formed. This applies to both the utterances containing direct speech and the remaining utterances.

All aphasic speakers (n = 10) were classified by the Dutch version of the Aachen Aphasia Test (Graetz et al., 1992) as having anomic or Broca's aphasia. They had been aphasic for at least three months. All but one suffered from a single-stroke in the left hemisphere. The other individual with aphasia suffered from a closed head injury. The ten NBD speakers were matched to the aphasic speakers at group level for age and gender (Table 3.1). All participants were native Dutch speakers.

Table 3.1: Characteristics of speakers rated in the study.

Speaker	Sub-group	Aphasia severity	Spontaneous speech[a]	Age	Aetiology	MPO	Gender	Handed-ness	Education
1	Anomic	Mild	4-3-3-3-4-4	35	CHI	7	M	Right	4
2	Anomic	Mild	4-5-5-4-5-4	35	CHI	28	M	Right	4
3	Anomic	Moderate	3-3-4-4-4-3	52	CVA	18	M	Right	3
4	Anomic	Mild	4-5-5-4-5-5	57	CVA	3	F	Right	1
5	Anomic	Mild	3-5-5-3-4-4	24	CVA	4	F	Right	3
6	Anomic	Mild	4-5-5-4-5-3	39	CVA	7	F	Right	3
7	Broca	Moderate	2-3-5-4-4-2	61	CVA	11	M	Right	1
8	Broca	Moderate	2-4-3-3-4-2	52	CVA	9	M	Right	2
9	Broca	Moderate	3-3-4-4-5-2	45	CVA	77	M	Right	2
10	Broca	Moderate	2-2-5-4-5-2	82	CVA	14	F	Right	1
11	NBD	-		69	N/A	N/A	M	Right	2
12	NBD	-		62	N/A	N/A	M	Right	4
13	NBD	-		51	N/A	N/A	M	Right	4
14	NBD	-		36	N/A	N/A	M	Right	4
15	NBD	-		66	N/A	N/A	M	Right	1
16	NBD	-		51	N/A	N/A	M	Right	4
17	NBD	-		32	N/A	N/A	F	Right	2
18	NBD	-		75	N/A	N/A	F	Right	4
19	NBD	-		34	N/A	N/A	F	Right	2
20	NBD	-		50	N/A	N/A	F	Right	4

[a]Spontaneous speech scores are ratings on 6 point scales for: I) Communicative behavior – II) Articulation an prosody – III) Formulaic language – IV) Semantics – V) Phonology – VI) Syntax (Miller, Willmes & de Bleser, 2010).
CVA: cerebrovascular accident; CHI: closed head injury; MPO: months post onset; NBD: non-brain-damaged speaker; M: male; F: female; educational levels: 1: primary school; 2: secondary school; 3: intermediate vocational education; and 4: higher vocational education/university.

For both the aphasic and the NBD group, a set of speech samples was selected on the basis of presence or absence of direct speech

constructions. We selected the first five speakers whose speech samples contained (n = 5) or did not contain (n = 5) direct speech constructions. Of the speakers who produced samples containing direct speech, two fragments were selected: one with (++) and one without direct speech constructions (+-)[3]. In all cases, the context of a narrative was left intact, so that no interference effects could be caused by lack thereof. In order to standardize this procedure, we used the following criteria: the fragment started with an opening (usually a question posed by the interviewer or the introduction of a new topic by the aphasic speaker), contained a narrative structure with a kind of climax, and finished with a topic closing sequence, such as laughter or agreement from the interviewer. An example is provided in Fragment 4:

> Fragment 4 (translated from Dutch). Aphasic speaker tells about her job in a second hand store. **Bold:** interviewer; (.): pause.
>
> **So what do you do there?** eh (.) yes in fact all kinds of things [particle] (.) yes (.) all kinds of things (.) eh (.) clothing and eh other stuff all second hand so (.) eh (.) like c- eh cleaning eh tidying up and eh in the store itself right that there are people who want to eh (.) eh (.) buy something (.) that you can help them for a while **yes** right **so you have to talk and communicate with them too** no yes yes that is true (.) my husband was also like *well what- are you going to do this? you shouldn't or eh something else I don't know* I say *I've got my mind set on this now I- I- I am like I want something again I will see what happens* **hm** right (.) so it's only been just a while [particle] but eh maybe within a month I will be like eh *what am I doing?* **yes yes** that I will be like *what am I doing here* but no the way it is going right now then eh (.) yes I am like *then you get to talk to someone else again* and **that's right!** yes

The +- fragments were matched to the ++ fragments, meaning that they not only originated from the same speaker, but also had similar durations and were concerned with similar topics. This design enabled

[3]None of the aphasic fragments contained indirect speech constructions.

us to compare fragments with (++) and without (+-) direct speech directly while controlling for individual effects like voice and speaking style. In addition, the distribution of speech fragments over gender was kept constant (i.e., always three male and two female speakers). For the speakers who did not produce direct speech, five fragments without direct speech (functioning as fillers), with an average duration similar to that of the ++ and +- condition fragments were selected. Table 3.2 provides an overview of the stimulus materials.

In the case of ++ fragments, either a *speech quotation,* a *thought quotation,* or a *bare quotation* (Groenewold et al., 2013) was present. In the case of a speech quotation, a verb of communication (e.g., *say, tell, ask,* etc.) was used to introduce the direct speech construction. In the case of a thought quotation, a verb of thought (e.g., *to think, to be like,* etc.) was used to introduce the 'quoted' thought. In the case of a bare quotation, the direct speech construction was not introduced by a quotative verb or construction. For the aphasic speakers, 18 out of 50 direct speech constructions were 'speech quotations', 18 were 'thought quotations', and 14 were 'bare quotations'. In the case of the NBD speakers, 24 out of 47 instances were 'speech quotations', two were 'thought quotations', and 21 were 'bare quotations'.

Table 3.2: Characteristics of fragments rated in the study.

Fragment	Speaker	Subgroup	Stimulus type	Duration	# Direct speech	Relative frequency
1	1	Aphasia	Filler	0:47	-	-
2	2	Aphasia	+-	0:43	-	-
3	2	Aphasia	++	0:55	9	0.50
4	3	Aphasia	Filler	1:41	-	-
5	4	Aphasia	+-	1:30	-	-
6	4	Aphasia	++	1:02	7	0.50
7	5	Aphasia	Filler	1:07	-	-
8	6	Aphasia	+-	1:34	-	-
9	6	Aphasia	++	1:30	12	0.50
10	7	Aphasia	Filler	1:07	-	-
11	8	Aphasia	+-	1:09	-	-
12	8	Aphasia	++	1:09	12	0.46
13	9	Aphasia	+-	1:02	-	-
14	9	Aphasia	++	1:15	10	0.40
15	10	Aphasia	Filler	1:20	-	-
16	11	NBD	Filler	1:09	-	-
17	12	NBD	Filler	0:52	-	-
18	13	NBD	+-	0:36	-	-
19	13	NBD	++	0:55	14	0.54
20	14	NBD	+-	0:41	-	-
21	14	NBD	++	1:01	7	0.27
22	15	NBD	Filler	0:54	-	-
23	16	NBD	+-	0:53	-	-
24	16	NBD	++	0:58	7	0.27
25	17	NBD	Filler	0:35	-	-
26	18	NBD	Filler	0:35	-	-
27	19	NBD	+-	1:01	-	-
28	19	NBD	++	0:46	9	0.50
29	20	NBD	+-	0:48	-	-
30	20	NBD	++	0:46	10	0.50

NBD: non-brain-damaged; Stimulus + -: speaker does produce direct speech but not in this fragment. Stimulus + +: speaker produces direct speech in this fragment; Relative frequency: number of instances of direct speech constructions in selected fragment divided by total number of utterances.

3.2.3 Procedures

The raters (n = 37) were seated in a lecture room and were given rating booklets (see Appendix B.1). They were not given information regarding the experimental manipulation (presence/absence of direct speech and presence/absence of aphasia) but they were informed about the possibility of hearing some of the voices twice. They were told that they would hear 30 short audio files, which they had to evaluate for liveliness and comprehensibility. In order to familiarize them with the type of speech samples and the evaluation system, the raters were presented with two practice items. Each rater made an individual judgment of the two practice items, using the rating system. During a short joint discussion after the practice items, the raters discussed the meaning of the concepts to be evaluated. Following the practice items and the discussion, the raters indicated that the procedure was clear. The 30 sound fragments were presented once at a comfortable loudness over professional loudspeakers (Behringer TRUTH B2031A), in a quasi-random order. The raters were asked to score the liveliness and the comprehensibility of what they had heard immediately after hearing each fragment.

3.2.4 Liveliness ratings

The raters were asked to judge the liveliness of the selected speech fragments on a ten-point rating scale (1 = least lively, 10 = most lively). To avoid biasing the raters' interpretation of liveliness, they were asked to only give one grade for the concept of liveliness. For the same reason, they were not provided with a definition or any specific instructions.

3.2.5 Comprehensibility ratings

Since comprehensibility concerns a more complex concept than liveliness, a different rating method was chosen. In order to cover all relevant aspects of perceived comprehensibility (i.e., semantic,

syntactic and pragmatic aspects of language use, Barefoot, Bochner, Johnson & Vom Eigen, 1993), statements were designed that took into account not only linguistic form, but also other relevant aspects of comprehensibility:

1. Ik kan de boodschap over het algemeen goed volgen. (*In general, I am well able to follow the message).*
2. Ik moet me inspannen om deze persoon te begrijpen. (*I have to make an effort to understand this speaker*).
3. Deze persoon kan zijn/haar gedachten goed onder woorden brengen. (*This person is able to put his/her thoughts into words well*).

The first statement aimed to draw attention to the semantics of a fragment: is the meaning of the message clear? The second drew attention to how well formed the message was: does the listener have to make an effort to be able to understand the sentential constructions that are used? The final question encouraged the listener to empathize with the speaker: how hard is it for the speaker to put his or her thoughts into words? To evaluate the perceived comprehensibility, a six-point Likert scale was used. For each of the three statements, the raters were required to indicate on the scale to what extent they agreed or disagreed with the three statements posed about the speech samples. The even-point scale can be considered balanced because there are equal amounts of positive and negative positions. In order to control for bias introduced by the positive or negative nature of the statements, one statement was formulated with reverse direction (i.e., statement 2). For the analysis of the results, the score of this item was reversed. In addition, for the comprehensibility results, the scores were collapsed and analysed as a single score, since the mutual correlation indicated that the three propositions on comprehensibility reflected a single one-dimensional latent construct (Cronbach's $\alpha = 0.8$). As a consequence,

the new maximum score for comprehensibility was 18.

3.3 Results

3.3.1 Inter-rater reliability

Table 3.3 presents statistics concerning the inter-rater reliability for evaluations of liveliness and comprehensibility of 37 raters. As mentioned in the Methods section, two of the raters were non-native speakers of Dutch. A Mann-Whitney *U*-test was conducted to evaluate whether their judgments deviated from the average group judgments. This was not the case, $z = -1.58$, $p > 0.05$ and $z = -1.68$, $p > 0.05$. Therefore, there was no need to exclude their judgments from the data set.

For liveliness, the mean minimum ratings occupy the middle of the rating scale (1–10), indicating that raters generally avoided giving extremely low ratings for liveliness to speech samples they listened to. The mean maximum ratings, however, are at the high end of the rating scale, indicating that raters did give high ratings if they found speech samples lively. The Cronbach's α values reported in Table 3.3 are fairly high (aphasic speakers) to very high (NBD speakers), indicating that there was a high degree of consistency among raters. Overall, the consistency among raters is satisfactory.

For comprehensibility, the mean minimum and mean maximum collapsed scores are at the low respectively high end of the rating scale (3–18), indicating that raters gave low ratings if they found speech samples hard to comprehend and high ratings if they perceived the speech samples as easily comprehensible. The Cronbach's α values reported in Table 3.3 are high for all condition and speaker types, indicating that there was a high and satisfactory degree of consistency among raters.

Table 3.3: Inter-rater reliability measures for liveliness and comprehensibility for 37 raters for two condition types of speech samples each produced by 4 aphasic (APH) and 5 NBD speakers.

		Mean rating	Standard deviation	Mean minimum rating	Mean maximum rating	Cronbach's α
Liveliness	APH +-	6.396	0.69	5.0	7.5	0.731
	APH ++	6.883	0.83	5.5	8.5	0.746
	NBD +-	7.568	0.68	5.5	9.0	0.932
	NBD ++	8.264	0.64	7.0	9.8	0.974
Comprehensibility	APH +-	10.696	1.35	7.8	13.8	0.938
	APH ++	10.142	1.76	6.5	12.8	0.941
	NBD +-	16.728	0.91	14.2	17.8	0.903
	NBD ++	16.588	1.03	13.8	17.8	0.950

In Figures 3.1 and 3.2, the outcomes are presented for the two condition types and the two speaker types. The average liveliness and comprehensibility scores were normally distributed in both condition types for both the aphasic and the NBD speech samples, as assessed by the Shapiro-Wilk test. The Levene's test of equality of error variances showed homogeneity of variances of both liveliness and comprehensibility scores across groups.

To examine whether there was a relationship between liveliness and comprehensibility, two-tailed Pearson tests were carried out for both the aphasic and the NBD speech samples. The results showed no statistically significant correlations between the two variables, r (35) = 0.318, p = 0.06 and r (35) = 0.228, p = 0.175, respectively.

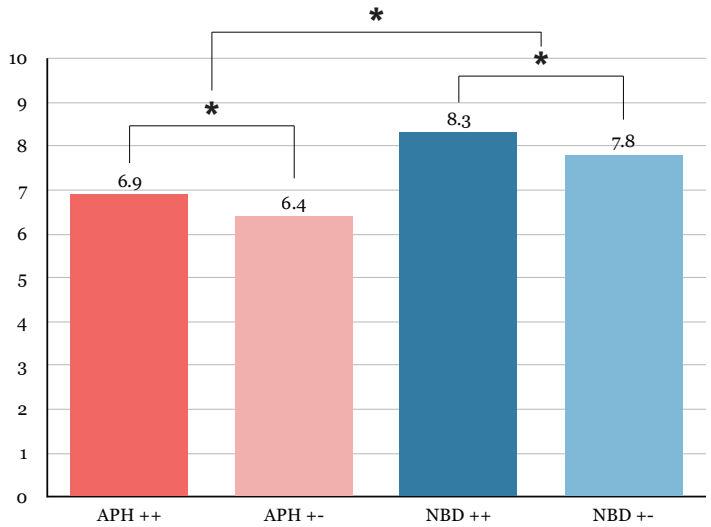

Figure 3.1: Average scores for liveliness for fragments from non-brain-damaged (NBD) and aphasic (APH) speakers in direct speech (++) and no direct speech (+-) condition.

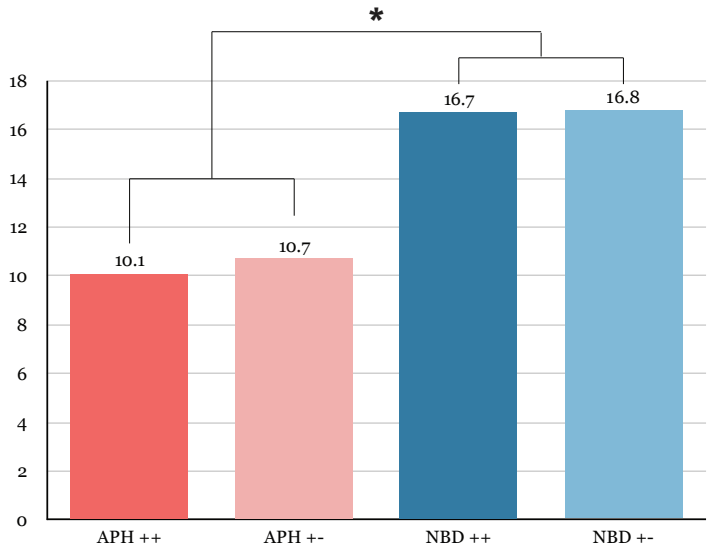

Figure 3.2: Average scores for comprehensibility for fragments from non-brain-damaged (NBD) and aphasic (APH) speakers in direct speech (++) and no direct speech (+-) condition.

3.3.2 Liveliness

A two-way ANOVA was conducted that examined the effects of speaker type (aphasic, NBD) and condition type (direct speech, no direct speech) on the liveliness scores. The main effect of speaker type was significant, $F(1, 144) = 136.754$, $p = 0.000$, as was the main effect of condition, $F(1, 144) = 16.546$, $p = 0.000$). The interaction of these two factors was not significant, $F(1, 144) = 0.027$, $p = 0.869$. Thus, the sample of NBD speakers were rated higher in liveliness across both conditions, and direct speech was rated as more lively in both types of speech samples.

To examine the effect of direct speech constructions on liveliness for both groups of speech samples separately, paired-samples *t*-tests were conducted. For the NBD speakers, the average scores on liveliness were higher for the direct speech condition (mean = 8.3, SD = 0.64) than for the no direct speech condition (mean = 7.8, SD = 0.68); $t(36) = 5.48$, $p < 0.001$. Similarly, for the aphasic speakers the scores were higher for the direct speech condition (mean = 6.9, SD = 0.83) than for the no direct speech condition (mean = 6.4, SD = 0.69); $t(36) = 3.83$, $p = 0.00$.

3.3.3 Comprehensibility

A two-way ANOVA was conducted to examine the effects of speaker type and condition type on the comprehensibility scores. As expected, the main effect of speaker type was significant, $F(1, 144) = 875.205$, $p < 0.001$. There was no main effect of condition, $F(1, 144) = 1.808$, $p = 0.181$. The interaction of these factors was not significant, $F(1, 144) = 1.547$, $p = 0.216$.

3.4 Discussion

In this study, we have examined two aspects of communicative competence in the narratives of Dutch people with and without aphasia: perceived liveliness and perceived comprehensibility. More specifically, we studied the effects of the occurrence of direct speech constructions on these aspects of communication. The questions addressed are of both theoretical and clinical relevance. No quantitative evidence had been provided yet for the claims that have been made in the literature regarding direct speech constructions in 'healthy' communication increasing liveliness. Using an experimental approach, we tested these claims. Moreover, we extended the focus from healthy communication only to healthy and aphasic communication. Given the observation of the relatively frequent occurrence of direct speech in narratives of speakers with Broca's and anomic aphasia (Groenewold et al., 2013), the effects on the listener also deserved attention. Examining the consequences for the listener of this increased use of direct speech provides us with insight into whether and to what extent direct speech contributes to the communicative competence of aphasic speakers.

The first research question addressed the contribution of direct speech to liveliness. The presence of direct speech constructions positively affected the perceived liveliness of speech fragments produced by both NBD and aphasic speakers. This finding supports previous claims that in NBD communication direct speech constructions add to the vividness of a story (Labov, 1972; Wierzbicka, 1974; Li, 1986; Mayes, 1990), and shows that the effects are similar in aphasic speech. Given that liveliness is claimed to help listeners stay focused (Hincks, 2005), the relatively frequent usage of direct speech by aphasic speakers (Groenewold et al., 2013) may reflect a strategy to increase not only the liveliness of their discourse, but also the focus of the listener.

The second research question addressed the effect of the occurrence of direct speech on the listener's perception of comprehensibility of NBD and aphasic speech samples. As expected, the NBD speech samples were rated highly in terms of perceived comprehensibility. The speech samples of the individuals with aphasia, however, received quite low scores. Contrary to liveliness, perceived comprehensibility was not affected by the occurrence of direct speech constructions for either NBD or aphasic speakers. These results do not support findings from previous studies that claimed that increased liveliness helps the listener understand the content of a message (e.g., Hincks, 2005).

3.4.1 Benefits and limitations of the design

The design that was used, which is similar to the matched-guise technique, allowed for a direct comparison of the effects of direct and indirect speech within and between groups. Our design was different from the traditional matched-guise technique because we used natural data instead of read aloud passages. This approach has important benefits for the representativeness of the data for 'real' interaction, but it also entails some drawbacks. The stimulus materials that we used are more difficult to compare than the pairs of stimuli that are used in a 'traditional' matched-guise design, because they differ in more than one respect. Not only the condition under study (namely direct speech versus no direct speech) but also the wording, role of the conversation partner, and several other linguistic and non-linguistic variables may have an effect on the raters' judgments. In order to optimize the comparability of the speech fragments, we matched them for topic and duration, and made sure the interviewer played a minimal role in the selected fragment.

Another characteristic of the matched-guise technique (and so the current study) is the fact that the raters are aware of the task they are performing: they are explicitly asked to provide ratings for voice

recordings. Especially in the case of 'liveliness' it is hard to avoid such an artificial judging situation. In the case of 'comprehensibility', this could be resolved by using a design that assesses *comprehension* rather than *perceived comprehensibility* based on content questions instead of subjective ratings. Such an approach may be considered somewhat more objective, since it concerns a direct measure of comprehension rather than an indirect measure of listeners' perception of comprehensibility. However, such an approach could not have answered our research question.

Another characteristic that should be considered when interpreting the results of the current study, is the fact that it was conducted in a classroom setting with students. These students are all familiar with aphasic speech, but not with the particular speaker. In everyday life however, individuals with aphasia usually talk to either people who have no experience with aphasia at all, or people who are very familiar with the communicative capacities of this particular speaker (e.g., partner, family, friends). This entails that the raters of the current study may be better able to understand the speakers than the 'non-experts', but less able than the 'experts'.

Similarly, there are certain limits of using audio-only stimuli when assessing liveliness and comprehensibility. Non-verbal communication plays an important role in human interaction in general[4], and more specifically in the contextualization of direct speech (Goodwin, 1990; Streeck & Knapp, 1992; Wilkinson et al., 2010). However, it was only partially (namely in the form of paralinguistic cues such as prosody, pitch, volume, intonation etc.) represented in the stimulus materials that were used for the current study. Therefore, the effects that we found may be bigger in 'real life', and even in an audiovisual version of

[4]Non-verbal communication is claimed to make up about two-thirds of all communication between two people or between a speaker and a group of listeners (Gobron, Ahn, Garcia, Silvestre, Thalmann & Boulic, 2012).

the same study.

3.4.2 Suggestions for clinical implications

Even though this study was explorative in nature, it has some clinical implications. We have shown that the employment of direct speech by aphasic speakers positively affects the perceived liveliness of speech. In line with the literature, this means that linguistic skills are not necessarily predictive of communicative skills: speech fragments of the same speakers were evaluated differently, depending on the presence or absence of direct speech constructions. Generally, these findings support a functional therapy approach, in which attention is paid to the compensation for language impairments by teaching strategies, and generalization of communicative skills and strategies in different communicative contexts. However, further research is required to set achievable therapy goals. Depending on the results of such studies, individuals with aphasia who already employ direct speech constructions in everyday interaction could be encouraged to keep doing so, even when it results in grammatically incomplete or incorrect constructions. Aphasic speakers who do not produce direct speech constructions could be encouraged to do so in language treatment.

Fragments 5 and 6 are examples that illustrate the way different aphasic speakers use direct speech constructions in conversation. Fragment 5 provides an example of how direct speech is used by a severely impaired agrammatic speaker during the semi-structured interview of the Aachen Aphasia Test (Graetz et al., 1992), whereas fragment 6 shows how a mildly impaired fluent aphasic speaker employs direct speech in a similar type of interview.

Fragment 5. Example of how a speaker with very limited linguistic resources (BK) used direct speech (italicized) to achieve interactive goals (fragment taken from Groenewold, Bastiaanse & Huiskes, 2012). SLT: Speech and Language Therapist.

1. SLT:	hoe gaat dat nou bij jou in de buurt,
	[how goes that now near you in the neighborhood]
	'how does it go in your neighborhood'
2. SLT:	>heb je< bij jou in de buurt veel contact,
	[have you near you in the neighborhood much contact,]
	'do you have a lot of contact in your neighborhood'
3. BK:	ehm
4.	(0.9)
5. BK:	eh eh –tact n:iet
	[eh eh –tact n:ot]
6.	(1.4)
7. BK:	eh ↑*hoi* ↑*hoi* en ↓*hoi* ↑*hoi* en eh niet eh
→	[eh ↑*hi* ↑*hi* and ↓*hi* ↑*hi* and eh not eh]
8.	(0.6)
9. SLT:	van die mensen die zo 'es eh echt een praatje met je maken
	[of those people that so once eh really a talk with you make]
	'those people who eh really come to chat with you'
10. BK:	nee nee nee
	[no no no]

Fragment 6. Semi-spontaneous speech fragment of speaker with anomic aphasia. (Direct speech italicized, fragment taken from Groenewold et al., 2012).

misschien heb ik ook wel zoiets van eh *waar ben ik mee bezig?*
[maybe have I also TAG something like eh *where am I with busy?*]
'maybe I'll be like *what am I doing?*'

As is clear from Fragments 5 and 6, the suitability of direct speech constructions to facilitate everyday interaction is not restricted to a certain subtype of aphasic speaker. Direct speech seems to be a useful and natural tool that can be employed by individuals with various subtypes and severities of aphasia (Groenewold et al., 2013), and in

versatile ways, for example, to get or to hold the floor, to contextualize the climax of a story, or to convey the point of a narrative (Mayes, 1990).

The usage of direct speech can be placed on a continuum of compensatory speech behaviour in which the speaker employs *grammatically simplified* rather than *error-strewn* (Ruiter, Kolk & Rietveld, 2010) language. Ruiter et al. (2010) showed that speaking in ellipses may help agrammatic speakers to get their message across more efficiently, and that the increased efficiency did not negatively affect verbal effectiveness. Like an elliptical speaking style, the use of direct speech may be an effective compensatory strategy.

However, further research is required. While the use of direct speech may provide speakers with means to achieve some interactive goals using limited linguistic resources, such turns can nevertheless sometimes be difficult for the listener to understand because of, for example, semantic opaqueness or an unclear relationship between the enactment and the other item(s) in the speaker's turn (Wilkinson et al., 2010).

3.4.3 Future research

When addressing similar questions in future studies, a number of aspects with regard to the methodology of the research should be considered. In order to assess the effects of direct speech versus indirect speech constructions on discourse comprehension, we would recommend to design an experiment that relies on *audiovisual* instead of audio-only stimuli. Moreover, as has been explained above, we recommend the use of *content* questions that directly refer to direct versus indirect speech constructions rather than (subjective) evaluations. Furthermore, to control for possible interference effects that may have played a role in the current study we would recommend the use of *pairs* of speech fragments that differ exclusively in condition

type. Finally, we recommend the use of longer stretches of talk (i.e., narratives) rather than the relatively short fragments that were used in the current study.

It is also possible to examine direct speech in aphasic language production, rather than reception as we have here. For example, such a study could count the number of correct information units (CIUs) (Nicholas & Brookshire, 1993) in speech samples from aphasic speakers with and without direct speech. Focusing on the production rather than the reception side of communication could provide objective, quantitative evidence for the beneficial effects of direct speech, and circumvent the inevitably subjective ratings in the current study. Moreover, if such a study led to evidence for a beneficial effect of the occurrence of direct speech in connected speech on the communicative effectiveness and informativeness of speech, it would motivate a study into the effects of therapy focusing on direct speech, and guide achievable goals for such a study. Nevertheless, clearly such a study answers a different question to that presented here since it focuses on communicative informativeness and efficiency of connected speech (e.g., Yorkston & Beukelman, 1980; Nicholas & Brookshire, 1993; Oelschlaeger & Thorne, 1999) rather than the perception of the listener.

3.4.4 Conclusions

We showed that direct speech constructions have a positive effect on the perceived liveliness, but no effect on the perceived comprehensibility of aphasic speech. The finding that direct speech constructions add to the liveliness of aphasic speech is in line with Holland's (1977: 173) observation that in some cases, individuals with aphasia 'probably communicate better than they talk'. Two decades ago a shift was observed in the aphasiological field from a somewhat restricted linguistic orientation, which emphasized correct form and content of language, to a more functional perspective, which incorporates not only

linguistic but also pragmatic proficiency (Simmons-Mackie & Damico, 1995). In many communicative situations the purpose of interaction is not the transmission of information or the conveyance of ideas, but rather a way to relate to another person. In those cases information exchange is less important than social affiliation (Brown & Levinson, 1978; Button & Lee, 1987).

In line with these approaches to communication, the frequent employment of direct speech constructions by aphasic speakers may be considered a strategy that enhances their communicative competence. In general, the relatively frequent use of direct speech seems to yield benefits for both the production and the reception side of aphasic communication: it facilitates production because direct speech constructions are in general grammatically simple (Berko-Gleason, Goodglass, Obler, Green, Hyde & Weintraub, 1980; Groenewold et al., 2013), and it eases reception because the increased liveliness that goes along with direct speech helps the listener to maintain focused (Hincks, 2005), and it increases the involvement of the listener in a story (Chafe, 1982; Tannen, 1989). Altogether, these characteristics make direct speech a natural and economical device for the aphasic speaker and the NBD listener to engage in a lively, attention-holding conversation.

CHAPTER 4

THE EFFECTS OF DIRECT AND INDIRECT SPEECH ON DISCOURSE COMPREHENSION IN DUTCH LISTENERS WITH AND WITHOUT APHASIA[1]

[1]This chapter was adapted from: Groenewold, R., Bastiaanse, R., Nickels, L., Wieling, M., and Huiskes, M. (2014). The effects of direct and indirect speech on discourse comprehension in Dutch listeners with and without aphasia, *Aphasiology*, *28*, 862-884.

4.1 Introduction

The distinction between direct and indirect speech exists in many languages and has been a major focus in linguistic studies. Direct speech (e.g., *John said: "Gosh, I'm hungry*") is assumed to constitute a *demonstration* of a reported utterance, whereas indirect speech (e.g., *John said that he was very hungry*) provides a *description* of what was said (Clark & Gerrig, 1990). Presenting ideas as dialogue is argued to be a strategy to frame information in a way that both communicates effectively and creates involvement (Tannen, 1989). Unsurprisingly, making discourse[2] more lively, direct speech has often been claimed to be an effective device for storytelling (Labov, 1972; Li, 1986; Mayes, 1990; Wierzbicka, 1974).

Previous studies have shown that the use of direct speech is usually preserved in aphasic speakers (Hengst, Frame, Neuman-Stritzel & Gannaway, 2005; Ulatowska & Olness, 2003; Ulatowska, Reyes, Santos & Worle, 2011; Wilkinson, Beeke & Maxim, 2010). Additionally, in a study comparing the forms and frequencies of direct speech constructions in narratives produced by Dutch aphasic and non-brain-damaged (NBD) speakers, Groenewold, Bastiaanse and Huiskes (2013) demonstrated that both NBD and aphasic speakers produce direct speech constructions, but that aphasic speakers use them more frequently than NBD individuals. Given the important role of direct speech constructions in discourse of individuals with aphasia, here we examine the role of direct speech in aphasic discourse in more detail and from a new perspective. We address the question of whether direct and indirect speech have different effects on the comprehension of spoken Dutch discourse in listeners with and without aphasia.

[2] "a unit of language larger than the sentence" (Chafe, 1992, p. 35)

As will become clear from the literature overview later, the current study is concerned with a complex research topic of which only limited aspects have been addressed earlier. Nevertheless, based on the findings of the literature to date, later we will formulate predictions for the outcomes of the current study. We first discuss how direct speech differs from reported speech. We then pay attention to some of general characteristics and shortcomings of the studies that have been carried out so far, before paying attention to the specific findings of these studies into the effects of direct and indirect speech processing, Next, we discuss studies of the effects of direct and indirect speech on healthy written language processing and healthy spoken language processing. Then, we focus on the results of a study into the effects of the occurrence of direct speech constructions in aphasic speech on healthy listeners. We move on to discuss the cognitive processes that accompany healthy discourse comprehension and impairments of spoken language comprehension in aphasia. Finally, we introduce the topic and research question and formulate predictions for the outcomes of the current study.

The authenticity of direct speech

Even though direct speech has often been claimed to portray what a current speaker or someone else said on a former occasion, it is certainly not restricted to accurate repetitions of prior speech. On the contrary, studies of reported speech in naturally occurring interactions have shown that this is rarely the case. First, it has been shown that speakers tend to remember the meaning rather than the form of utterances and are therefore not capable of giving an accurate repetition of former speech (Lehrer, 1989). Second, in many cases the material represented as reported speech was never said at all (e.g., Clark & Gerrig, 1990; Holt, 2000; Tannen, 1989). In a corpus study, Mayes (1990) showed that at least half of all investigated “quotes” were inventions by the current speaker. Reporting speakers are not necessarily committed to

reproduce an utterance verbatim, but instead they seem to aim to get the listener to recognise certain aspects of a situation (Clark & Gerrig, 1990).

Processing of direct versus indirect speech

In spite of the claims of the effects of direct speech constructions on listeners (e.g., Labov, 1972; Li, 1986; Mayes, 1990; Wierzbicka, 1974), so far the comprehension of reported speech has received little attention. While there are some exceptions, (e.g., Eerland, Engelen & Zwaan, 2013; Yao, Belin & Scheepers, 2011, 2012; Yao & Scheepers, 2011; Groenewold, Bastiaanse, Nickels & Huiskes, 2014), most of these studies have focused on written rather than spoken language. This is surprising, since the distinctive paralinguistic characteristics (e.g., pitch and voice quality, Romaine & Lange, 1991) of direct as compared to indirect speech usually become apparent in spoken language. In addition, the two studies that have used spoken rather than written narratives (Yao et al., 2012; Groenewold et al., 2014) relied on auditory rather than audio-visual stimuli. Therefore, the non-verbal aspects that often play an important role in production and interpretation of direct speech (Goodwin, 1990; Streeck & Knapp, 1992; Wilkinson et al., 2010) did not receive the attention they deserve. Finally, an important characteristic of the studies that have been carried out so far is that they have almost exclusively focused on processing of English direct and indirect speech constructions (but see, e.g., Groenewold et al., 2014). This restricted focus may have important consequences for the findings that have been obtained so far because of the limited grammatical differences between English direct and indirect speech constructions (both construction types have a subject-verb-object (SVO) word order, and both can occur without the complementiser *that*).

Direct and indirect speech in NBD written language processing

In a series of experiments, Eerland et al. (2013) addressed the question

of how direct and indirect speech quotations in English written language affect how the contents are represented. Participants showed superior memory for the exact wording of an utterance when it had the form of direct speech as opposed to indirect speech. Contrary to the claims made by Lehrer (1989; see earlier), Eerland et al. (2013) argued that direct speech makes the exact wording of an utterance more salient, enhancing memory for the surface structure of the utterance, whereas indirect speech encourages listeners to focus more on constructing a mental model of a described situation during language processing. This means that information regarding the communicative situation would be more accessible in indirect speech than in direct speech (Eerland et al., 2013).

Direct and indirect speech in spoken NBD language processing

Yao et al. (2012) used fMRI to assess mental simulations of suprasegmental acoustic representations during auditory language comprehension of direct and indirect reported speech. They used audio recordings in which direct and indirect speech constructions were spoken monotonously. Monotonously spoken direct speech constructions elicited significantly higher brain activity in temporal voice areas of the right auditory cortex than listening to meaning-equivalent monotonously spoken indirect speech constructions. Yao and colleagues suggest that listeners spontaneously engage in mental simulations of vivid vocal depictions when listening to monotonously spoken direct speech, but not when listening to monotonously spoken indirect speech. These findings suggest that the brain keeps track of context-based expectations of vivid acoustic information for direct speech, but not for indirect speech utterances. This shows that listeners routinely expect vivid depictions for direct speech, but rarely for indirect speech (Yao et al., 2012).

The effects of direct speech in aphasic discourse on NBD listeners

Groenewold et al. (2014) examined the effects of the occurrence of direct speech on the perceived liveliness and comprehensibility of speech for a group of independent NBD listeners. They showed that direct speech has a positive effect on the perceived liveliness of speech. This effect was found for samples from both NBD and aphasic speakers. These findings support the qualitative claims of the positive effect of direct speech on liveliness (e.g., Macaulay, 1987; Wierzbicka, 1974). However, there was no effect of direct speech on perceived comprehensibility of speech. Even though this study provides quantitative data on the effects of the occurrence of direct speech on language processing, audio-only stimuli were used. This means that the listeners could only utilise a limited range of paralinguistic cues (such as prosody, pitch, and volume) as markers of direct speech. The effects that were found may therefore be greater in real interaction, and even in an audiovisual version of the same study (Groenewold et al., 2014).

Cognitive processes in discourse comprehension

Comprehending language is a complex skill, which depends on a variety of cognitive processes. Studies of "normal" language comprehension have shown that there are important differences between the processes required to comprehend single sentences and those for comprehending discourse. In contrast to the usually highly constrained syntactic and semantic interpretation of sentences, discourse requires an extensive application of pragmatic rules (Ulatowska, 1981). For example, while conversation involves rules about turn-taking, narratives usually involve a sequence of elements proceeding from the initial setting, through complicating events, and finally to the resolution (Kempler, 2004). Understanding discourse not only demands the decoding of a message using linguistic processes but also requires non-linguistic skills such as attention when longer discourse is to be understood. Verbal working memory is necessary to keep successive utterances in

mind, and verbal learning is needed for transferring discourse content into a long-term memory representation. Executive function skills also come into play in, for example, the (re)structuring of information and the monitoring of comprehension success. Deficits in any of these cognitive processes can cause difficulty with understanding language in context (Ferstl, Walther, Guthke & Von Cramon, 2005).

Impairments in aphasic language comprehension

Impairments in spoken language comprehension have been considered a central problem in aphasia for many years (Brookshire, 1978; Brookshire & Nicholas, 1984; Schuell, Jenkins & Jimenez-Pabon, 1965). Virtually all individuals with aphasia have problems with comprehension, but there is considerable variation in the nature as well as in the severity of the comprehension deficits (e.g., Goodglass, Berko-Gleason & Hyde, 1970). Most studies on aphasic language comprehension have focused on comprehension of isolated words (e.g., Jonkers & Bastiaanse, 2007; Mason-Baughman & Wallace, 2013) and sentences (e.g., Burchert, Hanne & Vasishth, 2013; Yarbay Duman, Altinok, Özgirgin & Bastiaanse, 2011). Hence, our understanding of language comprehension (dis)ability in aphasia is incomplete, and important aspects of discourse, such as macrostructure and linguistic context, have been overlooked (Nicholas & Brookshire, 1995).

Comprehension impairments in aphasia can be situated at the phonological, lexical or syntactic levels of language (Caplan, 1992). Individuals with aphasia have been shown to perform better on comprehension assessments when a facilitative context (such as a predictive or a non-predictive narrative) is presented (Germani & Pierce, 1992; Guthke, Hauptmann & Ferstl, 2001). Two crucial components have been postulated for text comprehension (in contrast to word and sentence level comprehension). First, text comprehension requires inferencing. This refers to the combination of the text's explicitly stated

information with additional information taken from general world knowledge (Graesser, Singer & Trabasso, 1994; Singer, 1994). Second, comprehension requires extraction of the macrostructure of the text, which refers to the global meaning or topic of a text. In aphasic language production, both preserved (e.g., Glosser & Deser, 1991; Huber, 1990; Ulatowska & Chapman, 1994) and impaired macrostructures (e.g., Chapman & Ulatowska, 1992; Pierce & Grogan, 1992; Ulatowska & Sadowska, 1992) has been reported. Targeting assessment of text comprehension following brain damage, Brookshire & Nicholas (1993) developed the Discourse Comprehension Test (DCT), consisting of ten stories of about 200 words. They used the DCT to assess the factors "explicitness" and "salience" in English individuals with left-brain-damage (LBD), right-brain-damage (RBD) and traumatic brain injury (TBI). While they had predicted that RBD and TBI patients would be affected by either or both of the factors, in fact all three groups showed sensitivity to both salience and explicitness (Brookshire & Nicholas, 1993).

Ferstl et al. (2005) developed the German Story Comprehension Task (SCT), which aimed to detect text comprehension deficits after brain damage. Even though it is very similar to the DCT with respect to the factors explicitness and salience and the use of yes/no-questions, it consists of two stories, which are considerably longer than the DCT stories. Moreover, whereas in the DCT questions could be answered by referring to one content unit only, in the SCT many of the implicit detail questions could be answered by integrating several information sources. This was hypothesised to make the questions more sensitive to interference deficits. The performance of a group of control participants was compared to that of an unselected group of brain-damaged individuals, suffering from LBD, RBD or TBI. Across the entire group of brain-damaged participants, only the implicit, but not the explicitly stated information was found to be difficult. This is in

line with previous studies on aphasic discourse comprehension, which found that explicitly mentioned information was better understood than implicit information (Brookshire & Nicholas, 1984; Nicholas & Brookshire, 1995; Wegner, Brookshire & Nicholas, 1984). However, when analysed separately, the LBD group (which is prone to aphasic language deficits) responded better to implicit questions than to stated information. Ferstl et al. suggested that this group relied more on the use of contextual cues, general world knowledge and situation model representations rather than on the surface level of texts. Questions that required explicit detail information did not allow for these gist-based comprehension strategies and were therefore argued to be more difficult for LBD individuals (Ferstl et al., 2005).

The current study

In this study, we assess the effects of direct and indirect speech constructions on spoken discourse comprehension in Dutch listeners with and without aphasia. To do so, we developed the Direct Speech Comprehension (DISCO) test. The answer to this question is relevant for clinical practice, because if the occurrence of direct speech in narratives is beneficial for aphasic listeners, this will provide us with hints for conversational strategies to facilitate comprehension for individuals with aphasia. Moreover, the study will provide us with new insights into the discourse comprehension abilities of individuals with aphasia, and more specifically, the role of direct speech constructions in spoken discourse.

The question we aimed to answer was:

Is there a difference between the effects of direct and indirect speech constructions on comprehension of narrative discourse in Dutch listeners with and without aphasia?

Considering the findings of the studies discussed above, a number of predictions can be formulated. First, based on previous studies that showed that individuals with LBD have particular difficulty understanding detailed information in discourse, we expect NBD listeners to outperform aphasic listeners on the DISCO, which requires such knowledge. Second, based on the claim that the use of direct speech is an effective device for storytelling because of its dramatizing, enlivening and demonstration-like character (Clark & Gerrig, 1990; Labov, 1972; Li, 1986; Mayes, 1990; Tannen, 1989; Wierzbicka, 1974), participants are expected to achieve higher scores for the direct than for the indirect speech condition. Such findings would be in line with the results of a previous study indicating that the presence of direct speech has a positive effect on the perceived liveliness of speech (Groenewold et al., 2014). Another factor that predicts better comprehension of direct than indirect speech is that, in Dutch, direct speech constructions are syntactically less complex than indirect speech constructions because they have no complementiser, and, in contrast to indirect speech, direct speech does not require an embedded construction (Groenewold et al., 2013).

However, not all previous findings point to direct speech having an advantage. As discussed above, Eerland et al. (2013) found no evidence that direct speech, relative to indirect speech, enhances the availability of information about referential and communicative information. They claim that "while direct speech makes the exact wording of an utterance more memorable, this does not necessarily hold for the information it conveys" (p. 8). The questions that were used in the current study generally do not require memorising of the exact wording of utterances. Therefore, participants are not expected to benefit from this characteristic of direct speech constructions. Consequently, if anything, Eerland et al.'s (2013) finding that indirect speech enhances listeners more to focus on constructing a mental representation of a

described situation would predict better understanding of indirect rather than direct speech constructions.

4.2 Methods

Ethics statement
The local medical ethical committee of the University Medical Center of Groningen, the Netherlands, approved the study and all participants provided a signed informed consent prior to participation.

4.2.1 Participants

Twenty-three individuals with aphasia and 20 NBD participants participated in the study. The NBD participants were matched to the individuals with aphasia for mean level of education and mean age at the group level. Descriptive information for the two groups is presented in Table 4.1, and demographic and clinical data for the participants with aphasia are shown in Table 4.2. The NBD subjects reported no history of neurological or language impairment and none showed evidence of cognitive or language impairment during the testing session. Individuals with aphasia were recruited from aphasia centres and rehabilitation centres and had to be at least 3 months post-onset. Diagnosis of aphasia was made by certified speech/language pathologists from results of standard aphasia tests. The individuals with aphasia had a broad range of traditional clinical diagnoses such as Broca's aphasia or anomic aphasia but they were not always classified or deemed classifiable by the speech/language pathologists.

Table 4.1: Descriptive information of participants without brain damage (NBD) and participants with aphasia (PWA).

		Age	Education	MPO
NBD	Mean	55.7	12.15	N/A
	SD	12.1	2.83	N/A
	Range	35-76	6-17	N/A
PWA	Mean	56.3	12.1	75.3
	SD	8.7	2.8	68.1
	Range	41-71	6-17	3-226

Education: number of years of education completed; MPO: months post-onset; SD: standard deviation.

4.2.2 Materials

For the iPad-based DISCO test, we created seven pairs of narratives (one practice and six experimental narratives). The instructions, the passages and the questions for the DISCO were digitally video-recorded in a professional recording studio. Two different native speakers of Dutch were used, both being speech and language therapists. Each version (direct/indirect speech) of a narrative was read by the same speaker. To minimise distraction and to avoid a difference in non-verbal and paralinguistic information between the two condition types, the speakers were instructed to speak naturally and without gesturing (except for bodily speech-accompanying actions such as hand, face, or small body movements). The speakers were not informed about the purpose of the study.

Table 4.2: Demographic and clinical data for the 23 participants with aphasia.

PWA	Age	Gender	MPO	Cause	Diagnosis aphasia	Severity aphasia	TT	Education
P2	44	Male	9	CVA left	Fluent	Mild	4	14
P3	62	Male	162	CVA left	Non-fluent	Moderate-severe	41	15
P4	55	Female	103	CVA left	Non-fluent	Severe	36	10
P7	67	Female	50	CVA left	Fluent	Mild	1	10
P8	68	Male	18	Brain tumor removal	Fluent	Mild	5	15
P10	45	Male	34	CVA left	Fluent	Mild-moderate	7	14
P11	41	Female	64	CVA left (carotid dissection)	Non-fluent	Moderate-severe	18	11
P12	50	Male	96	CVA left	Non-fluent	Moderate-severe	12	14
P14	68	Male	79	CVA left	Fluent	Mild	3	15
P15	43	Male	31	CVA left	Non-fluent	Mild	10	10
P16	53	Male	21	CVA left	Non-fluent	Mild	4	11
P17	52	Male	24	CVA left	Non-fluent	Moderate	24	10
P18	58	Male	34	CVA left	Non-fluent	Moderate-severe	13	17
P19	59	Male	211	CVA left	Non-fluent	Severe	40	17
P21	55	Male	210	CVA left	Fluent	Mild	9	11
P23	71	Female	43	CVA right	Fluent	Mild	3	6
P24	53	Male	3	Subarachnoid hemorrhage	Fluent	Moderate-severe	11	14
P26	60	Male	18	CVA left	Non-fluent	Moderate-severe	35	10
P27	53	Male	92	CVA left	Fluent	Mild	3	10
P28	61	Male	53	CVA left	Non-fluent	Severe	16	10
P29	49	Female	27	CVA left	Non-fluent	Moderate	2	14
P30	66	Male	122	CVA left	Fluent	Moderate	12	10
P33	62	Male	226	CVA left	Non-fluent	Mild	17	10

PWA: participant with aphasia; MPO: months post onset; CVA: cerebro-vascular accident; TT: Token Test error score; Education: number of years of education completed.

The DISCO contains 1 pair of practice narratives and 6 pairs of experimental narratives ranging in length from 12 to 16 sentences

(191-258 words). The Flesch Reading Ease (FRE[3]; Flesch, 1948) scores varied from 67.2 to 88.9. Across condition types, FRE scores of the two versions of a narrative always fell within the same range. Moreover, any possible effect of difference in FRE was controlled for in the analysis. Descriptive information about the narratives is presented in Table 4.3.

Table 4.3: Descriptive information for materials.

		Number of words		Number of sentences		Words/ sentence		FRE	
Story line	Narrative	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
A1. Being on time	Airport	193	223	12	13	16.08	17.15	73.5	76.8
A2. Being on time	Theatre	198	217	12	12	16.50	18.08	86.7	87.1
B1. Home	Paint	201	214	12	12	16.75	17.83	86.3	87.5
B2. Home	Couch	218	217	13	12	16.77	18.08	88.9	87.5
C1. Making plans	Dinner	191	223	12	13	15.92	17.15	67.5	68.8
C2. Making plans	Jubilee	234	258	15	16	15.60	16.13	67.7	67.2

FRE: Flesch Reading Ease.

The narratives describe reports of conversations between a husband and a wife that are on topics that would be familiar to most adults in the Netherlands. The two versions of the narratives were identical except for the structure of the reporting sentences, which differed in condition (direct vs. indirect reported speech) in the two versions. The narratives also contain declarative sentences, which were identical in the two conditions. Examples of the pairs are shown in Examples (1) and (2), and samples of the two versions of the entire narratives are presented in Appendix C.1.

[3]The FRE test is designed to calculate comprehension difficulty, based on the number of words, sentences, and syllables of a narrative, using the following formula: 206.835 – 1.015 x (total words/total sentences) – 84.6 x (total syllables/total words). Higher scores indicate material that is easier to read. Texts with scores between 60 and 69 are considered standard, those between 70 and 79 fairly easy, and those between 80 and 89 easy (Flesch, 1948).

Examples (1) and (2). Dutch direct and indirect speech constructions. DS: direct speech; IS: indirect speech; LT: literal translation, TR: translation.

(1A)
DS: De vrouw zegt: *"*we kunnen misschien wel een bootje huren*"*.
LT: The wife says: "we can maybe [particle] a boat rent".
TR: 'The wife says: "we could rent a boat"'.

(1B)
IS: De vrouw zegt dat ze misschien wel een bootje kunnen huren.
LT: The wife says that they maybe [particle] a boat can rent.
TR: 'The wife says they could rent a boat'.

(2A)
DS: De man antwoordt: *"geen idee, zoek jij maar wat uit"*.
LT: The husband replies: no idea, pick you [particle] anything out.
TR: 'The husband replies: "no idea, you can pick anything"'.

(2B)
IS: De man antwoordt dat hij geen idee heeft en dat zij maar wat uitzoekt.
LT: The husband replies that he no idea has and that she [particle] anything picks.
TR: 'The husband replies that he has no idea and that she can pick anything'.

To ensure that the narratives were canonical, they all described a chronological sequence of events such that each sentence was either expository or a continuation from the prior sentences. Additionally, to reduce the demands on memory, no more than three characters were introduced per narrative, of which two were always the husband and the wife.

Each narrative was followed by eight questions. The same videos of the questions were used in the direct and indirect speech conditions. The first question served as a "warm-up" question and focused on the main idea of the text. The remaining seven questions required comprehension of more detailed information provided in the reporting

utterances (either direct or indirect speech) of the narratives. The sequential order of the questions followed the order of mention in the narrative.

Comprehension of the stories was tested with yes/no questions, similar to, for example, those given in Brookshire and Nicholas (1993) and Ferstl et al. (2005). An important advantage of this assessment method is that it rules out possible interference effects from language *production* impairments. For four of the questions, the correct response was "yes", for the other four it was "no". In Appendix C.1, the questions belonging to the example narrative are provided.

To verify that the materials for this study were appropriate, a written version of the test was pretested online. Two lists were created, each containing 4 narratives and 32 questions. Two narratives were offered in condition A (direct speech) and two narratives in condition B (indirect speech). One of the lists contained Narrative 1 version A, Narrative 2 version B, etc., and the other one contained Narrative 1 version B, Narrative 2 version A, etc. In total, 70 NBD speakers read the short narratives and answered the questions. When a question was found to be difficult, the part of the narrative it referred to or the question itself was adapted. The final version of the (written) pretest was carried out by 26 participants who performed almost at ceiling (97.1 % correct).

To ensure that correct answers to the questions could only be given when the narrative was understood (rather than relying on world knowledge or information that was presented in other questions), the questions were also presented to a separate group of NBDs (n = 33) who had not heard the stories. As expected, this group performed around chance level (proportion correct = 0.56, SD = 0.19).

Because of the potentially important role of non-verbal information

we used audio-visual stimuli. When listeners both hear and see the speakers, they can obtain information from several "layers" of communication and potentially benefit from the speakers' paralinguistic (e.g., intonation) and non-verbal (e.g., facial expression) cues, just like in daily life.

4.2.3 Procedures

Each participant was tested individually in a single session of about an hour for the aphasic participants and 30 minutes for the NBD participants. The NBD participants were only tested on the DISCO, whereas the aphasic participants were also tested on the Token Test subtest of the Aachen Aphasia Test[4] (Graetz, de Bleser, Willmes & Heeschen, 1992) to measure the severity of aphasia. The Token Test score reflects the number of incorrectly performed items (0-50).

The DISCO narratives were presented in a pseudo-random order using 12 fixed lists to control for any possible effect of presentation order. Before the test began, the participants were informed that they would be watching videos on an iPad, of which the first served as a practice item, and that after each video, they would be asked to answer 8 yes/no-questions about the content of the narrative. They were told that they could answer the questions by touching the screen, where a red button with a cross [no] and a green button with a tick [yes] would appear. All participants were instructed to use their left hand to answer the questions. The participants commenced the experiment by pressing a "start experiment" button. After pressing this button, the participants saw a short video with the following message (in Dutch), ensuring that the instructions were constant across participants:

[4]During this test, the participant receives instructions to perform tasks that increase in difficulty with a set of tokens differing in shape, color or size, such as: "show me the red square and the yellow circle".

> *You are going to watch 6 short videos. During these videos, my colleague and I will tell short stories. At the end of each of the stories you will hear 8 questions, which you can answer with "yes", or "no". These questions concern the broad storylines. Therefore, you do not have to remember the details. We will start with a practice video.*

After these instructions spoken by one of the two speakers, the participants were presented with the practice item, which was recorded by the other speaker so that they were accustomed to both speakers and the procedure before commencing with the six experimental narratives and accompanying questions. Three seconds after the final sentence of each narrative, the first of the eight questions was automatically presented. The participants saw videos of a speaker asking the questions. Participants answered each question with a button press ("yes" or "no"). The response triggered the next question. Using this fixed paradigm, no variability in timing between the narratives and the first question existed across participants. Before moving on to the next narrative after the completion of the eight questions of the previous narrative, the participants saw a blank screen with a movie icon. This way, participants could either move on immediately or take a short break if desired. The software recorded the answer to each question as a binary variable (representing "yes" or "no").

4.2.4 Statistical analyses

SPSS 20.0.0.2 (SPSS IBM, New York, NY, USA) and R 3.0.2 (R Foundation for Statistical Computing, Vienna, Austria) were used to analyse the data. The mean and standard deviation were calculated for the Token Test scores. For the analysis of the DISCO results, the answers for all questions were converted into a binary variable (correct: 1; incorrect: 0) for logistic regression analysis. First, an item analysis was conducted to make sure all scores were suitable for further analysis, using a two-paired Wilcoxon Rank Sum Test.

For the overall analysis in which the results of both subject groups were analysed, we used generalised linear mixed-effects regression (GLMER) modelling. We included the following predictors of interest: group (NBD vs. aphasia) and condition type (direct vs. indirect speech). The GLMER approach allowed us to model that participants who were likely to answer one question correctly may also be more likely to answer other questions correctly (i.e., a random intercept for participant), and that some questions may be easier than others (i.e., a random intercept for question).

In addition, we took into account that there may be variability in the effect a certain predictor has. For example, some questions might show a great difference in performance between individuals with aphasia and NBD participants, whereas for other questions this effect might be smaller (i.e., a by-question random slope for group). Comparing the Akaike Information Criterion (AIC; Akaike, 1974) values of the model, we evaluated whether random intercepts and slopes for participant, story and question were needed. In Appendix C.2, a more detailed account of the procedures and interpretation of logistic regression and AIC differences is provided.

Furthermore, the possible effects of the following material-related covariates were examined: number of sentences, number of words, number of syllables, number of characters, mean length of utterance (MLU), mean length of words (in characters), FRE and question number. For the participants, the possible effects of the following factors and covariates were assessed: age, gender, number of years of education completed and educational level. Again, model comparison on the basis of AIC was used to assess whether each of these predictors or interactions between these predictors significantly improved the model.

To be able to take the severity of aphasia into account, we also conducted a similar analysis for the subgroup of individuals with aphasia. The only difference with the previous analysis was that instead of group, Token Test error scores were used as predictor in the model.

4.3 Results

The item analysis showed that of the 48 (6 stories x 8 questions) items, 1 deviated significantly from ceiling performance for the NBD participants ($p < .05$, after applying a Bonferroni correction to account for multiple comparisons). Therefore, this item was removed before conducting any further analyses.

In Figure 4.1, the average scores per group and condition type are presented. Individual scores are given in Appendix C.3.

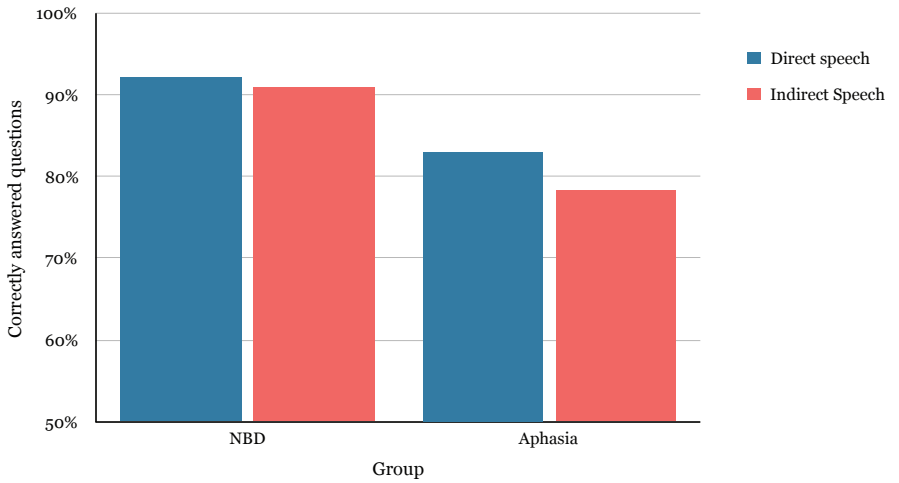

Figure 4.1: Average percentage of correctly answered DISCO questions, presented per group and condition type. NBD: non-brain-damaged.

In Table 4.4, the proportions of "hits" (correct answer: yes, response: yes), "misses" (correct answer: yes, response: no), "correct rejections" (correct answer: no, response: no), and "false alarms" (correct answer: no, response: yes) for the two subgroups are presented.

Table 4.4: Proportions of hits, misses, false alarms and correct rejections for the DISCO by participant group.

	NBD		Aphasia	
	Response: Yes	Response: No	Response: Yes	Response: No
Stimuli: Yes	0.94 (hit)	0.06 (miss)	0.86 (hit)	0.14 (miss)
Stimuli: No	0.11 (false alarm)	0.89 (correct rejection)	0.26 (false alarm)	0.74 (correct rejection)

NBD: non-brain-damaged.

Table 4.5 shows the best generalised mixed-effects regression model for the overall analyses, in which the scores for all participants were included. This model shows that there is a main effect of listener type: an NBD participant has a greater likelihood of answering a DISCO question correctly (i.e.,, has a better performance) than a participant with aphasia ($\beta = 1.56$, $z = 5.49$, $p < .01$). In addition, there is a main effect of condition type: participants perform significantly worse in the indirect speech condition than in the direct speech condition ($\beta = -0.30$, $z = -2.13$, $p < .05$). Finally, if a story is easier (as measured by a higher FRE), participants are more likely to answer a question correctly ($\beta = 0.04$, $z = 2.47$, $p < .05$). No other predictors (or interactions between predictors) were found to be significant. Random intercepts were necessary for participant and question, but not for story. In addition, a by-question random-slope was necessary for the group difference (NBD vs. aphasia) indicating that there is variability in how large the performance difference is between participants with and without aphasia for different questions.

Table 4.5: Generalised linear mixed-effects regression model predicting the probability (in terms of logits) of answering a Dutch DISCO question correctly.

Fixed effects	Estimate	Standard error	*z*-value	*p*-value
(Intercept)	1.9203	0.2125	9.037	<.01
NBD as opposed to aphasic participant	1.5652	0.2853	5.487	<.01
Indirect as opposed to direct speech	-0.3025	0.1420	-2.130	<.05
Flesch Reading Ease (centered)	0.0415	0.0168	2.467	<.05

Only significant predictors were included. Negative estimates indicate a lower probability of answering a question correctly.

Table 4.6 shows the results of the best GLMER model focusing on the group of participants with aphasia only. As becomes clear from this model, a high Token Test error score had a negative impact on the probability of answering a DISCO question correctly (β = -0.06, z = -4.59, p < .01). In addition, if a story was easier (as measured by the FRE), participants with aphasia were more likely to answer a DISCO question correctly (β = 0.04, z = 2.39, p < .05). As shown by the effect of question number, participants with aphasia were more likely give an incorrect answer to questions that were presented later than those that were presented earlier in the sequence (β = -0.12, z = -1.96, p < .05). The effect of indirect vs. direct speech shows that the indirect speech condition was significantly more difficult for the participants with aphasia than the direct speech condition (β = -0.89, z = -3.21, p < .01). However, as there was a significant interaction between the Token Test error score and condition type (β = 0.03, z = 2.46, p < .05), the difference in performance (i.e., the probability of answering a question correctly) between direct versus indirect speech diminishes for participants with higher Token Test error scores. More specifically, the difference is significant for participants with low and average Token Test error scores, but not for participants with high Token Test

error scores.[5] No other predictors (or interactions between predictors) were significant. Random intercepts were necessary for participant and question, but not for story. Also no random slopes were required.

Table 4.6: Generalised linear mixed-effects regression model predicting the probability (in terms of logits) of a participant with aphasia answering a DISCO question correctly.

Fixed effects	Estimate	Standard error	*z*-value	*p*-value
(Intercept)	2.7945	0.2871	9.734	<.01
Token Test error score of 1 point more	-0.0560	0.0122	-4.592	<.01
Indirect as opposed to direct speech	-0.8904	0.2777	-3.206	<.01
Flesch Reading Ease (centered)	0.0371	0.0155	2.390	<.05
Question 1 position later in a sequence	-0.1213	0.0619	-1.961	<.05
Indirect as opposed to direct speech* Token Test error score of 1 point more	0.0307	0.0125	2.462	<.05

Only significant predictors were included. Negative estimates indicate a lower probability of answering a question correctly.

4.3.1 Summary of results

The performance of NBD individuals on the DISCO was better than that of the aphasic participants. Moreover, there was a main effect of condition with narratives that were presented with direct speech reports being more accurately understood than narratives in which indirect speech reports were used. The lack of interaction between condition type and group indicates that this held for both the individuals with aphasia and the neurologically healthy controls. In addition, an effect of FRE (Flesch, 1948) was found, indicating that participants obtained higher scores for narratives with lower complexity.

Focusing on the subgroup of individuals with aphasia, we found similar results: There was a main effect of condition type, with narratives in

[5]Further analyses show that the direct speech condition is easier than the indirect speech condition for participants with Token Test error scores up to 29, and that the effect disappears for participants with Token Test error scores above 30. However, this threshold should be interpreted with caution, as it is based on different sample sizes (n = 19 and n = 4, respectively).

the direct speech condition being easier to understand than narratives in the indirect speech condition. Individuals with aphasia performed better on narratives that were less complex as measured by the FRE. Moreover, individuals with fewer Token Test errors performed better on the DISCO. An additional effect was found for question number: Participants with aphasia had more difficulty with questions that were presented later in a sequence than with those presented earlier, indicating that within each story the task became more difficult due to, for example, an increasing demand on memory or cognitive load. Finally, the interaction that was found between condition and Token Test scores indicates that aphasia severity played a role in the effect size of condition type. Individuals with mild to moderate aphasia clearly benefitted from direct as opposed to indirect speech constructions in narrative comprehension, whereas this effect diminished for individuals with severe aphasia. However, this finding should be interpreted with caution, since it is based on observations of a very small group of participants ($n = 4$). Moreover, a closer inspection of the data learns that three of these participants scored close to chance level (i.e., 64%, 64% and 55% correct), indicating that the task may have been too difficult for them to reveal an effect of a subtle manipulation such as that of condition type.

4.4 Discussion

In the current study, we elaborated on previous research using spoken language and audio-visual materials. Moreover, we extended the focus from healthy comprehension only to both healthy and aphasic comprehension. Finally, we carried out the study in Dutch, in which more grammatical differences between direct and indirect speech constructions exist than in English. The nature and the possible effects of these differences will be addressed below.

The beneficial effect of direct over indirect speech on narrative comprehension in listeners with and without aphasia that was found in the current study is in line with findings of several previous studies of "healthy" language processing. Based on qualitative descriptions, direct speech has often been claimed to be an effective device for storytelling, because of its dramatizing and enlivening effects on narratives (Clark & Gerrig, 1990; Labov, 1972; Li, 1986; Mayes, 1990; Tannen, 1989; Wierzbicka, 1974). The results of the current study underline these findings. Yao et al. (2012) also argue for a beneficial effect of direct over indirect speech constructions. Conversely, Eerland et al. (2013) found no evidence that direct speech enhances the availability of information about the referential or communicative situation as compared to indirect speech. In fact, they found (some) evidence to the contrary.

Our findings also build on and complement previous studies of aphasic language comprehension. These studies revealed a number of factors that determine how well individuals with aphasia understand spoken discourse. Pashek (1977) showed that individuals with mild auditory comprehension deficits benefit from the use of contrastive stress in Token Test commands, suggesting that prosodic variations within spoken language facilitate auditory comprehension for at least some individuals with aphasia. The results of the current study, in which aphasic participants may benefit from prosodic variation as well, are in line with these findings. Pashek and Brookshire (1982) found that both speech rate and linguistic stress had an effect on discourse comprehension in aphasia: Scores of aphasic individuals were higher for paragraphs presented with a slow rate of speech than for those presented at a normal rate and for paragraphs presented with exaggerated stress than for paragraphs with normal stress. Their findings relating the effects of stress are compatible with our results, because it is known that speakers use intonational cues such as voice quality, tempo, pitch and loudness as a means of contextualising direct

speech constructions (Couper-Kuhlen, 1998; Lind, 2002).

Therefore, one possible explanation for our finding of an advantage for direct speech relates to the additional "cues" that are often present in direct but not in indirect reported speech. While indirect speech is claimed to be description-like, direct speech is considered to be more demonstration-like (Clark & Gerrig, 1990). Direct speech constructions are often rich in terms of non-verbal and paralinguistic information such as intonation and facial expression (Couper-Kuhlen, 1998; Goodwin, 1990; Holt, 1996; Li, 1986; Streeck & Knapp, 1992; Wilkinson et al., 2010). Moreover, speakers often mimic other formal aspects of speech, such as the pitch or voice quality of the original speech (Romaine & Lange, 1991). This "prosodic richness" may lead to direct speech constructions being better understood than their "prosodically flat" counterparts. In a previous study (Groenewold et al., 2014) we showed that the occurrence of direct speech has a positive effect on the perceived liveliness of discourse produced by both aphasic and NBD speakers. Increased liveliness, in turn, has been argued to improve the comprehensibility of speech and to keep the listener focused (Hincks, 2005). Combining the findings of these studies, one would expect a positive effect of the occurrence of direct speech on discourse comprehension as was found here. While Groenewold et al. (2014) did not find any advantage for direct speech on perceived comprehensibility ratings, the current study, using objective measures of comprehensibility, indeed showed a beneficial effect of direct speech on language comprehension for both aphasic and NBD individuals. However, the extra "layers" of communication that accompany direct but not indirect speech may not be necessary to obtain a differential effect between direct and indirect speech processing. As was argued by Yao et al. (2012), even monotonously spoken direct speech makes listeners spontaneously engage in mental simulations of vivid vocal depictions. Apparently, the surface form of direct as compared to

indirect speech constructions can be enough to achieve a differential effect on spoken language processing.

An alternative explanation for the findings of the current study relates to the grammatical differences between direct and indirect reported speech. In a study assessing the effects of a number of linguistic variables on discourse comprehension in aphasia, Levy, Hoover, Waters, Kiran, Caplan, Berardino and Sandberg (2012) found that passages with syntactically simple sentences were better understood than passages with syntactically complex sentences. This was the case for both individuals with aphasia and neurologically healthy controls. Since Dutch direct and indirect reported speech constructions also differ with respect to their grammatical complexity, this may be of influence in our study as well. To further address the difference in grammatical complexity of the two construction types we discuss examples 3A and 3B.

Example and translation of direct reported speech in Dutch:

(3A) *Marie zei: "ik ben moe".*
Marie said: "I am tired".
'Marie said: I am tired'.

Example and translation of indirect reported speech in Dutch:

(3B) *Marie zei dat ze moe was.*
Marie said that she tired was.
'Mary said that she was tired'.

Even though the reported content and the quotation frame, *Marie said,* are the same, Examples 3A and 3B are grammatically different in several respects. First, Example 3A differs from Example 3B in the use of pronouns ("I" versus "she") and verb tense ("ben" versus "was"). Furthermore, Example 3B involves a change of the original (reported) word order in the reported clause, whereas in Example 3A the report

remains in the same (main clause) word order[6]. Finally, in Example 3B, the reported speech is embedded in the main clause, as shown by the obligatory complementiser *that*. Direct speech constructions (e.g., Example 3A) do not require such an embedding and are, therefore, possibly easier to process for individuals with and without aphasia.

Since there are two candidate explanations for our findings, which cannot be disentangled with the data collected for the current study, further research is required. In order to determine the role of the obligatory complementiser and embedded construction in Dutch indirect speech, it is important to examine the effects of direct and indirect speech on discourse comprehension in a language that does not have these grammatical differences between condition types. In English for example, the word order for indirect speech is the same as for direct speech (i.e., SVO). Second, unlike in Dutch, the complementiser *that* in English indirect speech constructions is not obligatory (e.g., *he said he will come later*). It is more, in the embedded clauses of verbs such as *say, know* or *think* in English conversation register the default construction is the one with an absent *that* (Biber, Johansson, Leech, Conrad & Finegan, 1999; Llinàs-Grau & Martínez-Ferreiro, 2014). Conducting a similar study in English may reveal whether non-verbal and paralinguistic or grammatical factors are the critical feature.

[6]Whilst it is clear that Example 3B has a changed word order (as compared to the *reported* word order, which is subject-verb-object (SVO)), it is not straightforward whether the SVO word order in Example 3A represents the base or the derived form. In Dutch, the position of the finite verb in main clauses differs from that in subordinate clauses. The unmarked order of main clauses is SVO, while subordinate clauses exhibit an SOV pattern. Therefore, which order is basic is a fundamental and highly debated problem in Dutch grammar. For many years, from the early 1970s, the general consensus was that Dutch (like German) is an SOV language (e.g., Bastiaanse, 2011; Bastiaanse, Hugen, Kos, & Van Zonneveld, 2002; Bastiaanse & Van Zonneveld, 2006; Koster, 1975; Scaglione, 1981). However, new theories suggest that the SOV order is itself derived from a more basic SVO order (e.g., Den Dikken, 1996; Koster, 1994; Zwart, 1994, 1997;). This linguistic debate regarding canonical word order in Dutch is beyond the scope of this study.

CHAPTER 5

THE DIFFERENTIAL EFFECTS OF DIRECT AND INDIRECT SPEECH ON DISCOURSE COMPREHENSION IN DUTCH AND ENGLISH LISTENERS WITH AND WITHOUT APHASIA[1]

[1]This chapter was adapted from: Groenewold, R., Bastiaanse, R., Nickels, L., Wieling, M., and Huiskes, M. (2014). The differential effects of direct and indirect speech on discourse comprehension in Dutch and English listeners with and without aphasia. *Aphasiology*. Advanced online publication.

5.1 Introduction

The term direct speech is traditionally used to refer to expressions such as *John said: "I am hungry"*, whereas indirect speech is used for expressions like *John said (that) he was hungry*. The difference between direct and indirect speech has received a considerable amount of attention from researchers in a variety of disciplines. The fundamental difference between the two forms is claimed to lie in the point of view of the reporter: in direct speech the reporter lends his/her voice to the original speaker, whereas in indirect speech the reporter relates a speech event from his/her own point of view (Coulmas, 1986).

Several studies have shown that direct speech serves specific interactional goals in communication. Clark and Gerrig (1990) argue that an important function of direct speech is to provide a vivid *demonstration* of former speech, whereas indirect speech delivers a *description* of what was said. Various researchers have pointed out that direct speech is characterised by its dramatic, theatrical nature (e.g., Li, 1986; Tannen, 1989; Wierzbicka, 1974). Compared to indirect speech, direct speech is usually more vivid and perceptually engaging than indirect speech (e.g., Yao, Belin, & Scheepers, 2011). Therefore, it is often used at the climax of stories and is proposed to be an effective way of conveying the point of a narrative (Mayes, 1990).

In the current study we focus on the effects of direct and indirect speech constructions on spoken discourse comprehension in English listeners with and without aphasia. This is a follow-up to a study in Dutch (Groenewold, Bastiaanse, Nickels, Wieling, & Huiskes, 2014) to examine whether the effects of direct and indirect speech constructions on discourse comprehension are the same or different for the two languages. Groenewold, Bastiaanse, Nickels, Wieling, et al. (2014) showed that, for Dutch individuals with and without aphasia, narratives

containing direct speech constructions were better comprehended than narratives with indirect speech constructions. Two possible explanations were put forward to account for these findings.

One of the candidate explanations was related to the increase in liveliness for direct speech compared to indirect speech (Groenewold, Bastiaanse, Nickels, Wieling, et al., 2014). Liveliness of speech is mainly associated with enthusiasm (Sinclair, 1995). The degree of perceived liveliness can be affected by modification of the three prosodic dimensions of speech: loudness, pitch, and tempo (Hincks, 2005). Based on several qualitative descriptions, direct speech has often been claimed to have a positive effect on liveliness of speech (e.g., Macaulay, 1987; Wierzbicka, 1974) and to be an effective device for storytelling (e.g., Labov, 1972; Li, 1986; Mayes, 1990). Similar effects have been reported for more quantitatively oriented research. Studies on processing of "unimpaired" language have shown that direct speech is perceived as more vivid and is thought to be more engaging than indirect speech (Yao, Belin, & Scheepers, 2012; Yao & Scheepers, 2011; Yao et al., 2011). This has also been shown to hold for "impaired" language: auditory speech fragments of speakers with and without aphasia containing direct speech were perceived as more lively than those without (Groenewold, Bastiaanse, Nickels, & Huiskes, 2014). Other studies have shown that direct speech is considered a way to create involvement in a story (Chafe, 1982; Tannen, 1989), and that, in general, increased liveliness helps the listener to stay focused and understand the content of a message (Hincks, 2005). Given that direct speech is perceived as more vivid than indirect speech, it seems likely that the occurrence of direct speech constructions contributes not only to the liveliness but also to the comprehensibility of spoken language.

A second candidate explanation proposed for the differences found in Groenewold, Bastiaanse, Nickels, Wieling, et al. (2014) is related

to the grammatical differences between direct and indirect speech constructions. Some of these differences exist only in Dutch, others exist in both Dutch and English. The grammatical characteristics of direct and indirect speech constructions that may be of relevance for our study are addressed later.

A first grammatical difference between direct and indirect speech concerns the degree of integration of reporting and reported parts of the sentence: Direct reported speech involves a word-by-word rendition of former speech. However, even though the propositional content is retained, indirect speech typically modifies the grammar of the reported utterance to embed it in the reportative construction (Jäger, 2007). Individuals with (agrammatic) aphasia have been shown to have difficulty understanding embedded sentences (Abuom, Shah, & Bastiaanse, 2013) and may therefore find it more difficult to process indirect speech compared to direct speech. Even though in both Dutch and English indirect speech has features that signal that the "quote" is more fused with the clause containing the (reporting) verb than in direct speech, this difference is greater for Dutch than for English. Dutch indirect speech constructions are more overtly marked for embedding than English constructions. First, unlike in English, in Dutch, indirect speech constructions are mandatorily introduced by the complementiser "dat" (*that*). Second, in Dutch, clauses representing direct speech and clauses representing indirect speech have different word orders: While in direct speech the word order is subject-verb-object (SVO), in indirect speech it is subject-object-verb (SOV) (Groenewold, Bastiaanse, & Huiskes, 2013). Which word order is basic is highly debated (Groenewold, Bastiaanse, Nickels, Wieling, et al., 2014): For many years the general consensus was that Dutch is an SOV language (e.g., Bastiaanse, 2011; Bastiaanse, Hugen, Kos, & Van Zonneveld, 2002; Bastiaanse & van Zonneveld, 2006; Koster, 1975; Scaglione, 1981); however, more recent theories propose that the SOV

order is actually derived from a more basic SVO order (see Zwart, 2011 for an overview of the discussion). In English, there is no difference in word order between direct and indirect speech constructions (both are SVO).

Direct and indirect speech differ in the use of pronouns, and this is universal across languages (Li, 1986). Consider Example 1:

Example 1. Direct and corresponding indirect speech in English and Dutch.

Direct speech

(1a) John told Paul: "I want to go".
Jan zei tegen Paul: "Ik wil gaan".

Indirect speech

(1b) John told Paul (that) he wanted to go.
Jan zei tegen Paul dat hij wilde gaan.

In direct speech, pronouns (1a, *I, ik*) are consistent with the vantage point of the original speaker (first person), whereas in indirect speech, pronouns (1b, *he, hij*) have the same person as in the surrounding narrative (third person). It has been suggested that a first-person perspective is easier to identify with and to link to one's own perspective than a third-person perspective (e.g., Bohan, Sanford, Cochrane, & Sanford, 2008). However, indirect speech (1b) may also be more difficult to process than direct speech (1a) because of construction ambiguity. In the direct speech in (1a), "I" unquestionably refers to the reporting speaker (in this case: John). If, instead, the pronoun "he" had been used, this could not be interpreted as referring to John, and the referent would remain clear (in this case: some other third-party male person). Conversely, "he" in the indirect speech of (1b) could refer to either the reported speaker (John) or to some other male person and is therefore ambiguous. This is the case for both Dutch and English.

Direct speech constructions do not suffer from referential ambiguity (Coulmas, 1986b), and may therefore be easier to process in both the languages.

It is not currently clear to what extent the findings of the Dutch DISCO study are also valid for other languages. It could be the case that the Dutch participants performed better on the direct speech condition because of an increase in liveliness compared to the indirect speech condition. If liveliness is the crucial factor, then we should find similar results for other languages, regardless of how direct and indirect speech constructions are grammatically realised. Alternatively, the difficulty for Dutch indirect speech constructions could be due to the grammatical factors discussed earlier. Replicating the previous study in English the current study serves to provide us with more insight into the effects of direct versus indirect speech constructions on discourse comprehension in aphasia, and the role that grammatical characteristics play in comprehension success.

Other previous studies have paid some attention to the contrasting effects of direct and indirect speech on language comprehension (e.g., Bohan et al., 2008; Eerland, Engelen, & Zwaan, 2013; Yao & Scheepers, 2011; Yao et al., 2011). However, the scope and the methodologies of these studies have been diverse. As yet, no consensus has been reached with regard to either the direction or the size of the differential effects of direct versus indirect speech processing. In addition, there are some methodological factors that limit interpretation of the results, making predictions for follow-up studies, and generalising the findings. For example, the majority of the experiments so far have used *written* rather than *spoken* language to assess the difference between the two construction types (e.g., Bohan, et al., 2008; Eerland et al., 2013; Yao & Scheepers, 2011; Yao et al., 2011). Moreover, in the few cases in which spoken language was used, stimuli were *auditory* rather than

audiovisual (e.g., Groenewold, Bastiaanse, Nickels, & Huiskes, 2014; Yao et al., 2012). This is remarkable since many characteristics that play an important and distinguishing role in reported speech (e.g., the occurrence of gesture, facial expression, intonation, etc.) only become apparent in the audiovisual modality. Therefore, even though these studies have provided us with valuable insights into the effects of direct and indirect speech, the findings are neither exhaustive nor necessarily representative of naturalistic speech data. Consequently, in the current study a different approach was used, relying on audiovisual recordings of spoken language.

The current study was conducted to gain further insight into audiovisual discourse comprehension in aphasia, to find out more about the differential effects of direct and indirect speech constructions on discourse comprehension, and to determine to what extent the findings of the Dutch DISCO study are also valid for English. It may help us to explain the findings of the Dutch DISCO study, to formulate predictions for other languages, and to develop recommendations for clinical practice.

The research question we aimed to answer in the current study was:

What are the differences between the effects of direct and indirect speech constructions on narrative comprehension in Dutch- and English-speaking individuals with and without aphasia?

5.2 Methods

5.2.1 Participants

Twenty Australian-English native speakers with aphasia and 19 Australian-English non-brain-damaged (NBD) native speakers

participated in the English DISCO study[2]. The English-speaking participants with and without aphasia were matched to one another and to the 23 individuals with aphasia and 20 NBD participants of the Dutch DISCO study (Groenewold, Bastiaanse, Nickels, Wieling, et al., 2014) for mean level of education and mean age at the group level. The NBD participants reported no history of neurological or language impairment and did not show evidence of cognitive or language impairment during the testing session. Individuals with aphasia were recruited through a database of research volunteers and through local aphasia groups. Certified speech and language pathologists made diagnosis of aphasia from results of standard aphasia tests, and the participants with aphasia had to be at least 3 months post-onset. As part of the procedure, the Token Test (Aachen Aphasia Test; Graetz, De Bleser, Willmes, & Heeschen, 1992) was conducted to establish the severity of aphasia. Table 5.1 presents descriptive information about the two groups, and Table 5.2 shows demographic and clinical data for the participants with aphasia.

5.2.2 Materials

For the English version of the DISCO experiment, the narratives of the Dutch experiment were translated. Unless otherwise noted, the replication followed the procedures of the Dutch DISCO study (Groenewold, Bastiaanse, Nickels, Wieling, et al., 2014). The instructions, the narratives, and the questions for the English DISCO were digitally video recorded in a professional recording studio by two native speakers of Australian English. Each version of a narrative (direct/indirect speech) was read by the same speaker, and the speakers were instructed to speak naturally and only use limited gestures (such as hand, face, and small body movements). The speakers were not aware of the purpose of the study.

[2]Macquarie University Human Research Ethics Committee approved the study and all participants provided signed informed consent prior to participation.

Table 5.1: Descriptive information of participants without brain damage (NBD) and participants with aphasia (PWA).

			Age	Education	MPO
Dutch	NBD	Mean	55.7	12.15	N/A
		SD	12.1	2.83	N/A
		Range	35-76	6-17	N/A
	PWA	Mean	56.3	12.1	75.3
		SD	8.7	2.8	68.1
		Range	41-71	6-17	3-226
English	NBD	Mean	65.16	12.67	N/A
		SD	8.78	2.66	N/A
		Range	40-76	10-20	N/A
	PWA	Mean	64.90	13.47	89.65
		SD	11.53	3.10	67.01
		Range	35-78	8-19	10-249

Education: number of years of education completed; MPO: months post onset; SD: standard deviation.

The English DISCO test consisted of one pair of practice narratives and six pairs of experimental narratives. The narratives ranged in length from 12 to 16 sentences (183-268 words). The Flesch Reading Ease (FRE[3]) scores (Flesch, 1948) varied from 74.7 to 85.2. The FRE scores of the two versions (direct and indirect speech) of a narrative always fell within the same range. In addition, any effect of FRE was controlled for in the analysis. Table 5.3 presents descriptive information about the Dutch and English narratives.

All the narratives describe reports of conversations between a husband and a wife. The topics of the narratives would be familiar to most adults.

[3]The FRE test is designed to indicate comprehension difficulty, based on the number of words, sentences, and syllables of a narrative. Higher scores indicate material that is easier to read. Texts with scores between 60 and 69 are considered standard, those between 70 and 79 fairly easy, and those between 80 and 89 easy (Flesch, 1948).

The materials were designed in such a way that the narratives described a chronological sequence of events and that each sentence was either expository or a continuation of the prior sentences. In addition, no more than three characters were introduced per narrative to reduce the demands on memory. Two of these characters were always the husband and the wife. In Appendix D.1 samples of the two versions of the narratives can be found. Apart from the reporting sentences, which differed in condition (direct vs. indirect reported speech), the two versions of the narratives contained declarative sentences and were identical in the two versions. In order to make optimal use of the grammatical differences between Dutch and English indirect speech constructions, the English indirect reporting sequences did not contain the optional complementiser *that* (which is mandatory in Dutch). In colloquial English is much more common to omit *that* than include it, and this is therefore considered the norm in conversational or informal styles (Biber, Johansson, Leech, Conrad, & Finegan, 1999).

Eight yes/no questions per narrative were used to assess comprehension. This assessment method rules out possible interference effects from spoken language *production* impairments (Groenewold, Bastiaanse, Nickels, Wieling, et al., 2014), and is similar to that of, for example, Brookshire and Nicholas (1993), and Ferstl, Walther, Guthke, and Von Cramon (2005). Just like the narratives, these English questions were translations of the Dutch DISCO questions. For four of the questions the correct response was YES, for the other four it was NO. The questions were video recorded, and the same videos were used for both conditions (direct and indirect speech). The first question always focused on the main idea of the text and served as a "warm up" question. The remaining questions required comprehension of more detailed information provided in the reporting utterances (direct/indirect speech) of the narratives. The sequential order of the questions was in accordance with the order of mention in the narrative. The questions belonging to the example narrative are provided in Appendix D.1.

Table 5.2: Demographic and clinical data for the participants with aphasia.

Language	PWA	Age	Gender	MPO	Cause
Dutch	D_P2	44	Male	9	CVA left
Dutch	D_P3	62	Male	162	CVA left
Dutch	D_P4	55	Female	103	CVA left
Dutch	D_P7	67	Female	50	CVA left
Dutch	D_P8	68	Male	18	Brain tumor removal
Dutch	D_P10	45	Male	34	CVA left
Dutch	D_P11	41	Female	64	CVA left (carotid dissection)
Dutch	D_P12	50	Male	96	CVA left
Dutch	D_P14	68	Male	79	CVA left
Dutch	D_P15	43	Male	31	CVA left
Dutch	D_P16	53	Male	21	CVA left
Dutch	D_P17	52	Male	24	CVA left
Dutch	D_P18	58	Male	34	CVA left
Dutch	D_P19	59	Male	211	CVA left
Dutch	D_P21	55	Male	210	CVA left
Dutch	D_P23	71	Female	43	CVA right
Dutch	D_P24	53	Male	3	Subarachnoid hemorrhage
Dutch	D_P26	60	Male	18	CVA left
Dutch	D_P27	53	Male	92	CVA left
Dutch	D_P28	61	Male	53	CVA left
Dutch	D_P29	49	Female	27	CVA left
Dutch	D_P30	66	Male	122	CVA left
Dutch	D_P33	62	Male	226	CVA left
AVERAGE DUTCH		55.9		67.8	
English	E_P1	68	Male	105	CVA left
English	E_P2	74	Male	192	CVA left
English	E_P3	68	Male	60	CVA left
English	E_P4	68	Male	43	CVA left
English	E_P5	56	Female	47	CVA left
English	E_P6	58	Female	73	CVA left
English	E_P7	71	Male	106	CVA left
English	E_P8	72	Male	81	CVA left
English	E_P9	73	Male	46	CVA left
English	E_P10	59	Male	89	CVA left
English	E_P11	64	Male	20	CVA left
English	E_P12	73	Male	11	CVA left
English	E_P13	64	Male	45	CVA left
English	E_P14	70	Male	179	CVA left
English	E_P15	78	Male	162	CVA left
English	E_P16	72	Male	168	CVA left
English	E_P17	67	Male	10	TBI
English	E_P18	72	Female	38	CVA left
English	E_P19	35	Female	69	CVA left
English	E_P20	36	Female	249	Brain hemorrhage
AVERAGE ENGLISH		64.9		89.7	

PWA: participant with aphasia; MPO: months post onset; CVA: cerebro-vascular accident;
TT: Token Test error score (0-50); Education: number of years of education completed.

	Diagnosis aphasia	Severity aphasia	TT	Education
	Fluent	Mild	4	14
	Non-fluent	Moderate-severe	41	15
	Non-fluent	Severe	36	10
	Fluent	Mild	1	10
	Fluent	Mild	5	15
	Fluent	Mild-moderate	7	14
	Non-fluent	Moderate-severe	18	11
	Non-fluent	Moderate-severe	12	14
	Fluent	Mild	3	15
	Non-fluent	Mild	10	10
	Non-fluent	Mild	4	11
	Non-fluent	Moderate	24	10
	Non-fluent	Moderate-severe	13	17
	Non-fluent	Severe	40	17
	Fluent	Mild	9	11
	Fluent	Mild	3	6
	Fluent	Moderate-severe	11	14
	Non-fluent	Moderate-severe	35	10
	Fluent	Mild	3	10
	Non-fluent	Severe	16	10
	Non-fluent	Moderate	2	14
	Fluent	Moderate	12	10
	Non-fluent	Mild	17	10
			14.2	12.2
	Non-fluent	Mild	15	12
	Non-fluent	Moderate-severe	19	10
	Non-fluent	Severe	19	19
	Fluent	Mild	2	12
	Non-fluent	Severe	30	11
	Fluent	Mild	18	16
	Non-fluent	Moderate	22	9
	Fluent	Mild	10	13
	Fluent	Mild	10	8
	Fluent	Mild	1	12
	Non-fluent	Severe	30	13
	Non-fluent	Moderate	12	18
	Non-fluent	Mild-moderate	20	14
	Fluent	Mild	13	12
	Non-fluent	Moderate-severe	23	19
	Non-fluent	Severe	36	12
	Fluent	Mild-moderate	19	12
	Non-fluent	Severe	24	12
	Fluent	Mild	8	16
	Fluent	Mild	9	16
			17.0	13.3

Table 5.3: Descriptive information for materials.

			Number of words		Number of sentences		Words/sentence		FRE	
Story line	Narrative	Language	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
A1. Being on time	Airport	Dutch	193	223	12	13	16.1	17.2	73.5	76.8
		English	183	205	12	13	15.3	15.8	80.4	83.1
A2. Being on time	Theatre	Dutch	198	217	12	12	16.5	18.1	86.7	87.1
		English	212	223	12	12	17.7	18.6	85.2	84.0
B1. Home	Paint	Dutch	201	214	12	12	16.8	17.8	86.3	87.5
		English	198	204	12	12	16.5	17.0	77.3	74.7
B2. Home	Couch	Dutch	218	217	13	12	16.8	18.1	88.9	87.5
		English	213	236	13	12	16.4	19.7	83.4	81.1
C1. Making plans	Dinner	Dutch	191	223	12	13	15.9	17.2	67.5	68.8
		English	201	227	12	13	16.8	17.5	78.3	79.2
C2. Making plans	Jubilee	Dutch	234	258	15	16	15.6	16.1	67.7	67.2
		English	246	268	15	16	16.4	16.8	77.1	78.1

FRE: Flesch Reading Ease. Texts with scores between 60 and 69 are considered standard, those between 70 and 79 fairly easy, and those between 80 and 89 easy.

To ensure that correct answers to the questions could only be given when the narrative was understood (rather than relying on world knowledge or information that was presented in other questions), the questions were presented to a separate group of NBD participants (n=21) who had not heard the stories. As expected, this group performed at around chance level (proportion correct = 0.54, SD = 0.09).

5.2.3 Procedures

Testing took place individually in a single session of about an hour for the aphasic participants, and 30 minutes for the NBD participants. The NBD participants only carried out the DISCO, while the aphasic participants also performed the Token Test subtest of the Aachen

Aphasia Test[4] (Graetz et al., 1992) to provide a measure of aphasia severity. The Token Test scores reflect the number of incorrectly performed items (0-50).

To control for possible effects of presentation order, the English DISCO narratives were presented in a pseudo-random order using 12 fixed lists. In addition, order was controlled for in the analysis. The participants were informed that they would be watching seven videos on an iPad, the first of which served as a practice item, and that after each video they would be asked to answer eight yes/no-questions about the content of the narrative. The questions could be answered by touching the screen, where a red button with a cross [NO] and a green button with a tick [YES] appeared. The participants were instructed to use their left hand to answer the questions. The experiment commenced by the participant pressing the [START] button. The participants then saw a short video spoken by one of the two speakers with the following message (translated from the Dutch DISCO instructions), ensuring that the instructions were constant across participants:

> *You are going to watch 6 short videos. During these videos, my colleague and I will tell short stories. At the end of each of the stories you will hear 8 questions, which you can answer with "yes", or "no". These questions concern the broad storylines. Therefore, you do not have to remember the details. We will start with a practice video.*

Next, the participants were presented with a practice narrative, which was told by the other speaker. Hence, they were accustomed to both the speakers and the procedure of the test before commencing the six experimental narratives. Three seconds after the last sentence of each narrative, the first of the eight questions was automatically presented. The participants answered the question with a button press ("yes"

[4]During this test, the participant receives instructions to perform tasks that increase in difficulty with a set of tokens differing in shape, color or size, such as: "show me the red square and the yellow circle".

or “no”), which also triggered the next question. This fixed paradigm ensured there was no variability across participants in timing between the narratives and the first question. After completion of the eight questions of the previous narrative the participants saw a blank screen with a movie icon before moving on to the next narrative. The participants could decide whether they wanted to take a short break or move on immediately.

5.2.4 Statistical analyses

For the statistical analyses we used the protocol that was used for the Dutch DISCO study (Groenewold, Bastiaanse, Nickels, Wieling, et al., 2014), but added language (Dutch vs. English) as an extra predictor. First, an item analysis using a two-paired Wilcoxon Rank-Sum Test was carried out to confirm that all items were suitable for further analysis. Items that deviated significantly from ceiling performance for the NBD participants were considered unsuitable and therefore removed.

Subsequently, generalised linear mixed-effects regression modeling (GLMER) was used to analyse the English and Dutch data together. The following predictors of interest were included: language (Dutch vs. English), group (NBD vs. aphasia), and condition type (direct vs. indirect speech). We assessed whether random intercepts for participant, question and story were necessary to take into account that some participants may perform better than others and that some questions or stories may be easier than others. Furthermore, the necessity of (by-question, by-subject, and by-story) random slopes was assessed to account for possible variability (per question, subject and story) in the effects of certain predictors. For example, some questions may show a greater performance difference between participants with and without aphasia, whereas this effect may be smaller for other questions (i.e., a by-question random slope for group). Taking these random slopes and intercepts into account prevents type-I errors in assessing the influence

of the predictors of interest (Baayen, 2008). We evaluated whether random intercepts and slopes for language, participant, story, and question were necessary by comparing the Akaike Information Criterion (AIC; Akaike, 1974) values of the model including the random slope or intercept to the one without. An AIC decrease of at least 2 indicates that the more complex model is warranted given the improvement in fit. The possible effects of the following material-related covariates were examined: number of sentences, number of words, number of syllables, number of characters, mean length of utterance (MLU), mean length of words (in number of characters), FRE, and question number (within a story). The following participant-related covariates were examined: age, gender, number of years of education completed, and educational level. To assess whether each of these predictors or interactions between predictors significantly improved the model, we relied on AIC-based model comparison (with a reduction of at least two signifying that the more complex model provides a better fit to the data, given the added complexity). To assess the influence of aphasia severity using the Token Test error score, a separate analysis was also conducted including only the individuals with aphasia.

5.3 Results

The mean Token Test error score was 14.2 for the Dutch participants with aphasia and 17.0 for the English-speaking participants with aphasia. Of the 48 English DISCO items (6 stories x 8 questions), five deviated significantly from the expected ceiling performance for the NBD participants ($p < .05$, after a Bonferroni correction for multiple comparisons) and were therefore removed for further analyses. The average scores per group and condition type after removal of these items are presented and compared to the Dutch DISCO scores in Figure 5.1. Individual scores for the participants are provided in Appendix D.2.

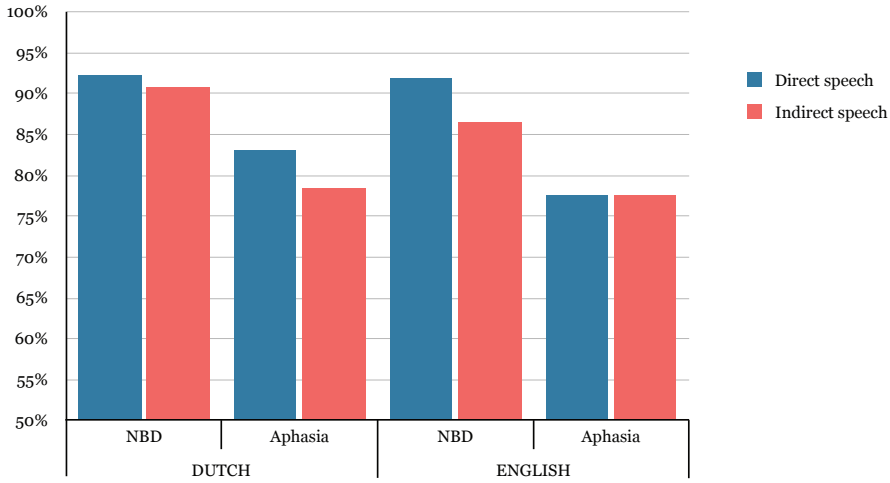

Figure 5.1: Average percentage of correctly answered DISCO questions, presented per language, group and condition type. NBD: non-brain-damaged.

In Table 5.4 the proportions of *hits* (correct answer: yes, response: yes), *misses* (correct answer: yes, response: no), *correct rejections* (correct answer: no, response: no), and *false alarms* (correct answer: no, response: yes) for the Dutch and English DISCO participants are presented.

Table 5.4: Proportions of hits, misses, false alarms and correct rejections for the English and Dutch DISCO by participant group

		NBD		Aphasia	
		Response: Yes	Response: No	Response: Yes	Response: No
Dutch	Stimuli: Yes	0.94 (*SD* = 0.05)	0.06 (*SD* = 0.05)	0.86 (*SD* = 0.10)	0.14 (*SD* = 0.10)
	Stimuli: No	0.11 (*SD* =0.09)	0.89 (*SD* = 0.09)	0.26 (*SD* = 0.16)	0.74 (*SD* = 0.17)
English	Stimuli: Yes	0.92 (*SD* = 0.07)	0.08 (*SD* = 0.07)	0.82 (*SD* = 0.12)	0.18 (*SD* = 0.13)
	Stimuli: No	0.15 (*SD* = 0.08)	0.85 (*SD* = 0.08)	0.28 (*SD* = 0.19)	0.72 (*SD* = 0.20)

NBD: non-brain-damaged.

Table 5.5 presents the final generalised mixed-effects regression (GLMER) model for the overall analysis in which the scores for groups, condition types, and countries were included. The model shows that there is a main effect of listener type: an NBD participant has a greater likelihood of answering a question correctly than a participant with aphasia (ß= 1.33, $z = 6.34$, $p < .01$). Furthermore, there is a main effect of condition: participants perform significantly better in the direct speech condition than in the indirect speech condition (ß = 0.26, z = 2.59, $p < .01$). Finally, a main effect of language was found: the Dutch participants were more likely to answer a question correctly than the English-speaking participants (ß = 0.47, z = 2.50, $p < .05$). No other predictors or interactions between predictors were significant. Random intercepts were necessary for participant and question, but not for story. Finally, a by-question random-slope for group was necessary, indicating that there was variability in the performance difference between participants with and without aphasia for different questions.

Table 5.5: Generalised linear mixed-effects regression model predicting the probability (in terms of logits) of answering a Dutch or English DISCO question correctly.

Fixed effects	Estimate	Standard error	*z*-value	*p*-value
(Intercept)	1.1958	0.2085	5.736	<.01
NBD as opposed to aphasic participants	1.3261	0.2092	6.338	<.01
Direct as opposed to indirect speech	0.2595	0.1003	2.586	<.01
Dutch as opposed to English participants	0.4740	0.1893	2.503	<.05

Only significant predictors were included.

Table 5.6 presents the results of the best GLMER model focusing on the group of participants with aphasia only. As is clear from this model, a higher Token Test error score had a negative impact on the probability of answering a DISCO question correctly (ß = -0.04, $z = -4.43$, $p < .01$). In addition, if a story was easier (as measured by the FRE), participants with aphasia were more likely to answer a DISCO question

correctly (ß = 0.03, z = 2.24, p <.05). Furthermore, participants with aphasia more likely give an incorrect answer to questions that were presented later than those that were presented earlier in the sequence within each narrative (ß = -0.14, z = -2.42, p < .05). Finally, there was an interaction between condition and language (ß = 0.47, z = 2.15, p < .05): the English-speaking individuals with aphasia showed no significant effect of condition (ß = -0.07, z = 0.16, p = .67), whereas for the Dutch participants with aphasia the direct speech condition was significantly easier than the indirect speech condition (ß = 0.40, z = 2.46, p < .05).[5] No other predictors (or interactions between predictors) were significant. Random intercepts were necessary for participant and question, but not for story. No random slopes were required.

Table 5.6: Generalised linear mixed-effects regression model predicting the probability (in terms of logits) for participants with aphasia of answering a Dutch or English DISCO question correctly.

Fixed effects	Estimate	Standard error	*z-value*	*p-value*
(Intercept)	1.8484	0.1874	9.865	<.01
Token Test error score of 1 point more	-0.0439	0.0099	-4.428	<.01
Flesch Reading Ease (centered)	0.0292	0.0131	2.240	<.05
Question 1 position later in a sequence	-0.1393	0.0576	-2.418	<.05
Condition=direct * Language=Dutch	0.4684	0.2179	2.149	<.05

Only significant predictors were included. Negative estimates indicate a lower probability of answering a question correctly. DU: Dutch, EN: English.

5.3.1 Summary of results

Examining both the languages and both the subject groups, the NBD participants performed better than the participants with aphasia. In addition, there was an effect of language on comprehension accuracy, indicating that Dutch participants obtained higher scores than English-

[5]There was not enough support to distinguish the English-speaking participants with aphasia from the other groups in the analysis including the NBD participants. The AIC reduction of the more complex model including the contrast (over the model reported in Table 6) was 1.4, and the interaction term was only marginally significant (p = 0.06).

speaking participants. Finally, there was a main effect of condition, indicating that narratives that were presented with direct speech reports were understood more accurately than narratives with indirect speech reports. There was no interaction, indicating that this held for both the NBD participants and the individuals with aphasia.

Focusing on the individuals with aphasia, we found an effect of Token Test score on comprehension accuracy, indicating that, as expected, individuals with fewer Token Test errors performed better on the DISCO. In addition, there was an effect of FRE (Flesch, 1948), indicating that aphasic participants obtained higher scores for narratives with lower complexity. Question number also affected performance: questions that were presented earlier after each story had a higher probability of being answered correctly than questions presented later, indicating that as the time after a story had finished increased, the task became more difficult. This could be due to, for example, an increasing demand on memory or cognitive load. Finally, there was an interaction effect between condition type and language: Whereas for the Dutch participants with aphasia narratives containing direct speech were significantly easier to comprehend than narratives containing indirect speech, no such effect was found for the English-speaking aphasic participants.

5.4 Discussion

This study replicated, in English, our earlier Dutch study on the effects of direct speech on discourse comprehension (Groenewold, Bastiaanse, Nickels, Wieling, et al., 2014). It particularly aimed to provide us with greater insight into the effects of direct versus indirect speech on discourse comprehension in English-speaking individuals with aphasia.

First, as expected, we found that, in both the languages, the aphasic participants performed significantly worse than the matched individuals without brain damage. Nevertheless, importantly, the participants with aphasia did perform above chance level, indicating that the DISCO test is suitable for assessing audiovisual discourse comprehension in aphasia in both English and Dutch. Second, Dutch participants performed better than English-speaking participants. This finding reflects the outcomes of the Token Test where the English participants with aphasia were more severely impaired in comprehension generally compared to the Dutch participants with aphasia. Finally, as in Dutch (Groenewold, Bastiaanse, Nickels, Wieling, et al., 2014), in English, narratives containing direct speech were easier to comprehend than narratives containing indirect speech. The DISCO materials are therefore sensitive enough to detect differential effects of subtle manipulations such as the occurrence of direct versus indirect speech constructions.

Two possible explanations were proposed to account for the fact that direct speech was better comprehended than indirect speech in the Dutch DISCO study: (1) direct speech is more lively than indirect speech; and (2) indirect speech is more complex grammatically than direct speech (Groenewold, Bastiaanse, Nickels, Wieling, et al., 2014).

Had liveliness been the crucial factor, then the beneficial effect of direct over indirect speech would exist in both the languages and for all the participant groups because the difference in liveliness between condition types is similar across languages. Indeed, overall, the same pattern was found in both the languages, suggesting that liveliness does play a role. Critically, however, English-speaking people with aphasia did not show the benefit for direct speech that was seen in the other groups. Consequently, we suggest that the grammatical differences between Dutch and English direct and indirect speech constructions

also play a role. As mentioned in the Introduction, there are several grammatical differences between the conditions in the two languages. The differences that may be relevant for the explanation of the results will be addressed in the following text.

First, unlike in English, in Dutch there is a difference in word order across condition types. In direct speech, the word order is SVO, whereas in indirect speech, it is SOV (Groenewold et al., 2013). The topic of basic word order in Dutch is still highly debated and beyond the scope of this paper. However, it seems plausible that the canonical SVO word order of direct speech benefits comprehension for the Dutch participants (and perhaps particularly the participants with aphasia). In English, there is no such difference and hence no benefit. Second, unlike in English, in Dutch, indirect speech constructions are explicitly embedded in the main clause, using the obligatory complementiser "dat" (*that*). Embedding has been shown to negatively impact sentence comprehension in individuals with agrammatic aphasia (Abuom et al., 2013) and could therefore explain the differences in comprehension of direct speech constructions (which do not contain embedding) and indirect speech constructions (which do contain embedding) in Dutch individuals with aphasia.

While the use of a complementiser is obligatory in Dutch indirect speech constructions, in English it is optional. In fact, the default construction in English conversation register is the one with the absent *that* (Biber et al., 1999). For this reason, in the English DISCO materials we omitted the complementiser in the indirect speech condition of the narratives. Nevertheless, indirect speech constructions still represent embedding in English.

Consider the two following examples:

(2a) The man says the woman is waiting
(2b) The man says: "the woman is waiting"

In (2a) "the woman is waiting" is an embedded sentence, in which "that" has been omitted, whereas in (2b) this same clause is not an embedding. When a sentence is perceived, it must be parsed. This happens fully automatically and incrementally, that is, word by word (see, e.g., Levelt, 1989) in a matter of milliseconds. Notice that the surface syntactic structure of sentences (2a) and (2b) is identical, that is, it is unclear from the surface structure whether the object is an embedded sentence or not. In order to resolve this surface syntactic ambiguity, the listener must draw on other interpretive resources, such as contextual and/or paralinguistic information. It is only when information at several levels (discourse, prosody, syntax, etc.) is integrated, that the sentence can be fully parsed and understood. Disambiguating such structures requires extra processing costs (Frazier, 1987). In NBD English individuals, these extra processing costs are not problematic. However, it has repeatedly been reported that individuals with aphasia are slower to fully integrate grammatical, lexical-semantic, discourse, and prosodic information (see, e.g., DeDe, 2012). The extra processing costs required by the integration process may disrupt the parsing process of English sentences with direct and indirect speech in individuals with aphasia. We suggest that, for English individuals with aphasia, these extra processing costs overrule the advantages that direct speech has in NBD English individuals and in Dutch NBD and aphasic individuals. In Dutch, there are no extra processing costs since the syntactic structure is transparent because of differences in word order and the obligatory use of a complementiser.

We expected to find similar patterns for English-speaking NBD and

aphasic participants; however, we found differential patterns for the two English-speaking subgroups. This suggests that neither of the candidate explanations put forward in Groenewold, Bastiaanse, Nickels, Wieling, et al. (2014) can stand alone. While an advantage from paralinguistic and non-verbal factors, producing increased liveliness, can account for the benefit of direct speech that was found for the English-speaking NBD subgroup, grammatical factors can explain the lack of an effect for the English-speaking participants with aphasia. For this subgroup, the extra parsing effort required to resolve the ambiguity caused by the absence of grammatical markers of embedding may nullify the positive effect of increased liveliness and reduced syntactic complexity in direct speech.

In sum, the findings of the current study have provided us with new insights into the role of direct speech constructions in aphasic discourse comprehension. Conducting similar studies in further languages may provide us with more insight into these and other effects of direct and indirect speech on discourse comprehension and help us determine to what extent the findings can be generalised cross-linguistically. In order to assess the role of ambiguity introduced by the omission of the complementiser in the English version of the DISCO, a follow-up study introducing a third condition type (i.e., indirect speech containing the complementiser *that*) could be carried out.

CHAPTER 6

GENERAL DISCUSSION

6.1 Introduction

In this final chapter we discuss the main findings of the research project presented in this thesis. In the first section, we address the use of direct speech in language production by individuals with aphasia and non-brain-damaged (NBD) control speakers. First, we discuss how often these groups use direct speech constructions, and how the use of direct speech differs qualitatively across groups. Second, we discuss the effects of direct speech in aphasic and NBD production on listener perception. In the second section of this chapter, we discuss the effects of direct versus indirect speech on language comprehension in Dutch individuals with and without aphasia. We propose two candidate explanations for the findings of this study. Next, we discuss the rationale behind and the findings of the English version of the study. In the concluding section, we discuss the clinical implications of all findings.

6.2 Main findings

6.2.1 Use of direct speech by individuals with and without aphasia

Previous research had shown that most individuals with aphasia were able to produce direct speech constructions in elicited speech (e.g., Ulatowska & Olness, 2003; Hengst, Frame, Neuman-Stritzel, & Gannaway, 2005; Ulatowska, Reyes, Santos, & Worle, 2011; Wilkinson, Beeke & Maxim, 2010). In this thesis, we built on these findings. In the study described in Chapter 2, we addressed the research question:

To what extent do Dutch aphasic and NBD speakers produce direct speech constructions in spontaneous speech?

In line with previous research, we found that individuals with aphasia were indeed able to produce direct speech constructions in different types of narrative tasks. In addition, we showed that speakers with aphasia used direct speech relatively more frequently than NBD speakers. We also observed variability across subgroups in the usage of direct speech: There was a quantitative difference between the use of direct speech by individuals with anomic aphasia and by NBD speakers; the difference between the individuals with Broca's aphasia and the NBD group was qualitative in nature.

Berko-Gleason, Goodglass, Obler, Green, Hyde and Weintraub (1980) previously suggested that an increased use of direct speech by speakers with agrammatic aphasia may be a *strategy*. They observed that individuals with agrammatic aphasia have a tendency to use *simplified* direct speech in their narratives (Berko-Gleason et al., 1980). Similarly, Wilkinson et al. (2010) argued that aphasic speakers used direct speech (and/or other behavior such as the use of gesture, body movement and prosody to iconically depict aspects of reported events, referred to as *enactment*) as a way to formulate actions and events using the limited lexical and grammatical resources at their disposal. They observed that speakers with agrammatic aphasia often produced enactments in a non-sentential form, containing no verb, and consisting of very few lexical items. Moreover, they showed that direct speech and other types of enactment could occur in utterances with very few syntactic restrictions. By using direct speech, speakers with agrammatic aphasia can reduce or omit grammatically complex constructions, because grammatical relations can be loose in such constructions. As addressed in the General Introduction, direct speech can be considered an example of a topic-comment structure, with the person reference as the topic, and the 'quote' as the comment (e.g., *John: "what?!"*). Instead of explicitly indicating grammatical relationships between items, through, for example, a subordinate construction (e.g., *John said that he could not*

believe it), using direct speech speakers can have an increased reliance on pragmatic relations between items (see also Wilkinson et al., 2010). Consistent with these observations and suggestions, we showed that speakers with Broca's aphasia indeed exhibit a preference for direct speech constructions without a reporting verb (i.e., *bare* quotations).

Like the individuals with agrammatic aphasia, the individuals with anomic aphasia produced relatively many direct speech constructions. However, individuals with anomic aphasia commonly produced direct speech constructions introduced by a reporting verb (e.g., *to say*), just like NBD speakers. We argued that the individuals with anomic aphasia may use direct speech to compensate for a different underlying deficit, that is, to avoid or resolve word-finding difficulties. Direct speech enables them to make abstract concepts such as thoughts, attitudes, and scenarios more concrete, and to produce high-frequency terms and words compared to descriptive alternatives. These factors are known to positively contribute to word retrieval in aphasia (e.g., Nickels & Howard, 1995).

We suggested that both groups of individuals with aphasia showed an increased use of direct speech, because it enables them to compensate for linguistic deficiencies, and to make optimal use of those communicative resources that are usually still relatively intact, such as pausing, tempo, loudness, pitch, and voice quality. In addition, we suggested that the differential patterns of type of direct speech constructions reflect the difference in the nature of underlying difficulties (i.e., grammatical versus word-finding problems). However, there may be an additional reason for speakers with aphasia to produce relatively many direct speech constructions. Previous studies have shown that, in 'healthy' interaction, direct speech contributes to the liveliness of speech (Labov, 1972; Wierzbicka, 1974; Li, 1986; Mayes, 1990), and that it creates involvement in a story (Chafe, 1982; Tannen, 1989). In turn,

increased liveliness may help the listener to understand a message (Hincks, 2005). Therefore, in aphasia, the increased occurrence of direct speech may directly affect liveliness, and, thus, contribute to the comprehensibility of speech. This hypothesis led to the second study.

6.2.2 Effects of direct speech in NBD and aphasic speech

Although claims have been made concerning the increased liveliness and comprehensibility of speech as a result of the occurrence of direct speech, no explicit evidence for this has been provided. In addition, research into these effects had been carried out in unimpaired speakers only. Therefore, in our second study (Chapter 3) we not only tested these claims in NBD communication, but also extended the focus to aphasic interaction, addressing the following research question:

How does the occurrence of direct speech in Dutch NBD and aphasic speech affect its perceived liveliness and comprehensibility?

Our findings supported previous claims regarding the positive effect of direct speech on perceived liveliness (e.g., Labov, 1972; Wierzbicka, 1974; Li, 1986; Mayes, 1990). In addition, we found that this was true for both NBD and aphasic speech. However, perceived comprehensibility was not affected by the occurrence of direct speech for either NBD or aphasic speakers. This means that our results are not in line with findings from previous studies that claimed that increased liveliness helps the listener understand the content of a message (e.g., Hincks, 2005). However, liveliness and comprehensibility were rated on the basis of audio recordings. The absence of non-verbal aspects, such as facial expressions, gestures and body movements may have led to an underestimation of the effects on comprehensibility.

The finding that direct speech adds to the liveliness but not to the comprehensibility of aphasic speech is in line with Holland's (1977)

observation that in some cases, individuals with aphasia "probably communicate better than they talk" (p. 173). In many communicative situations, the purpose of interaction is not necessarily information transmission, but rather a way to relate to another person. In line with such an approach to communication, the frequent employment of direct speech by individuals with aphasia may be considered a strategy that enhances their communicative competence. The increased use of direct speech seems to yield benefits for both production and reception of communication: it facilitates production because it is grammatically simple (Berko-Gleason et al., 1980), and it facilitates reception because it increases the involvement of the listener in a story (Chafe, 1982; Tannen, 1989). In addition, the increased liveliness of direct speech helps the listener to maintain focused (Hincks, 2005).

6.2.3 Comprehension of direct versus indirect speech by Dutch individuals with and without aphasia

Given that some of the possible explanations we provided for the results of Studies 1 and 2 affected not only language production but also comprehension (e.g., increased liveliness, increased listener involvement, less complex grammar, multiple resources of communication), the question arose what the effects of direct speech are on language *comprehension*. More specifically, we became interested in the effects of direct versus indirect speech constructions on aphasic and NBD listener comprehension.

The effects of direct speech on language comprehension received little attention in the literature, and was restricted to comprehension by NBD speakers. The scope and the methodologies of the studies were diverse and no clear consensus had been reached with regard to either the direction or the size of any effects. In addition, there were methodological restrictions that limited interpretation of the results, formulation of predictions for follow-up studies, and generalisation of

the findings. For example, the majority of the experiments used written rather than spoken language to assess the difference between the two construction types (e.g., Bohan, Sanford, Cochrane & Sanford, 2008; Yao, Belin & Scheepers, 2011; Yao & Scheepers, 2011; Eerland, Engelen & Zwaan, 2013). In addition, despite the fact that many characteristics that play an important and distinguishing role in reported speech (e.g., the occurrence of gesture, facial expression, body movement) only become apparent in the audiovisual modality, in the few cases in which spoken language was used, the researchers relied on auditory rather than audiovisual stimuli (e.g., Yao, Belin & Scheepers, 2012).

Therefore, even though there were valuable insights into the effects of direct and indirect speech, the research was neither exhaustive nor representative of naturalistic speech data. Consequently, in the study described in Chapter 4, we used audiovisual recordings of spoken language to address the following research question:

Is there a difference between the effects of direct and indirect speech constructions on comprehension of narrative discourse in Dutch listeners with and without aphasia?

To assess the effects of direct versus indirect speech on Dutch discourse comprehension, we developed the iPad-based DIrect Speech COmprehension (DISCO) test. Our Dutch DISCO study revealed that, as expected, the performance of NBD individuals was better than that of the aphasic participants. Moreover, narratives that were presented with direct speech reports were better understood than narratives in which indirect speech reports were used. This means that Dutch individuals with aphasia benefited from direct speech not only in language production, but also in language comprehension. We proposed several explanations for this finding. A first possible explanation for this finding is related to the additional 'cues' that are often present in direct but not

in indirect reported speech. While indirect speech is more description-like, direct speech is more demonstration-like (Clark & Gerrig, 1990). Compared to indirect speech, direct speech constructions are often rich in terms of non-verbal (e.g., facial expression, body movement, gestures) and paralinguistic (e.g., intonation, pauses, tempo, loudness, voice quality) information. This 'richness' in terms of communicative resources may lead to direct speech being better understood than descriptive indirect speech.

The alternative account we proposed is related to two main differences in grammatical complexity between Dutch direct and indirect speech constructions: the mandatory presence (indirect speech) or absence (direct speech) of the complementiser 'that', and the difference in word order (canonical order subject-verb-object (SVO) for direct speech, and the non-canonical order subject-object-verb (SOV) for indirect speech). The complementiser and the non-canonical word order overtly mark Dutch indirect speech constructions for embedding. Since individuals with (agrammatic) aphasia have difficulty understanding embedded sentences (Abuom, Shah & Bastiaanse, 2013), we suggested that the grammatical construction used in indirect speech in Dutch is harder to process than that of direct speech constructions for listeners with aphasia.

6.2.4 Comprehension of direct versus indirect speech by English individuals with and without aphasia

In order to disentangle the two candidate explanations above, we carried out a similar experiment in English. In English, direct and indirect speech constructions do not differ in complexity at surface grammar level, since their word orders are the same (SVO), and the complementiser for indirect speech is optional and usually omitted (e.g., *John said: I am happy* versus *John said he is happy,* see also Biber, Johansson, Leech, Conrad & Finegan, 1999). We expected

either a beneficial effect of direct speech for both English participant groups (indicating that liveliness was the crucial factor for improved comprehension), or no effect of condition type (suggesting that the difference in grammatical structure could explain the findings of the Dutch DISCO study).

Hence, in Chapter 5, the following research question was addressed:

What are the differential effects of direct and indirect speech on discourse comprehension in Dutch and English listeners with and without aphasia?

Combined across both languages and subgroups, we found that direct speech was better comprehended than indirect speech. However, this effect did not hold for the English-speaking listeners with aphasia. The fact that there were differential effects of direct speech on comprehension in Dutch and English and across NBD and brain-damaged speakers suggested there must be another factor that played a role.

We suggested that the crucial factor was the ambiguity of the surface syntactic structure. For English-speaking individuals with aphasia processing of direct and indirect speech constructions (without complementiser) may be hard because of the ambiguity of the status of the object of the sentence: it could either be a direct quote (e.g., "Mary says: "she's hungry"") or an embedded object in indirect speech (e.g., "Mary says she's hungry"). Since the complementiser is omitted in all the indirect speech constructions in the English DISCO narratives, all reported speech utterances (both direct and indirect speech) are ambiguous in a structural sense.

To disambiguate the structures, the participants needed to rely on context and/or paralinguistic cues (Jäger, 2007). It has been shown that individuals with aphasia are slower in using context and prosodic cues relative to NBD individuals (DeDe, 2012). Therefore, we argued that while the NBD participants immediately and automatically solve this grammatical ambiguity relying on these cues, for individuals with aphasia this disambiguation process requires extra processing, resulting in poorer performance. While English-speaking NBD participants benefitted from increased liveliness accompanying direct speech relative to indirect speech, this effect was overruled by difficulty resolving grammatical ambiguity for participants with aphasia. This resulted in the same scores for both condition types. Hence, grammatically simple constructions are not necessarily always easier to comprehend than grammatically more complex constructions for individuals with aphasia. In order to confirm this hypothesis, a similar study could be conducted with English individuals with aphasia which compares the comprehension of direct speech constructions to indirect speech constructions both with and without the complementiser.

6.3 Clinical implications

The results of this research project show that direct speech positively affects the interaction skills of Dutch speakers with aphasia in several ways. In language production, direct speech may help individuals with aphasia get around word finding problems and simplify grammatical constructions. Importantly, direct speech is a linguistic format that is also commonly used by NBD speakers and, hence, forms a natural strategy. In addition, individuals with aphasia can complement or even replace verbal communication using paralinguistic and non-linguistic devices such as intonation, gestures, and body movements, aspects that are usually intact in individuals with aphasia (Goodwin, 1995; Lind,

2002) and often of key importance in direct speech constructions. Another advantage of the production of direct speech by individuals with aphasia is that it contributes to the perceived liveliness of their speech. This is important given that previous studies have shown that increased liveliness helps the listener to stay focused (Hincks, 2005). Therefore, even though the use of direct speech does not directly affect comprehensibility, it may help Dutch individuals with aphasia to be stronger communication partners.

Discourse comprehension of direct speech has also been shown to be a useful linguistic device for Dutch individuals with aphasia. We showed that they found narratives containing direct speech constructions easier to understand than narratives containing indirect speech constructions. However, we did not find such a beneficial effect of direct speech on discourse comprehension for English listeners with aphasia.

Given that in many communicative situations, social affiliation is more important than information exchange (Brown & Levinson, 1978; Button & Lee, 1987), we recommend speech-language pathologists to practice the use of direct speech as part of everyday communication with aphasic speakers. They should demonstrate to aphasic speakers that direct speech is a natural and economical way to enable lively, attention-holding conversation. In addition, we recommend speech-language pathologists to make individuals with aphasia aware of the flexible format of direct speech (in terms of grammatical freedom, and the wide range of non-verbal and paralinguistic possibilities), and the versatile communicative contexts in which direct speech can be used (i.e., not only for quoting, but also for referring to thoughts or states of mind, making suggestions, etcetera). Finally, when talking to Dutch individuals with aphasia, we recommend communication partners to use direct rather than indirect speech constructions to report speech: the reduced grammatical complexity and extra information from non-

verbal and/or paralinguistic cues may help individuals with aphasia better understand a message.

In sum, this thesis has provided new insights into the occurrence of direct speech in aphasic as compared to NBD speech. It tested the claims that had been made regarding the effects of direct speech on liveliness and comprehensibility using an experimental approach, and extended the scope from unimpaired discourse to the effects of direct speech in unimpaired and aphasic discourse. The research project presented here was the first to demonstrate that both NBD and aphasic communication is perceived as more lively when it contains direct speech than when it does not, even though it is not more comprehensible. It has also contributed to the understanding of audiovisual comprehension at the discourse level in people with and without aphasia. The research project has not only provided theoretical insights into language processing and its breakdown, but also given clear directions for future intervention studies with people with aphasia.

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APPENDICES

APPENDIX A

Appendix to Chapter 2: Direct speech in aphasic narratives

A.1: Summary information about studies on direct speech in aphasia conducted so far.

Authors	Language	Terminology	Subtypes
Berko-Gleason et al. (1980)	English	Direct Speech	n.a.
Lind (2002)	Norwegian	Direct Reported Speech	n.a.
Ulatowska & Olness (2003)	African American	Direct Speech	Dialogue/ monologue, and narrative/ non-narrative.
Hengst et al. (2005)	English	Reported Speech	Direct/ indirect / projected / indexed/ undecided.
Ulatowska et al. (2010)	Caucasian American and African American	Reported Speech	Direct/ indirect and narrative/evaluative.
Wilkinson et al. (2010)	English	Enactment	Kinesic enactment with or without vocalization, *oh* and assessments, *no,* and *oh no*.
Present study	Dutch	Direct Speech	Speech quotation, thought quotation, bare quotation, and question-answer sequence.

	Task	Speaker types	# Aphasic speakers	# Control speakers
	Picture Story test	Broca's and Wernickes	10	5
	Spontaneous verbal interaction	Broca's and Wernickes	1	0
	Personal narrative of a frightening experience	Not mentioned (only: with mild and moderate levels of aphasia)	13	15
	Community observations, clinic-based sessions and semistructured interviews	Modaterate-severe nonfluent, mild nonfluent, moderate-severe fluent, and fluent	7	7
	Stroke narratives	Not mentioned (only: severity ranged from mild to moderate)	33	0
	Interaction with spouse/ family member or SLT	Non-fluent aphasia	4	0 (analyzed)
	2 picture-based tasks and semi-spontaneous speech	Broca's and anomic	30	88

A.2: Participant data.

PWA	Type of aphasia	Aetiology	Localization	Age	MPO	Sex	Task 1	Task 2	Task 3
1	Anomic	CVA	temporo-parietal	52	18	M	x	x	x
2	Anomic	CVA	unknown	53	13	M	x	x	
3	Anomic	CVA	thalamus	62	11	M	x	x	x
4	Anomic	CVA	nucl. caudatus/capsula interna	66	7	M	x	x	x
5	Anomic	CVA	thalamus, internal capsules and basal ganglia	24	4	F	x	x	x
6	Anomic	CVA	occipito parietal	50	4	F	x	x	x
7	Anomic	CVA	unknown	74	11	F	x	x	x
8	Anomic	CVA	no signs	55	7	M	x	x	x
9	Anomic	CVA	caudate nucleus	52	9	M	x	x	x
10	Anomic	CHI	parieto-occipito-temporal	35	28	M	x	x	x
11	Anomic	Encephalitis	mainly occipital and ventricular	47	3	M		x	
12	Anomic	CVA	parietal	79	15	M		x	x
13	Anomic	CVA	area middle cerebral artery	48	6	M			x
14	Anomic	HCVA	unknown	81	5	M			x
15	Anomic	CVA	unknown	59	15	M			x
16	Anomic	CVA	unknown	57	3	F			x
17	Anomic	HCVA	unknown	39	11	F			x
18	Anomic	ICVA	unknown	52	84	F			x
19	Broca	CVA	parieto-occipital	43	19	F	x		
20	Broca	CVA	area middle cerebral artery	38	154	F	x	x	x
21	Broca	CVA	parieto-temporal	45	77	M	x	x	x
22	Broca	CVA	area middle cerebral artery	66	37	M	x	x	x
23	Broca	CVA	area middle cerebral artery	51	10	F	x	x	x
24	Broca	CVA	temporo-parietal	47	38	M	x		
25	Broca	CVA	fronto-temporal	63	125	F	x		
26	Broca	CVA	occipito parietal	53	12	M	x	x	x
27	Broca	CVA	parietal	65	5	M		x	
28	Broca	CVA	unknown	55	136	M			x
29	Broca	ICVA	unknown	70	14	M			x
30	Broca	CVA	unknown	82	14	F			x
31	Broca	CVA	fronto-temporal	63	125	F			x

(PWA: person with aphasia; CVA: cerebro vascular accident; CHI: closed head injury; MPO: months post onset; M: male; F: female; task 1: Dinner Party; task 2: Orchestra; task 3: semi-spontaneous speech).

A.3: Summary information for the individuals with aphasia.

Task	PWA	Type of aphasia	Duration	# Words	# Utterances	Mean # words / utterance
Dinner Party	1	Anomic	2:56	199	20	10.0
	2	Anomic	2:41	232	27	8.6
	3	Anomic	1:37	224	37	6.1
	4	Anomic	1:48	89	11	8.1
	5	Anomic	1:05	107	16	6.7
	6	Anomic	2:16	200	20	10.0
	7	Anomic	3:06	170	26	6.5
	8	Anomic	2:05	221	36	6.1
	9	Anomic	1:38	176	27	6.5
	10	Anomic	2:47	303	33	9.2
	19	Broca	3:17	207	54	3.8
	20	Broca	4:35	106	25	4.2
	21	Broca	3:14	86	33	2.6
	22	Broca	15:06	136	34	4.0
	23	Broca	2:32	82	20	4.1
	24	Broca	4:27	95	36	2.6
	25	Broca	6:14	313	69	4.5
	26	Broca	1:47	104	16	6.5
Orchestra	1	Anomic	2:43	115	21	5.5
	2	Anomic	4:21	184	36	5.1
	3	Anomic	2:28	278	37	7.5
	4	Anomic	1:47	66	20	3.3
	5	Anomic	3:07	51	15	3.4
	6	Anomic	2:06	118	15	7.9
	7	Anomic	1:43	104	18	5.8
	8	Anomic	1:44	129	18	7.2
	9	Anomic	1:56	76	20	3.8
	10	Anomic	4:34	209	30	7.0
	11	Anomic	2:15	78	20	3.9
	12	Anomic	1:06	102	18	5.7

(Continued)

Task	PWA	Type of aphasia	Duration	# Words	# Utterances	Mean # words / utterance
	20	Broca	3:56	63	17	3.7
	21	Broca	2:34	27	21	1.3
	22	Broca	3:45	63	21	3.0
	23	Broca	3:13	62	20	3.1
	26	Broca	2:49	182	43	4.2
	27	Broca	3:58	113	30	3.8
Spontaneous speech	1	Anomic	9:25	307	71	4.3
	2	Anomic	2:12	398	46	8.7
	3	Anomic	5:38	428	58	7.4
	4	Anomic	4:37	220	50	4.4
	5	Anomic	3:11	382	56	6.8
	6	Anomic	2:30	357	51	7.0
	7	Anomic	3:07	422	58	7.3
	8	Anomic	2:22	386	50	7.7
	9	Anomic	3:00	410	33	12.4
	10	Anomic	2:25	355	40	8.9
	11	Anomic	3:05	389	59	6.6
	12	Anomic	12:51	1515	192	7.9
	13	Anomic	6:25	613	87	7.0
	14	Anomic	9:32	972	126	7.7
	15	Anomic	10:22	1458	182	8.0
	16	Anomic	9:58	659	92	7.2
	17	Broca	9:46	347	63	5.5
	18	Broca	10:33	364	76	4.8
	19	Broca	14:47	228	40	5.7
	20	Broca	6:59	357	82	4.4
	21	Broca	6:02	404	81	5.0
	22	Broca	6:59	391	74	5.3
	23	Broca	11:28	343	71	4.8
	24	Broca	7:04	194	35	5.5
	25	Broca	8:02	462	77	6.0

PWA: person with aphasia.

APPENDIX B

Appendix to Chapter 3: Perceived liveliness and speech comprehensibility in aphasia

B.1: Example response sheet (translated from Dutch)

Fragment XX

1. How lively do you find the speech? (Grade 1 – 10): _____

2. In general, I am well able to follow the message

Strongly agree	Agree	Somewhat agree	Somewhat disagree	Disagree	Strongly disagree
O	O	O	O	O	O

3. I have to make an effort to understand this speaker

Strongly agree	Agree	Somewhat agree	Somewhat disagree	Disagree	Strongly disagree
O	O	O	O	O	O

4. This person is able to put his/her thoughts into words well

Strongly agree	Agree	Somewhat agree	Somewhat disagree	Disagree	Strongly disagree
O	O	O	O	O	O

APPENDIX C

Appendix to Chapter 4: The effects of direct and indirect speech on discourse comprehension in Dutch listeners with and without aphasia

C.1: Written samples from the two versions of the DISCO materials (translated from Dutch).

Reporting sentences are in italics.

Direct speech

A husband and a wife go to a store. The wife is looking for a new couch. In the shop the couple are immediately welcomed. The shopkeeper asks: "*Can I help you somehow?*" The wife says: "*Thank you, we will just look around ourselves*." The shopkeeper says: "*I"m available if you need any help*." The husband and the wife walk around the store. The wife asks the husband: "*What would you like?*" The husband replies: "*No idea, you can pick anything*". The wife says: "*I don"t like that suggestion, I think we should both like the couch*." The husband says: "*If you point to a couch, I will say whether I like it*." The wife points to a couch. The husband says: "*Too small, I want to be able to lie on it*." The wife points to a different couch. The husband says: "*That color is too dark, it does not fit in our house*." The wife walks around and sits on another couch. The husband asks: "*Is it comfortable?*" The wife replies: "*Very!*" The husband says: "*Then we take that one*." The wife walks towards the shopkeeper and says: "*We are taking the couch there in the corner of the store*." After ten minutes the husband and the wife leave the store.

Indirect speech

A husband and a wife go to a store. The wife is looking for a new couch. In the shop the couple are immediately welcomed. The shopkeeper *asks whether he can help them somehow*. The wife *thanks him* and *says they would like to look around themselves*. The shopkeeper *replies that he is available if they need any help*. The husband and the wife walk around the store. The wife *asks* the husband *what he would like*. The husband *replies that he has no idea and that she can pick anything*. The wife *says she doesn't like that suggestion* and *that she thinks they should both like the couch*. The husband *says if she points to a couch he will say whether he likes it*. The wife points to a couch. The husband *says it is too small and he wants to be able to lie on it*. The wife points to a different couch. The husband *says that color is too dark, and that it does not fit in their house*. The wife walks around and sits on another couch. The husband *asks whether it is comfortable*. The wife *replies that it is very comfortable*. The husband *says they will take that one*. The wife walks towards the shopkeeper and *says they are taking the couch there in the corner of the store*. After ten minutes the husband and the wife leave the store.

Questions

1. Is the wife looking for a new coffee table? [no]
2. Would the wife like to get advice from the shopkeeper? [no]
3. Did the wife find the opinion of the husband important? [yes]
4. Did the shopkeeper make suggestions for a couch? [no]
5. Did the husband want to be able to lie on the couch? [yes]
6. Did the husband find the color of the couch important? [yes]
7. Did the husband try the couch? [no]
8. Did the husband and the wife buy a couch? [yes]

C.2: Supplements to the statistical procedures.

By using logistic regression, we do not model the dependent variable directly, but rather model the probability (in terms of logits: the logarithm of the odds) of observing a correct answer. When interpreting the estimates, these need to be interpreted with respect to the logit scale (i.e., an estimate of 0 indicates that there is a 50% chance of answering the question correctly, whereas a positive estimate denotes a higher than 50% chance, and a lower estimate a lower chance).

The AIC difference can be used to determine the evidence ratio, which expresses the relative probability that the model with the lowest AIC is more likely to provide a more precise model of the data. An AIC difference of 2 is generally used as the minimum required reduction and indicates that the model with the lowest AIC is 2.7 times more likely to provide a precise model of the data (Akaike, 1974). Including random intercepts and slopes (if they provide a better fit) is important to prevent type-I errors in assessing the significance of the predictors of interest. More information about the merits of this approach can be found in Baayen, Davidson, and Bates (2008) and Baayen (2008, Ch. 7).

C.3: Individual scores by group and condition type.

Participant	Group	Direct speech	Indirect speech
P2	Aphasia	74.4%	72.6%
P3	Aphasia	77.4%	70.2%
P4	Aphasia	62.5%	66.1%
P7	Aphasia	91.7%	91.1%
P8	Aphasia	95.8%	73.8%
P10	Aphasia	87.5%	73.8%
P11	Aphasia	95.2%	70.8%
P12	Aphasia	91.7%	91.7%
P14	Aphasia	91.1%	79.2%
P15	Aphasia	70.8%	74.4%
P16	Aphasia	95.8%	100.0%
P17	Aphasia	79.2%	95.8%
P18	Aphasia	83.3%	81.5%
P19	Aphasia	61.3%	66.67%
P21	Aphasia	91.1%	83.3%
P23	Aphasia	91.1%	58.3%
P24	Aphasia	73.8%	66.7%
P26	Aphasia	44.0%	66.7%
P27	Aphasia	95.2%	95.8%
P28	Aphasia	86.9%	66.7%
P29	Aphasia	95.8%	91.7%
P30	Aphasia	91.7%	83.3%
P33	Aphasia	83.3%	82.1%
AVERAGE	Aphasia	83.1%	78.4%
C1	NBD	95.8%	90.5%
C2	NBD	87.5%	82.7%
C3	NBD	91.7%	95.8%
C4	NBD	91.7%	100.0%
C5	NBD	79.2%	91.1%
C6	NBD	83.3%	87.5%
C7	NBD	86.9%	91.7%
C8	NBD	100.0%	95.8%

(Continued)

Participant	Group	Direct speech	Indirect speech
C9	NBD	83.3%	75.0%
C10	NBD	100.0%	87.5%
C11	NBD	91.1%	83.3%
C12	NBD	91.1%	83.3%
C13	NBD	91.7%	100.0%
C14	NBD	91.7%	100.0%
C15	NBD	95.8%	95.2%
C16	NBD	95.8%	91.1%
C17	NBD	95.2%	87.5%
C18	NBD	100.0%	95.8%
C19	NBD	95.2%	87.5%
C20	NBD	95.2%	95.8%
AVERAGE	NBD	92.1%	90.9%

NBD: non-brain-damaged.

APPENDIX D

Appendix to Chapter 5: The differential effects of direct and indirect speech on discourse comprehension in Dutch and English listeners with and without aphasia

D.1: Written samples from the two versions of the English DISCO materials.

Reporting sentences are in italics.

Direct speech

It is a Sunday morning in summer. At the airport, a couple are queuing to board their flight to Paris. They are going on their honeymoon and only have twenty minutes before the plane departs. The wife looks in her bag. She says to the husband: "*I am almost certain that my passport was in my purse, but I cannot find it*." The husband exclaims: "*We will miss our flight, we have only twenty minutes left!*" The wife says: "*Calm down, we will find it. Oh, I know, I left it on the table in the café*." The husband looks at her and says: "*You can be so absent-minded! Stay here, I will go there immediately!*" The wife thinks to herself: "*What a troublemaker!*". Not even a minute later the husband comes back running. He says: "*We are really lucky!*" The wife asks: "*Lucky, why?*" The husband says: "*The waiter was waving at me with your passport in his hand and asked whether we could leave the table neatly the next time*." The wife says: "*I was right, there's nothing to worry about*".

Indirect speech

It is a Sunday morning in summer. At the airport, a couple are queuing to board for their flight to Paris. They are going on their honeymoon and only have twenty minutes before the plane departs. The wife looks in her bag. She *says to the husband she was almost certain that her passport was in her purse but she cannot find it*. The husband *exclaims they will miss their flight and have only twenty minutes left*. The wife *says he should stay calm and that they will find it*. She *says she already knows where it is, and that she left it on the table in the café*. The husband looks at her and *says she can be so absent-minded*. He *tells her to stay there and says he will go there immediately*. The wife *thinks to herself he is a troublemaker*. Not even a minute later the husband comes back running. He *says they are really lucky*. The wife *asks why*. The husband *says the waiter was waving at him with her passport in his hand and had asked whether they could leave the table neatly the next time*. The wife *says she was right and that there is nothing to worry about*.

Questions

1. Were the husband and the wife at the station? [no]
2. Was the wife in a panic? [no]
3. Was the husband afraid that they would miss the plane? [yes]
4. Did the wife remember where her passport was? [yes]
5. Did the wife think the husband overreacted? [yes]
6. Had the waiter accidentally thrown the passport away? [no]
7. Did the husband think they had been lucky? [yes]
8. Did the wife admit the husband was right? [no]

D.2: Individual scores by language, group and condition type.

Participant	Language	Group	Direct speech	Indirect speech
D_P2	Dutch	Aphasia	74.4%	72.6%
D_P3	Dutch	Aphasia	77.4%	70.2%
D_P4	Dutch	Aphasia	62.5%	66.1%
D_P7	Dutch	Aphasia	91.7%	91.1%
D_P8	Dutch	Aphasia	95.8%	73.8%
D_P10	Dutch	Aphasia	87.5%	73.8%
D_P11	Dutch	Aphasia	95.2%	70.8%
D_P12	Dutch	Aphasia	91.7%	91.7%
D_P14	Dutch	Aphasia	91.1%	79.2%
D_P15	Dutch	Aphasia	70.8%	74.4%
D_P16	Dutch	Aphasia	95.8%	100.0%
D_P17	Dutch	Aphasia	79.2%	95.8%
D_P18	Dutch	Aphasia	83.3%	81.5%
D_P19	Dutch	Aphasia	61.3%	66.67%
D_P21	Dutch	Aphasia	91.1%	83.3%
D_P23	Dutch	Aphasia	91.1%	58.3%
D_P24	Dutch	Aphasia	73.8%	66.7%
D_P26	Dutch	Aphasia	44.0%	66.7%
D_P27	Dutch	Aphasia	95.2%	95.8%
D_P28	Dutch	Aphasia	86.9%	66.7%
D_P29	Dutch	Aphasia	95.8%	91.7%
D_P30	Dutch	Aphasia	91.7%	83.3%
D_P33	Dutch	Aphasia	83.3%	82.1%
AVERAGE	Dutch	Aphasia	83.1%	78.4%
E_P1	English	Aphasia	76.7%	91.7%
E_P2	English	Aphasia	91.7%	86.1%
E_P3	English	Aphasia	91.7%	100.0%
E_P4	English	Aphasia	86.9%	80.6%
E_P5	English	Aphasia	73.0%	79.2%
E_P6	English	Aphasia	87.5%	89.2%
E_P7	English	Aphasia	55.6%	83.3%

(Continued)

Participant	Language	Group	Direct speech	Indirect speech
E_P8	English	Aphasia	61.1%	80.8%
E_P9	English	Aphasia	87.5%	95.8%
E_P10	English	Aphasia	87.5%	76.4%
E_P11	English	Aphasia	87.5%	55.6%
E_P12	English	Aphasia	80.8%	79.2%
E_P13	English	Aphasia	58.0%	68.1%
E_P14	English	Aphasia	63.9%	53.3%
E_P15	English	Aphasia	77.8%	87.5%
E_P16	English	Aphasia	51.4%	47.4%
E_P17	English	Aphasia	61.7%	44.2%
E_P18	English	Aphasia	73.8%	75.0%
E_P19	English	Aphasia	95.8%	91.7%
E_P20	English	Aphasia	100.0%	91.7%
AVERAGE	English	Aphasia	77.5%	77.8%
D_C1	Dutch	NBD	95.8%	90.5%
D_C2	Dutch	NBD	87.5%	82.7%
D_C3	Dutch	NBD	91.7%	95.8%
D_C4	Dutch	NBD	91.7%	100.0%
D_C5	Dutch	NBD	79.2%	91.1%
D_C6	Dutch	NBD	83.3%	87.5%
D_C7	Dutch	NBD	86.9%	91.7%
D_C8	Dutch	NBD	100.0%	95.8%
D_C9	Dutch	NBD	83.3%	75.0%
D_C10	Dutch	NBD	100.0%	87.5%
D_C11	Dutch	NBD	91.1%	83.3%
D_C12	Dutch	NBD	91.1%	83.3%
D_C13	Dutch	NBD	91.7%	100.0%
D_C14	Dutch	NBD	91.7%	100.0%
D_C15	Dutch	NBD	95.8%	95.2%
D_C16	Dutch	NBD	95.8%	91.1%
D_C17	Dutch	NBD	95.2%	87.5%
D_C18	Dutch	NBD	100.0%	95.8%

(Continued)

Participant	Language	Group	Direct speech	Indirect speech
D_C19	Dutch	NBD	95.2%	87.5%
D_C20	Dutch	NBD	95.2%	95.8%
AVERAGE	Dutch	NBD	92.1%	90.9%
E_C1	English	NBD	85.0%	84.7%
E_C2	English	NBD	93.3%	62.5%
E_C3	English	NBD	85.0%	76.6%
E_C4	English	NBD	100.0%	91.7%
E_C5	English	NBD	100.0%	100.0%
E_C6	English	NBD	85.0%	77.8%
E_C7	English	NBD	86.1%	72.5%
E_C8	English	NBD	87.5%	89.2%
E_C9	English	NBD	95.8%	87.5%
E_C10	English	NBD	95.8%	89.2%
E_C11	English	NBD	94.4%	78.3%
E_C12	English	NBD	95.8%	89.2%
E_C13	English	NBD	89.2%	95.8%
E_C14	English	NBD	91.7%	100.0%
E_C15	English	NBD	89.2%	95.8%
E_C16	English	NBD	100.0%	95.8%
E_C17	English	NBD	95.8%	79.2%
E_C18	English	NBD	87.5%	87.5%
E_C19	English	NBD	86.3%	91.7%
AVERAGE	English	NBD	91.8%	86.6%

NBD: non-brain-damaged.

SUMMARY

In this thesis, the occurrence of direct speech (e.g., *Mary said: "Let's go"*) in language produced by individuals with aphasia and its effects on listener perception are explored. The thesis also investigates the effects of direct and indirect speech (e.g., *Mary said that she wanted to go*) on discourse comprehension in individuals with aphasia. The principal finding is that direct speech has a positive effect on both language production and language comprehension in Dutch individuals with aphasia.

In the General Introduction, Chapter 1, possible causes of aphasia are discussed, followed by a description of how aphasia affects language production and comprehension. Next, possible ways that individuals with aphasia may compensate for these difficulties are considered. This is followed by a description of the main findings from the literature on direct and indirect speech processing and, more specifically, the use of direct speech in aphasia. Although much attention had been paid to reported speech in "healthy" interaction, the review of the literature makes it clear that little is known about the role of reported speech in aphasic discourse. In addition, there are a number of methodological limitations in the previous research, such as a reliance on English-language studies, small participant groups, the absence of a control group, and a major focus on written language. Hence, even though previous research on the production of direct speech in aphasia provides a clear base to build on, it is concluded that further research is

needed because of these methodological limitations. The chapter ends with the formulation of the research questions that are addressed in this thesis.

In the study presented in Chapter 2, the occurrence of direct speech constructions in narratives of Dutch individuals with and without aphasia is examined. The question posed in this chapter is whether and how often the construction is used, and in which forms it becomes manifest. To answer this question, the relative frequencies of direct speech constructions are calculated and compared within and between groups and tasks. Based on the patterns found in the data, different forms of direct speech are categorised: speech quotations, thought quotations, bare quotations and question-answer sequences. The results show that both groups make use of various forms of direct speech, but the individuals with aphasia produce more direct speech constructions than the non-brain-damaged (NBD) speakers. In addition, their direct speech instances have a different distribution across categories. The larger proportion of direct speech by individuals with aphasia is suggested to be a strategy to avoid difficulties with word-finding and grammar.

In Chapter 3 the effects of the occurrence of direct speech on the perceived liveliness and speech comprehensibility of spontaneous speech produced by speakers with and without aphasia are assessed. Previous studies have shown that direct speech is frequently accompanied by, for example, shifts in prosody, voice quality, and pitch. As modification of intonation has been suggested to affect the degree of perceived liveliness of speech, the occurrence of direct speech is expected to have a positive effect on perceived liveliness. Furthermore, since increased liveliness has been argued to help a listener to stay focused and understand the content of a message, the occurrence of direct speech is expected to positively affect speech comprehensibility.

The study demonstrates, as expected, that communication is perceived as more lively in both populations when it contains direct speech than when it does not. However, it is not more comprehensible. We suggest that the relatively high frequency of use of direct speech by speakers with aphasia reflects a strategy to increase not only liveliness of their discourse, but also listener focus and involvement.

Chapter 4 addresses the question of whether the use of direct speech, compared to indirect speech, affects comprehension of narrative discourse in Dutch listeners with and without aphasia. The Direct Speech Comprehension (DISCO) test is developed to examine the effects of manipulation of direct versus indirect speech on discourse comprehension. As predicted, narratives with direct speech are better understood than narratives with indirect speech by listeners with and without aphasia. Two possible explanations are proposed: 1) the positive effect of direct speech is caused by the additional "layers" of communication (e.g., changes in pitch, volume and speech rate, facial expression, pauses) accompanying direct but not indirect speech; 2) in Dutch, direct speech is easier to comprehend than indirect speech, since the grammatical structure of direct speech is less complex than that of indirect speech. That is, direct speech constructions do not have grammatical embedding and are in canonical word order. Indirect speech constructions are embedded sentences with an (obligatory) complementiser ('that') and the word order of the embedded sentence is non-canonical.

Chapter 5 presents a study investigating which of the two explanations for the Dutch results is correct by replicating the study in English. In English, like in Dutch, indirect speech constructions are embedded. However, English indirect speech constructions have the same (canonical) word order as direct speech constructions, and the complementiser is optional and usually omitted. Hence, an English

version of the DISCO test is developed and presented to participants with and without aphasia. The effects of language (Dutch versus English), group (speakers with aphasia versus speakers without aphasia) and condition (direct versus indirect speech) are examined. All three variables affect DISCO scores: the Dutch participants perform better than the English-speaking participants, the non-aphasic control group outperforms the aphasic group, and the direct speech condition is easier than the indirect speech condition. However, for English-speaking participants with aphasia, direct speech is not easier to understand than indirect speech. Given these differential effects for the Dutch and English aphasic individuals, it is argued that both the extra "layers" of communication (changes in intonation, facial expression, pauses, etc.) and the grammatical characteristics of direct and indirect speech constructions play a role in discourse comprehension success, but that the surface syntactic ambiguity of English reported speech constructions influences performance.

In Chapter 6, the issues raised in Chapter 1 and explored in Chapters 2 to 5 are discussed, and the results interpreted in relation to previous literature. Individuals with aphasia produce more direct speech constructions than speakers without aphasia, and this relative increase is suggested to reflect a strategy to mask word finding difficulty and to avoid grammatically complex constructions. It is argued that this is the first research to show that communication is perceived as more lively when it contains direct speech than when it does not. Furthermore, the positive effects of direct speech constructions on discourse comprehension in individuals with aphasia are considered. Finally, some clinical implications of the research are discussed: As direct speech is a linguistic format used by speakers without aphasia, it can provide a natural strategy to compensate for word-finding problems and grammatical difficulties. Direct speech can be a way that individuals with aphasia can complement or even replace verbal

communication by relying on paralinguistic and non-linguistic devices, such as intonation, gestures, and body movements (aspects that are usually intact in individuals with aphasia). In this way, direct speech can contribute to the perceived liveliness of speech, helping individuals with aphasia to be stronger communication partners. Direct speech provides them with a natural, economical and flexible linguistic format that can be used in versatile communicative contexts. Therefore, speech-language pathologists should consider practicing the use of direct speech in everyday communication with aphasic speakers. Similarly, there may be benefits from communication partners of individuals with aphasia using direct rather than indirect speech constructions to report speech, since the reduced grammatical complexity and extra non-verbal and paralinguistic cues may help individuals with aphasia better understand a message.

SAMENVATTING

Het doel van dit proefschrift is drieledig. Ten eerste wordt inzicht verschaft in het gebruik van directe-rede-constructies (bijvoorbeeld *Marie zei: "Kom, we gaan!"*) door sprekers met afasie. Ten tweede wordt onderzocht wat het effect is van het voorkomen van direct-rede constructies op waargenomen levendigheid en begrijpelijkheid. Ten slotte wordt het verschil in effect tussen directe- en indirecte-rede-constructies (bijvoorbeeld *Marie zei dat ze wilde gaan*) op discoursebegrip bij luisteraars met en zonder afasie in kaart gebracht. De belangrijkste uitkomst van dit onderzoek is dat de directe rede een positief effect heeft op zowel taalproductie als –begrip bij Nederlandse mensen met afasie.

In Hoofdstuk 1 worden mogelijke oorzaken van afasie besproken, gevolgd door een beschrijving van hoe afasie taalproductie en –begrip beïnvloedt. Vervolgens wordt uitgelegd hoe sprekers met afasie dit soort talige problemen kunnen compenseren. Daarna worden de belangrijkste bevindingen uit de literatuur over directe- en indirecte-rede-constructies besproken en, meer specifiek, het gebruik van de directe rede door individuen met afasie. Hoewel er al veel onderzoek is gedaan naar het gebruik en het effect de directe rede in 'gezonde' interactie, blijkt uit het literatuuroverzicht dat er weinig bekend is over de rol van de directe rede in de interactie van mensen met afasie. Bovendien heeft voorgaand onderzoek een aantal methodologische beperkingen, zoals een nadruk op Engelstalige interactie, kleine

deelnemersaantallen, het ontbreken van een controlegroep en een focus op geschreven in plaats van gesproken taal. Om deze redenen concluderen we dat er, ondanks het grote aantal onderzoeken naar directe-rede-constructies in 'gezonde' interactie, aanleiding is voor vervolgonderzoek. Het hoofdstuk eindigt met de formulering van onderzoeksvragen die worden beantwoord in dit proefschrift.

In Hoofdstuk 2 wordt het gebruik van directe-rede-constructies in spontane taal van sprekers met en zonder afasie onderzocht. De vraag die centraal staat in dit hoofdstuk, is hoe vaak directe-rede-constructies worden gebruikt en in welke vormen deze voorkomen. Om deze vragen te beantwoorden, worden de relatieve frequenties van directe-rede-constructies uitgerekend en vergeleken binnen en tussen groepen en elicitatietaken. De directe-rede-constructies zijn ingedeeld in de volgende datagestuurde categorieën: spraakcitaten, gedachtencitaten, citaten zonder rapporterend werkwoord en vraag-antwoordsequenties. Uit de resultaten blijkt dat beide groepen proefpersonen verschillende vormen van directe-rede-constructies gebruiken, maar dat de proefpersonen met afasie de directe rede vaker gebruiken dan de sprekers zonder afasie. Bovendien bestaat er tussen de groepen sprekers met afasie een verschil in verdeling van directe-rede-constructies over de verschillende categorieën: Afhankelijk van het type afasie hebben deze sprekers verschillende voorkeuren voor specifieke directe-rede-constructies. Het frequente gebruik van de directe rede door individuen met afasie wordt dan ook toegeschreven aan een adaptatiestrategie om problemen met woordvinding en grammatica te vermijden.

In Hoofdstuk 3 wordt het effect van de directe rede in spontane taal van sprekers met en zonder afasie op waargenomen levendigheid en begrijpelijkheid van taal onderzocht. Uit voorgaande studies is gebleken dat de directe rede dikwijls samengaat met onder andere veranderingen

in prosodie, stemkwaliteit en toonhoogte. Omdat vaak wordt beweerd dat dergelijke aanpassingen van intonatie de mate van waargenomen levendigheid van spraak beïnvloedt, wordt verondersteld dat de directe rede een positief effect heeft op waargenomen levendigheid. Verder wordt op basis van voorgaand onderzoek verwacht dat de directe rede een positief effect heeft op begrijpelijkheid, omdat dikwijls wordt beweerd dat levendigheid bijdraagt aan de focus van de luisteraar en de begrijpelijkheid van de inhoud van een boodschap. Uit het onderzoek blijkt dat, zoals verwacht, communicatie als levendiger wordt beschouwd als deze directe-rede-constructies bevat dan wanneer deze geen directe-rede-constructies bevat. Er bestaat echter geen effect op waargenomen begrijpelijkheid. Naar aanleiding van deze bevindingen suggereren we dat het relatief veelvuldige gebruik van de directe rede door mensen met afasie een strategie reflecteert om niet alleen de levendigheid, maar ook de aandacht en betrokkenheid van de luisteraar te vergroten.

In Hoofdstuk 4 wordt onderzocht of het gebruik van de directe rede, vergeleken met de indirecte rede, van invloed is op het begrip van Nederlandstalige discourse bij luisteraars met en zonder afasie. Om te onderzoeken wat de effecten zijn van de directe versus de indirecte rede op taalbegrip, hebben we de *Direct Speech Comprehension* (DISCO) test ontwikkeld. Zoals voorspeld, worden verhalen met de directe rede beter begrepen dan verhalen met de indirecte rede. Hiervoor worden twee mogelijke verklaringen voorgesteld: 1) het positieve effect van de directe rede wordt veroorzaakt door de extra “lagen” in communicatie (veranderingen in toonhoogte, volume, spreeksnelheid, gezichtsuitdrukkingen, pauzes, etc.) die samengaan met de directe rede maar niet de indirecte rede; 2) in het Nederlands is de directe rede makkelijker te begrijpen dan de indirecte rede, omdat de grammaticale structuur van directe-rede-constructies minder complex is dan die van indirecte-rede-constructies. Directe-rede-constructies zijn namelijk

niet grammaticaal ingebed en hebben een canonieke woordvolgorde, terwijl indirecte-rede-constructies ingebedde zinnen zijn met een (verplichte) complementeerder ('dat') en een niet-canonieke woordvolgorde.

In Hoofdstuk 5 wordt een onderzoek gepresenteerd waarin wordt nagegaan welke van de twee verklaringen voor de Nederlandse resultaten correct is. Hiertoe wordt het experiment uitgevoerd met Engelstalige deelnemers met en zonder afasie. Net als in het Nederlands zijn indirecte-rede-constructies in het Engels ingebed. Echter, in tegenstelling tot in het Nederlands, hebben indirecte-rede-constructies in het Engels dezelfde (canonieke) woordvolgorde als directe-rede-constructies, en is de complementeerder optioneel (en doorgaans afwezig). Met de Engelstalige versie van de DISCO-test hebben de effecten van taal (Nederlands versus Engels), groep (afasie versus controle) en conditie (directe versus indirecte rede) onderzocht. Alle drie de variabelen blijken de DISCO-scores te beïnvloeden: de Nederlandse deelnemers presteren beter dan de Engelstalige deelnemers, de gezonde controlegroep heeft hogere scores dan de groep deelnemers met afasie, en de directe-rede-conditie is makkelijker dan de indirecte-rede-conditie. Echter, dit laatstgenoemde effect geldt niet voor Engelstalige luisteraars met afasie: voor deze groep bestaat er geen effect voor conditie. Vanwege het hoofdeffect van conditie in beide talen en de verschillende effecten voor de Nederlandse en Engelstalige deelnemers met afasie, stellen we dat zowel de extra 'lagen' in communicatie (zoals veranderingen in intonatie, gezichtsuitdrukkingen en het gebruik van pauzes) als de grammaticale kenmerken van directe- en indirecte rede constructies een rol spelen bij discourse-begrip, maar dat er een extra factor moet zijn die een rol speelt. We suggereren dat de ambigue oppervlaktestructuur van Engelse directe- en indirecte-rede-constructies de afwijkende prestatie van Engelstalige afasiepatiënten kan verklaren.

In Hoofdstuk 6 worden de bevindingen van de onderzoeken uit dit proefschrift onderling en aan voorgaande literatuur gerelateerd. Mensen met afasie produceren meer directe-rede-constructies dan mensen zonder afasie, en we suggereren dat deze relatieve toename een strategie reflecteert waarmee woordvindingsproblemen kunnen worden gemaskeerd en grammaticaal complexe constructies worden vermeden. Daarnaast stellen we dat dit het eerste onderzoek is dat bewijs levert voor de stelling dat directe-rede-constructies positief bijdragen aan de levendigheid van interactie. Verder wordt in dit onderzoek besproken hoe directe-rede-constructies positief bijdragen aan discourse-begrip bij luisteraars met afasie. Ten slotte bespreken we de klinische implicaties van het onderzoek: omdat de directe rede een constructie is die frequent wordt gebruikt door 'gezonde' sprekers, kan deze voor sprekers met afasie een natuurlijke strategie vormen om te compenseren voor problemen met woordvinding en grammatica. De directe rede kan worden gebruikt om verbale communicatie aan te vullen of zelfs te vervangen. Door hierbij gebruik te maken van paralinguïstische en non-linguïstische middelen (zoals intonatie, gebaren en lichaamsbewegingen), kan de directe rede bijdragen aan de levendigheid van spraak en een spreker met afasie een sterkere communicatiepartner maken. Het biedt mensen met afasie een natuurlijk, economisch en flexibel taalkundig format, dat kan worden ingezet in uiteenlopende communicatieve contexten. We stellen dan ook dat logopedisten zouden moeten overwegen het gebruik van de directe rede in alledaagse communicatie van individuen met afasie te oefenen. Op vergelijkbare wijze zouden er voordelen kunnen bestaan aan het gebruik van directe-rede-constructies door (gespreks)partners van mensen met afasie, omdat de afgenomen grammaticale complexiteit en de extra non-verbale en paralinguïstische informatie individuen met afasie kunnen helpen bij het begrijpen van een boodschap.

ABOUT THE AUTHOR

Rimke Groenewold was born in Drachten on the 5th of September in 1984. She attended pre-university secondary education at the Agnieten College in Zwolle, where she graduated in 2002. After a one-year exchange programme in Argentina she started her undergraduate studies in Communication and Information Sciences at the University of Groningen in 2003. She obtained her Bachelor's degree in 2006, and her Master's degree in 2007. Because of a strong interest in neurolinguistics, in 2008 she also commenced the Master in Linguistics at the University of Groningen. For this Master's programme she wrote a thesis about aphasia, and graduated in 2009. During and after her studies she worked as a teaching- and research assistant in several projects at the University of Groningen. Furthermore, she was an intern at *Stichting Afasietherapie Amsterdam* (SAA). From September 2010 onwards, she worked on her PhD project, which was financed by the Netherlands Organisation for Scientific Research (NWO), and is described in this thesis. In 2011 she was admitted to the international doctorate programme *International Doctorate for Experimental Approaches to Language and Brain (IDEALAB)*, administered by the University of Groningen, Newcastle University (UK), the University of Potsdam (GE), the University of Trento (IT), and Macquarie University (AU). She spent six months working on her research at the *ARC Centre of Excellence in Cognition and its Disorders* (CCD) at Macquarie University in Sydney, Australia.

OVER DE AUTEUR

Rimke Groenewold werd geboren op 5 september 1984 te Drachten. Zij behaalde in 2002 haar vwo-diploma aan het Agnieten College te Zwolle. Na een uitwisselingsjaar in Argentinië is zij in 2003 begonnen aan de opleiding Communicatie- en Informatiewetenschappen aan de Rijksuniversiteit Groningen. In 2006 behaalde ze haar bachelor en in 2007 haar master. Vanwege een sterke interesse in neurolinguïstiek begon zij in 2008 aan de master Taalwetenschap, die zij in 2009 afrondde. Tijdens en na afloop van haar opleidingen werkte zij in diverse projecten als student- en onderwijsassistent. Verder liep ze stage bij *Stichting Afasietherapie Amsterdam* (SAA). In september 2010 begon ze aan het door de Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO) gefinancierde PhD-project dat beschreven staat in dit proefschrift. In 2011 werd ze toegelaten tot het internationale doctoraatsprogramma *International Doctorate for Experimental Approaches to Language and Brain (IDEALAB)* van de Rijsuniversiteit Groningen, Newcastle University (UK), the University of Potsdam (GE), the University of Trento (IT) en Macquarie University (AU). In het kader van haar PhD-project heeft ze zes maanden onderzoek gedaan aan het *ARC Centre of Excellence in Cognition and its Disorders* (CCD) aan Macquarie University in Sydney, Australië.

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