Time reference in standard Indonesian agrammatic aphasia

Anjarningsih, Harwintha Yuhria

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Harwintha Yuhria Anjarningsih

Kementerian Pendidikan dan Kebudayaan Republik Indonesia

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Untuk putraku, buah hatiku, permata hidupku

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[1] The codes for participants with aphasia are slightly adapted in this dissertation to enable the readers identify the participants who participated in all four experimental studies (Chapters 2, 3, 4 and 5). The participants who participated in all four studies are designated with A plus a number (e.g., A1, A2) and the ones who did not with P plus a number (eg., P6, P7), the same as the codes in the published articles. Therefore, the same A-codes refer to the same participants, while the same P-codes may refer to different people across the chapters.

Chapter 1

Introductory remarks

This chapter discusses the general background and concepts that are needed to understand the chapters that follow. Specific information is provided in the experimental chapters, to avoid too much overlap.

1.1 Agrammatic aphasia: a general view

Aphasia is a language problem that may happen after the occurrence of a Cerebro Vascular Accident (CVA), commonly called 'stroke', a trauma, or other diseases. The location of the damage is typically in the left side of the brain (left lateralization) in most right-handed individuals and some left-handed and ambidextrous individuals. Investigations into the linguistic characteristics of aphasia have been carried out for more than a century in the field of aphasiology. These studies have looked mostly into aphasic speakers of languages that belong to the Indo-European language family, such as English, German, Dutch, Italian, and French, which means there are potential limitations to their generalizability.

Cross-linguistic investigations into the nature and characteristics of agrammatism and aphasia are very important and needed. Paradis (2001) stated that "the form of the error may depend on the type of aphasia, though potential errors are constrained by the structural characteristics of each language." (pp. 2-3). In the case of agrammatism, little is known about it in languages that belong to the Austronesian language family, while the

Austronesian language family is one of the largest language families in terms of number of languages and geographic spread (Encyclopaedica Britannica, 2011). Furthermore, less is known about agrammatism in Standard Indonesian, a member of this language family. This language family can contribute enormously to a better understanding of agrammatism. For instance, structures that do not exist in other language families can be investigated in the Austronesian language family and can help revise or formulate hypotheses or theories about the nature of agrammatism.

The classification of aphasia types that is used today is reminiscent of the work of neurologists such as Wernicke (1874) and Lichtheim (1885) that sought to relate the language impairments to the parts of the brain that are damaged by the CVA or trauma. Types of aphasia such as Broca's aphasia with damage to the third convolution of the left frontal gyrus (Broca's area/Brodmann Areas 44 and 45), Wernicke's aphasia with damage to the superior part of the left posterior temporal lobe (Wernicke's area, Broadmann's Area 22) were the first described.

The studies reported in this dissertation investigated time reference processing in speakers of Standard Indonesian (SI) with agrammatic aphasia. Agrammatism is one of the symptoms defined by research using a psycholinguistic method (Caplan, 1987). This method looks into problems in a certain linguistic function such as grammatical processing in speakers with aphasia and relates the performance of the aphasic speakers to the performance of non-brain-damaged speakers. Agrammatism is a symptom most often related to the syndrome of Broca's aphasia. The speech of agrammatic speakers lacks function words, such as prepositions and affixes, but content words are generally spared in speaking, repetition, and writing (Caplan, 1987). Their comprehension is generally better than their limited, non-fluent production. The performance of agrammatic speakers can show variabilities. Below an example of the variabilities is presented, taken from Caplan (1987, p. 279). In order for the research to proceed, we first needed to define how agrammatism can be characterized in SI. This was because when we started the research there was no method yet that could identify agrammatic SI speech. A study aiming to characterize agrammatic speech in SI is presented in Chapter 2.

Figure 1 1. Examples of non-fluent speech (Caplan, 1987, p. 279)

Short excerpts from discourse showing function word and inflectional omissions:

(1) Ah... Monday...ah, dad and P.H. (the patient's name) and Dad... hospital. Two... ah, doctors..., and ah... thirty minutes... and yes... ah... hospital. And, er Wednesday... nine o'clock. And er Thursday, ten o'clock... doctors. Two doctors... and ah... teeth. Yeah, ... fine.

(2) My uh mother died... uh... me...uh fi'teen. Uh, oh, I guess six month... my mother pass away. An' uh ... an'en...uh ... ah... seventeen... go uh High School. An'uh Christmas... well, uh, I uh... Pitt'burgh.

Omission of main verbs:

(Patient attempts to describe the picture of a girl presenting flowers to a teacher)

(1) The young... the girl... the little girl is... the flower.

(2) The girl is... going to flowers.

Nominalizations used instead of verbs:

(Same situation as in B)

(1) The girl is flower the woman.

(2) The girl is... is roses. The girl is rosin'.
(Picture of a man taking a photograph of a girl)

(3) The man kodaks... and the girl... kodaks the girl.

Semantic ill-formedness:

(Picture of a man painting a house)

(1) The painter washed the paint...
(Picture of a cat peeping out from behind an armchair)

(2) The cat leans on the sofa up...
(Picture of a boy giving a valentine to a girl)

(3) The boy put a valentine into this girl.

In section 1.3., we discuss the general characteristics of SI which are glossed over or assumed in Chapters 2 to 5. The participants identified as having agrammatism in Chapter 2 participated in the next studies investigating time reference. The methods used in these studies were 1) spontaneous speech elicitation, 2) a sentence-to-photograph matching comprehension experiment, and 3) a production experiment in which the participants were asked to describe events depicted in photographs.

Especially addressed by the current research project, the grammatical morphology related to verbal predicates in SI is different from that in Indo-European languages. Verbal

morphology is said to be vulnerable in agrammatism, but this has been concluded mostly from studies on Indo-European languages. SI is used very extensively in the Indonesian archipelago and is an important language in East Timor and Australia. The closely related language Malay is spoken in Malaysia, Thailand, Singapore, and Brunei Darussalam. Understanding how agrammatism may surface in SI is thus a very important endeavor for clinical purposes because there are more than 350 million speakers of Indonesian and/or Malay. This understanding may also shed light how agrammatism can surface in other Austronesian languages that are even less researched than SI.

1.2 Time reference in the production and comprehension of agrammatic speakers

The current studies were undertaken as a project in the international cross-linguistic research program Test for Assessing Reference of Time (http://www.let.rug.nl/neurolinguistics/?pagina=./projects/time). This project involves investigations of comprehension and production of grammatical morphology of time reference in aphasia using the same tests in more than 15 languages. Chapters 4 and 5 contribute to this project.

As a background to the current studies, problems in time reference in the speech and comprehension of speakers with agrammatism were first identified in relation to the production of verbs and accompanying inflectional morphemes, such as tense and aspect. It is well established that speakers with agrammatism produce significantly fewer lexical verbs and fewer finite verbs than controls (e.g., Saffran, Berndt, & Schwartz, 1989; Bastiaanse & Jonkers, 1998; Bastiaanse, Hugen, Kos, & van Zonneveld, 2002).

1.2.1 Time reference in languages with verb inflection for tense and aspect

According to Comrie (1985), tense is “grammaticalised expression of location in time.” Grammaticalisation refers to integration into the grammatical system of a language. Comrie (1985) explained that grammaticalisation can be understood in terms of the

interaction of two parameters: obligatory expression and morphological boundedness. One example illustrating obligatory expression is the English past/non-past opposition. Finite verbs must be in either the past or non-past form, although the distinction is not always relevant or even clear. *Maria plays chess* is clearly non-past, although it can refer to a situation in which Maria played in the past as well as the present (habitual reading) while *Maria played chess* is clearly past. Furthermore, the opposite is expressed by bound morphemes (i.e., an element that cannot be a separate word). The position of the grammatical morphemes that express tense may vary between languages. Some possibilities that were discussed by Comrie (1985) are that tenses may be indicated on the verb, either by verb morphology or by grammatical words adjacent to the verb, and that tenses may be indicated by sentence particles, such as in Warlpiri (a language spoken by indigenous Australian). Although expressed on the verb, tense is for the whole sentence, because the truth-value of the sentence depends on whether the proposition expressed by the sentence matches the state of the world at the time point/interval expressed by the tense.

In aphasia literature, problems in verb production and verbal inflections observed in the speech of agrammatic speakers have been considered interesting for quite a long time. In sentences, differential production performance has been observed regarding different functional categories. Working in the Minimalist framework (e.g., Chomsky, 1995), Hagiwara (1995) stated that the lower the position of the functional head and its projection, the more accessible that head is for an agrammatic aphasic individual. This would have consequences for which inflections are most likely to survive. For instance, in Japanese the order of functional categories is assumed to be CP – AgrSP – TP – NegP– AgrOP – VP (respectively, Complementizer Phrase - Subject Agreement Phrase - Tense Phrase-Negative Phrase - Object Agreement Phrase - Verb Phrase). TP and NegP, being lower in the syntactic tree, are more resistant to impairment by brain damage, but AgrSP and CP are no longer available, leading to particular types of errors. Friedmann and Grodzinsky (1997), who follow Pollock (1989), argued that the order of the phrase structure of Hebrew is CP – C'- TP – T' - AgrP – Agr' - VP – V' - XP. They found that Hebrew-speaking agrammatic patients are impaired in the production of elements in the T node and up; hence the name of the account: The Tree Pruning Hypothesis. Based on this hypothesis, agreement (Agr) should be intact in the production of speakers with agrammatism. In the same trend, in a German study, Wenzlaff and Clahsen (2004) found that agreement morphology is less impaired than tense morphology, and that past and present tenses are produced equally poorly. In general, it seems that depending on the framework used and language investigated, different functional nodes are shown to be

impaired. No consensus has yet been reached that can explain all the patterns of agrammatic production cross-linguistically.

Focusing on an alternative view of tense, the particular vulnerability of this element in agrammatic aphasia has been further elaborated by Avrutin (2000; 2006). According to Avrutin, syntactic processing is done on two levels, sentence level ('narrow syntax') and discourse level ('discourse syntax'). Computation in narrow syntax is needed for all syntactic operations that are 'locally bound', that is, operations that are done within the sentence. For example, agreement between subject and finite verb or between adjective and noun inflection is computed in narrow syntax. According to Avrutin (2006), computations at the level of narrow syntax are not very costly. More computation is needed for extra-sentential relations, that is, computations between elements of the sentence and discourse. It is, according to Avrutin (2000; 2006) a lack of computational resources that makes the linking at the discourse level hard for agrammatic individuals. Evidence for this view has been provided by experiments on comprehension of pronouns ('he', 'she' etc.) compared to reflexives ('himself', 'herself'). Pronouns are processed by discourse syntax, because the referent is not bound by the syntax within the sentence. The binding takes place by a mechanism between the pronoun and discourse.

Reflexives are typically processed by narrow syntax. For example, in the sentence 'the girl washes herself', the referent of 'herself' is within the sentence ('the girl'), whereas in the sentence 'the girl washes her', the referent of 'her' is, by definition, outside the sentence/clause and must, thus, be processed by discourse syntax. Grodzinsky, Wexler, Chien, Marakovitz, and Solomon (1993) showed that agrammatic individuals have more problems with pronouns (discourse syntax) than with reflexives (narrow syntax).

Avrutin (2000; 2006) makes a similar distinction between agreement and tense. Agreement is typically processed by narrow syntax, because it is always computed within the sentence; tense is processed by discourse syntax, because it refers to a point in time (past, present, future) that is not part of the sentence. He therefore predicts that tense is more impaired than agreement in agrammatic aphasia. Avrutin (2000; 2006) thus assumes that the agrammatic problems are not due to a representational deficit, like that proposed by Hagiwara (1995) and Friedmann and Grodzinky (1997). He calls his theory the 'weak syntax model': agrammatic individuals do have syntax, but it is weak. Because of limited resources, syntactic computations at the discourse level are affected.

The finding that tense can be selectively impaired in the production of speakers with aphasia prompts the next question: are different tenses affected to the same extent? There is work showing that the answer is "no." Tsapkini, Jarema, and Kehayia (2001) found

that a Greek-speaking agrammatic speaker substituted perfective tense forms with present and imperfective past tense forms in an elicitation study. The Greek speaker with non-fluent aphasia was prompted with pictures to say what the person in the picture did (once) in the past; the target was the perfective form of the verb. With a similar methodology, Dutch data from Bastiaanse (2008) also showed that reference to the past with both finite and non-finite verb forms was more difficult than reference to the present. The finding that the distinction also held for non-tensed or non-finite participles showed that morphology did not seem to be the determining factor. Furthermore, Turkish data from Yarbay Duman and Bastiaanse (2009) revealed that the past tense/perfect aspect was found to be more difficult to produce than the future tense/imperfect aspect.

Another relevant question is what role aspect plays in verb comprehension and production. According to Smith (1997, p. xiii), "It is through aspect that we grasp the type of situation talked about, from a temporal perspective which focuses all or part of the situation." Temporality in this sense concerns the way situations unfold in time. It involves such properties as beginnings and endings, dynamic stages, and static periods. The difference in the two sentences below is in aspect, not tense. Sentence (1) has perfective viewpoint, and sentence (2) has imperfective viewpoint (according to Smith, 1997).

1. David made an apple pie last night.

2. David was making an apple pie last night.

With the perfective aspect, we indicate the entire event and that it is completed, while in the imperfective aspect, the event is seen as in progress without any information about completion. Comrie (1976, cited in Dahl, 1985 p. 25) differentiate aspect and tense as follows: "Aspect is not concerned with relating the time of the situation to any other time-point, but rather with the internal temporal constituency of the one situation; one could state the difference as one between situation-internal time (aspect) and situation-external time (tense)". For Standard Indonesian (SI), Harimurti Kridalaksana (2007) differentiated aspectual adverbs describing events or states as ongoing (*duratif*), finished (*perfektif*), not yet finished (*imperfek*), and beginning to happen (*inkoatif*). A fuller description of the SI aspectual system will be given section 1.4.

Most of the theories so far have been based on studies of languages with verb inflection for time reference. However, because there is an indication that morphology and syntax are not the only features playing a role in time reference comprehension and production problems, what may happen in languages without verb inflection needs to be

investigated. Bastiaanse, Bamyaci, Hsu, Lee, Yarbay Duman, and Thompson (2011) found a selective deficit in the comprehension of past time reference in Chinese, which does not have verb inflection. If there is a central problem with time reference that surfaces regardless of how it is manifested in different languages, a deficit should also be found in the comprehension and production of speakers with agrammatic aphasia in languages without verb inflections. These languages may express time reference with lexicalized adverbs, such as 'yesterday' or 'now', or aspectual adverbs that show the inner structure of events. The next part of this chapter is dedicated to recent findings from Chinese, a language without verb inflection but with aspectual adverbs. Chinese is similar to SI in this respect.

1.2.2 Time reference in Chinese

Chinese does not have verb inflection for time reference. Anchoring events or states in real time is done by using adverbs of time, such as mingtian: 'tomorrow' or minnian: 'next year'. The work of Wei-ming Ho (2008) investigated, among other variables, how aspectual adverbs are realized in the spontaneous speech of speakers of Mandarin Chinese with agrammatic aphasia. The aspectual adverbs are the following:

3. Zhangsan zai xue yinyu.

   Zhangsan ZAI learn English.

   "Zhangsan is learning English."

ZAI: indicates the progressive aspect of an action

4. Zhangsan xue-le sannian yingyu.

   Zhangsan learn-LE three year English.

   "Zhangsan learned English for three years."

LE: perfective marker, expresses the completion of an action

5. Wo bu mai shu le.

   I no buy book LE

"I don't buy books anymore."

LE: also considered to be a sentence final particle, emphasizes completion/ changes relative to some point in the past.

6. Zuotian chuangzihei kei-zhe.

Yesterday window still open-ZHE

"Last night the window was still open."

ZHE: indicates continuity of an action or state, implying that the action is still going on during the reference time of the speech

7. Zhangsan xue-guo san-nian yingyu.

Zhangsan learn-GUO three year English

"Zhangsan learned English for three years."

GUO: indicates that a certain action has been completed, and to place a special stress on this experience.

Ho (2008) compared the production of these aspectual adverbs in the spontaneous speech of speakers with aphasia and non-brain-damaged speakers. The results showed that Chinese speakers with agrammatism used proportionately fewer aspectual adverbs in their speech compared to non-brain-damaged control speakers. Ho also found that the number of verbs in the 300-words spontaneous speech sample did not differ between the two groups, but the speakers with agrammatism as a group used significantly fewer different verbs (lower verb diversity) than the non-brain-damaged group. Ho (2008) also did an analysis at the individual level and found that even Chinese agrammatic speakers who were relatively good at producing aspect markers showed a low verb diversity. On the other hand, the production of diverse verbs was directly at the expense of aspect markers. Ho cited Bastiaanse and Jonkers (1998) who found a similar trade-off phenomenon in Dutch speakers with agrammatic aphasia.

Recapitulating what has been found so far, problems in comprehending and producing the functional category of aspectual markers by speakers with aphasia have been documented in typologically different languages. Categories expressing time reference may be differentially affected and the problems have been observed in languages with tense and with aspectual adverbs.

Another study which looked at time reference processing by agrammatic speakers of Chinese is that by Bastiaanse et al. (2011). This was a cross-linguistic study which also investigated the performance of Turkish and English agrammatic speakers. In the comprehension experiment, the Chinese agrammatic participants had problems in matching sentences spoken by the experimenter to the correct photograph. They performed worse in the past condition than in the present and future conditions. In other words, the post-verbal past aspectual adverb *le* in Chinese was understood more poorly by the Chinese agrammatic participants than the preverbal present adverb *zai* and the preverbal future adverb *yao*. In the production experiment, the Chinese agrammatic speakers performed similarly poorly in the three conditions. Across the three conditions, the most frequent errors were omission of the (optional) aspectual adverbs.

Bastiaanse et al. (2011) thus showed that time reference problems in agrammatism can also affect the comprehension and production of free-standing aspectual adverbs. What is more important is their finding that the past aspectual adverb *le* was affected although it is not in the tense node. Thus, they argued that referring to the past was difficult for agrammatic speakers both when the reference was done by bound verb inflections, as in Turkish and English, and by free-standing aspectual adverbs, as in Chinese, leading to the formulation of the PADILIH (Past Discourse Linking Hypothesis, see subsection 1.1.4).

If these time reference problems happen to Chinese aspectual adverbs, it is interesting to investigate SI aspectual adverbs all of which are within the scope of the Verb Phrase (VP) to replicate and extend the findings from Chinese (see section 1.3 for detailed information on time reference in Standard Indonesian).

1.2.3 The PAst DIscourse LInking Hypothesis (PADILIH)

As shown in the previous overview, agrammatic speakers have problems with verb inflection for time reference, although the exact explanation is under debate. According to Friedmann and Grodzinsky (1997) tense is impaired, and according to Tsapkini et al. (2001) aspect is impaired. Bastiaanse (2008) and Bastiaanse et al. (2011) argue that it is not tense and/or aspect per se that is impaired, but that the problem is more specific. Agrammatic individuals have problems with time reference, not only with simple verb forms that are inflected for tense and/or aspect, but also for periphrastic verb forms, such as 'he was reading a book', and adverbs that are used for time reference in a language that does not have verb inflection, that is, Chinese. Moreover, not all verb forms are equally impaired. Bastiaanse and colleagues showed that verb inflections, periphrastic verb forms and

aspectual adverbs that refer to the past are particularly difficult. In Dutch (Bastiaanse, 2008), Chinese, English and Turkish (Ho, 2008; Bastiaanse et al. 2011) simple past, present perfect, and aspectual adverbs referring to the past are most vulnerable, both in production and in comprehension.

How can this be explained? Why would reference to the past be difficult? As mentioned above, Avrutin (2000; 2006) hypothesized that tense is affected in agrammatic aphasia, because it is processed by discourse syntax. This can explain why verb inflection is difficult, but not why reference to the past is selectively affected. However, according to Zagona (2003), it is not tense as such that is processed by discourse syntax. She makes a distinction between non-past tense (present and future) and past tense. According to her, non-past tense is locally bound, because the time of speaking and the time of the event co-incide. Past tense, however, is discourse linked, that is, processed by discourse syntax. Bastiaanse et al. (2011) have used the theories of Avrutin (2006) and Zagona (2003) to formulate a hypothesis on time reference in agrammatic aphasia. They extended the scope of Zagona's idea. They argue that it is not just past tense that is discourse linked, but all verb forms and aspectual adverbs that refer to the past, regardless of the syntactic nodes for tense and aspect which occur in a given language. This means that both simple and periphrastic verb forms in past tense and or perfect aspect and perfective aspectual adverbs will be impaired in agrammatic aphasia, in comprehension and production. For English this means that V-ed, has V-ed, was V-ing, has been V-ing and had V-ed are all impaired, whereas V-s, is V-ing, and will V are relatively preserved. Notice that the periphrastic verb form has V-ed is in present tense ('has'), but as a whole refers to an event in the past.

Bastiaanse et al. (2011) called this the PAst DIscourse LInking Hypothesis (PADILIH). This hypothesis decouples deficits in past reference from bound morphology and also from position within the verb phrase. Since it is claimed that there is a discourse component to deficits in time reference apart from their syntactic representation, it is interesting to investigate what will happen with SI lexical adverbs (e.g., 'now,' 'yesterday') all of which are outside the scope of the VP. If it is indeed reference to time frames that is difficult for the agrammatic speakers, we predict that these open-class words also pose problems for agrammatic speakers compared to matched non-brain-damaged participants.

1.3 Standard Indonesian: A general overview

Standard Indonesian (SI) is the national language of the Republic of Indonesia. Historically, Indonesian or Bahasa Indonesia evolved from the Malay spoken in the northern part of Sumatera island around the 17th century A.D. The first historically recorded mention of Indonesian is in The Youth Pledge (Soempah Pemoeda) in 1928, that states that "We, the youth of Indonesia, uphold the unifying language, Bahasa Indonesia."

Linguistically, SI is a member of the western branch of the Austronesian language family. While originating from Malay, which is still spoken in present day Malaysia, Brunei Darussalam, Thailand, and Singapore, SI is different from Malay because of the influence of vocabulary from Sanskrit, Dutch, Arabic, English, and native languages, such as Javanese and Sundanese. For example, some words that are taken from Dutch in SI are taken from English in Malay (e.g., mesin VS injin: 'machine'). Therefore, the degree of mutual intelligibility between speakers of Malay and SI can be less than 80%. SI has about 23 million speakers in and outside Indonesia (Lewis, 2009). We assume that this number is the number of native speakers. In Indonesia, with a population of 250 million people, SI is frequently a second or third language. SI is taught from the first grade of elementary school up to the first year of university. Because of this, anyone who has graduated at least from elementary school has some command of the language.[2] The more educated a person is, the more standard the Indonesian he/she uses. People who only have elementary or junior high school education tend to speak Indonesian that is more influenced by their mother tongue or dialect. Due to the influence of the local languages, SI as taught in schools is not used in daily life in its entirety. If one wishes to speak to sellers at markets or at common restaurants, less standard Indonesian must typically be used. This variant is syntactically simpler and uses words from the local dialects or languages spoken in the respective region. To give an example of the similarities and differences between Standard Indonesian and the less standard Indonesian used in daily life, the following sentences are cited from Alwi, Dardjowidjojo, Lapoliwa, and Moeliono (2003). The first sentence in the pair is the standard Indonesian sentence and the second is the less standard sentence, more appropriate for the situation. Notice the different

[2] 94% of all children aged between 7 and 12 years old in Indonesia attend primary education (UNICEF Indonesia, 2012)

spellings of the word meaning 'spinach' which indicates how it is pronounced in the standard and less standard variants.

8.	a.	Berapakah	Ibu	mau
		menjual	bayam	ini?
		How much-question marker	mother	will
		active marker-sell	spinach	this?

	b.	Berapa bayemnya?	nih,	Bu,
		How much spinach-this?	this (colloquial),	mother

"How much is this spinach, Madam?"

1.3.1 Multilingualism and diglossia in Indonesia

SI as taught in schools is different from the Indonesian used in daily lives in the 33 provinces of Indonesia. A person who acquires Indonesian as a mother tongue in Maluku (an area in the east of Indonesia) will speak differently from another person acquiring Indonesian in Padang (an area in the west of Indonesia). Sometimes, the pronunciation is different as a result of the influence of native languages spoken in these two areas. Furthermore, some dialects of Indonesian have their own affixes or different lexical items that make them unique. For example, the Jakarta dialect of Indonesian has the suffix –in which is roughly equivalent to the suffix –kan in SI. Sentence number 9 below is from SI, and sentence number 10 is the same meaning expressed in the Jakarta dialect of Indonesian. Both sentences mean "Please open the door."

9. Tolong buka***kan*** pintunya.

10. Tolong buka***in*** pintu dong.

Another example is the distinctive pronoun referring to 1st person singular (beta) and the raising of intonation towards the end of sentences that are used by speakers of Indonesian from the east part of Indonesia (Sulawesi, Maluku). Sentence number 11 below is from SI, and sentence number 12 is the same meaning expressed in the east of Indonesia. Both sentences mean "I have said that."

11. ***Saya*** sudah katakan itu.

12. ***Beta*** sudah katakan itu.

In this multiligual situation, SI is spoken as a lingua franca.

Even somebody from the capital Jakarta needs to switch to SI and cannot use the Jakarta dialect when visiting other provinces. Some words from native languages spoken in a certain area or intonation patterns used in the native languages may pop up in SI sentences as a way to accommodate conversational partners who speak the native languages.

In educational institutions or public offices, SI is the language of communication. It is associated with better education and prestige. It is in this way that a diglossia situation exists in Indonesia. SI is seen as a "higher" language, but native languages or dialects have their role as languages for intimate and relaxed situations. Throughout this research project, SI has been used for the experiments. As it is difficult to control for the native languages of the participants, it was ensured that SI is used frequently (80%) of the time by participants, both the ones with aphasia and the non-brain-damaged participants.

With its very important function, it is essential that speakers of SI, either as a first or second language, are provided with adequate and scientific clinical support when they suffer from agrammatism, or aphasia in general. For this reason, all our experimental chapters will end with a clinical implication section. A general clinical contribution of the current research project will also be presented in the ultimate chapter.

1.3.2 Default word order in Standard Indonesian

Word order was among the variables we analysed for the characterisation of agrammatic speech in SI. This was because there is a considerable amount of literature on processing and production of sentences in base and derived word order by agrammatic speakers of various languages (e.g., Schwartz, Saffran, & Marin, 1980; Bastiaanse & van Zonneveld, 1998; Luzzatti, Toraldo, Guasti, Ghirardi, Lorenzi, & Guarnaschelli, 2001; Bastiaanse & Thompson, 2003; Stavrakaki & Kouvava, 2003; Bastiaanse & van Zonneveld, 2005). One example of derived order sentences is passives. However, SI passives are different from the passives in the languages investigated so far, in terms of syntax, semantics, and frequency (see Chapter 2). This is why it is of interest to find out if such derived order structures pose problems for agrammatic speakers of SI.

Butar-Butar (1976) argued that the underlying order of SI sentences is SVO. He stated that although constituents of sentences may move around without changing meaning (e.g. "Kamu makan apa?" VS "Makan apa kamu?" VS "Makan apa?" [*lit*. "You eat what?" VS. "Eat you what?" VS "Eat what?"]), positing SVO as underlying order is more elegant and does not create unnatural, suspicious rules. Butar-Butar (1976) used the following sentences to illustrate acceptable variants which have the meaning "Probably the boy stole some money":

13.	Anak	itu	mencuri uang			barangkali.
	Boy	the	steal	money		probably
14.	Anak	itu	barangkali		mencuri uang.	
	Boy	the	probably		steal	money
15.	Barangkali		anak	itu	mencuri uang.	
	Probably		boy	the	steal	money
16.	Mencuri uang		anak	itu	barangkali.	
	Steal	money	boy	the	probably	

17.	Mencuri uang	barangkali	anak	itu.
	Steal money	probably	boy	the.
18.	Barangkali	mencuri uang	anak	itu.
	Probably	steal money	boy	the

Citing Butar-Butar (1976), some conclusions that can be drawn from the above grammatical sentences are:

a. Adverbs like barangkali: 'probably' seem to be moveable; they can occupy the initial position, the middle position, and the final position in a sentence.

b. The subject and predicate (V+O) can be inverted freely, as can be seen in 13, 14, and 15.

c. The movement of an adverb can take place either before or after the application of subject-predicate inversion (compare 15 and 16).

d. A noun and a determiner have a fixed order (compare 14 and 15), and an adverb may not intervene between them; it is ungrammatical to say "*Anak barangkali itu mencuri uang": lit. boy probably the steal money).

e. The sequence verb-object may not be reordered, and no word can intervene between a verb and its object. Furthermore, a verb and its object are closer than a Verb and its Subject (thus always VO in active sentences). To support this, three kinds of evidence were given:

- When the object is a singular pronoun, this pronoun is preferred in its enclitic form and it is attached to the Verb to become one unit with it (e.g. "Mereka melihatmu" [mu from kamu]: 'They see you'; "Dia mencintaiku" [ku from aku]: 'She loves me').

- No transformations, except the passive operation, can move the Object out of the sequence verb-object; *Mobil baru-kah lelaki itu membeli?:* 'new car-question suffix man the buy?', is not grammatical.

- Certain transformations have the effect of moving the VO as a constituent (e.g. *Memasak nasi Maria:* 'cook rice Maria' is grammatical with subject-verb inversion.

1.3.3 Obligatory elements in Standard Indonesian sentences

1.3.3.1 Predicate

Subject (S) is the same notion as that found in English or Dutch in that S can be agent or experiencer in active sentences and patient or theme in passive sentences. However, Verb (V) in SI needs to be clarified, since verbs are only one type of several kinds of predicate, one of which must be present in SI sentences. Clauses can have verbal or non-verbal predicates; there are in turn several kinds of non-verbal predicate. These two kinds of predicate are exemplified below, b,y reference to Kridalaksana (2007):

- Verbal clause

19. Orang itu berlari.

Man the run.

"The man is running."

- Non-verbal clause

20. Prepositional phrase as predicate

Ayah ke kantor.

Father to office.

"Father is going to office."

- Adjective or adjectival phrase as predicate

21. Tugasnya berat sekali.

Work his/her-3rd person possessive suffix hard very

"His/her work is very hard."

- Noun or nominal phrase as predicate

22. Dia istriku.

She wife my-possessive suffix

"She is my wife."

- Pronoun or pronominal phrase as predicate

23. Orang ini dia.

Man this him.

"This person is him."

- Numeral or numeral phrase as predicate

24. Anakku baru tiga.

Children- 1st person possessive suffix only three.

"I only have three children."

Therefore, a grammatical sentence in SI may lack a verb, unlike English or Dutch. In Indonesian dictionaries, verbs are usually listed based on their roots (kata dasar, 'word basis'). Therefore, the dictionary entry for the verb *urus* (to take care of) is like the following. The dictionary starts with the root *urus*, and goes on to different inflectional forms of this verb which can be formed by adding a prefix or a suffix (*mengurus*,

mengurusi, *menguruskan*, *terurus*). After the verb forms, the dictionary lists derived nouns with the same root (e.g. *urusan*).

Figure 1 2. Dictionary entry of the verb urus: "take care of" and related verbs

(Kamus Besar Bahasa Indonesia, Pusat Bahasa Departemen Pendidikan Nasional, 2005, p. 1253)

[1]urus *v* rawat; piara; pelihara; atur: *tidak* --, *cak* tidak terpelihara; tidak terurus;
ber.u.rus.an *v* **1** ada urusan (dng); berhubungan (dng): *saya tidak mau ~ dng dia lagi;* **2** tersangkut dl suatu hal (perkara kepolisian dsb): *krn tidak mau membayar utang, ia harus ~ dng polisi;*
meng.u.rus *v* **1** mengatur segala-galanya (tt suatu urusan atau hal dan bertanggung jawab mengenai hal itu): *untuk perpisahan itu ada yg ~ keuangan, ada yg ~ acara kesenian, dsb;* **2** mengatur menjadi baik; menata; merapikan; mengemasi; membenahi; membereskan: *sesudah menyapu lantai, ia ~ tempat tidur;* **3** menyelenggarakan (perayaan, pertemuan, dsb); memelihara dan menjaga (kebun, rumah tangga, dsb); merawat (kendaraan dsb); menjaga baik-baik: *panitia sibuk ~ perayaan Hari Kemerdekaan RI; ~ kebun cengkih memang tidak mudah;* **4** mengusahakan (perdagangan, perusahaan, dsb); mengelola; memimpin dan mengatur (sekolah, perkumpulan, dsb): *tiap anak diserahi tugas ~ toko; tidak mudah ~ koperasi;* **5** mengusut atau menyelidiki suatu hal; menyelesaikan (persoalan, perkara, perselisihan, dsb): *bapaknya diminta datang ke sekolah untuk ~ persoalan anaknya; perkara perkelahian itu sudah ada yg ~;*
~ buku mencatat keluar-masuknya uang dl perniagaan;
~ diri merawat kesehatan diri;
meng.u.rusi *v* mengatur baik-baik; menjaga dan merawat: *keluarga itu berantakan krn suami ataupun istri tidak pernah ~ keadaan rumah tangganya;*
meng.u.rus.kan *v* **1** mengurusi; **2** menyelesaikan (membereskan) sesuatu untuk orang lain: *kalau Tuan tidak mampu menyelesaikan sendiri, saya sanggup ~nya sampai selesai;*
ter,u.rus *v* terpelihara (terawat, teratur) baik-baik: *anak-anaknya tidak ~;*
urus.an *n* **1** sesuatu yg diurus: *adă ~ penting;* **2** perkara; masalah; hal ihwal; persoalan: *untuk ~ ini, polisi telah menahan orang yg dicurigai; ~ politik adalah tanggung jawab kita juga; itu ~mu, bukan ~ku;* **3** sesuatu yg berhubungan atau ada sangkut-pautnya dng: *setelah ~ pabean selesai, kita masih berurusan dng calo-calo taksi;* **4** bagian pekerjaan (jawatan, dinas, dsb) yg mengurus sesuatu: *jawatan ~ pajak; bagian ~ pegawai; kantor ~ pegawai;* **5** cara mengurus (merawat, menyelenggarakan, dsb): *kurang beres ~nya;*
~ belakang **1** hal-hal yg berkenaan dng kebutuhan dapur;

1.3.3.2 Subject

A subject in SI can be a noun or a pronoun. There is no subject-verb agreement in SI. Singular and plural subjects take the same predicate. Some examples are given below:

25.	Anak	itu	minum	susu	tiga	kali	sehari.
	Child	the	drink	milk	three	time	per day

"The child drinks milk three times a day."

26.	Dia	minum	susu	tiga	kali	sehari.
	He/she	drink	milk	three	time	per day

"He/she drinks milk three times per day."

27.	Teman-temanku sehari.	dulu	minum	susu	tiga	kali	
	Friends possessive	in the past		drink	milk	three	times per day.

"My friends used to drink milk three times a day."

28.	Mereka	dulu	minum	susu	tiga	kali	sehari.
	They	in the past	drink	milk	three	times	per day.

"They used to drink milk three times per day."

Notice that the verb minum: 'drink' takes the same form for singular and plural subjects, both in reference to present and past actions.

1.4 Time reference in Standard Indonesian

Time reference is not an obligatory element in SI sentences. In this sense, SI is different from Indo-European languages, where the verb or verb complex is always marked for reference to past, present or future. In SI, when no time is given, the assumption is that this is clear from the context. Some examples are given below.

29. Dunia menderita karena krisis finansial

World suffer because of crisis financial

"The world is suffering because of the financial crisis."

30. Dia bersedih karena kematian kucingnya.

He/she sad because of death cat-possessive

"He/she is sad now because of the death of his/her cat."

31. Kemarin saya bertemu bos kamu. Saya mengucapkan selamat malam

Yesterday I meet boss you. I say good evening.

"Yesterday I met your boss. I said good evening."

Therefore, sentences without time reference or, in other words, without lexical and/or aspectual adverbs, are grammatical in SI. However, if explicit reference to time is deemed necessary by the speaker or writer, lexical and / or aspectual adverbs are produced.

1.4.1 Lexical adverbs

According to Butar-Butar (1976), the scope of lexical adverbs of time is sentential. An example is given (Butar-Butar, 1976) concerning the adverbial phrase of time *tadi malam*. The elements of the sentence *Maria menyanyi tadi malam*: 'Maria sang last night,' were determined by using the "maka test." *Maka* is a word in SI that means 'then' or 'thus'. If the word *maka* is added to the sentence, the particle *–lah* appears and needs to be attached to the predicate (a verb in this case). The subject follows the verb phrase immediately.

32.	**Maka**	menyanyi**lah**	Maria	tadi	malam.
	Thus	sing-**lah**	Maria	last	night

"Thus Maria sang last night."

If the adverbial phrase of time were a part of the verb phrase, the following sentence should be grammatical in SI, but it is not.

33. ***Maka** menyanyi tadi malam**lah** Maria.

From aphasia research it is known that sentences with derived word order are difficult to process for speakers with aphasia (e.g., Yarbay Duman, Altinok, & Bastiaanse, 2011; Bastiaanse & Van Zonneveld, 2005; Caramazza, Capasso, Capitani, & Miceli, 2005). Because the position of lexical adverbs of time can vary in sentences, it is necessary to find which position is considered more natural or preferred by native speakers. A questionnaire was sent out to Indonesian students in Groningen (n=20) and the result was the adverbs are experienced to be more natural in the very beginning of sentences, before the subject.

34.	Besok	saya	pergi	ke	Bandung.
	Tomorrow	I	go	to	Bandung.

"Tomorrow I will go to Bandung."

35. Kemarin dia mengepel lantai.

Yesterday he/she mop floor.

"Yesterday he/she mopped the floor."

This position is the one used for materials of the Indonesian version of the Test of Assessment of Reference of Time (TART: Bastiaanse, Jonkers, & Thompson, 2008; Indonesian version: Anjarningsih & Bastiaanse, 2009).

1.4.2 Aspectual adverbs

As with the lexical adverbs of time, aspectual adverbs are not obligatorily used in SI sentences. In the absence of contextual clues, a sentence without any aspectual adverb is taken to describe an action, event, or state that is true at any time (Alieve, Arakin, Oglobin, & Sirk, 1991).

36. Matahari terbit di sebelah timur dan tenggelam di sebelah barat.

Sun rise at side east and set at side west.

"The sun rises in the east and sets in the west."

There is clear evidence for the claim that aspectual adverbs are indeed aspectual and not temporal. For example, it is possible to use the *duratif* aspectual adverb sedang with a future action, event, or state as well with past and present (Alieve et al., 1991)

The following sentence describes a historical moment in Java in the 1700s. Notice that *akan* is translated as 'would' as well as 'was' for *sedang*, as the overall time is past.

37.

Surapati	memberi	jawaban	bahwa	ia	akan	tinggal
di	tengah,	karena	Mataram	sedang	diperebutkan	oleh
kedua	keluarga	yang	berhak.			
Surapati	give-active	answer	that	he	would	stay
at	middle,	because	Mataram	was	contest-passive	by
two	family	who	rightful.			

"Surapati gave the answer that he would be neutral, because Mataram was contested by two families that were rightful heirs."

Syntactically, aspectual adverbs always precede the predicates of clauses or sentences.

38.	Saya	sudah/sedang/akan	makan.
	I	complete/in progress/will	eat.

"My eating is/was complete, My eating is/was in progress, My eating will/would start."

This obligatory placement relative to the predicate demonstrates that aspectual adverbs form a part of the Verb Phrase (VP). Only as an answer to a question may aspectual adverbs stand alone without predicates. The predicates are then understood from the question.

39.	A:	Kamu	sudah	makan	atau	belum?
		You	already	eat	or	not yet

"Have you eaten or not?"

B: Sudah

"Yes, I have."

The studies reported in chapters 4 and 5 in the current dissertation focused on three aspectual adverbs: *sudah, sedang*, and *akan,* and Kridalaksana's terms (2007) referring to these aspectual adverbs (i.e. perfektif, duratif) are used throughout the chapters. The choice of adverbs was made based on the frequency of occurrence of these adverbs in SI and their suitability for the photo stimuli of the cross-linguistic research project.

These aspectual adverbs are more frequent than other aspectual adverbs with similar meanings. This condition is expected to make it easy for the NBD participants to produce the intended aspectual adverbs upon seeing the photo stimuli. Therefore, any deviations in the performance of the agrammatic participants from that of the NBDs can be reliably attributed to their agrammatism. Furthermore, *sudah, sedang, and akan* match the available photo stimuli well. As mentioned in section 1.2, this research project is a part of the international TART project which has a set of tests consisting of photo stimuli that are used in a lot of languages.

The features of SI described thus far can provide some ways to disentangle issues that cannot be easily dissociated in other languages. The existence of lexical adverbs of time without tense may help to shed light on the discussion whether there is a central problem with time reference. The morphological/syntactic computations required in languages that use tense and / or aspect inflections on the verb are absent in SI. If time reference as shown by the production and comprehension of lexical adverbs of time is impaired in SI agrammatic aphasia, then this is caused by a particular problem with time reference, ruling out computational load of verb inflections. Furthermore, past, present, or future lexical adverbs of time can each be investigated separately for impairment. Results from earlier studies cited above suggest that reference to the past will be particularly vulnerable. The next important contribution of analyzing agrammatism in SI is the possibility of teasing apart aspect and tense. In some Indo-European languages (e.g., Greek), aspect and tense are expressed together by an affix. In SI, any influence of aspect in agrammatic production and comprehension can be observed purely, not confounded by tense.

1.5 Theoretical Framework

After discussing the relevant background of both both the literature and SI, the dissertation needs theories that are specific about time reference in agrammatic aphasia and are general enough to predict agrammatic performance in a language which does not have tense inflections. Two theories that meet these requirements are Avrutin's weak syntax model and Bastiaanse et al.'s PADILIH hypothesis. The weak syntax model is appropriate because the two kinds of adverbs investigated in the current research project are optional and related to discourse. In addition, the lexical adverbs are similar to pronouns in the sense that they refer to specific points in time. According to Avrutin's model, pronouns are vulnerable because they are processed by discourse syntax. The PADILIH, being a cross-linguistic hypothesis, is not tied to a syntactic explanation based on Indo-European language family, from which SI differs. However, the PADILIH does not make predictions with respect to what effect the optionality of the SI time reference adverbs will have on the performance of the agrammatic SI speakers. Our experiments will test the predictions of these theories.

1.6 Research questions

The general research questions for the study to time reference in SI agrammatism are:

1) Will Standard Indonesian (SI) aspectual adverbs be difficult for agrammatic speakers?

The weak syntax model predicts that they should be difficult because they are discourse-linked. In contrast, the PADILIH predicts that only the *perfektif* aspectual adverbs will be difficult because ….

2) Will lexical adverbs be difficult for agrammatic SI speakers?

Classically, these adverbs have never been documented as impaired in the literature. However, the fact that they are used to refer to time and that they are discourse-linked implies that they may be difficult for SI agrammatic speakers.

3) Do these two kinds of adverbs produce the same pattern of impairment or not?

4) If they differ, are the differences related to the modality (spontaneous speech, comprehension, and production)?

Three studies have been done to address these questions: (1) analysis of the use of verbs, aspectual adverbs, and lexical adverbs of time in spontaneous speech (chapter 3); (2) comprehension of aspectual adverbs and lexical adverbs of time (chapter 4); and (3) production of aspectual adverbs and lexical adverbs of time (chapter 5). However, before these experiments are described, a study to the characteristics of SI agrammatic speech will be presented (chapter 2).

Chapter 2
Characterizing agrammatism in Standard Indonesian[3]

Background: The spontaneous speech of speakers of Standard Indonesian (SI) with agrammatic Broca's aphasia has not yet been characterized, though there are features of SI which are relevant for the discussion of agrammatic speech. *Aims*: The purpose of this study was to find the characteristic features of agrammatism in SI. SI is spoken by about two hundred million people and it is important for clinical and rehabilitation purposes to characterize agrammatism in SI. *Methods and Procedures*: A total of 21 adults (6 with Broca's aphasia and 15 without history of neurological problems) participated in the study. Three hundred words of a spontaneous speech sample from each participant underwent syntactic and morphological analyses. The study focused on the defining characteristics of SI agrammatic speech, analyzing syntactic and morphological variables. *Outcomes and Results*: The study showed that some characteristics of agrammatic speech in Indo-European languages are also found in SI (slower speech rate, shorter MLU, simpler sentence structure, fewer syntactic particles). However, there are also results that are typical for SI agrammatic speech (normal/above normal verb production, overuse of inflectional affixes compared to derivational ones, normal production of sentences with non-canonical word order, such as passives).

Conclusions: For the first time, features of SI agrammatic speech are described. Agrammatic SI can be characterized by a low speech rate and the production of short sentences, just as in other languages. However, several characteristics that have been

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[3] Anjarningsih, H.Y., Haryadi-Soebadi, R., Gofir, A., and Bastiaanse, R. (2012). Characterizing Agrammatism in Standard Indonesian. *Aphasiology*. DOI: 10.1080/02687038.2011.648370

reported for other languages (e.g., reduced use of verbs) have not been found for SI agrammatic speech, whereas there are agrammatic characteristics in SI that have not been mentioned before for other languages (e.g., reduced number of derivational morphemes, combined with normal number of inflectional morphemes and good access to passive structures). It is argued that this is inherent to the structure of SI. The value of the variables for clinical purposes is discussed.

2.1 Introduction

2.1.1 Some characteristics of agrammatic speech

In general, agrammatic speech can be characterized by a reduced rate of speech, short utterances, poor verb production and omission and/or substitutions of grammatical morphemes. Typically, agrammatic speakers encounter difficulties with finite verbs (Saffran, Schwartz, & Berndt, 1989; Jonkers, 1998) and with sentences in which the constituents are not in their base positions (Bastiaanse & Van Zonneveld, 2005).

In Standard Indonesian (SI) verbs are not inflected for tense or agreement. Additionally, the use of passives, which have non-canonical word order, is very frequent (Hidajat, 2010). This raises the question of how agrammatic speech manifests itself in SI. For this purpose, the spontaneous speech of six SI speakers with Broca's aphasia has been analyzed and compared to the speech of non-brain-damaged SI speakers on variables that are known to be vulnerable in other languages and on variables that are typical for SI. Some background on SI may be needed before further exploring these issues.

2.1.2 Some characteristics of the Indonesian language

There are some features of SI that are interesting and can help to reveal the nature of SI agrammatism. Typologically, SI (Bahasa Indonesia, *lit.* the "Language of Indonesia," the national language of the Republic of Indonesia) is a member of the western branch of the Austronesian language family and is closely related to Bahasa Malaysia of the Federation of Malaysia and Bahasa Kebangsaan of the Republic of Singapore (Sie, 1989). SI is related to Malay, which was used as a lingua franca up to 1940s throughout the archipelago (present day Malaysia, Indonesia, and Brunei Darussalam) by traders and Muslim and Christian missionaries. SI also incorporates words from native languages spoken in the Indonesian archipelago, such as Javanese and Sundanese, and has many loan words from Dutch and Portuguese. This contrasts to Bahasa Malaysia and Bahasa Kebangsaan, which

are more influenced by English. For many Indonesians, SI is learned in school and people who never go to school usually have limited command of the (standard) language. Throughout the Indonesian archipelago, SI is used as lingua franca among speakers of hundreds of native languages.

In the past, the variety of Malay which was used throughout the archipelago as the lingua franca was Bazaar Malay (Melayu Pasar, *lit.* 'market Malay'). Bazaar Malay is a pidginized form of Malay with a drastically reduced lexicon and highly simplified morpho-syntax (Platt, 1975, p. 364). This simplification also happens in Indonesian, and this bazaar-type Indonesian language is mostly spoken by less-educated people or in informal situations.

In the following section, the features of SI that are relevant for the current study will be sketched.

2.1.2.1 Predicates

Verb, noun, adjective, numeral, and prepositional phrases function as predicates in SI. In 1 to 5, sentences illustrating the use of each kind of predicate are given. In each example, the underlined words are the head of the predicates.

1 verbal phrase

Saya	<u>mengojek</u>	terus	di	Babadak sini.
I	[offered motor taxi service]	[all the time]	in	Babadak here.

"I offered my taxi motorcycle service here in Babadak all the time."

2 nominal phrase

Saya	<u>stroke</u>	tahun	lalu.
I	stroke	year	before

"I suffered a stroke last year."

3 adjectival phrase

Orang	malas	mendengarkan	saya.
People	reluctant	listen	me

"People are/were reluctant to listen to me."

4 numeral phrase

Pendapatan	saya	lima belas	ribu	per	hari.
Earning	my	fifteen	thousand	per	day

"I earned fifteen thousand rupiahs per day."

5 prepositional phrase

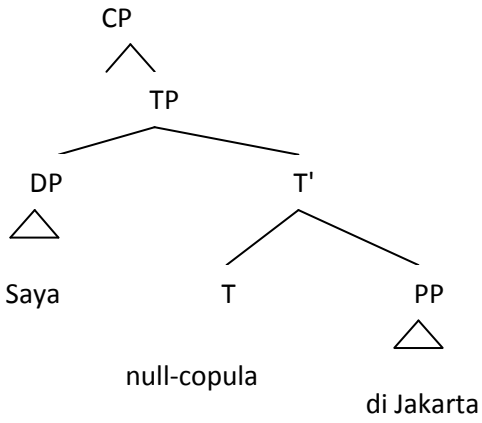
Saya	di	Jakarta	mulai	tahun	1978.
I	in	Jakarta	start	year	1978

"I have been in Jakarta since 1978."

SI verbal predicates are not inflected for tense, aspect, or subject-verb agreement; however they are inflected for voice and transitivity (see below). SI sentences containing non-verbal predicates do not have copulas. It has been argued that in such sentences the non-verbal predicates are headed by null copulas. We follow Tjung (2006)[4] and here present the tree diagram of the core parts of sentences? (5).

[4] Tjung (2006) studies Jakarta Indonesian language, a dialect of Indonesian language spoken in and around Jakarta, the capital of Indonesia. It differs in some respects with the standard Indonesian language studied in the present work, but both variants of Indonesian language have the same structures regarding predicates.

Figure 2-1. Tree diagram of a sentence containing non-verbal predicates



2.1.2.2 Particles

SI particles are roughly comparable to Indo-European prepositions. Their status is based on entries in the most authoritative dictionary of SI, the Kamus Besar Bahasa Indonesia (2005), which defines particles as forms that cannot be derived or inflected. In the work of Alwi, Dardjowidjojo, Lapoliwa, and Moeliono (2003) most of what we classify as particles are called "kata tugas" (grammatical words). Within this class there are words termed "preposisi" (prepositions) and "partikel penegas" (confirming particles). The difference between these subclasses lies in their functions: prepositions express semantic information and "partikel penegas" express syntactic relations. Yet, some prepositions in the classification of Alwi et al. (2003) express direction which we take as semantic information. In the present study, we investigate whether there is a difference between particles that express semantic and syntactic meaning. Taking Alwi et al. (2003) as guidelines, our semantic particles roughly correspond to their "preposisi", especially prepositions that express direction/movement/location, such as *dari*, *ke*, *di*: 'from', 'to', 'at/in' and syntactic particles to their "partikel penegas" (such as *–lah* and *pun*) and prepositions that do not express direction, such as *sebagai*: 'as', *untuk:* 'for', and *oleh*: 'by'. We also take as syntactic particles preposition-like forms that occur inseparably from verbs such as the word *dari*: 'in' *tergantung dari:* 'depend on'.

2.1.2.3 Derivational and inflectional morphemes

SI linguists differentiate between derivational and inflectional morphemes in the word formation. These can be one affix or suffix, or a combination of affix and suffix. According to Keraf (1991), derivational morphemes (affixes) are used to derive new words from existing words with or without a change in word class. Chaer (1994) states that determining the identity of new words has to do with the meaning of the words. For example, the word *pembicaraan* (a noun: 'conversation' or 'what is being talked about') is the result of the addition of the derivational circumfix *pe-an* to the base *bicara* (a verb: 'talk' or 'speak'). Another example of a derivational process is the base verb *makan*: 'eat', to which the suffix *–an* can be added, resulting in the noun *makanan*: 'food'. An example of derivation not resulting in a different word class is the base noun *potong*: 'piece' and the derived noun *perpotongan* (per + *potong* + an) which means 'the point where two lines cross each other.'

Inflectional morphemes, according to Keraf (1991), are morphemes that create new words without changing the word class or the meaning of the base form, for example, *me-*, *di-*, and *ter-* as exemplified in the words *membawa*: 'bring', active, *dibawa*: 'bring', passive intentional, and *terbawa*: 'bring', passive unintentional. All these words carry the meaning "bring" and the use of each word depends on the syntactic structure of the sentence.

According to Subroto (1985), affixes are considered as inflectional when they belong to a paradigm in which they can substitute other inflectional affixes, as shown above. Thanks to this predictability, there is a grammatical regularity in inflectional paradigms. These two conditions do not hold for derivational paradigms. In other words, derivational paradigms are less regular than inflectional paradigms -- the affixes are not predictable.

2.1.2.4 Accusative markers

A specific kind of inflectional morpheme is the accusative marker. In SI, verbs that take direct objects are marked by an affix (*me-*, *me-i*, and *me-kan* such as *memasak rendang:* 'to cook rendang', *melempari penjahat*: 'to repeatedly throw things at thieves' and *mengumumkan perubahan:* 'to announce changes'), and in order to qualify as taking direct objects (as opposed to noun complements) the verbs must be capable of passivization (di-, di-i, and di-kan). In non-standard Indonesian, the prefix *me-* is dropped, and the base form

is produced with a nasalized initial phoneme that is a part of the morphophonemic variant of *me-* when combined with different stems, such as *mengontrak:* 'to rent' [me + kontrak] becomes *ngontrak*; *menyapu:* 'to sweep', [me + sapu] becomes *nyapu*, and *memanggil:* 'to call' [me + panggil] becomes *manggil*.

In previous analyses (e.g., Alwi et al., 2003), the suffixes *–kan* and *–i* were called 'causative' and 'locative', respectively. These terms are based on the relation between the meaning of base form of the verbs and the meaning of the resulting transitive verbs. For example, the relation between the meaning of the base form *bangkit*: 'to arise' and the meaning of the transitive verb *membangkitkan:* 'to raise something' is that in the resulting transitive verb the suffix *-kan* contributes to the meaning of 'causing something to raise'. Similarly for the suffix *–i:* if the base form is a noun (e.g. *gula*: 'sugar'), in the resulting transitive verb (e.g. *menggulai*: 'to give sugar to') the suffix *–i* contributes to the meaning that "sugar is put to/in a certain location." In the sentence, *Ibu menggulai tehnya*: 'Mother puts sugar into her tea', the sugar is put into the tea or into the glass/cup. In the current study, we focus on the sentence level relation between these transitive verbs and their objects. With this relation in mind, we analyse the *me-*, *mekan*, and *me-i* affixes as accusative markers.

2.1.2.5 Reduplication

A specific feature of SI in nominal, verbal, adjectival, and adverbial formation is reduplication. By completely or incompletely reduplicating base forms, with or without affixes or sound change, new words with new meanings are formed. According to Alwi et al. (2003), there are four forms of nominal reduplications: complete reduplication (e.g., *rumah-rumah*: 'houses'), reduplication with a change in sounds (e.g., *warna-warni*: 'all sorts of colors'), incomplete reduplication (e.g., *rumah-rumah sakit*: *lit*. home-home-sick: 'hospitals'), and reduplication containing affix (e.g., *batu-batuan*: 'a collective set of different kinds of rocks'). There is no one-to-one relation between forms of reduplication and meaning. Reduplicated nouns may belong to one these five meaning groups:

a. Diversity, such as *rumah-rumah*: *lit*. house-house 'many different houses' and *laukpauk*: *lit*. side dish-side dish 'many different side dishes such as tofu, tempeh, rendang etc.'.

b. A collective set of the same thing or substance, such as *pepohonan*: *lit*. tree-tree-*an* 'a collective set of trees' and *jari-jemari*: *lit*. finger-finger 'a collective set of fingers'

c. A collective set of different kinds of the same thing or substance, such as *rumputrumputan*: *lit*. grass-grass 'a collective set of different kinds of grass' and *kacangkacangan*: *lit*. nut-nut-*an* 'a collective set of different kinds of nuts'

d. Similarity in looks, such as *bapak-bapak*: *lit*. father-father 'looking like a father/grown up man' and *keabu-abuan*: *lit*. *ke*-grey-grey-*an* 'looking like the color grey'

e. Similarity in manner, such as *kebelanda-belandaan*: *lit*. *ke*-Dutch-dutch-*an* 'having a Dutch-like manner when doing something' and *koboi-koboian*: *lit*. cowboy-cowboy-*an* 'having a cowboy-like manner when doing something'

However, after the words *banyak*: 'many', *beberapa*: 'some' and numerals starting from two, reduplications are ungrammatical (i.e., **dua rumah-rumah: lit*. two house-house 'two houses').

For verbal reduplications, Alwi et al. (2003) differentiates between those resulting in transitive verbs and those resulting in intransitive verbs. The first process is not productive and in general means that the action is done repeatedly and without a specific aim. Below we give an example of reduplicated transitive verbs as compared to their non-reduplicated counterparts:[5]

6	Halaman	koran	itu	dia	bolak-balik.
	Page	newspaper	that	he/she	turn repeatedly without any specific aim
	"He/she turns the newspaper page repeatedly without any aim."				

7	Halaman	koran	itu	dia	balik.
	Page	newspaper	that	he/she	turn.
	"He/she turns the newspaper page."				

Verbal reduplications resulting in intransitive verbs are productive and denote actions that are done without a specific aim (e.g., *duduk-duduk*: *lit*. sit-sit 'sitting somewhere just for the sake of sitting'), actions done repeatedly or continuously with variation (e.g., *bersalam-salaman*: *lit*. *ber*-shake-shake-*an* 'shaking hands repeatedly with different

[5] The sentence construction of sentences 6 and 7 is what is termed subjective passive. See Word order section.

people'), or actions that are reciprocal (e.g., *hormat-menghormati*: *lit*. respect-*me*-respect-*i* 'respecting each other').

Reduplicated adjectives and adverbs may mean "very" or plurality or repetition. For example, in the sentence "Kulitnya merah-merah" (*lit*. Her skin red-red), *merah merah* means there are some red spots or sores that are spread on the skin.

2.1.2.6 Word order

The basic word order of SI sentences is Subject + Predicate + Object (SVO) in the active voice (Butar-Butar, 1976). There are several grammatical non-canonical word order constructions notably five different passive constructions (Sie,1989) where the theme/patient is the topic or is focused. What is common in these passive constructions is that the theme/patient role is fronted and becomes the syntactic subject. To some extent, the corresponding active and passive verbs have two different affixes (most notably *me-* in active and *di-* or *ter-* in passive sentences).

8 Canonical passive

Novel	ini	ditulis	oleh	dia.
Novel	this	*di*-write	by	him/her.

"This novel is written by him/her."

The corresponding active sentence is:

Dia	menulis	novel	ini.
He	*me*-write	novel	this

"He/she writes this novel."

The *oleh*: 'by' prepositional phrase is followed by the agent in canonical passive sentences.

9 Subjective passive

Novel	ini	dia	tulis.
Novel	this	he/she	write.

"This novel is written by him/her."

In the subjective passive example sentence (sentence number 9), the semantic agent (i.e., *dia*) appears before the bare verb (i.e., *tulis*). There is no *oleh* (by) phrase, unlike in the canonical passive. Furthermore, nothing can intervene between the agent (i.e., *dia*) and the bare verb (i.e., *tulis*), thus making a sentence such as (10)" ungrammatical in SI.

10 *Novel ini dia sudah tulis.

Novel this he/she perf-asp. write

"*This novel he has already written."

11 Perfective passive aspect

Pintu	mobil	itu	terbuka	sedikit.
Door	car	that	*ter*-open	a little.

"The door of that car is open a little."

The perfective passive aspect denotes situations that are unexpected, accidental, or unintentional. Although not mentioned in sentence (11), perfective passive aspect can contain the *oleh* prepositional phrase, but the semantic agents must be non-third person pronominals.

12 The ke-an forms

Mobil	itu	kejatuhan	pohon	mangga.
Car	that	*ke*-fall-*an*	tree	mango.

"The car is hit by a falling mango tree."

The *ke-an* passive sentences usually denote misfortunes or unexpected situations. Some *ke-an* passive verbs are related to *me-i* active verbs (e.g. *kejatuhan* and *menjatuhi*), but some others are not. The agent may be left unspecified.

13 *Kena* (befallen) plus stem

Mobil	itu	kena	sial.
Car	that	*kena*	misfortune.

"That car is befallen by misfortune."

This form has been called 'auxiliary passive' because of the presence of *kena,* which modifies the following stem. However, not all stems coming after *kena* are verbal. The agent may be left unspecified.

However, the observation that passivized and object-first constructions are very frequent in both spoken and written SI has led some linguists to suggest that the notion of canonical order of thematic roles is undermined in SI (Postman, 2004, p. 463; Stack, unpublished). In other words, SI has a relatively free word order with the left-most element/word in the sentence being the one focused by the speakers. Therefore, based on frequency, word order may not predict difficulties encountered by Indonesian agrammatic speakers.

2.1.2.7 Grammatical intonation

With a relatively free word order compared to English (Stack, unpublished), intonation plays a very important role: it signals utterance and information boundaries or focus conveyed by speakers of SI. Pudjosoedarmo (1986) proposes that a SI sentence minimally

contains one focal unit that has a rising-falling contour. This proposal is taken into account in deciding sentence boundary for the current study (see section 3.1.).

2.1.2.8 The current study

The aim of the current study is to identify the syntactic and morphological characteristics of SI speech that well-experienced Speech and Language Therapists (SLTs) and clinical linguists judge as 'agrammatic'. There are few studies on SI agrammatism (e.g., Postman, 2004, which assessed comprehension and production of canonical and non-canonical word order in a single agrammatic speaker of SI), and none has looked at spontaneous speech. Therefore, an analysis was performed in order to identify the linguistic variables that contribute to the clinical impression of agrammatic speech from individuals who have been diagnosed as having Broca's aphasia. Several lexical and morphosyntactic variables generally known to be useful for characterizing agrammatism across languages (such as number and diversity of verbs, Mean Length of Utterances) have been included. Additionally, a number of morphosyntactic variables that may be typical for SI agrammatism have been included, to evaluate which ones may help to distinguish SI agrammatic and non-impaired speech.

2.2 Methods

2.2.1 Participants

Six speakers with Broca's aphasia, as determined by the *Tes Afasia untuk Diagnosis, Informasi, dan Rehabilitasi* (TADIR, Dharmaperwira-Prins, 1996), participated in the study. The TADIR is a standardized test for measuring the severity of language disorders in production and comprehension at the word and sentence level, and it provides cut-off scores for aphasic behavior. Additionally, aphasia can be classified in the most common classical types. For the current study we selected participants who were classified as suffering from Broca's aphasia. Five of these participants became aphasic because of a stroke and were more than 3 months post-onset at the time the spontaneous speech data were elicited. One aphasic participant (P4) suffered from a second stroke a month before being interviewed for the current study. Due to limited access to CT-scanners and/or a great distance between the participants' houses and hospitals that have CT-scanners, no information is available on the locus of the lesion.

Demographic details of the participants are presented in Table 2-1.

Table 2-1. Demographics of the participants with Broca's aphasia

	Age	Gender	Handed-ness	Years of education	Professional background	Time post-onset	Dialect of Indonesian spoken
A1	55	m	Left	1	Security guard at various factories	> 3 months	Flores
A2	65	m	Right	6	Owner of a small grocery stall	> 2 years	Jakarta
A3	65	m	Right	12	Worker at glass factory and taxi driver	> 4 years	Jakarta
P4	59	m	Right	12	Administration staff at private company	> 1 month	Central Java
A4	54	m	Right	18	University lecturer	> 3 months	Central Java
A5	41	f	Right	9	Housewife	> 1 year	East Java

In Table 2-2 the scores of the relevant tests from the TADIR for the six participants are presented. According to the speech therapists, their speech was non-fluent and their speech rate was severely reduced. The speech therapists and the clinical linguist who performed the study (the first author) characterized the spontaneous speech intuitively as 'agrammatic'. The aphasic speakers had no apraxia or dysarthria associated with Broca's aphasia that had an effect on speech intelligibility.

Table 2-2. Raw scores of relevant oral/auditory TADIR subtests[6] (Dharmaperwira-Prins, 1996).

NBDs=Non-Brain-Damaged speakers

	# animal names produced in 1 min	Word-level picture naming (max. 8)	Words per minute	Auditory word & sentence comprehension (max. 10; word=4, sentence=6)	Word & sentence repetition (max. 4; word=2, sentence=2)	Severity
A1	6	6	35	7	2	Moderate
A2	8	7	55	6	2	Moderate
A3	8	6	58	7	2	Moderate
P4	3	3	45	7	2	Severe
A4	7	7	23.5	8.5	3	Mild
A5	9	7	19	10	4	Mild
NBDs	>10	8	80-119	10	4	

Three participants (A1, A4, and A5) had received speech therapy mainly aimed at word finding.

Fifteen non-brain-damaged speakers (NBDs) without any history of neurological trauma participated as control subjects. They were matched for gender, age, educational background, and professional background to the participants with aphasia (A1 matched to C1, C2, and C3; A2 and A3 matched to C4 and C5; P4 matched to C6, C7, C8, and C9; A4

[6] Only oral/auditory data are given because some participants with aphasia could not read and write.

matched to C10, C11, and C12; A5 matched to C13, C14, C15). This education and professional background matching is essential for SI because SI is taught and acquired at school age (6/7 years old) for most Indonesians.[7] Indonesians whose work is more white-collar in nature tend to be exposed to, and so speak, a more standard form of the language than those whose work is more blue-collar in nature. These "blue-collar speakers" tend to speak a variety of Indonesian language comparable to the informality of Bazaar Malay (market Malay). Therefore, the background matching is required to control for the influences of length and level of education and work environment on participants' language production. Complete details of the NBDs are presented in Table 2-3 below.

[7] Although nowadays, many children acquire SI as their native language (Quinn, 2001)

Table 2-3. Demographic details of the non-brain-damaged speakers (NBDs)

Matched with	NBD	Gender	Age	Handedness	Years of education	Professional background	Dialect of Indonesian spoken
A1	C1	m	50	Right	1	Second-hand shop keeper	Flores
	C2	m	51	Right	3	Truck driver	Flores
	C3	m	56	Right	5	Owner of a small grocery store at home	Flores
A2	C4	m	55	Right	10	Private driver of a manager	Jakarta
A3	C5	m	63	Right	12	Technician at a telecommunicatio n company	Jakarta
P4	C6	m	56	Right	12	Administration staff at a government office	Central Java
	C7	m	57	Right	12	Administration staff at a government office	Central Java
	C8	m	66	Right	13	Researcher at a provincial research institute	Central Java
	C9	m	63	Right	12	Assistant manager	Central Java
A4	C10	m	51	Right	20	Lecturer	Jakarta
	C11	m	57	Right	20	Lecturer	Jakarta
	C12	m	52	Right	20	Lecturer	Jakarta
A5	C13	f	40	Right	9	Housewife	East Java
	C14	f	45	Right	9	Housewife	East Java
	C15	f	40	Right	9	Housewife	East Java

2.2.2 Materials and Procedure

A semi-standardized interview was audio-recorded and orthographically transcribed. To elicit reference to the past, two questions were asked:

a. Can you tell me about your stroke? 'Bisakah Bapak/Ibu menceritakan kepada saya kejadian stroke yang Bapak/Ibu alami?'

b. Can you tell me about your work before the stroke? 'Bisakah Bapak/Ibu menceritakan kepada saya pekerjaan Bapak/Ibu sebelum stroke?'

Two other questions were asked to elicit reference to the present:

c. Can you tell me about your family? 'Bisakah Bapak/Ibu menceritakan sesuatu tentang keluarga Bapak/Ibu kepada saya?'

d. Can you tell me about your hobbies? 'Bisakah Bapak/Ibu menceritakan sesuatu tentang hobi atau kesukaan Bapak/Ibu kepada saya?'

For the NBDs, questions 3 and 4 were the same, but question 1 was changed into "Can you tell me about the worst health problem you have ever had?" 'Bisakah Bapak/Ibu menceritakan kepada saya masalah kesehatan atau penyakit Bapak/Ibu yang paling parah selama ini?' and question 2 into "Can you tell me about your previous work?" 'Bisakah Bapak/Ibu menceritakan kepada saya pekerjaan Bapak/Ibu sebelum yang sekarang?'

Three hundred-word samples were orthographically transcribed by the first author. Then the analysis needed to characterize SI agrammatic speech was carried out.

2.2.3 Characteristics of SI agrammatic speech

2.2.4 Methods of analysis

To provide reliable samples for lexical and grammatical analyses, 300 words were taken from the speech of every participant, following Brookshire and Nicholas (1994), and Vermeulen, Bastiaanse, and Van Wageningen (1989), with a balance between answers to the four questions as much as possible. These samples were analyzed by the first author, who is a native speaker of SI and a clinical linguist, and by a native speaker assistant who graduated from an Indonesian language department majoring in linguistics and who was

blind to the status of the participants. The few disagreements were discussed and resolved.

2.2.5 Variables and scoring procedure

2.2.5.1 Speech rate

To ensure that the speech of the individuals classified as Broca patients was nonfluent, the speech rate was counted in words per minute. From each sample, one minute was chosen that was most representative of the patient's speech. If possible, this was a part in which the interviewer did not speak. The time during which the interviewer spoke was not included in the speech rate.

2.2.5.2 Mean Length of Utterance in words

The speech of each participant was divided into utterances based on the presence of intonation and pauses. Since the majority of sentences produced by all participants were statements, sentence final intonation was most often falling. Therefore, aphasic speakers were considered to have finished their sentences when it comprised a syntactic unit or when both raters agreed that the speakers had minimally produced a rising-falling intonation contour and the length of the following pause exceeded the length of pauses in midsentence positions. Repetition of words and dialectal words (i.e., words that are not included in SI lexicon/dictionaries and come from other languages spoken by the participants) were excluded from the analysis. The total number of words (300) was then divided by the number of utterances for the Mean Length of Utterance (MLU).

2.2.5.3 Sentence types

This part of the analysis follows the guidelines for analyzing sentence structures explained in Alwi et al. (2003). Each utterance was classified as minor, simple, or compound. A well-formed clause in SI must have at least one subject and one predicate. A clause with a falling intonation followed by a pause that is missing subject, predicate, or both subject and predicate was classified as a 'minor sentence'. Minor sentences in SI must be discourse licensed, meaning that the missing sentence elements must be recoverable from

context. A simple sentence is an utterance that has only one subject-predicate combination. A combination of two or more clauses is termed a 'compound sentence', regardless of whether the combination is done by conjunction (e.g., 'and', 'or', 'but') or subjunction (e.g., 'because', 'if'). In (13-15) some examples of the three kinds of sentences are given.

13 minor

Cukup	buat	nasi	sepiring.
Enough	for	rice	a plate

"Enough for a plate of rice."

14 simple

Bapak[8]	sekarang	bawa	mobil.
Father	now	bring	car

"I drive cars now."

15 compound

Kalau	kerjaannya	belum	rapi	tidak	ada	waktu	kosong.
If	work	not yet	done	no	exist	time	spare

"If our work is not yet done, we do not have any spare time."

[8] The SI words meaning father or mother are sometimes used by adult speakers of SI to refer to themselves. The English translation is then 'I'.

2.2.5.4 Predicates

In some languages, agrammatic speakers produce proportionally fewer verbs (compared to nouns) than NBDs. Therefore, we analyzed the proportional use of different kinds of predicates. Each predicate was tallied as being a verbal, nominal, adjectival, numeral, or prepositional predicate, and the proportions produced by the speakers with aphasia were compared to those of the NBDs.

2.2.5.5 Syntactic particles

The proportion of syntactic particles per utterance was counted. The particles examined do not include clausal co-ordinators (e.g., *tapi*: 'but', *dan*: 'and', *atau*: 'or') or sub-ordinators (e.g., *walaupun*: 'although'), and are all free morphemes, with the exception of *–lah* (-lah is used to confirm/stress something, such as *makanlah*: 'do eat') which is a bound morpheme. As mentioned above, SI syntactic particles are comparable to prepositions with a syntactic function in languages like English. The following syntactic particles appeared in the samples: *sama:* 'with', *pun:* 'also', *dengan:* 'by', *buat:* 'for', *-lah*: 'stressing the word it is attached to', *daripada:* 'than', *sebagai:* 'as', *untuk:* 'for', *menurut:* 'according to', *kepada:* 'to', and *oleh:* 'by, usually found in passive sentences'.

2.2.5.6 Derivational and inflectional morphemes

All affixes were classified as derivational or inflectional. Judgment was based on a comparison of root words and resulting words. The derivational and inflectional affixes produced by the agrammatic speakers were counted and the numbers were compared with those of the NBDs.

2.2.5.7 Accusative markers

The accusative markers, both the full and the reduced forms, were counted. As mentioned in section 1.2., full accusative markers are affixes such as *me-*, *me-i*, and *me-kan* that signal active sentences and their reduced forms (the forms where the prefix *me* is dropped and

the base form is produced with a nasalized initial phoneme). Accusative markers indicate a direct object. Therefore, we also analyzed whether or not the direct object was realized.

2.2.5.8 Reduplication

We counted the grammatical realizations of nouns, verbs, adjectives, and adverbs that underwent reduplication. The proportion of reduplicated words per utterance produced by the aphasic participants was compared to that produced by their respective NBDs.

2.2.5.9 Word order

Sentences containing overt markings/affixes for active and passive constructions were counted. Passive sentences were grouped under canonical passive, subjective passive, *ke-an* forms, and *ter-* forms (perfective passive aspect). The proportion of the verbs with overt active and passive markings was counted. In addition, the number of realized grammatical subjects in the passive sentences was counted.

2.3 Results

Since the number of participants in this study was small and the analyses were conducted within the groups of matched participants, we analyzed the results as conservatively as possible, and compared the scores of the aphasic speakers to the ranges of their matched NBDs. Only scores outside (below or above) the range of the matched controls were considered to reflect a relevant difference.

2.3.1 Speech rate

The speech rate of each participant with Broca's aphasia was reduced compared to the norms of the TADIR (see Table 2 above) and fell below the range of all the NBDs, thus confirming that the aphasia was non-fluent.

2.3.2 Mean Length of Utterances in words

In Table 2-4, the MLUs of the participants are given. In general, it can be observed that the higher the education and the better the professional background of the NBDs, the longer their sentences were. All aphasic speakers scored not only below the range of their matched control group, but also below the range of all NBDs (except for A3 whose MLU is the same as C14's).

Table 2-4. Number of utterance and the mean length of utterances (MLU) in words per participant.

	# utterances	MLU in words		# utterances	MLU in words
A1	62	4.8	C1	39	7.7
			C2	41	7.3
			C3	35	8.6
A2	49	6.12	C4	37	8.1
A3	43	7	C5	23	13
P4	47	6.4	C6	27	11.1
			C7	38	7.9
			C8	18	16.7
			C9	23	13
A4	52	5.8	C10	23	13
			C11	39	7.7
			C12	34	8.8
A5	89	3.37	C13	39	7.7
			C14	43	7
			C15	38	7.9

2.3.3 Sentence types

The sentence types produced by participants are given in Table 2-5.

In general, the agrammatic speakers produced relatively more minor and simple sentences. A1 produced considerably more minor sentences than the NBDs in his group. In other words, A1 omitted the obligatory parts of sentences (subjects and predicates) more often than the NBDs. As a consequence, A1 produced fewer simple and compound

sentences. A2 produced proportionately more minor sentences and fewer compound sentences than the NBDs matched to him. A3 produced proportionally more minor utterances and simple sentences than the NBDs in his group. Although the number of compound sentences that A3 produced is just within the normal range, proportionally he produced fewer of these constructions. The number of minor utterances produced by P4 fell below the normal range, whereas he produced fewer compound sentences than the NBDs. A4 and A5 also produced proportionately more minor sentences and fewer compound sentences. While A4 produced a proportionately normal number of simple sentences, the proportion of simple sentences in A5's speech was below normal compared to her NBDs.

Table 2-5. Total numbers and percentages of the three sentence types per agrammatic and NBD participant.

	Minor	Simple	Compound		Minor	Simple	Compound
A1	33 (53.2%)	14 (22.6%)	15 (24.2%)	C1	11 (28.2%)	15 (38.5%)	13 (33.3%)
				C2	9 (22%)	17 (41.5%)	15 (36.5%)
				C3	6 (17.2%)	11 (31.4%)	18 (51.4%)
A2	19 (38.8%)	17 (34.7%)	13 (26.5%)	C4	7 (19%)	13 (35%)	17 (46%)
A3	9 (21%)	19 (44.2%)	15 (34.9%)	C5	2 (8.8%)	6 (26%)	15 (65.2%)
P4	15 (32%)	22 (47%)	10 (21%)	C6	0 (0%)	15 (55.6%)	12 (44.4%)
				C7	10 (26.3%)	14 (36.8%)	14 (36.9%)
				C8	1 (5.6%)	2 (11.1%)	52 (83.3%)
				C9	3 (13%)	5 (21.7%)	15 (65.3%)
A4	18 (34.6%)	20 (38.5%)	14 (26.9%)	C10	2 (8.7%)	11 (47.8%)	10 (43.5%)
				C11	9 (23%)	19 (48.7%)	11 (28.3%)
				C12	10 (29.4%)	8 (23.5%)	16 (47.1%)
A5	51 (57.3%)	21 (23.6%)	17 (19.1%)	C13	2 (5.1%)	25 (64.1%)	12 (30.8%)
				C14	11 (25.6%)	22 (51.1%)	10 (23.3%)
				C15	4 (10.6%)	17 (44.7%)	17 (44.7%)

Sentences that are lacking subjects and/or predicates were ungrammatical in the strict sense, because a grammatical sentence in SI is a clause consisting of at least a subject and predicate (Kridalaksana, 1999). Minor sentences lack the subject and/or predicate, but if the omission is discourse-licensed, the minor sentence is considered to be grammatical (Lubis, 1991; Martohardjono, 1993). The proportion of minor sentences produced by each participant is listed in Table 6.

As can be seen from this table, aphasic speakers produced more ungrammatical minor sentences than their matched NBDs. Except for A3, the aphasic speakers fell above the range of all NBDs. Two examples of ungrammatical minor sentences are given below. Sentence 15 lacks grammatical subject and sentence 16 lacks a grammatical object after the word meaning *surround*. The corresponding grammatical sentences are given in sentences 17 and 18.

Table 2-6. Proportion of minor sentences, which are considered ungrammatical

Participant	Proportion of ungrammatical sentences (minor sentences)	Participant	Proportion of ungrammatical sentences (minor sentences)
A1	53.2%	C1	28.2%
		C2	22%
		C3	17.2%
A2	38.8%	C4	19%
A3	21%	C5	8.8%
P4	32%	C6	0%
		C7	26.3%
		C8	5.6%
		C9	13%
A4	34.6%	C10	8.7%
		C11	23%
		C12	29.4%
A5	57.3%	C13	5.1%
		C14	25.6%
		C15	10.6%

15 *Perlu sama bos.

Need with boss

“Need the boss.

16	*Sudah ngerumunin	jatuh kenapa.	terus	banyak	orang
	Perf-asp. surround	fall down what's wrong	then	a lot	people

"After falling down then a lot of people surrounded (me), (asking) what's wrong, what's wrong."

17	Saya	perlu	sama	bos
	I	need	with	boss

"I need the boss."

18	Sudah saya,	jatuh, kenapa.	terus	banyak	orang	ngerumunin
	Perf-asp. me,	fall down what's wrong	then	a lot	people	surround

"After falling down then a lot of people surrounded me, (asking) what's wrong, what's wrong."

2.3.4 Predicates

In Table 2-7 the nature of the produced predicates is given.

Since we analyzed a fixed number of words and the utterances were short, agrammatic speakers produced more predicates than the NBDs (although C7 produces only one more predicate than P4). Therefore, we compared the distribution of the different kinds of predicates, rather than raw numbers in the 300-word samples. Remarkably, all agrammatic speakers used a normal percentage of verbal predicates. For three of them (A1, A2, and A3) the percentage of verbal predicates was even higher than normal. Thus, the agrammatic speakers in this study did not have problems producing verbs compared to nouns. A1 even seemed to be better in producing verbs than nouns. As for the other predicates, the picture is quite diverse and no conclusions can be drawn.

Table 2-7. Raw numbers and percentages of the different predicates produced by the agrammatic and NBD speakers.

	Verbal	Nominal	Adjectival	Prep. phrase	Numeral	Sentences without predicates
A1	68 (81%)	4 (4.7%)	9 (10.7%)	2 (2.4%)	1 (1.2%)	3
C1	33 (57%)	9 (15.5%)	9 (15.5%)	2 (3.4%)	5 (8.6%)	1
C2	29 (60.4%)	7 (14.6%)	6 (12.5%)	5 (10.4%)	1 (2.1%)	9
C3	32 (58.2%)	5 (9.1%)	13 (23.6%)	3 (5.5%)	2 (3.6%)	3
A2	40 (69%)	7 (12%)	6 (10.3%)	4 (7%)	1 (1.7%)	5
A3	44 (71%)	9 (14.5%)	7 (11.3%)	1 (1.6%)	1 (1.6%)	3
C4	23 (47%)	11 (22.4%)	11 (22.4%)	3 (6.1%)	1 (2.1%)	5
C5	30 (62.5%)	2 (4.2%)	11 (22.9%)	3 (6.2%)	2 (4.2%)	5
P4	34 (64.2%)	7 (13.2%)	6 (11.3%)	3 (5.65%)	3 (5.65%)	7
C6	32 (76.2%)	9 (21.4%)	0 (0%)	1 (2.4%)	0 (0%)	0
C7	33 (61.1%)	9 (16.7%)	4 (7.4%)	8 (14.8%)	0 (0%)	2
C8	29 (67.4%)	8 (18.6%)	3 (7%)	2 (4.7%)	1 (2.3%)	0
C9	32 (71.1%)	7 (15.5%)	3 (6.7%)	3 (6.7%)	0 (0%)	2
A4	36 (54.5%)	17 (25.7%)	9 (13.6%)	0	4 (6.2%)	12
C10	19 (46.3%)	9 (22%)	7 (17%)	5 (12.2%)	1 (2.5%)	2
C11	31 (56.4)	13 (23.6%)	3 (5.4%)	5 (9.2%)	3 (5.4%)	2
C12	26 (48%)	13 (24%)	13 (24%)	1 (2%)	2 (2%)	2
A5	56 (69.1%)	7 (8.6%)	11 (13.6%)	4 (5%)	3 (3.7%)	25
C13	40 (70.2%)	6 (10.5%)	8 (14%)	0	3 (5.3%)	2
C14	32 (56.1%)	15 (26.3%)	4 (7%)	4 (7%)	2 (3.6%)	1
C15	44 (61%)	10 (14%)	13 (18%)	4 (5.6%)	1 (1.4%)	1

2.3.5 Syntactic particles

In Table 2-8 the production of particles is provided.

The most commonly produced syntactic particles were *daripada* (than), *pun* (also or although, depending on context), and *–lah* (confirming or stressing the word -lah is attached to). The percentage of particles per utterance produced by the participants with aphasia was below the lower range of their matched NBDs (except for A1, whose matched NBD, C2, did not produce any particles). This was true for particles in general and for syntactic particles in particular.

All sentences containing syntactic particles were grammatical. The lower proportion of syntactic particles by some aphasic speakers was due to the fact that they produced proportionately fewer syntactic particles per utterance than their NBDs, but the functions of the produced particles were correct. Thus, if aphasic speakers produced syntactic particles, the meaning and function were correct.

Table 2-8. Total numbers of particles in general and syntactic particles in particular, and proportion of the particles per utterance.

	Total number of particles	Percentages of particles/utterance	Total number of syntactic particles	Percentages of syntactic particles/utterance
A1	19	0.31 (19/62)	4	0.06 (4/62)
C1	13	0.33 (13/39)	8	0.21 (8/39)
C2	0	0	0	0
C3	14	0.40 (14/35)	4	0.11 (4/35)
A2	23	0.47 (23/49)	6	0.12 (6/49)
A3	15	0.35 (15/43)	2	0.05 (2/43)
C4	21	0.57 (21/37)	8	0.22 (8/37)
C5	16	0.70 (16/23)	9	0.39 (9/23)
P4	7	0.15 (7/47)	1	0.02 (1/47)
C6	18	0.67 (18/27)	6	0.22 (6/27)
C7	22	0.58 (22/38)	4	0.11 (4/38)
C8	21	1.17 (21/18)	7	0.39 (7/18)
C9	22	0.96 (22/23)	8	0.35 (8/23)
A4	13	0.25 (13/52)	4	0.08 (4/52)
C10	19	0.83 (19/23)	6	0.26 (6/23)
C11	22	0.56 (22/39)	8	0.21 (8/39)
C12	17	0.50 (17/34)	11	0.32 (11/34)
A5	14	0.16 (14/89)	2	0.02 (2/89)
C13	11	0.28 (11/39)	4	0.10 (4/39)
C14	18	0.42 (18/43)	8	0.19 (8/43)
C15	11	0.29 (11/38)	1	0.03 (1/38)

2.3.6 Derivational and inflectional morphemes

In Table 2-9, the production of derivational and inflection morphemes is given.

A1 was exceptionally poor in the production of affixes and his score fell far below the range of all NBDs. A4 produced fewer affixes than his NBDs. A2, A3, P4, and A5 used a normal number of affixes.

However, the patterns of production for inflectional and derivational affixes were different from normal for three aphasic speakers. The proportions of derivational affixes for A1, A3, and P4 fell below the range on NBDs (A1 11.1%; A3 20%; P4 18%; range control participants: 25.8-64.7%). This, of course, resulted in a relatively large proportion of inflectional affixes. For A3 and P4 there was also an absolute difference: they produced numerically more inflectional affixes than their matched control participants.

A2, A4, and A5 produced normal proportions of derivational and inflectional affixes compared to the NBDs in their groups. However, numerically A4 produced fewer derivational affixes than his NBDs.

Table 2-9. Number of derivational and inflectional morphemes produced by the agrammatic and NBD speakers.

Between brackets are the percentages of derivational and inflectional morphemes on the total number of bound grammatical morphemes (=derivational + inflectional).

	# bound grammatical morphemes	# (%) derivational morphemes	# (%) inflectional morphemes
A1	9	1 (11.1%)	8 (88.9%)
C1	45	12 (26.7%)	33 (73.3%)
C2	37	15 (40.5%)	22 (59.5%)
C3	22	11 (50%)	11 (50%)
A2	32	10 (31.2%)	22 (68.8)
A3	40	8 (20%)	32 (80%)
C4	31	8 (25.8%)	23 (74.2%)
C5	43	29 (67.4%)	14 (32.6%)
P4	39	7 (18%)	32 (82%)
C6	36	21 (58.3%)	15 (41.7%)
C7	27	10 (37%)	17 (63%)
C8	41	17 (41.5%)	24 (58.5%)
C9	48	25 (52%)	23 (48%)
A4	26	10 (38.5%)	16 (61.5%)
C10	48	26 (54.2%)	22 (45.8%)
C11	49	16 (32.7%)	33 (67.3%)
C12	39	15 (38.5%)	24 (61.5%)
A5	38	12 (31.6%)	26 (68.4%)
C13	38	10 (35.7%)	28 (64.3%)
C14	33	15 (45.5%)	18 (54.5%)
C15	27	3 (11.1%)	24 (88.9%)

2.3.7 Accusative markers

In Table 2-10, the numbers of accusative markers with and without an object are given.

A1 did not produce any accusative markers, whereas his (and the other) NBDs did. A2 and P4 were in the normal range in terms of the production of accusative markers and the realization of direct objects following the markers. A3, A4, and A5 produced a normal number of accusative markers, but omitted the object more often than their matched NBDs. Notice that omission of the object was not only done by A3, A4, and A5: all NBDs produced accusative markers without objects. The two raters agreed that all the omissions were discourse-licensed.

Table 2-10. Numbers of accusative markers and numbers (percentages) of realized and omitted direct objects when an accusatives marker was produced

	# verbs with acc. marker	# (%) realized direct objects	# (%) omitted direct objects
A1	0	-	-
C1	4	3 (75%)	1 (25%)
C2	6	1 (16.7%)	5 (83.3%)
C3	3	2 (66.7%)	1 (33.3%)
A2	6	5 (83.3%)	1 (16.7%)
A3	7	3 (43%)	4 (57%)
C4	3	2 (66.7%)	1 (33.3%)
C5	7	4 (57%)	3 (43%)
P4	8	4 (50%)	4 (50%)
C6	5	5 (100%)	0 (0%)
C7	2	1 (50%)	1 (50%)
C8	9	7 (77.8%)	2 (22.2%)
C9	8	7 (87.5%)	1 (12.5%)
A4	6	4 (66.7%)	2 (33.3%)
C10	2	2 (100%)	0
C11	6	6 (100%)	0
C12	6	5 (83.3%)	1 (16.7%)
A5	12	7 (58.3%)	5 (41.7%)
C13	2	2 (100%)	0
C14	6	4 (66.7%)	2 (33.3%)
C15	7	5 (71.4%)	2 (28.6%)

2.3.8 Reduplication

Table 2-11 provides information on verbal, nominal and adjectival-adverbial reduplications.

In terms of proportion of reduplications per utterance, A1, A3, and A4 were below the lower end of the performance of their NBDs, while P4 and A5 were in the range, and A2 was above the normal range. This suggests that a low percentage of reduplicated words per utterance in a 300-word speech sample can be used to characterize agrammatism in SI.

Table 2-11. Number of nominal, verbal, and adjectival/adverbial reduplications.

	Reduplication						Reduplication				
	Total	% Redupl./ utt.	Verbal	Nominal	Adjectival & adverbial		**Total**	% Redupl./ utt.	Verbal	Nominal	Adjectival & adverbial
A1	**5**	0.08 (5/62)	3	2	-	C1	**6**	0.15 (6/39)	4	1	1
						C2	**8**	0.20 (8/41)	2	5	1
						C3	**6**	0.17 (6/35)	2	3	1
A2	**5**	0.10 (5/49)	1	2	2	C4	**2**	0.05 (2/37)	-	-	2
A3	**1**	0.02 (1/43)	-	-	1	C5	**2**	0.09 (2/23)	-	1	1
P4	**5**	0.11 (5/47)	-	3	2	C6	**0**	0	-	-	-
						C7	**7**	0.18 (7/38)	3	4	-
						C8	**0**	0	-	-	-
						C9	**4**	0.17 (4/23)	-	-	4
A4	**0**	**0**	-	-	-	C10	**2**	0.09 (2/23)	-	1	1
						C11	**4**	0.10 (4/39)	1	1	2
						C12	**7**	0.20 (7/34)	1	4	2
A5	**8**	0.09 (8/89)	4	3	1	C13	**7**	0.18 (7/39)	2	3	2
						C14	**4**	0.09 (4/43)	-	3	1
						C15	**5**	0.13 (5/38)	-	4	1

2.3.9 Word order

In Table 2-12 the numbers of sentences in canonical and non-canonical order are given.

From the proportion of realized passive and active markers per verbal predicate, which unambiguously signal the production of active and passive sentences, it can be observed that A1 produced no active markers, and was, therefore, below the range of his NBDs. He also produced a lower than normal percentage of passive markers. A4 was also poor in the proportion of active and passive markers per verbal predicate. A5 was within the normal range for the production of the active markers, but was below the normal range for the production of the passive markers. The other three participants with Broca's aphasia (A2, A3, P4) were within or above the normal range for both active and passive markers. We did not analyse the proportion of each passive marker separately as some participants did not produce some of the markers.

Using these active and passive sentences, we analyzed how many have realized grammatical subjects. We predicted that the extra processing load needed for producing the non-canonical word order would interfere with the explicit mention of grammatical subjects. In other words, if the aphasic speakers had problems in the production of non-canonical sentences, we expected that they would produce proportionately fewer grammatical subjects in the passive sentences than the NBDs. Recall that this subject dropping is possible in SI if the context allows for the identification of the dropped subjects. We did not analyze realized agents because these are not obligatory in some passive constructions. Active sentences have basic SVO word order and passive sentences have derived word order in which the theme/patient is the grammatical subject.

Table 2-12. Number of passive sentences produced by the participants

(Can.= Canonical Passive, Subj.= Subjective passive, Ke-an= Ke-an forms, Ter- = Perfective passive aspect),[9] total pass./#utt.=total number of passive markers/number of utterances.

	Active	Passive						Active	Passive				
		Total pass./ #utt.	Can.	Subj.	Ke-an	Ter-			Total pass./ #utt.	Can.	Subj.	Ke-an	Ter-
A1	0	3/68	3	-	-	-	C1	4/33 (12%)	6/33 (18%)	3	-	2	1
							C2	2/29 (7%)	3/29 (10%)	2	-	-	1
							C3	3/32 (9%)	2/32 (6.3%)	2	-	-	-
A2	6/40 (15%)	4/40 (10%)	2	1	-	1	C4	2/23 (9%)	5/23 (21.7%)	4	-	-	1
A3	5/44 (11.4%	12/44 (28%)	4	-	-	8	C5	7/30 (23%)	2/30 (6.7%)	2	-	-	-
P4	10/34 (29%)	6/34 (18%)	6	-	-	-	C6	5/32 (16%)	5/32 (15.6%)	5	-	-	-
							C7	1/33 (3%)	2/33 (6%)	2	-	-	-
							C8	7/29 (24%)	6/29 (20.7%)	4	-	1	1
							C9	9/32 (28%)	6/32 (18.8%)	6	-	-	-
A4	6/36 (16.7%)	3/36 (8.3%)	3	-	-	-	C10	5/19 (26%)	3/19 (15.8%)	3	-	-	-
							C11	9/31 (29%)	4/31 (13%)	4	-	-	-
							C12	9/26 (35%)	4/26 (15.4%)	3	-	-	1
A5	15/56 (26.8%)	6/56 (11%)	4	-	-	2	C13	2/40 (5%)	7/40 (17.5%)	7	-	-	-
							C14	6/32 (19%)	2/32 (6.25%)	2	-	-	-
							C15	9/44 (20%)	8/44 (18.2%)	5	1	1	1

[9] *Kena* forms were not produced by the participants.

As can be observed in Table 2-13, the NBDs of all subgroups varied largely in the percentage of expressed subjects in both active and passive sentences, and so did the participants with aphasia.

Table 2-13. Total number of active and passive sentences produced by all participants, and number and proportion of realized grammatical subject in passive sentences

	#Active	#Passive	#Realized subject active	#Realized subject passive		#Active	#Passive	#Realized subject active	#Realized subject passive
A1	**0**	**3**	**-**	2 (66.7%)	C1	**4**	**6**	3 (75%)	2 (33.3%)
					C2	**2**	**3**	0 (0%)	1 (33%)
					C3	**3**	**2**	3 (100%)	1 (50%)
A2	**6**	**4**	2 (33.3%)	2 (50%)	C4	**2**	**5**	0 (0%)	3 (60%)
A3	**5**	**12**	4 (80%)	8 (66.7%)	C5	**7**	**2**	3 (42.8%)	2 (100%)
P4	**10**	**6**	6 (60%)	6 (100%)	C6	**5**	**5**	4 (80%)	3 (60%)
					C7	**1**	**2**	0 (0%)	1 (50%)
					C8	**7**	**6**	7 (100%)	5 (83.3%)
					C9	**9**	**6**	6 (66.7%)	5 (83.3%)
A4	**6**	**3**	2 (33.3%)	2 (66.7%)	C10	**5**	**3**	5 (100%)	2 (66.7%)
					C11	**9**	**4**	4 (44.4%)	1 (25%)
					C12	**9**	**4**	5 (55.6%)	2 (50%)
A5	**15**	**6**	5 (33.3%)	2 (33.3%)	C13	**2**	**7**	2 (100%)	3 (50%)
					C1	**6**	**2**	1 (16.7%)	0 (0%)
					C15	**9**	**8**	2 (22.2%)	2 (25%)

Furthermore, because of the small number of participants who were divided into matched subgroups, our expectation regarding the relationship between canonicity and the realization of grammatical subjects was not supported. There was no evidence that word order interacted with the production of the subjects of grammatical sentences by SI speakers with Broca's aphasia.

2.4 Discussion

In Table 2-14, an overview of the performance of the Broca patients is given.

Table 2-14. Overview of the analysis.

– is below the normal range, = is within the normal range, + is above the normal range. MLU = mean length of utterances; minor utt. = minor utterances; %verb. pred. = percentage verbal predicates; %der. morph. = percentage derivational morphemes; %infl. morph. = inflectional morphemes acc. markers = accusative markers; omitted obj. after acc. markers= omitted objects after accusative markers; redupl. = reduplication; #passive sentences = number of passive sentences; %real. gram. subj. in passive sent. = percentage of realized grammatical subject in passive sentences

	speech rate	MLU	#minor utt.	%verb. pred.	% syntactic particles	%der. morph.	%infl. morph	acc. markers	omitted obj. after acc. markers	redupl.	#passive sentences	%real. gram. subj. in passive sent.
A1	-	-	+	+	-	-	+	-	-	-	=	+
A2	-	-	+	+	-	=	=	=	=	+	=	-
A3	-	-	+	+	-	-	+	=	+	-	+	=
P4	-	-	+	=	-	-	+	=	=	+	=	+
A4	-	-	+	=	-	=	=	=	+	-	=	=
A5	-	-	+	=	-	=	=	+	+	+	=	=

As in other languages (e.g., for English Goodglass, 1976; Thompson, Shapiro, Li, and Schendel 1995; for Italian Rossi and Bastiaanse, 2007; and for a cross-linguistic study of English, Dutch, German, French, Italian Sanchez (1996), the spontaneous speech of Broca's aphasic SI speakers consists of short sentences and is produced at a slow rate. Also, proportionately more minor and simple sentences are produced, which can be considered to be characteristics of agrammatic speech in SI. The fact that the NBDs also left out obligatory parts of sentences reflects the fact that in spoken conversations in SI, ellipsis may occur, provided that the referents are understood from context (Lubis, 1991).[10] The Broca participants used this pragmatic/discourse strategy more often than the NBDs. In other words, they relied more on pragmatic strategies to compensate for their problems with explicitly naming the subjects and predicates of their sentences. The larger percentage of minor and simple sentences produced by the aphasic speakers than the NBDs also supports Paradis' observation that "patients tend to resort to whatever devices are available in the language (e.g. stylistic possibilities of simplification) in order to avoid, or to get around complexity" (Paradis, 2001, p. 88).

Problems with verb production were not typical for SI agrammatic speech, at least not at the level of analysis described here. A normal number of lexical verbs within a fixed sample size has also been reported for Dutch agrammatic speakers (Bastiaanse and Jonkers, 1998).

The proportion of particles is low for all aphasic participants. This holds for particles in general and for syntactic particles in particular. Two aphasic participants with Broca's aphasia produced fewer derivational morphemes than the NBDs, but two others overused inflectional affixes. As inflectional affixes are more rule-governed and predictable than derivational affixes, further research is needed to investigate whether predictability and a basis in common syntactic rules contribute to the production of inflectional affixes by speakers with Broca's aphasia. Furthermore, producing verbal accusative markings with direct objects was not easy for the participants with Broca's aphasia, although some of them produced them to a normal extent.

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[10] Subject dropping motivated by pragmatic/discourse reasons also happens in Chinese, Imbabura Quechua, and Old Icelandic (Huang, 1995). Omission of more subjects and topics by agrammatic speakers of Cantonese (a dialect of Chinese) compared to NBDs was observed in Yiu and Worrall (1996).

Production of derived word order was assessed by counting several kinds of passive sentences. However, this variable was not very useful for characterizing agrammatism in SI. The aphasic speakers were perfectly able to produce them spontaneously. Notice that SI passive sentences are fundamentally different from those in, for example, English. One explanation is that passive constructions are produced as frequently as active constructions in Indonesian, if not more frequently (Postman, 2002). Therefore, the passive construction is more anchored in the language system. It has been argued before that grammatical characteristics that are firmly anchored in the language system are often preserved in agrammatic aphasia. Abuom, Obler and Bastiaanse (2011) report that in English – Swahili bilingual agrammatic speakers, verb inflection in Swahili, which has a very large and complex verb inflection paradigm, is significantly better preserved than verb inflection in English, with its simple paradigm. They suggest that this is caused by the fact that in Swahili, the verb inflection paradigm is very firmly anchored in the language system, like passive contructions in SI. A second explanation is that passive constructions do tax the processing system of the aphasic speakers, but that the problems do not show up in spontaneous speech. Maybe a more controlled experiment, such as that of Postman (2002), is more suitable to capture the agrammatic word order deficits.

Regarding reduplications, we suggest that this unique linguistic feature of SI be investigated in more sensitive experimental tasks that zoom in on this feature to assess its processing in speakers with Broca's aphasia/agrammatism. This may pose problems for agrammatic speakers since three out of the six aphasic participants produced proportionately fewer reduplicated words than their NBDs.

In sum, overt ungrammaticalities are only reflected by the overproduction of minor sentences. Other variables do not yield observations of ungrammatical sentences, although some Broca participants had problems with the variables as shown by their lower proportion of the variables compared to that of the NBDs. These results show that the traditional variables alone, which were based on previous studies of mainly Indo-European languages, provide insufficient information to characterize SI agrammatic speech. Analysis of verb production, for example, should be more precise, as shown in another paper of ours (Anjarningsih and Bastiaanse, 2011). The current results give some ideas for analysis of spontaneous speech in SI. Perhaps the definition of agrammatism, which is based on other languages, should be revised to account for the results from SI. Perhaps agrammatism is not only about syntactic and morphological variables, but also about the interaction between syntax and pragmatics, as suggested by the higher rate of pragmatically-licensed omissions. Or perhaps the spontaneous speech of Broca

participants goes around their syntactic problem by choosing simpler constructions and producing shorter sentences, an observation already voiced by Paradis (2001).

In this study, SI agrammatic speakers were characterized by the fact that they had more omissions than the NBDs, which led to a compromised comprehensibility as reported by the speech therapists (when applicable) and their families. We propose that omissions of obligatory parts of sentences by the agrammatic speakers suggest an unbalanced/abnormal use of syntactic and pragmatic strategies that render the agrammatic speech difficult to understand. This difficulty may stem from the fact that conversation partners need to pay more attention to context in order to understand the message.

2.5 Clinical implications

With the present study, we aimed to find characteristics of SI agrammatic speech and to provide norms that can be used to evaluate deviant speech. Although the variables were chosen for a study to agrammatism, most of them can be used to analyze SI aphasic speech in general, including speech samples from fluent aphasic speakers. This study is important in that there is no standardized battery yet to characterize and diagnose agrammatism in Indonesian. What is now available is a battery for assessing semantic problems in Malay-speakers with aphasia (Jalil, Liow, and Keng, 2011).

From a communicative perspective, the current data suggest that the core of the problem of these agrammatic speakers is the omission of obligatory elements of the sentence. Derived word order does not seem to be a crucial factor. This suggests that the focus of the treatment of the Broca participants who speak agrammatically should be on the explicit production of all relevant information. This can be trained in several ways, but considering that most aphasic patients are helped more by learning strategies rather than by relearning language skills, training focused on the pragmatic consequences of certain linguistic constructions seems most appropriate to improve agrammatic speech in SI. Several of the variables that have been used in the current study can be used to measure improvement. For example, Links, Hurkmans and Bastiaanse (2010) showed that MLU is a valuable measure for improvement. Similarly, McCall, Virata, Linebarger and Berndt (2010) found improvement on MLU and percentage of grammatical clauses and Kirmess and Maher (2010) reported an increase of speech rate after treatment. Thompson, Choy,

Holland, and Cole (2010) reported an improvement on MLU, speech rate and percentage of grammatical sentences after training. However, when measuring the results of treatment, one should realize that agrammatic behavior may vary. It is important to do a complete analysis, not only on the variables that were trained (Bastiaanse, 1995; Bastiaanse, Hurkmans and Links, 2006; Cameron, Wambaugh, and Shannon, 2010). We know that improvement on these variables is of crucial importance. Stark showed that improvement of telegraphic speech results in better communicative abilities in daily life (Bastiaanse et al., 2006; Links et al., 2010; Stark 2010).

The variables we used are simple to analyze, and, hence, are easy to use for speech-language therapists and linguists working with SI speakers with Broca's aphasia. Since (limited) norms of NBDs are now available, it is possible to do a spontaneous speech analysis before and after treatment, and? to evaluate the results. However, the variables that we included in this study may not be exhaustive for characterizing agrammatic SI speech. Furthermore, other methods to elicit agrammatic speech, such as picture description or repetition may reveal deficits not apparent in the samples analyzed in the current study. Nevertheless, we realize that what is still needed is an account of what is normal for all possible subgroups of SI speakers. With SI as a national language and a lingua franca, education, professional background, gender, and age influence the language produced. To control for these factors and to make sure that the aphasic speakers are not evaluated based on the wrong standard, a database of normal production from all socioeconomic levels is needed.

Chapter 3
Verbs and time reference in Standard Indonesian agrammatic speech[11]

Background: It has been shown for a number of languages that verb retrieval and verb inflection are impaired in agrammatic speech. Several studies showed that, while some agrammatic speakers are relatively good in verb retrieval but poor in verb inflection, others show the inverse pattern (Dutch: Bastiaanse & Jonkers, 1998; Italian: Rossi & Bastiaanse, 2008, among others). However, not all languages use verb inflection to express sentence internal and external relationships, such as agreement, tense, and aspect; some use free-standing grammatical morphemes instead. Standard Indonesian (SI) is such a language.

Aims: The aim of the current study is to find out whether the production of free-standing grammatical morphemes—which specify time frame and are thus comparable to tense and aspect inflection in other languages—is impaired in SI agrammatic spontaneous speech, and whether there is a similar inverse relationship between verb retrieval and the use of these morphemes, as suggested by findings on verb inflection in other languages.

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[11] Anjarningsih, H.Y., Haryadi-Soebadi, R., Gofir, A., and Bastiaanse, R. (2011). Characterizing Agrammatism in Standard Indonesian. *Aphasiology*. DOI: 10.1080/02687038.2011.626844

Methods & Procedures: A total of 21 adult speakers of SI (6 with Broca's aphasia with mild to moderate agrammatic speech and 15 without history of neurological problems) participated in the study. From the speech of each participant 300 words were extracted, and the occurrence of verbal predicates, aspectual adverbs, and lexical adverbs of time was counted. Type-token ratios (TTR) were used to express the diversity of lexical verbs produced, and the proportion of aspectual and temporal lexical adverbs per verbal predicate was calculated for all participants.

Outcomes & Results: An inverse relationship was observed between the verb variability and the proportion of aspectual adverbs. The agrammatic participants who used a low proportion of aspectual adverbs did not compensate with over-production of lexical adverbs.

Conclusions: Based on the results of the current study we propose that the inverse relationship between lexical diversity of the verbs and the use of aspectual adverbs reflects the same underlying deficit as the inverse relationship between lexical diversity of verbs and verb inflection observed in Dutch and Italian. Apparently it is difficult for agrammatic speakers to simultaneously retrieve verbs (names of the events) and specify the time frame in which the events take place. This has some important clinical implications.

3.1 Introduction

It has been shown for many languages that production of verbs and verb inflection is impaired in agrammatic spontaneous speech (Dutch: Bastiaanse, & Jonkers, 1998; English: Saffran, Berndt, & Schwartz, 1989; Italian: Miceli, Mazzucchi, Menn, & Goodglass, 1983; Rossi & Bastiaanse, 2008). Bastiaanse and Jonkers (1998) and Miceli et al. (1983) showed that verb retrieval and verb inflection can be independently reduced: some agrammatic speakers produce a normal number of lexical verbs with a normal diversity as measured by a type-token ratio but are poor in verb inflection, whereas others produce a normal proportion of finite verbs in combination with a low number or a low diversity of lexical verbs. It has been demonstrated that reduced verb retrieval in agrammatic spontaneous speech is not related to these patients' poor performance on action naming (Bastiaanse &

Jonkers, 1998; Crepaldi, Ingignoli, Verga, Contardi, Semenza, & Luzzatti, 2011). Thus, assuming that agrammatism is primarily a deficit in grammatical encoding (rather than a word retrieval deficit), the spontaneous speech data suggest that production of lexical verbs in spontaneous speech is hampered by the need to inflect the verbs for tense and agreement. The feature "tense" seems to be particularly vulnerable. Tense is used to set the time frame in which the event took, is taking, or will take place. This means that a semantic notion (time) has to be expressed by grammatical morphology. It is this operation that makes tense difficult for agrammatic speakers (Bastiaanse, 2008; Bastiaanse et al., 2011; Burchert, Swoboda-Moll, & De Bleser, 2005; Clahsen & Ali, 2009; Faroqi-Shah & Dickey, 2009; Lee, Milman, & Thompson, 2008; Wenzlaff & Clahsen, 2004, 2005). However, data from Greek patients (Nanousi, Masterson, Druks, & Atkinson, 2006; Stavrakaki & Kouvava, 2003) suggest that it is not only tense that is impaired in agrammatic speech, but that aspect is affected as well. Aspect does not set the time frame (past, present, future) of the event, but rather specifies whether the event is finished (perfect) or still going on (imperfect). Agreement (e.g., person and number) seems to be less vulnerable than tense and aspect. Therefore it is plausible that the inverse relationship between verb diversity and verb inflection reported by Bastiaanse and Jonkers (1998) reflects an inability to perform the double task of retrieving the name of the event (the lexical verb) and expressing the time frame of the event: good retrieval is combined with poor verb inflection and vice versa.

In the languages that have been studied so far the time in which the event takes place is grammatically expressed either directly on the verb (e.g., 'writes', 'wrote') or by a periphrastic verb form (e.g., 'has written', 'is writing', 'will write'). The current study investigates whether the production of lexical verbs in spontaneous speech is indeed hampered solely by the requirements of verbal inflection, with no relationship to time reference, or hampered by the requirements of expressing time reference through verbal inflection. To do this we turned to Standard Indonesian (SI), in which verbs are not inflected for tense and agreement, but where verbal predicates can be modified by aspectual adverbs to specify whether events are complete, ongoing, beginning to happen, or will happen in the future. The aspectual adverbs are free-standing function words, which cannot be produced on their own and must appear with the verbs they modify. In the next section some relevant features with regard to verbs and time reference in SI will be given.

3.2 Verbs and time reference in Indonesian

SI is a language that has no verb inflection for tense, aspect, or agreement. Aspectual adverbs are free-standing grammatical morphemes that are used to express the time frame of the event grammatically. SI, just like Indo-European languages, also uses temporal lexical adverbs to specify the time frame. Below we present in more detail the features of SI that are investigated in the current study.

3.2.1 Lack of verb inflection for tense, aspect, and subject–verb agreement

Grammatical clauses in SI are composed of at least a subject and a predicate, the latter being a verb-, noun-, adjective-, numeral-, or prepositional-phrase. There are no inflectional morphemes attached to predicates to mark tense, aspect, or subject–verb agreement. Therefore verbal predicates such as the ones below form grammatical clauses in SI and look very different from analogous clauses in English, Dutch, or German, which require verbs with tense, aspect, and agreement affixes (i.e., eats, eat, and ate).

1	Azka	makan	nasi	setiap	pagi
	Azka	eat	rice	every	morning
	“Azka eats rice every morning.”				

2	Azka	dan	Diana	makan	nasi	setiap	pagi
	Azka	and	Diana	eat	rice	every	morning
	“Azka and Diana eat rice every morning.”						

3	Azka	makan	nasi	kemarin	sore
	Azka	eat	rice	yesterday	afternoon
	"Azka ate rice yesterday afternoon."				

3.2.2 The use of adverbs to mark aspectual information

When speakers of SI want to express the internal organisation of verbal, adjectival, and numeral predicates, aspectual adverbs are used. These aspectual adverbs always come before the predicates that they modify. Following the terminology of Kridalaksana (2007), these are *duratif* [12] (*sedang*, *lagi*: 'is V–ing'), *imperfektif* (*masih*: 'still'), *perfektif* (*pernah*, *sudah*, *telah*: 'already'), and *inkoatif* (*mulai*: 'beginning to'). These aspectual adverbs are non-deictic and do not anchor an event in time (Grangé, 2003), which means that aspectual adverbs do not mention when events or situations happen. For example, the use of the *perfektif* aspectual adverb *sudah* does not guarantee that the event described happened in the past; *sudah* can also be used to describe events that happen in the future.

4	Besok buaya	[pukul empat]	Azka	sudah	makan	roti
	Tomorrow crocodile	[four o'clock]	Azka	*perfektif*	eat	bread
	"Tomorrow at four o'clock Azka will have eaten the crocodile-shaped bread."					

[12] We use the terms used by Kridalaksana (2007) and follow his definitions of the terms. This is for theoretical as well as practical reasons; in the literature of aspect different terms have been proposed by different authors studying different languages, and a full comparison of the terms is beyond the scope of this paper.

Regarding future events, the modal adverbs *mau* or *akan* are used, which translate into 'will' in English. However, syntactically they behave similarly to the aspectual adverbs, and in the current study the modals meaning 'will' are labelled as future aspectual adverbs and are treated on par with the *duratif, imperfektif, perfektif,* and *inkoatif* aspectual adverbs. The use of the aspectual adverbs is illustrated in (5–9).

5 Azka sedang makan.

Azka *duratif* eat

"Azka is eating or Azka was eating (at some time in the past)."

This sentence can be taken as meaning 'now Azka is eating' or 'at some time in the past Azka was eating' depending on the context of the utterance. This dependence on context for the English translations can also be seen for the following sentences.

6 Azka masih makan.

Azka *imperfektif* eat

"Azka is still eating." or "Azka was still eating."

7 Azka sudah makan

Azka *perfektif* eat

"Azka has eaten." or "Azka ate" (at some time in the past)." or "Azka had eaten."

8 Azka mulai makan

Azka *inkoatif* eat

"Azka begins to eat." or "Azka has begun to eat." or "Azka began to eat." or "Azkahad begun to eat."

9	Azka	akan	makan
	Azka	future	eat
	“Azka will eat.” or “Azka would eat.”		

3.2.3 The use of temporal lexical adverbs to mark time reference

If a speaker wants to emphasise the time frame of an event, temporal lexical adverbs are used (e.g., ‘yesterday’, ‘now’, ‘later’). This explicit use of lexical temporal adverbs also occurs when a speaker or writer mentions an action, event, or state for the first time so that conversational partners or readers know where to anchor the action, event, or state in time. The usage is very similar to that of English. Lexical temporal adverbs can occur in three positions in a clause, all of which are outside the scope of VP, as shown in (10–12).

10	Besok	Azka	pergi	ke	Jayapura
	Tomorrow	Azka	go	to	Jayapura
	“Tomorrow Azka will go to Jayapura.”				
11	Azka	besok	pergi	ke	Jayapura
	Azka	tomorrow	go	to	Jayapura
	“Azka will go to Jayapura tomorrow.”				
12	Azka	pergi	ke	Jayapura	besok
	Azka	go	to	Jayapura	tomorrow
	“Azka will go to Jayapura tomorrow.”				

It is important to notice that aspectual adverbs and temporal lexical adverbs can be used separately or in combination. SI sentences without either of these two adverbs are also

very common. The verbal predicates lacking temporal and aspectual adverbs should be discourse-licensed; it must be clear from context when the events happen or what the internal organisations of the events are. This is different from, for example, English and Dutch, where the time frame must be explicitly expressed by the verb (complex). An example of the sentences lacking temporal and aspectual adverbs is given below.

13	MARJOSO	Baiklah	Pak Kyai,[13]	saya		sudah
			menawarkan	kesempatan		
		All right	Sir Kyai[2]	I		perfektif
			offer	chance		

"All right, Sire. I have offered a chance"

Sersan!	Sudah	siap	regu	tembak?
Sergeant!	Perfektif	ready	troop	shoot?

"Sergeant! Has the shooting troop readied?"

SERSAN	Siap,	Pak!
	Ready,	Sir!

"Ready, Sir!"

[Drama Fajar Siddiq, by Emil Sanossa, lines 115–116]

In the answer of the sergeant he does not repeat the perfektif aspectual marker sudah spoken by his superior (Marjoso) because presumably the shooting troop can already be seen in the field where the execution will take place and they have their rifles ready.

[13] *Kyai* roughly means a scholar in Islamic sciences and teachings.

3.2.4 Verbs and predicates

In SI several kinds of predicates are distinguished: verbal, nominal, adjectival, numeral, and prepositional phrases. It is important to note that only the nominal predicates cannot be modified by aspectual adverbs, whereas all predicates can be modified by lexical adverbs of time. For a more extensive analysis regarding predicates in Indonesian, see Anjarningsih, Haryadi-Soebadi, Gofir, and Bastiaanse, 2012).

For the present study, only verbal predicates, and time reference adverbs (aspectual and lexical) modifying them were tallied.

3.2.5 Research questions

According to Bastiaanse and Jonkers (1998), the inverse relationship between verb diversity and verb inflection observed in their study reflects the inability of the (Dutch) agrammatic speakers to simultaneously retrieve a verb and inflect it for tense and agreement. They termed this a 'trade-off effect', which we interpret as an integration deficit: relatively good verb retrieval pairs with a reduced proportion of finite verbs and the other way around. The first question for the present study is whether this inverse relationship is due to the fact that the use of a verb in Dutch requires that a lexical item is retrieved and inflected for tense and aspect, a kind of double task on the same word, or to the fact that the name of an event must be retrieved and the time frame in which the event takes place must be specified. If it is a matter of a double task on the verb, then a similar trade-off effect should not be found in SI agrammatic speech, since the aspectual adverb is a free-standing morpheme. However, if the combination of verb retrieval and time frame specification is the problem, then there should be an inverse relationship in SI agrammatic speech as well: good verb retrieval would then be accompanied by poor use of aspectual adverbs, and vice versa.

Since aspectual adverbs are grammatical morphemes that also contain semantic information (i.e., reference to perfectivity and imperfectivity) and since such grammatical morphemes are hard to produce for agrammatic speakers, it is expected that SI-speaking agrammatic speakers will produce proportionally fewer aspectual adverbs than non-brain-damaged speakers (NBDs). The second question of the current study is whether the lack of aspectual adverbs will be compensated or accompanied with an overuse of temporal

lexical adverbs. This is not inconceivable: temporal lexical adverbs are content words that are usually not seriously affected in agrammatic aphasia. However, if specifying the time frame of an event is the problem, then such compensation is not to be expected, because temporal lexical adverbs also specify the time frame in which the event takes place.

3.3 Method

3.3.1 Participants

We recruited six speakers with Broca's aphasia, as determined by the *Tes Afasia untuk Diagnosis, Informasi, dan Rehabilitasi* (TADIR; Dharmaperwira-Prins, 1996). The characteristics of SI agrammatic speech were reported in a separate study (Anjarningsih et al., 2012). The aphasia in five of these participants resulted from a stroke and they were more than 3 months post-onset at the time they were interviewed. One aphasic participant (P4) suffered from a second stroke a month before being interviewed for the current study. Due to limited access to CT scanners and/or a great distance between the participants' houses and hospitals that have CT scanners, no information is available on the locus of the lesion. Demographic details of the participants are presented in Table 3-1.

In Table 3-2 we give the scores of the relevant tests from the TADIR for the six aphasic participants. The TADIR is a simple standardised test for the classification of aphasia with cut-off scores for aphasic data. It is the only formal test available for Indonesian. It provides a method for classifying aphasia in one of the classical aphasia types (including 'mixed' aphasia). All six aphasic participants were classified as suffering from Broca's aphasia. They spoke non-fluently; their speech rate and mean utterance length were reduced. Their speech was qualified as agrammatic (Anjarningsih et al., 2012). They had no apraxia or dysarthria that might have had an effect on speech intelligibility.

Table 3-1. Demographics of the participants with Broca's aphasia

	Age	Gender	Handed-ness	Years of education	Professional background	Time post-onset	Dialect of Indonesian spoken
A1	55	m	left	1	Security guard at various factories	> 3 months	Flores
A2	65	m	right	6	Owner of a small grocery stall	> 2 years	Jakarta
A3	65	m	right	12	Worker at glass factory and taxi driver	> 4 years	Jakarta
P4	59	m	right	12	Administration staff at private company	> 1 month	Central Java
A4	54	m	right	18	University lecturer	> 3 months	Central Java
A5	41	f	right	9	Housewife	> 1 year	East Java

Table 3-2. Raw scores of relevant oral/auditory TADIR subtests

	# animal names produced in 1 min	Word-level picture naming (max. 8)	words per minute	Auditory word & sentence comprehension (max. 10; word=4, sentence=6)	Word & sentence repetition 4 (max. 4; word=2, sentence=2)	Severity
A1	6	6	35	7	2	Moderate
A2	8	7	55	6	2	Moderate
A3	8	6	58	7	2	Moderate
P4	3	3	45	7	2	Severe
A4	7	7	23.5	8.5	3	Mild
A5	9	7	19	10	4	Mild
NBDs	>10	8	80-119	10	4	

Dharmaperwira-Prins, 1996. NBDs = Non-Brain Damaged Speakers. Only oral/auditory data are given because some participants with aphasia could not read and write.

We also recruited 15 non-brain-damaged speakers (NBDs) without any history of neurological disease. These NBDs were matched as well as possible for gender, age, educational background, and professional background to the agrammatic participants (P1 matched to C1, C2, and C3; P2 and P3 matched to C4 and C5; P4 matched to C6, C7, C8, and C9; P5 matched to C10, C11, and C12; P6 matched to C13, C14, C15). Matching the education and professional background is essential for Indonesian because SI is taught and acquired at school age for most of Indonesians, and Indonesians with a higher socio-economic status tend to be exposed to, and to speak, a more standard form of the language than those from the lower socioeconomic classes. Therefore this background matching is required to control the influences of length, level of education, and work environment on the participants' language production. Demographic details of the NBDs are presented in Table 3-3.

Table 3-3. Demographic details of the non-brain-damaged speakers (NBDs)

Matched with	NBD	Gender	Age	Handed-ness	Years of education	Professional background	Dialect of Indonesian spoken
A1	C1	m	50	Right	1	Second-hand shop keeper	Flores
	C2	m	51	Right	3	Truck driver	Flores
	C3	m	56	Right	5	Owner of a small grocery store at home	Flores
A2	C4	m	55	Right	10	Private driver of a manager	Jakarta
A3	C5	m	63	Right	12	Technician at a telecommunication company	Jakarta
P4	C6	m	56	Right	12	Administration staff at a government office	Central Java
	C7	m	57	Right	12	Administration staff at a government office	Central Java
	C8	m	66	Right	13	Researcher at a provincial research institute	Central Java
	C9	m	63	Right	12	Assistant manager	Central Java
A4	C10	m	51	Right	20	Lecturer	Jakarta
	C11	m	57	Right	20	Lecturer	Jakarta
	C12	m	52	Right	20	Lecturer	Jakarta
A5	C13	f	40	Right	9	Housewife	East Java
	C14	f	45	Right	9	Housewife	East Java
	C15	f	40	Right	9	Housewife	East Java

3.3.2 Materials and procedure

A semi-standardised interview was audio-recorded and orthographically transcribed.

Four questions were asked. The first two were directed at the past:

a. Can you tell me about your stroke?

b. Can you tell me about your work before the stroke?

Two other questions were asked to elicit reference to the present time:

c. Can you tell me about your family?

d. Can you tell me about your hobby?

For the NBDs, questions 3 and 4 were the same, but question 1 was changed to 'Can you tell me about the worst health problem you have had?' and question 2 to 'Can you tell me about your previous work?'

3.3.3 Analysis

From each spontaneous sample, 300 words were orthographically transcribed. This number is sufficient for a reliable and valid analysis (Vermeulen, Bastiaanse, and van Wageningen, 1989). The samples were composed in such a way that there was an equal number of words (around 75) for each of the four questions. This sample was analyzed by a trained linguist (the first author) and, independently, by an assistant with a degree in Linguistics, specialising in Indonesian linguistics, who was not informed about the status of the participants (agrammatic or not). The few and minor disagreements were discussed and solved.

Each sample was segmented into sentences, and each sentence into clauses. The lexical verbs that formed the predicate of clauses (comparable to finite verbs in Indo- European languages) were counted and the number of different verbs was tallied. Type-token ratios

(TTR) for the verbs were then calculated for each participant (number of different verbs divided by the total number of verbs).[14]

The following aspectual adverbs were counted: 'pernah', 'sudah', and 'telah' (*perfektif* markers), 'sedang' and 'lagi' (*duratif* markers), "masih" (*imperfektif* marker), 'mau' and 'akan' (future markers), and 'mulai' (*inkoatif* marker). First, all aspectual adverbs occurring with verbal, adjectival, and numeral predicates were counted. Since we concentrated on the production of the verbs and aspectual adverbs (which form a verb phrase) for comparison with the finite verbs of Indo-European languages, we then counted the number of aspectual adverbs occurring with verbal predicates. The number of aspectual adverbs was divided by the total number of verbal predicates in the 300-word corpus, yielding the percentage of aspectual adverbs per verbal predicate for each participant.

The same procedure was followed for temporal lexical adverbs to find out whether potential problems with the production of aspectual adverbs in combination with verbal predicates was also encountered in producing temporal lexical adverbs.

3.4 Results

3.4.1 Number and variability of lexical verbs

The results are given in Table 3-4. Some actual sentences spoken by some of the participants with agrammatism are given below.

14	Perlu	sama	bos	
	Need	with	boss	
	"(I) need the boss."			
15	Kalau	apel,	masih	diblender

[14] Since the sample size was equal for each participant and only one word class (lexical verbs) was involved, the figures we used were reliable, especially since the number of verb tokens was more or less equal in all participants (Malvern & Richards, personal communication)

	If		apple,	still	passive-blend (by a blender machine)

"For apple, is still blended (by a blender machine)."

16	Terus	saya	jatuh	di	situ
	Then	I	fall	at	there

"Then I fell there."

Following Bastiaanse and Jonkers (1998), number and TTR of the lexical verbs were calculated for all participants. A1, A3, and A5 produced more lexical verb types per 300 words than their NBDs, and A2, P4, and A4 scored just within the normal range. Also the diversity of verbs (tokens) for A1, A3, and A5 is higher than normal; A2 and P4 scored just within the normal range. A4 produced more tokens than his NDBs.

When the TTR of the verbs is considered we see that A1 and A5 scored within the normal range, and A2, A3, P4, and A4 scored below the normal range. All in all, A1 and A5 do not seem to be impaired in the use of their lexical verbs in the 300-word samples. A2, A3, P4, and A4, however, seem to have problems using a normal variety of lexical verbs.

Table 3-4. Number of verb types (diversity) and number of verb tokens on a sample of 300 words

	verb types	verb tokens	type token ratio
A1	45	68	0.66
C1	23	33	0.70
C2	15	29	0.52
C3	22	32	0.69
A2	23	40	0.58
A3	27	44	0.61
C4	18	23	0.78
C5	24	30	0.80
P4	19	34	0.56
C6	19	32	0.59
C7	23	33	0.70
C8	36	39	0.92
C9	26	32	0.81
A4	22	36	0.61
C10	16	19	0.84
C11	22	31	0.71
C12	18	26	0.69
A5	42	56	0.75
C13	30	40	0.75
C14	20	31	0.65
C15	30	44	0.68

3.4.2 Aspectual and lexical adverbs

The production of aspectual and temporal adverbs of both groups is given in Table 3-5. Both A3 and A5 produced fewer aspectual adverbs per 300 words than their NBDs; moreover, the number of aspectual adverbs occurring with verbal predicates is outside the range of their control participants. A1's and P4's raw number of aspectual adverbs is quite normal: the number of aspectual adverbs they produced is within the normal range and the number of aspectual adverbs occurring with verbal predicates is virtually normal. A2 and A4 produced more aspectual adverbs in general.

Table 3-5. Numbers and kinds of aspectual and temporal adverbs occurring with all predicates

	aspectual							lexical				
	total	**wvp**	Perf.	Dur.	Imperf.	Fut.	Incho.	total	**wvp**	past	present	Fut.
A1	10	**9**	5	-	-	5	-	2	**2**	1	1	-
C1	11	**5**	2	3	1	5	-	4	**3**	1	3	-
C2	8	**4**	4	2	-	2	-	3	**2**	-	3	-
C3	16	**11**	10	-	5	-	1	9	**6**	8	1	-
A2	9	**6**	5	-	2	2	-	13	**10**	4	7	2
A3	3	**3**	2	1	-	-	-	3	**1**	1	2	-
C4	7	**6**	2	1	1	3	-	6	**2**	2	3	1
C5	4	**4**	4	-	-	-	-	12	**7**	9	3	-
P4	7	**6**	2	2	-	3	-	6	**3**	2	2	2
C6	7	**6**	2	-	2	2	1	11	**8**	2	7	2
C7	9	**5**	6	-	2	1	-	11	**7**	3	6	2
C8	9	**6**	3	-	4	1	1	1	**0**	1	-	-
C9	13	**9**	9	-	2	1	1	0	**0**	0	0	0
A4	15	**11**	8	3	2	1	1	4	**2**	2	2	-
C10	2	**1**	2	-	-	-	-	4	**2**	2	2	-
C11	5	**3**	4	-	-	1	-	4	**2**	1	3	-
C12	4	**1**	3	-	1	-	-	5	**1**	1	4	-
A5	0	**-**	-	-	-	-	-	5	**5**	3	2	-
C13	7	**4**	6	-	1	-	-	6	**4**	2	2	2
C14	15	**14**	5	3	2	4	1	1	**1**	1	-	-
C15	10	**8**	7		1	2	-	2	**2**	1	1	-

wvp= adverbs occurring with verbal predicates; perf. = perfektif; dur. = durative; imperf. = imperfektif; fut. = future; incho. = inchoative. For the lexical adverbs it is indicated whether they refer to past, present or future.

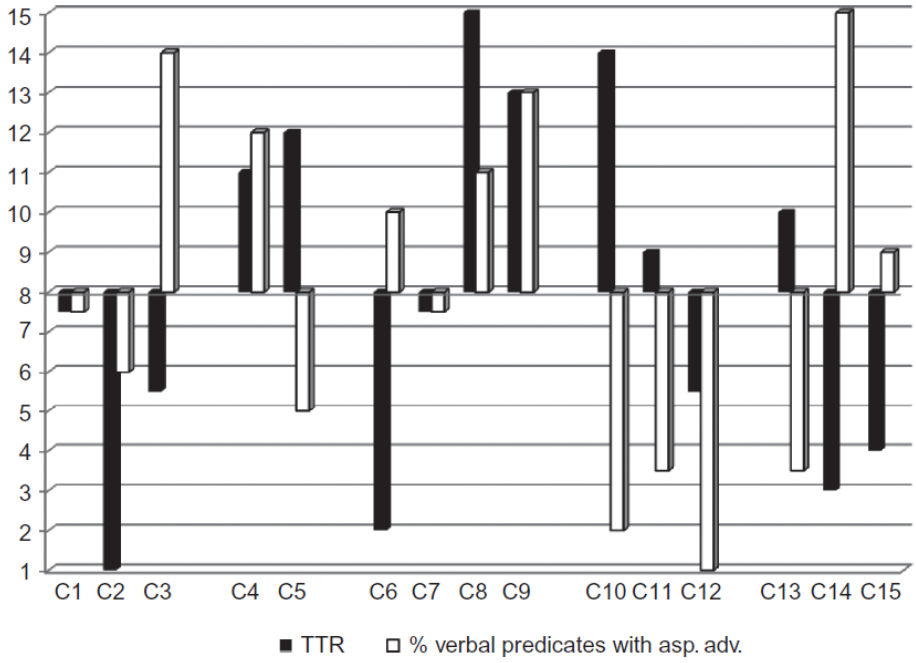
All agrammatic and all NBD speakers produce *perfektif* markers. Remarkably, four of the six agrammatic speakers do not produce any *imperfektif* markers, whereas all but one of the control speakers do. The use of other aspectual adverbs is more or less similar in agrammatic speakers and NBDs. It is important to realise, however, that the number of utterances of the agrammatic speakers is much higher than in the NBDs because the agrammatic utterances are considerably shorter and a fixed number of words (300) was analysed. To get a realistic picture of the use of aspectual adverbs, we calculated the number of aspectual adverbs per verbal predicate. Hence it was calculated how frequently an aspectual adverb was used when a verbal predicate was produced. The results are given in Table 3-6.

A1, A3, and A5 produced proportionately fewer aspectual adverbs per verbal predicate than their matched NBDs, whereas A2, P4, and A4 produced the aspectual adverbs in normal/ above normal frequency.

The first question was whether the inverse relationship reported by Bastiaanse and Jonkers (1998) between the diversity of lexical verbs and verb inflection is also observed in Indonesian agrammatic speech. Instead of verb inflection, we compared the number of aspectual adverbs that express event time, similar to tense in Dutch, per verb predicate with the type token ratio of the verbal predicates. In Figure 3-1 we first show the patterns found in the NBDs.

Figure 3-1. Relation between type-token ratio of verbal predicates (TTR) and percentage of aspectual adverbs used with verbal predicates

(C1–C15 are the NBDs; the values on the Y-axis are ranks (median of ranks=8)).



On the X-axis the individual NBDs are given (C1–C15). On the Y-axis the ranks for TTR (black bars) and for the proportion of verbal predicates with an aspectual adverb (white bars) are plotted. The X and Y-axis cut at the median rank (8). As can be seen, there are four different patterns: relatively low ranks for both variables (C1, C2, C7, C12) relatively low rank for TTR but high rank for proportion of verbal predicates with an aspectual adverb (C3, C6, C14, C15), relatively low rank for proportion of verbal predicates with an aspectual adverb but high rank for TTR (C5, C10, C11, C13), and high ranks for both TTR and proportion of verbal predicates with an aspectual adverb (C4, C8, C9).

The results for the agrammatic participants are shown in Figure 3-2. On the X-axis the individual agrammatic speakers are given (A1–A5, and P4). On the Y-axis the ranks for TTR (black bars) and for the proportion of verbal predicates with an aspectual adverb (white bars) are plotted. The X and Y-axis cut at the median rank (3.5). The results of this comparison show one single pattern that is remarkably similar to that of Bastiaanse and

Jonkers (1998) for their Dutch group of agrammatic speakers: there is an inverse relationship between the ability to retrieve a variety of verbal predicates and to express the time frame of the event grammatically. A1, A3, and A5 are relatively good at producing verbal predicates with a roughly normal diversity, but their production of aspectual adverbs accompanying these verbal predicates is relatively poor. A2, P4, and A4 are relatively good at expressing the time frame of the predicates, but this comes at the cost of verb retrieval: there is relatively little diversity in the verbs they use. Notice, however, that the absolute difference between the TTRs of A3 and A4 is quite small (P3: 0.614; P5: 0.611).

Figure 3-2. Relation between type-token ratio of verbal predicates (TTR) and percentage of aspectual adverbs used with verbal predicates

(A1–A5 and P4 are the individual agrammatic speakers; the values on the Y-axis are ranks (median of ranks=3.5)).

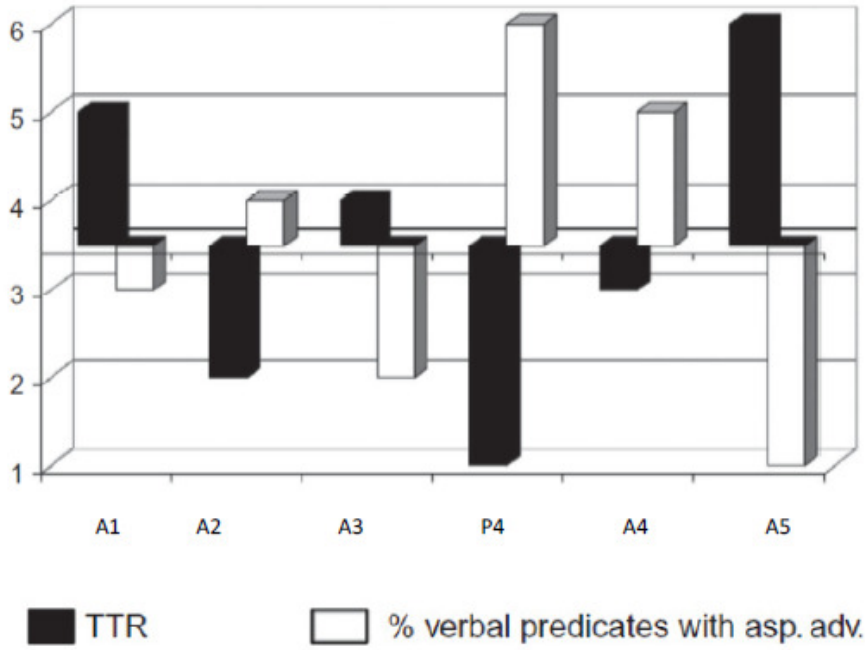


Table 3-6. Percentage of aspectual adverbs and lexical adverbs occurring with verbal predicates (wvp)

	No. verbal predicates	No. aspectual adverbs wvp	No. asp. adv./No. verbal pred.	No. lexical adverbs wvp	No. lexical adv./No. verbal pred.
A1	68	9	13.2%	2	3%
C1	33	5	15.1%	3	9%
C2	29	4	13.8%	3	10.3%
C3	32	11	34.4%	6	18.8%
A2	40	6	15%	10	25%
A3	44	3	6.8%	1	2.3%
C4	23	6	26%	2	8.7%
C5	30	4	13.3%	7	23.3%
P4	34	6	17.6%	3	8.8%
C6	32	6	18.8%	8	25%
C7	33	5	15.1%	7	21.2%
C8	29	6	20.7%	0	0%
C9	32	9	28.1%	0	0%
A4	66	11	16.7%	2	3%
C10	19	1	5.3%	2	10.5%
C11	31	3	9.7%	2	6.5%
C12	26	1	3.8%	1	3.8%
A5	56	0	0%	5	8.9%
C13	40	4	10%	4	10%
C14	31	14	45.2%	1	3.2%
C15	44	8	18.2%	2	4.5%

The second question was whether agrammatic speakers would compensate for their poor use of aspectual adverbs with an over-production of lexical/temporal adverbs. The relevant data are given in Table 3-6. On the one hand, between the two participants with aphasia whose production of aspectual adverbs was below the normal range (A3 and A5), only A5 seemed to compensate for her poor use of aspectual adverbs by producing more lexical adverbs, but this was only apparent in the number of lexical adverbs produced with verbal predicates and not in the percentage of the lexical adverbs used with the verbal predicates. A3 was not only poor in the production of aspectual adverbs, but his use of temporal lexical adverbs fell below the normal range as well. On the other hand, A1 and A4 show a different pattern that does not support the idea of compensation. P1's production of aspectual adverbs was normal, but his production of lexical adverbs is below the normal range. For A4, his number of lexical adverbs produced was normal but the proportion of those lexical adverbs was below normal. A2 and P4 show normal or above normal performance on both aspectual and lexical adverbs.

3.5 Discussion

This study focused on the relation between verb retrieval and the use of grammatical morphology for time reference. The data show that agrammatic speakers produce a normal number of lexical verbs, but that the verb diversity is reduced in several agrammatic speakers. These are those participants who produce a relatively large number of aspectual adverbs. This means that they do not give much information with their verbs, but they put the events that they refer to in a time frame. The other agrammatic speakers demonstrate the opposite pattern: they produce a normal number of lexical adverbs with a high diversity compared to the entire group. However, the number of aspectual adverbs per verb is relatively low. This implies that these agrammatic speakers use a more informative range of verbs, but information regarding the time frame of the event is relatively sparse. There is only very little evidence for compensatory overuse of temporal lexical adverbs.

A similar pattern has been reported for Dutch agrammatic speakers: retrieving the name of an event (i.e., a lexical verb) and simultaneously inflecting this verb for the appropriate time frame with tense and aspect morphology is difficult for them. They produce either a normal diversity of verbs with a decreased number of inflected verbs or a lower diversity of verbs with a normal proportion of finite verbs.

It has been suggested, for example by Tissot, Mounin, and Lhermitte (1973) and Miceli et al. (1983), that the discrepancy between the use of lexical verbs and the problems of verb inflection is due to different underlying disorders. However, Bastiaanse (1995) shows that both phenomena may result from the same disorder. Therefore, rather than a double dissociation, Bastiaanse (1995) suggests that there is a trade-off effect in agrammatic speakers. This was further elaborated by Bastiaanse and Jonkers (1998). Bastiaanse and Jonkers (1998) suggested that the observed inverse relationship between verb retrieval and verb inflection was due to the inability of the agrammatic speakers to retrieve the verb and inflect it. This implies two operations on the same word. Bastiaanse and Jonkers (1998) assumed that this problem was caused by a syntactic deficit; that is, that the agrammatic speakers had problems with verb inflection. The authors suggested that if the agrammatic speaker focused on verb inflection, this was at the cost of verb retrieval. Those agrammatic speakers who focused on the content used verbs with a greater diversity, but they could only do so by neglecting verb inflection. On the basis of the data of agrammatic speech in SI, this interpretation of the Dutch data seems too narrow: in SI the same inverse relation is seen, but the verbs are not inflected. We therefore suggest an alternative theory: it is difficult for agrammatic speakers to retrieve the name of the event and simultaneously express the time frame of the event, whether the latter is done through verb inflection or through aspectual adverbs. Some agrammatic speakers use the names of events to a normal extent, but fail to produce the time frame. Notice that this does not hold only for time frames that are expressed grammatically (via aspectual adverbs) but also for those that are expressed lexically (via temporal adverbs). Other agrammatic speakers show the opposite pattern: their speech is poor in the production of lexical verbs, but those verbs that are expressed refer to time frame to a normal extent.

This means that the underlying deficit is not purely syntactic in nature. The combination of an (uninflected) lexical verb and an optional free-standing aspectual adverb is not a syntactic relation, but requires integration of the name of an event (the verb) and the specification of the time frame in which the event takes place. So, rather than calling this a syntactic deficit, we opt to refer to it as an integration deficit. In Dutch this results in a trade-off effect between lexical diversity of the verbs and verb inflection for tense and agreement, in SI this results in an inverse relationship between verb diversity and the production of aspectual adverbs.

In an intact language system this integration of several layers of information is fully automatised (e.g., Green, 1986). In agrammatic aphasia this automatised processing is hampered, and therefore the agrammatic speaker is unable to integrate the information of the different layers. In the case of verbs and time reference, simultaneously attending

to the lexical information (the verb) and the semantico-syntactic information (the aspectual adverb) overloads the limited available resources of the agrammatic speaker, resulting in the observed pattern. It seems as if the same concepts are vulnerable in typologically very different languages. The between-participant variability data are in line with several theories that assume that individual agrammatic patients may react differently to the same underlying disorder; for example, Kolk's adaptation theory (Kolk and van Grunsven, 1985); Caplan's (2006) theory of reduction of resources for syntactic processing; Yarbay Duman, Altıinok, Özgirgin, and Bastiaanse's (2011) integration problem hypothesis. For the participants with aphasia, simultaneously retrieving the name of the event and expressing the time frame seems to create a bottleneck in the production.

The similarities between Dutch, Standard Indonesian, and other languages such as Italian (Miceli et al., 1985; Rossi & Bastiaanse, 2008) and Swahili (Abuom & Bastiaanse, 2012) with respect to the production of verbs and time reference, combined with the recently observed selective problems with reference to the past in agrammatic aphasia (Bastiaanse et al., 2011) and the parallel disorder in aspectual and temporal lexical adverbs in the present study, suggest that time reference is a weak point in agrammatism. This has a serious impact on the use of verbs and, therefore, on communication in daily life. Verbs are used to express relations between entities and to name events, actions, states, et cetera. Poor use of verbs will result in a lack of information, and thus in poor communication. More cross-linguistic studies are needed to deepen our understanding of the source of the problems in agrammatic aphasia.

3.6 Clinical implications

The main conclusion of the current study is that agrammatic speakers who focus on lexical information (the verb) do so at the cost of information about the time frame in which the event takes place, and vice versa. We do not suggest that this focus is a conscious choice, or that the focus of agrammatic speakers is static. Bastiaanse (1995), for example, described a woman with agrammatic Broca's aphasia who was interviewed about her speech problems and produced a normal proportion of finite verbs, but the lexical verbs had a low diversity. When the interview topic switched to the description of her house, she switched to typical agrammatic speech: the verb diversity increased but the verbs were no longer inflected as regularly. When she was asked whether she was aware of this switch, she said she was not. It was obvious that the change of register was unconscious. From a clinical point of view this is an interesting phenomenon: when the patient focused

on the use of lexical verbs she was much more comprehensible and she provided much more information. Such variability within aphasic speakers has been observed more often (Cameron, Wambaugh, & Shannon, 2010). This implies that focus on the appropriate use of verbs is better than focus on verb inflection from a communicative point of view. The current study suggests that it is the expression of the time of the event in combination with the verb is the core of the problem, rather than verb inflection.

In aphasia therapy, especially in treatment of agrammatic aphasia, the focus is often on the production of correct and complete sentences. However, considering the relationship between verb retrieval and specifying the time frame by verb inflection or aspectual adverbs, speech-language therapists should be very careful that successful training of correct and complete sentences does not come at the cost of verb diversity (see Bastiaanse, Hurkmans, & Links, 2006; Links, Hurkmans, & Bastiaanse, 2010). Rather, speech therapy should focus on the use of lexical verbs, specifically on the use of a variety of lexical verbs. These are very important for communication in daily life.

A successful therapy in this respect can be decided after a certain baseline performance is obtained and is sustained in a certain period of time. Afterwards, further therapy is conducted which focuses on the production of aspectual adverbs. An important example of such a therapy is provided by Wieczorek, Huber, and Darkow (2011), who used a computer program to train the production of aspectual information. Finally, we think it is appropriate to inform to the agrammatic speakers about their deficit and to train them to cope with it in an optimal way. Therefore it should be explicitly mentioned to the agrammatic speakers that they should focus on verbs and not on grammatical sentences, and therapy should be adapted to this (see Ruiter, Kolk, & Rietveld, 2010; Springer, Huber, Schlenck, & Schlenck, 2000).

Chapter 4
The comprehension of aspectual adverbs and lexical adverbs of time in Standard Indonesian agrammatic aphasia[15]

Problems posed by time reference in languages that do not have verbal inflections for tense and aspect have only been sparsely explored in the literature on sentence comprehension by individuals with agrammatic aphasia. In production experiments, tense and aspect inflections have been shown to be difficult for individuals with agrammatism. In Standard Indonesian (SI), time reference is not expressed by verb inflection. Instead, aspectual adverbs, which are free standing morphemes, are used. For the current study, we assessed how agrammatic speakers of Standard Indonesian (SI) comprehended sentences with time reference adverbs. It was predicted that SI agrammatic individuals would have problems with aspectual adverbs. Additional research questions asked were whether (1) comprehension of lexical adverbs was also impaired; (2) reference to the past was selectively impaired, as reported for languages that use verb inflections for time

[15] Anjarningsih, H.Y., Gofir, A., Haryadi-Soebadi, R., and Bastiaanse, R. (submitted). The comprehension of aspectual adverbs and lexical adverbs of time in Standard Indonesian agrammatic aphasia. *Wacana*, Jurnal Ilmu Pengetahuan Budaya (Journal of the Humanities of Indonesia).

reference. The results showed that time reference comprehension deficits in agrammatism are not restricted to languages that use verb inflection and are not restricted to grammatical morphology. It is argued that this is due to a problem with integrating grammatical and semantic-conceptual information. Relevance for treatment is discussed.

4.1 Introduction

Agrammatic aphasia has been characterized as a grammatical deficit and was at first described as a production only deficit. The speech of individuals with agrammatism is effortful and the sentences that are produced are short and simple: grammatical morphemes are omitted or substituted and the speech consists mainly of a string of nouns, verbs and adjectives. Comprehension of grammatically complex sentences is impaired.

Several cross-linguistic studies have shown that studying agrammatism in languages other than English reveals interesting insights in the nature of the underlying deficits. The current study is focused on time reference in Standard Indonesian (SI) which has rarely been investigated in aphasiology. SI has quite simple verb morphology. There is no verb inflection for tense, aspect and agreement. Instead, free standing aspectual adverbs are used for inflection to mark time reference, as described below. Previous research has shown that tense and aspect are vulnerable in agrammatic speakers of languages that use verb inflection for time reference. Therefore, SI is an interesting language to investigate.

A number of recent studies have shown that referring to the past by tense inflections is particularly difficult for agrammatic speakers, irrespective of their language, not only on well-controlled comprehension and production experiments (Abuom et al., 2011 for English and Swahili; Bastiaanse, 2008 for Dutch; Bastiaanse, et al., 2011 for Chinese, English and Turkish; Mehri, Tahan Zadeh, & Jahani, 2010 for Farsi), but also in spontaneous speech (Simonsen & Lind, 2002 for Norwegian; Stavrakaki & Kouvava, 2003 for Greek). Anjarningsih and Bastiaanse (2011) showed that some agrammatic SI speakers produced fewer aspectual adverbs than non-brain-damaged speakers in their spontaneous speech. Interestingly, their production of temporal lexical adverbs was also compromised. For the agrammatic speakers who produced a lower percentage of aspectual adverbs, there was no evidence that lexical adverbs of time (‘previously’, ‘just’,

'now', 'later', 'soon' etc.) were overproduced to compensate. The current paper describes the performance of SI speaking individuals with agrammatism on two sentence-to-picture-matching experiments, one on comprehension of grammatical aspectual adverbs for time reference and one on comprehension of lexical adverbs of time.

4.1.1 Time reference problems in sentence comprehension by speakers with agrammatic aphasia/agrammatism

Hagiwara (1995) investigated the status of functional categories in the grammar of Japanese speakers with agrammatic aphasia. The agrammatic participants in her study did not have serious problems producing correct tenses and judging them as used correctly or incorrectly on a grammaticality judgment task. Instead, what was problematic for them was agreement. Hagiwara (1995) proposed that this was due to the position of the AgrSP, which is higher in the syntactic tree than TP for Japanese, and that the higher nodes are hard to access for agrammatic patients. This proposal was named the Economy of Derivation Hypothesis. Friedmann and Grodzinsky (1997) and Friedmann (2000) reported that Hebrew and Arabic-speaking agrammatic participants made more tense errors than agreement errors in production tasks. This finding was captured in the Tree Pruning Hypothesis, which states that the syntactic tree of the agrammatic speakers is pruned from the tense node up. This line of investigating the functional categories in agrammatic aphasia was carried out by other investigators, such as Wenzlaff and Clahsen (2004; 2005) and Burchert, Swoboda-Moll, and De Bleser (2005). In these studies, at least some of the participating German-speaking agrammatic speakers had more problems in choosing verbs with the correct tense to complete the sentences given to them than they did choosing verbs with the correct subject-verb agreement. Wenzlaff and Clahsen (2004) proposed the Tense Underspecification Hypothesis to account for their data while Burchert et al. (2005) proposed the Tense and Agreement Underspecification Hypothesis.

Another group of researchers argued that it is not tense as a syntactic category that is difficult for agrammatic speakers, but rather the fact that Tense is used for time reference. Faroqi-Shah and Thompson (2007) and Faroqi-Shah and Dickey (2009), for example, argued that the agrammatic speakers' problem is to retrieve and encode the diacritic features of time reference (+Past, -Past). For example, in order to produce an English past tense form correctly, it has to be encoded as [+Past], which then has to be encoded to Verb + D, and then attached to the target verb. According to them, the integration of the

semantic conceptual information and verb inflection is the cause of the problems that agrammatic individuals encounter with tense inflection.

In all of these studies, it was assumed that all tenses (past, present and future) were disturbed to a similar extent. Bastiaanse (2008), Jonkers and De Bruin (2009) and Yarbay Duman and Bastiaanse (2009), however, suggested that this is not the case. Bastiaanse (2008) did a production study to assess time references to the past and present in a Dutch-speaking agrammatic population and found that reference to the past was more impaired than reference to the present, both for finite and for non-finite verb forms. Jonkers and De Bruin (2009) reported the same for comprehension. A selective production deficit with reference to the past has also been reported for Turkish agrammatic speakers (Yarbay Duman & Bastiaanse, 2009).

What all these studies show is that tense is a vulnerable feature, particularly past tense. However, time reference can be done in several other ways, for example, by aspect and by lexical adverbs. Whereas tense refers primarily to the way grammar marks the time at which the action or event denoted by the verb takes place (Crystal, 2003), aspect gives information on how situations unfold in time (Smith, 1997) or whether an event was completed or not. In Indo-European languages, aspect is usually expressed through grammatical morphology related to the verb, either through affixation ('he walks') or through periphrastic verb forms ('he <u>is walking</u>').

According to some researchers, aspect is impaired in agrammatic production as well. Novaes and Braga (2005) investigated the production of aspectual inflection by an agrammatic speaker of Brazilian Portuguese. For eliciting past tense, they asked the participant to produce verbs with perfective and imperfective aspect. While not having major problems with tense and agreement, verbs with imperfective aspect were more difficult to produce than verbs with perfective aspect for this agrammatic speaker. Varlokosta, Valeonti, Kakavoulia, Lazaridou, Economou, and Protopapas (2006) presented three Greek-speaking agrammatic participants who showed a worse performance in aspect and tense production than in agreement production. What all these studies have in common is that they focused on time reference through verb morphology.

In a large cross-linguistic study, Bastiaanse et al. (2011) investigated the production and comprehension of time reference through tense and aspect in three typologically diverse languages — Chinese, English and Turkish — and the results were strikingly similar:

reference to the past was selectively impaired, both in comprehension and production.[16] The authors formulated the PAst DIscourse LInking Hypothesis (PADILIH) that is based on the theories of Zagona (2003) and Avrutin (2000). According to Zagona (2003), reference to [+Past] through tense inflection requires discourse linking, whereas reference to [-Past], by present tense, is locally bound, because the speech time and the event time coincide. Bastiaanse et al. rephrased this idea of Zagona and suggested that reference to the past, whether expressed by tense, aspect, finite or periphrastic verb forms, or aspectual adverbs, is discourse linked. Discourse linking is known to be difficult for individuals with agrammatic aphasia (Avrutin, 2000).

So far, time reference marked by lexical adverbs has not been studied. Lexical adverbs, such as yesterday, just, now, today, tomorrow, soon also refer to past, present and future. Lexical adverbs are lexical morphemes rather than grammatical morphemes and are, therefore, assumed to be spared in agrammatic aphasia. However, if time reference is difficult in general, rather than reference through grammatical morphology (verb inflection; aspectual adverbs), then production and comprehension of lexical adverbs used for time reference should be impaired as well. Investigating this in Indo-European languages is impossible because the use of lexical adverbs and grammatical morphology of time reference cannot be independently studied: if a lexical adverb such as *yesterday* is used, the verb form is marked for the past. However, in some Austronesian languages, verbs are not inflected for time reference. Rather, optional 'aspectual adverbs', which are comparable to (obligatory) verb inflection in Indo-European languages, are used. In these languages, grammatical and lexical time reference can be studied independently. The present study focuses on the comprehension of time reference in SI, one of the languages in which the use of lexical and aspectual adverbs can be disentangled.

[16] For Chinese this is only true for comprehension. The used test (Test for Assessing Reference of Time: TART; Bastiaanse, Jonkers & Thompson, 2008) turned out to be unsuitable to test production reliably in Chinese.

4.1.2 Time reference in Standard Indonesian

Standard Indonesian is the national language of Indonesia. It is spoken throughout the Republic of Indonesia mainly as a second or third language by more than 200 million people. However, recently more and more people acquire SI as their mother tongue (Quinn, 2001). It is a member of the western branch of the Austronesian language family, and is historically related to the Malay language spoken in the Riau islands in Indonesia, the Bahasa Malaysia of the Federation of Malaysia, and Bahasa Kebangsaan of the Republic of Singapore (Sie, 1989).

The basic word order is Subject + Predicate + (Object), with possible predicates being a verbal, nominal, adjectival, numeral, or prepositional phrase. Verbal predicates in SI are not inflected for tense and subject-verb agreement. Time reference in an SI sentence is optional and is expressed with aspectual and lexical adverbs.

Below are some example sentences with aspectual (1-3) and lexical adverbs (4-6)[17] used in the experiments of the current study.

1	Dia	<u>sudah</u>	menyetrika	baju.
	She	perfektif	iron	shirt.
	"She ironed the shirt."			
2	Dia	<u>sedang</u>	menyetrika	baju.
	She	duratif	iron	shirt.
	"She is ironing the shirt."			
3	Dia	<u>akan</u>	menyetrika	baju.
	She	future-asp.	iron	shirt.
	"She will iron the shirt."			

[17] We use the terms used by Kridalaksana (2007) and follow his definitions of the terms. This is done for theoretical as well as practical reasons. In the literature of aspect, different terms have been proposed by different authors studying different languages and a full comparison of the terms is beyond the scope of this paper.

4	Baru saja	dia	mendorong	troli.
	Just	he	push	trolley.
	"He just pushed the trolley."			
5	Sekarang	dia	mendorong	troli.
	Now	he	push	trolley.
	"Now he is pushing the trolley."			
6	Sebentar lagi	dia	mendorong	troli.
	Soon	he	push	trolley.
	"Soon he will push the trolley."			

What we call 'lexical adverbs of time' here have been called differently by different scholars. Kridalaksana (2007) classified them functionally as *keterangan waktu* (lit. 'time information') and categorically as nouns. Kridalaksana (2007) stated that his approach is different from that of other scholars, such as Asmah Hj. Omar (1980) and Macdonald (1976) who, like us, classified *baru saja*, *sekarang*, and *sebentar lagi*, as adverbs of time. Furthermore, Sneddon (1996) classified these words as 'adjuncts of time' that give information about relative time or when an action or state occurs in relation to the present or some other event. We use the term 'lexical adverbs of time' to highlight the difference between the two ways of time reference examined in the current study: one is lexical (i.e., lexical adverbs of time), and the other one is grammatical (are function words; i.e., aspectual adverbs).

Aspectual adverbs are part of the verb phrase (VP) and can only occur with predicates in declarative sentences. Aspectual adverbs are non-deictic: their use is independent from the 'anchoring' of an event in time, although they may express the time incidentally (Grangé, 2003). In the absence of lexical adverbs (e.g. just now, now, in a moment, tomorrow) aspectual adverbs can indicate when, in general, events or situations happen. For example, as an answer to the invitation "Kita makan siang dulu ya" (Let's have lunch together first), the reply "Saya sudah makan" (I have eaten) means "I already had my lunch a few minutes ago before meeting you." In the following paragraphs, the semantic

dimension of the aspectual adverbs used in the experiments will be elaborated (sudah, sedang, akan). We will use the terms *perfektif* and *duratif,* following Kridalaksana (2007).

In combination with transitive, dynamic verbs (as used in the current study), the *perfektif* aspectual adverb sudah expresses that the events denoted by the verbs have been done or finished (Kridalaksana, 2007). Among the *perfektif* aspectual adverbs, sudah is the most frequently used in speech. Grange (2006) argued that this is due to the modal meaning also possessed by sudah, which is intrusiveness or the attention to the consequence of the finished events on the speakers at the time of speech. As can be seen in the Methods section below, this modal dimension of sudah is readily translated in photographs so that participants can use the clue of the consequence to understand the use of sudah. For instance, the correct answer for the sentence "Dia sudah menyetrika baju " ('She ironed the shirt') can be deduced from the condition of the hanging and ironed shirt in the photograph.

Another *perfektif* aspectual adverb, which we did not elicit in the current study, is telah. This aspectual adverb is used when speakers want to present a completed event or situation as independent, and not influencing their current situations (Grangé, 2006). We did not elicit this because it is difficult to be depicted in photographs; we will need another way to elicit the production of this aspectual adverb. To illustrate, (7) and (8) are identical in their surface forms, except for the use of sudah and telah. Both sentences translate as "My mother has passed away" or "My mother passed away" in English.

7 Ibu saya sudah meninggal dunia.

8 Ibu saya telah meninggal dunia.

Using sudah, the context of the sentence is that the child of the woman who has passed away means that "as a consequence of my mother's death, currently I do not receive a proper care and education" or "as a consequence of my mother's death, our family does not have any breadwinner anymore." Meanwhile, the context of using telah is that the child merely wants to convey that it is a fact that he/she does not have a mother anymore.

The *duratif* aspectual adverb sedang focuses attention on the ongoingness of the events. The initial and end points of the events are excluded. In our experiments, the photographs depicting this aspectual adverb capture the events in action. For example, the photograph denoting the sentence "Dia sedang mendorong troli" (He is pushing the trolley) depicted

the pusher's hands on the handle of the trolley, body slightly bent forwards, and feet and legs positioned accordingly.

The future-aspectual adverb akan has been classified as a modal adverb (Kridalaksana, 2007). In SI there are no aspectual adverb for future actions. In other words, expressing future events using akan is classified as mood. However, since the adverb akan behaves grammatically the same as the *perfektif* adverb sudah and the *duratif* adverb sedang, in this paper akan is treated on par with aspectual adverbs. For instance, the photograph denoting the sentence "Dia akan menyetrika baju" (She will iron the shirt) shows the iron at the side of the ironing board, ready to be used and the person preparing or arranging the shirt on the board.

It is important to stress here that aspectual adverbs are only obligatory when the time frame is not clear from the discourse. As said above, aspectual adverbs are non-deictic, they are not linked to the event time (Grangé, 2003). Rather, aspectual adverbs are used to express how the event relates to the context. Therefore, it can be argued that all aspectual adverbs are, by definition, discourse linked, not only the ones that refer to the past.

Lexical adverbs of time can have three positions in sentences (see examples 9-11). The sentence-initial position is considered to be the preferred position, as assessed by a questionnaire sent to Indonesian students (n=20) in Groningen, the Netherlands. Indonesian lexical adverbs of time are comparable to those in English, although English lexical adverbs of time do not usually occur after the grammatical subjects.

9	Sekarang	dia	menyetrika	baju.
	Now	she	iron	shirt.
	"Now she is ironing the shirt."			
10	Dia	sekarang	menyetrika	baju.
	She	now	iron	shirt.
	"She now is ironing the shirt."			

11	Dia	menyetrika	baju	sekarang.
	She	iron	shirt	now.
	"She is ironing the shirt now."			

From Anjarningsih and Bastiaanse (2011), we know that in the speech of SI-speaking non-brain-damaged speakers (NBDs), aspectual adverbs occur more frequently than lexical adverbs. In a corpus of spontaneous speech produced by 15 neurologically unimpaired speakers of SI ranging from 41 to 65 years old, only three participants (20%) produced more lexical adverbs than aspectual adverbs. Two participants produced no lexical adverbs at all in the 300-word spontaneous speech sample, though they did produce around ten aspectual adverbs. From these data, it seems that neurologically healthy speakers of SI pay more attention to how situations or events unfold in time than to when they happen, or at least they produce more aspectual adverbs.

4.1.3 The current study

The current study compared comprehension of aspectual adverbs and lexical adverbs of time by individuals with agrammatic aphasia who used SI on a daily basis before the onset of their stroke. A comparison between lexical time reference and grammatical time reference has not been done before. Considering that lexical adverbs behave like content words and that aspectual adverbs are grammatical morphemes, comparable to verb inflection in Indo-European languages, it is expected that comprehension of lexical adverbs is relatively spared, whereas comprehension of aspectual adverbs is impaired. The latter is also expected on the basis of the Chinese comprehension of Bastiaanse et al. (2011).

PADILIH (Bastiaanse et al., 2011) predicts that time reference to the past is particularly impaired because reference to [+Past] is discourse linked. However, SI aspectual adverbs are only used when the time frame of the event is not clear from the discourse. In other words, SI aspectual adverbs are used to link the time frame to the discourse. Therefore, it is expected that the selective comprehension deficit for reference to the past that was found in other languages (like Dutch, English, and Swahili) would not be found in SI

agrammatic comprehension. Instead, reference to all time frames would be impaired, because aspectual adverbs are always discourse linked.

4.2 Methods

4.2.1 Participants

Seven participants with agrammatic aphasia participated in the study. The status of Broca's aphasia was assessed using the Tes Afasia untuk Diagnosis, Informasi, dan Rehabilitasi (TADIR, Dharmaperwira-Prins, 1996). This test has been standardized by the author with the assistance of speech and language therapists in Indonesia and norms are available (see Part IV: Standardization dan Norming of the TADIR, Dharmaperwira-Prins, 1996). The defining features of Broca's aphasia which differentiate it from other aphasia syndromes and from the language performance of non-aphasic population according to the TADIR is non-fluent speech, good oral language comprehension, and impaired repetition ability.

The speech of five of the participants with aphasia was characterized as agrammatic (A1, A2, A3, and A4, and A5: Anjarningsih, Haryadi-Soebadi, Gofir, & Bastiaanse, 2012.). In Table 4-1, we present the most important characteristics of SI agrammatism from these five participants. The remaining participants with agrammatism were not included in Anjarningsih et al. (2012). P2 had a very severe word finding problem which made her speech very non-fluent and effortful, and it was not possible to collect a spontaneous speech sample of 300 words in the time slots for testing, and P6 suffered from severe apraxia of speech which rendered speech impossible. [18]

[18] Strictly speaking, this patient with Broca's aphasia cannot be classified as 'agrammatic' because he does not speak, but that, for the sake of unison of terms, we prefer to refer to the group of individuals with Broca's aphasia as 'agrammatic'.

Table 4-1. Defining Standard Indonesian agrammatic characteristics for participants A1, A2, A3, A4, and A5.

	speech rate (words per minute)	MLU in words	% minor utterances	% syntactic particles per utterance
Normal range	> 76	7-16.7 (mean 9.7)	0-29.4% (mean 16%)	0-39% (mean 20.7%)
A1	35	4.8	53.2%	6%
A2	55	6.12	38.8%	12%
A3	58	7	21%	5%
A4	23.5	5.8	34.6%	8%
A5	19	3.37	57.3%	2%

The demographic information of the participants with agrammatism is presented in Appendix B and their TADIR data, which are important for establishing the type of aphasia, are presented in Table 4-2. Two of the participants were less than three months post onset: P2 was one and a half months post onset, and A5 suffered from a second stroke one month prior to testing.

Table 4-2. Raw scores of relevant oral/auditory TADIR subtests[19] (Dharmaperwira-Prins, 1996).

	# animal names produced in 1 min	Word-level picture naming (max. 8)	words per minute	auditory word & sentence comprehension (max. 10; word=4, sentence=6)	Word & sentence repetition (max. 4; word=2, sentence=2)	Severity
A1	6	6	35	6	2	Moderate
A2	8	7	55	6	2	Moderate
A3	8	6	58	7	2	Moderate
A4	7	7	23.5	6	3	Mild
A5	9	7	19	10	4	Mild
P2	4	2	7	3	2	Severe
P6	0	1	0	6	0	Severe
Normal numbers/ scores	More than 10	8	More than 76	10	4	

All aphasic participants had formal education of at least 6 years, except for A1. However, A1's mother tongue is a dialect of Indonesian spoken on Flores Island (eastern Indonesia) and his speech was perfectly understood by the experimenter, who spoke SI. A1 continued to use his mother tongue with his family although another language was predominantly used in the city where he lived for the last thirty years. He never mastered this other

[19] Only oral/auditory data are given because some participants with aphasia could not read and write.

language. The instructions of the experimenter were also understood by A1 and there was no misunderstanding due to the fact that he was not educated as extensively as the other participants with agrammatism. All other participants did not have SI as their mother tongue, but used SI in their work and daily lives before the strokes that left them aphasic. Their SI proficiency in comprehension was judged to be native-like by the experimenter, with only slight accents in their speech as an influence of their mother tongues.

Due to financial reasons and/or great distance to hospitals with CT-scan facilities, no CT-scans were available. However, the participants and/or their doctors provided information that the speech problems were due to a stroke. P2 and A5 suffered from a second stroke prior to testing, while the other six participants with agrammatism suffered from a single stroke.

As matched-controls, sixteen NBDs participated in the study. For each participant with aphasia, there were at least two NBDs matched in age, gender, and educational and professional background. The matching of educational and professional background is viewed as essential because the SI investigated in this study is usually learned at school starting from the age of five or six, and people who have a higher socio-economic status are usually exposed to a more formal register of the language. Thus, we wanted to control the effects of these variables. The demographic details of the NBDs are presented in the appendix.

4.2.2 Materials and procedure

The comprehension test of the Indonesian version of the *Test for Assessing Reference of Time* (TART, Anjarningsih and Bastiaanse, 2009) was used. A total of 120 sentences with the basic pattern of Subject + Transitive verb + Direct Object containing 4 or 5 words were read to the participants and two pictures were shown. After hearing the sentence, the participants were to point to one of the two photographs as the correct depiction of the sentence. A pilot study with a different group of NBDs illustrated that photographs depicting past and *perfektif* actions could not occur on the same page as future actions, since two "no-action" photographs were difficult for the pilot NBDs to differentiate. Therefore, the photographs of past/*perfektif* and of future actions were always contrasted with pictures of present and *duratif* actions. A test item with the action "ironing" is given in Figure 4-1.

Figure 4-1. Example of a test item.

In experiment 1,[20] testing comprehension of aspectual adverbs, the target sentence for this particular item was "Dia sedang menyetrika baju" (She is ironing the shirt). In experiment 2, testing comprehension of lexical adverbs of time, the sentence was "Sekarang dia menyetrika baju" (Now she is ironing the shirt). Participants were to point to the picture on the left as the correct answer. A summary of the test materials is given in Table 4-3 below.

[20] The experiments were administered in reverse order of presentation here. For our reasoning throughout this article, however, it is more logical to present them in the current order.

Table 4-3. A summary of the experimental materials

	Details of the materials
Experiment1	20 with *perfektif* aspectual adverb *sudah*
	20 with *duratif* aspectual adverb *sedang*
	20 with future-aspectual adverb *akan*
Experiment 2	20 with past lexical adverb *baru saja* ('just')
	20 with present lexical adverb *sekarang* ('now')
	20 with future lexical adverb *sebentar lagi* ('soon')

A practice block of six items was presented before starting with the experimental sentences in each experiment. Corrections and explanations were given until it was clear that the participants understood the task. Then 60 experimental sentences were presented and no feedback was given anymore. There was no time constraint and participants were allowed to spontaneously correct their answer within a reasonable time after the first answer was given. The experiment aiming at comprehension of lexical adverbs of time (60 items) was always carried out first. Participants with agrammatism were tested on comprehension of aspectual adverbs on the next day or on their next visit to the hospital where they received speech therapy. The NDBs participated in experiment 2 on the same day as the first experiment, after a break of about 15 minutes. The whole assessment lasted for about an hour.

4.3 Results of experiment 1 (comprehension of aspectual adverbs)

In Table 4-4, we present the results of the participants with agrammatism and their matched NBDs for experiment 1, which assessed the comprehension of sentences with aspectual adverbs. First, the results across the groups are presented, followed by the individual scores per time frame. Two comparisons were made. First, the scores of the agrammatic individuals were compared with those of the NBDs. Nonparametric tests were

used in the across group comparisons because of the limited sample size of the individuals with agrammatism. Next, the individual scores were analyzed per time frame. To determinewhether the scores of the participants with agrammatism were significantly different from those of their NBDs and whether the scores were within the range of those of their matched NBDs, the software singlims.exe (http://www.abdn.ac.uk/~psy086/dept/psychom.htm#conflims, Crawford and Garthwaite, 2002) was used for the individual analyses.

Table 4-4. Raw scores of all participants in experiment 1 assessing the comprehension of aspectual adverbs

Participants with agramma-tism	*Perfektif*	*Duratif*	Future-aspectual	Total	NBD-participants	*Perfektif*	*Duratif*	Future-aspectual	Total
A1	5	16	10	31	C1	20	20	20	60
					C2	20	20	20	60
					C3	20	20	20	60
					Mean	*20*	*20*	*20*	
P2	17	14	12	43	C4	20	18	19	57
					C5	20	20	20	60
					Mean	*20*	*19*	*19.5*	
A5	20	20	20	60	C6	20	20	20	60
					C7	20	20	20	60
					Mean	*20*	*20*	*20*	
A2	19	19	15	53	C8	19	19	18	56
A3	20	17	20	57	C9	20	20	20	60
					C10	20	20	20	60
					Mean	*19.7*	*19.7*	*19.3*	
P6	7	16	12	35	C11	20	18	19	57
					C12	20	20	19	59
					C13	20	20	20	60
					Mean	20	19.3	19.3	
A4	20	20	20	60	C14	19	20	18	57
					C15	20	20	20	60
					C16	20	20	19	59
					Mean	*19.7*	*20*	*19*	

4.3.1 Across group comparisons

Overall, the NBDs scored significantly higher than aphasic individuals (z=-2.278, p=0.023). This was also true for the *perfektif* and *duratif* aspectual adverbs separately (*perfektif*: z=-2.426, p=0.012; *duratif*: z=-2.713; p=0.004), but not for future (z=-1.703, p=0.098).

4.3.2 Comparisons at the individual level per time frame

The computation using siglims.exe for the scores of A5 and A4 showed that their scores were not significantly different from those of their NBDs. A1 scored significantly worse than his NBDs in all time frames, with 0% of normal population estimated to score below the scores in all time frames. The other four participants with agrammatism varied. P2 and P6 scored significantly different compared to their NBDs on *perfektif* aspectual adverbs (with 0.26% of normal population for P2 and 0% for P6 estimated to score lower), while for *duratif* and future aspectual adverbs their scores were within the normal range. For A2, only his score on future aspectual adverb was significantly different from those of his NBDs, with 4.8% of normal population estimated to score lower. Lastly, for A3, only his *duratif* aspectual adverb score was significantly different, with 2.82% of normal population estimated to score lower.

4.4 Results of experiment 2 (comprehension of lexical adverbs of time)

In Table 4-5, we present the results of the participants with agrammatism and their matched NBDs for experiment 2, which assessed the comprehension of lexical adverbs in sentences. The same statistical tests and software were used here as for experiment 1.

Table 4-5. Raw scores of all participants in experiment 2 assessing the comprehension of lexical adverbs of time

Participants with agr.	Past	Present	Future	Total	NBD-participants	Past	Present	Future	Total
A1	3	15	13	31	C1	20	20	20	60
					C2	20	20	20	60
					C3	20	20	20	60
					Mean	*20*	*20*	*20*	
P2	12	5	5	22	C4	19	19	19	57
					C5	20	20	20	60
					Mean	*19.5*	*19.5*	*19.5*	
A5	20	20	20	60	C6	20	20	20	60
					C7	18	19	17	54
					Mean	*19*	*19.5*	*18.5*	
A2	20	17	18	55	C8	19	20	19	58
A3	18	17	18	53	C9	20	20	20	60
					C10	18	20	17	55
					Mean	*19*	*20*	*18.7*	
P6	3	18	12	33	C11	19	19	20	58
					C12	19	19	14	52
					C13	20	20	20	60
					Mean	*19.3*	*19.3*	*18*	
A4	20	20	18	58	C14	19	20	15	54
					C15	20	20	20	60
					C16	20	19	20	59
					Mean	*19.7*	*19.7*	*18.3*	

4.4.1 Across group comparisons

There was a significant difference in overall scores between the individuals with agrammatism and the NBDs (Mann Whitney U; z=-2.311, p=0.019). The differences between the two groups reached significance for present and future, but not for past time frame (present: z=-2.599, p=0.013; future: z=-2.399, p=0.021; past: z=-1.489, p=0.152).

4.4.2 Comparisons at the individual level per time frame

The scores of agrammatic participants A5 and A4 were not significantly different from those of their NBDs in all time frames. For A1 and P2, scores were significantly different compared to those of their NBDs in all time frames. For A1, 0% of normal population was estimated to score below him on comprehending sentences containing past, present, and future lexical adverbs, and for P2 the numbers were 0.57%, 0.15%, and 0.15% respectively. Some of the scores of the remaining agrammatic participants were not significantly different from those of their NBDs while others were significantly different. For A2 and A3, only their present lexical adverb scores were different from those of their NBDs and only 0.26% in the case of A2 and 0.39% in the case of A3 of normal population was estimated to score below their scores. For P6, only his past lexical adverb score was significantly different - 0.08% of normal population was estimated to score lower than him.

4.4.3 Comparison of Experiments 1 and 2

The NBDs performed well on the two comprehension tasks of the *Test for Assessment of Reference of Time* (TART: Bastiaanse et al., 2008; Indonesian version: Anjarningsih and Bastiaanse, 2009). For the individuals with agrammatism, there was no difference between the performance on the two experiments (Wilcoxon: z=-1.511; p>0.05), meaning they were equally well (or poor) in comprehending lexical and aspectual adverbs. In fact,

there is a high and significant correlation between the scores of the individuals with agrammatism on the two experiments (Spearman: R=0.847, p=0.016).

4.5 Discussion

The results of these two experiments showed that comprehension of adverbs used for time reference is impaired in SI agrammatic aphasia. This confirms earlier findings for languages that use verb inflection for time reference (Dutch: Jonkers and De Bruin, 2009; English and Turkish: Bastiaanse et al., 2011). In these studies, a selective deficit to the past was found. This is not found for Standard Indonesian. Contrary to our expectations, comprehension of lexical adverbs is also impaired.

In this section, we will first address the issue that comprehension of both aspectual adverbs and lexical adverbs is impaired. We will then discuss the reference to the three different time frames. This will be followed by an explanation for the reported results. Finally, we will discuss the consequences for treatment of agrammatic aphasia.

The results of the experiment on lexical adverbs showed, contrary to our expectation, that comprehension of lexical adverbs of time is impaired in agrammatic aphasia. In fact, the comprehension of lexical adverbs was not better than the comprehension of aspectual adverbs. Five of the participants with agrammatic aphasia had significantly lower scores than their control NBDs in 7 time frames in experiment 1, while those five participants were impaired in 9 of the time frames in experiment 2. Based on this, we can conclude that time reference problems in agrammatic aphasia are not restricted to production, but occur in comprehension as well. The data also showed that time reference problems initially identified by researchers investigating languages that inflect finite verbs for tense and aspect or use aspectual adverbs, like Chinese, were a reflection of a general time reference problem that also occurred in aphasic individuals of SI, a language that does not inflect verbs for tense and aspect. This means that the time reference problems occur both in production and in comprehension, both for verb inflection and for aspectual adverbs. Additionally, we found that comprehension of lexical adverbs of time, which are supposed to be lexical morphemes, is impaired as well.

The results of experiment 1 showed that comprehension of aspectual adverbs is impaired in SI agrammatic aphasia. This replicates the result of Bastiaanse et al. (2011) for Chinese, although we did not see a selective impairment to the SI *perfektif* aspectual adverb. The finding that the participants with agrammatism were impaired in more time frames in experiment 2 than in experiment 1 may reflect a frequency effect. As mentioned above, non-brain-damaged speakers of SI produced more aspectual adverbs than lexical adverbs in their spontaneous speech. Combined with the finding that the aspectual adverbs were more retained by the agrammatic participants than the lexical adverbs in the current comprehension study may point to a frequency effect. However, Bastiaanse, Bouma, and Post (2009) showed that in Dutch agrammatic production, the frequency with which the construction is used by healthy Dutch speakers plays no role in the agrammatic performance. It is also unlikely that word frequency determines the production or comprehension of agrammatic individuals: they omit high frequent function words and telegraphic speech consists of an overuse of content words, the frequency of which is lower than that of the omitted function words.

In general, the impaired agrammatic participants in experiment 1 were also impaired in experiment 2. These are A1, P2, A2, A3, and P6. However, the time frames that were impaired in experiment 1 may not have been the same as that impaired in experiment 2. Considering that the same 60 pairs of photographs were used in the two experiments, this difference could not have been because of problems in understanding the actions in the photographs. To illustrate, A2 in experiment 2 was significantly impaired in present and future lexical adverbs, while in experiment 1, that impairment pertained only to future aspectual adverb. Nor could the problem solely have been due to the quality of the photographs themselves. There seemed to be a genuine time reference problem across the two experiments, at least in the past, *perfektif*, present, and *duratif* conditions.

To sum up the discussion so far, since the current study focused on the comprehension of time reference without verb inflection in general, the results were useful in broadening our knowledge of what problems are encountered by individuals with agrammatism. The results of experiment 1 showed that time reference problems did not only occur when individuals with agrammatism processed inflected finite verbs, but also when free standing aspectual adverbs were used to refer to a time frame. The results of experiment 2 showed that these problems with understanding words used for time reference is not restricted to grammatical morphemes.

None of the hypotheses that were aimed at problems with verbal inflections marking tense and aspect in agrammatism can account for the data. Their scope is not wide

enough to explain our findings. The current results, for example, support the hypothesis by Faroqi-Shah and Thompson (2007) that agrammatic individuals have problems with the integration of conceptual-semantic information and grammatical information. However, their hypothesis is only meant for verb inflection and can, therefore, not fully explained the SI results. Still, we think this hypothesis is on the right track. Yarbay Duman, Altinok, Özgirgin and Bastiaanse (2011) suggested that agrammatic speakers, in general, have a problem *integrating* information from two or more linguistic levels. This they called the Integration Problem Hypothesis (IPH). This hypothesis was based on the results of an experiment on sentence comprehension in Turkish agrammatism. The performance of Turkish agrammatic individuals declined when either morphological (deviant case) or syntactic operations (non-canonical word order) should be applied. Worst performance was reported on sentences that could only be understood when the information provided by deviant case and non-canonical word order was integrated. In the current study information from the conceptual-semantic level (time reference) and from the grammatical level (an optional adverbial phrase for time reference) needed to be integrated in order to understand the sentence. Notice that this explanation is not very different from the hypothesis from Faroqi-Shah and Thompson (2007). The problem with their hypothesis is that it refers to diacritic features, so it is meant to account for languages that express time reference morphologically, that is, through verb inflection. The IPH is much wider and applies integration of information of two (or more) linguistic in general. Therefore, it seems more appropriate for the current data.

The second expectation was that comprehension of sentences with a reference to finished events / the past would not be selectively impaired in SI agrammatic individuals. Such a selective deficit has been shown in agrammatic speakers of languages that use verb inflections for time reference (Dutch; English; Turkish). In these languages, verb inflection is either locally bound (for the [-Past] verb forms present and future) or discourse linked (for [+Past] verb forms referring to the past, such as past tense and perfect aspect). Discourse linking is difficult for agrammatic individuals (Avrutin, 2000; Bastiaanse et al., 2011). In SI, however, as explained in the Introduction, aspectual adverbs are only used when it is not clear from the context whether the event is finished (*perfektif* → [+Past]), is going on (*durative* → [-Past]), or has not yet started (*future* → [-Past]). This means that SI aspectual adverbs are, by definition, meant to link the proposition to the discourse. In other words, aspectual adverbs are always used for discourse linking, also when they are [-Past]. This explains why in SI agrammatic aphasia no selective deficit for reference to the past is found. Instead, reference to each of the time frames is equally impaired (and not equally spared!). Interestingly, the same pattern has been observed in SI agrammatic spontaneous speech (Anjarningsih and Bastiaanse, 2011): agrammatic speakers produced

fewer aspectual and lexical adverbs for time reference than the NBDs, but there was no selective deficit for reference to the past. In a similar analysis of agrammatic spontaneous speech of English-Swahili bilingual speakers – languages that use verb inflection obligatorily – fewer verb forms referring to the past than normal were produced, whereas the production of verb forms referring to present and future was within the normal range (Abuom and Bastiaanse, 2012). The selective deficit for comprehension of verb forms referring to the past was also found in these agrammatic individuals, both in English and in Swahili.

For the agrammatic participants who scored significantly lower than their NBDs, the time reference problem did not seem to be related to the severity of the agrammatism. In experiment 2, P2 and P6, both of whom had severe agrammatism, differed. P2 had problems in all time frames, while P6 had problems only in one. Like P2, A1 had problems in all time frames although he had moderate agrammatism. A2 and A3, both of whom had moderate agrammatism, were also impaired in 3 time frames, like P2. In experiment 1, A1 was impaired in all time frames although he only had moderate agrammatism. P2 and P6 in this experiment only had problems in 1 time frame.

These results have some clinical implications. They can inform therapists why certain agrammatism speakers had problems in comprehending sentences containing time reference. In order to make the results more relevant for speech and language therapists in Indonesia, it is of interest to assess more SI-speaking agrammatic speakers who differ in the severity of the aphasia. By sampling more people, the interaction between severity and comprehension problems can be better captured and generalized. It is also of interest to test SI-speaking aphasic speakers from various syndromes in a comparative study. By doing this, it can be observed whether time reference problems in comprehension is similar across syndromes and if they differ, what are the fundamental differences. Later, valid and reliable tests and therapy materials should be developed. Considering the importance of SI for the more than 200 million Indonesians, speech and language therapies in SI for aphasic stroke-survivors should be based on careful studies and this study is a pioneer in that respect.

Chapter 5
The production of aspectual adverbs and lexical adverbs of time in Standard Indonesian agrammatic aphasia

In the previous chapter, time reference comprehension problems were reported in a group of Standard Indonesian (SI) speakers with agrammatic aphasia. The findings showed that understanding time reference using both aspectual adverbs and lexical adverbs of time was significantly more difficult for the agrammatic speakers than for the Non-Brain-Damaged (NBD) participants.

The aim of the study reported in this chapter is to investigate the production of time reference adverbs. The results will be compared to the results of the comprehension study to determine if the time reference problems are also evident in production and if so, if these are exactly the same as those in comprehension. The results will also be used to determine if the production part of the Test for Assessing Reference of Time is valid to be used in SI.

5.1 Introduction

So far in this dissertation, it has been shown that at least some Standard Indonesian-speaking agrammatic speakers had problems with adverbs for time reference, in spontaneous speech and in sentence comprehension. It remains to be seen whether they also have problems in producing the aspectual adverbs and lexical adverbs of time in sentence context in an experimental condition.

Parallels in performance of agrammatic speakers between comprehension and production is debated in the literature (Grodzinsky, 1990). The early definition of agrammatism was that comprehension is almost intact, but grammatical elements were missing from the speech of the agrammatic speakers (Goldstein, 1948). However, later studies showed that at least some agrammatic speakers also had comprehension problems, especially with sentences whose interpretation relied solely on syntactic processes (e.g. Caramazza & Zurif, 1976) and sentences that had non-canonical word order (e.g., Yarbay Duman, Altinok, & Bastiaanse, 2011; Bastiaanse & van Zonneveld, 2005; Caramazza, Capasso, Capitani, & Miceli, 2005). Thus, findings from comprehension cannot be generalized directly to production and, hence, we also tested the agrammatic SI speakers for how good they could produce the aspectual adverbs and lexical adverbs of time compared to the non-brain-damaged (NBD) control participants.

In addition to accounts about time reference processing in agrammatic aphasia which have been discussed in the previous chapters, the literature about pronoun comprehension in agrammatic/Broca's aphasia is also relevant for our discussion in this chapter. This is because the lexical adverbs tested also have a relation with discourse in the sense that the adverbs such as 'just' and 'now' refer to a specific stretch of time, similar to the way pronouns such as 'him' refer to someone mentioned earlier in the discourse. Avrutin (2000) discussed the findings that Broca aphasic participants were better in understanding sentences such as 'Father Bear washed himself' and 'Every bear washed him' than in understanding sentences such as 'Father Bear washed him'. He explained this performance pattern in terms of lack of resources which makes it difficult for the Broca aphasic participants to integrate information from syntax and discourse. In understanding the third sentence, the participants needed to know and compute the syntactic relations among the constituents and the referentiality of the pronoun *within the sentence*. Therefore, for the first two sentences only syntactic operations/information were needed to be comprehended. In the third sentence, discourse syntax is needed, that

is, the pronoun 'him' must be linked to an extrasentential element, which, according to Avrutin (2000) requires extra computations.

The lexical adverbs behave similar to pronouns in this respect. The findings that individuals with agrammatic Broca's aphasia had problems comprehending pronouns may be relevant in the current experiment on the production of lexical adverbs. This is because apart from expressing time reference, the agrammatic Standard Indonesian-speaking participants also have to pay attention to the referentiality of the lexical adverbs.

Pronoun comprehension was not looked into in the previous chapter because our main aim was to contrast and compare the Standard Indonesian comprehension experiments with other results on time reference processing mentioned earlier in the literature. This focus was important especially because our comprehension study tested two kinds of adverbs not published before in the literature (a sole exception being Chinese aspectual adverbs, Bastiaanse et al., 2011). Yet, our results showed that aspectual adverbs were comprehended as poorly as lexical adverbs of time. The extra processing which is possibly needed to interpret lexical adverbs of time was not evident in our comprehension study.

The literature about D-linked wh-questions such as which-questions is also relevant for our current study. In understanding the sentence 'Which student is the soldier pushing violently into the street?' English speakers need to have in mind a set of students, one of whom was pushed by the soldier. They do not need to imagine a set of students to understand "Who is the soldier pushing violently into the street?" Shapiro (2000) used Cross Modal Priming tasks with non-brain-damaged individuals to show that gap filling in object *which*- was significantly slower than gap filling in object *who*-questions. Shapiro (2000) interpreted this difference in priming time between the *who*- and *which*-questions as reflecting extra time and effort that were needed to re-access the antecedent in *which*-questions that needed to be linked to discourse and are referential.

Although the current experiment is a production experiment and did not deal with wh-questions, it is interesting to observe that the comprehension of sentences that necessitate integration of syntactic and extra-sentential or discourse-level information is more challenging, at least for some individuals with agrammatic Broca's aphasia. This may have consequences for the production of the aspectual adverbs and lexical adverbs of time.

5.2 Predictions for the production tests

Based on the results of the comprehension tests (chapter 4) which used the same materials as the current production tests, the spontaneous speech data (chapter 3) and the findings available from the literature, two predictions can be made about the production tests.

Both the aspectual adverbs and the lexical adverbs will difficult to produce by agrammatic participants.

The agrammatic individuals will not be selectively impaired in one of the time frames because in SI time reference is always processed as being discourse linked, as these adverbs are only used when the time frame is not clear from the context.

In addition, taking into account data from research that investigated pronouns and D-link wh-questions in agrammatism and in non-brain-damaged populations, the following can be expected.

If morphosyntax matters more than linking to the discourse, production of aspectual adverbs will be more impaired than the production of lexical adverbs, because the aspectual adverbs are supposed to be grammatical morphemes and lexical adverbs are supposed to be lexical morphemes.

If only linking to the discourse matters then there will be no difference between aspectual and lexical adverbs, sicne they are both used for discourse linking in SI.

5.3 Methods

5.3.1 Participants

Five agrammatic participants participated in this experiment. They also participated in the comprehension experiment discussed in chapter 4 (A1, A2, A3, A4, A5). The readers are referred to chapter 4 for details of their diagnosis of Broca's aphasia, agrammatism, and demographic information.

Eight non-brain-damaged speakers (NBDs) without a history of neurological problems also participated. They were matched as closely as possible to the aphasic participants in age (mean 51, range 40-63), gender, and educational and professional background. We took an extra care in the matching of educational and professional background between the agrammatic participants and NBDs because educational and professional background is considered to be important for the acquisition, learning, and use of SI; SI is usually a second or third language which is learned at school starting from the age of 5 or 6. Furthermore, the more white collar someone's work is, the more he/she is exposed to and uses the standard register. Demographic details of the NBDs are presented in Table 5-1.

Table 5-1. Demographic details of Non-Brain-Damaged control participants (NBDs)

Participants with aphasia	NBD participants	Age	Handed-ness	Years of education	Professional background
A1	C1	52	Right	1	Owner of a second-hand shop
	C2	51	Right	6	Truck driver
A5	C3	45	Right	9	Housewife
	C4	40	Right	9	Housewife
A3	C5	63	Right	12	Technician at a telecommunication company
A2	C6	55	Right	10	Private driver of a manager
A4	C7	49	Right	16	Staff at a government institution
	C8	53	Right	16	Staff at a government institution

5.3.2 Materials and procedure

The readers are referred to chapter 4 section 4.1.2 for the linguistic details of the aspectual adverbs and lexical adverbs of time used in this experiment.

The production test of the Indonesian version of the *Test for Assessing Reference of Time* (*TART*; Anjarningsih and Bastiaanse, 2009) was used. Twenty transitive verbs were chosen as stimuli and each verb was acted out in three different photos: one in a completed condition, one showing the action in progress, and one showing the action before starting to happen (see Figure 5-1 for an example). Half of the actions had a female agent and the other half a male agent. In their responses, the participants were expected to use the pronoun *dia* which translates into 'he' or 'she' in English.

Figure 5-1. An example of test item used in experiment 1 and experiment 2

menyapu

There were always two photos on one page depicting the same verb in a different time frame. The one on the left hand-side was the photo used for prompting. Its description was read by the experimenter, and the one of the right hand-side was the stimulus whose description was asked to be produced by the participants. The verb was always written above the photos to avoid word-finding problems.

The basic structure of the target sentences was Subject + Transitive Verb + Object with a difference only in the target aspectual or lexical adverb. In the example below, the description of the example item is *Dia sudah menyapu lantai:* 'she has swept the floor' in experiment 1, and *Baru saja dia menyapu lantai:* 'Just now she swept the floor' in

experiment 2.[21] The participants were asked to describe the photo on the right-hand side, which is *Dia akan menyapu lantai:* 'she will sweep the floor' and *Sebentar lagi dia menyapu lantai:* 'in a moment she will sweep the floor' in experiment 1 and 2 respectively. Overall, there were sixty photos or items per experiment. Six practice items were given before starting and feedback was given to the participants to ensure their understanding of the instructions and the mechanism of the experiments. See the Appendix for chapter 5 for a list of the verbs.

5.3.3 Possible difference in participants' responses between time reference using inflections and time reference using adverbs

Before starting with our two experiments, we gave practice sessions for the participants during which the target adverbs were reinforced and we made sure that the participants understood what was expected from them. However, there was always a possibility to use other adverbs or other constructions to describe the photo stimuli. This possibility is presumably very low in experiments studying verbal inflections because the actions seen in the photo stimuli can only be described by limited sets of verbal inflections (e.g., verb + *–ing* suffix for actions that are in progress). In the following, we present some possibilities of answers that differ from the target adverbs, while still describing the stimuli well.

The first possibility is the use of synonymous adverbs to the ones designated as targets of the experiments. The adverb synonyms are used in different dialects of Indonesian, such as the target *sedang* and the dialectal *duratif* aspectual adverb *lagi* spoken in colloquial Jakarta Indonesian and in Javanese-influenced regions. The second possibility is that lexical adverbs can combine with aspectual adverbs and the result describes the photo stimuli just as well as the target aspectual adverbs. For example, in experiment 1, instead of the target future modal/aspectual adverb *akan*, the combination of the lexical adverb *sekarang* and the modal *mau* (resulting in *sekarang mau*: 'now will') can describe the photo stimuli depicting an agent who is depicted as about to do something. The third

[21] The experiments were administered in reverse order of presentation here. For our reasoning throughout this article and so that the results are easily compared to the comprehension study, however, it is more logical to present them in the current order.

possibility is the use of aspectual adverbs in experiment 2 targeting the production of lexical adverbs. Aspectual adverbs may be more natural to describe events used in the two experiments reported here. For instance, in experiment 2, participants may have problems in inhibiting the more natural adverb *sedang* (the *duratif* aspectual) when asked to produce *sekarang* (now, present lexical adverb) to describe a doer who is depicted in the middle of an action (e.g. peeling an apple with some of the apple skin still on the apple and some already off the apple).

5.3.4 Scoring

The responses of the participants were analyzed both quantitatively and qualitatively. A simple correct and incorrect tally was used for the quantitative analysis. Synonyms produced by the NBDs were scored as correct when they had similar meanings and belonged to the same word class as the target adverbs. The number of correct answers of the agrammatic participants was statistically compared to that of their matched NBDs to see if the agrammatic participants performed significantly worse at the group and individual levels. For the qualitative analysis, three kinds of errors were distinguished:

1. errors within the word class referring to a different time frame
2. errors across word classes (lexical adverbs ←→ aspectual adverbs)
3. other errors (multiple errors, nil responses)

The qualitative analysis aimed to see whether the agrammatic aphasic participants produced a different pattern of responses compared to the NBDs.

5.4 Results of experiment 1 (production of aspectual adverbs)

5.4.1 Quantitative analysis

In Table 5-2 we present correct scores of all participants for experiment 1.

Table 5-2. Correct scores of all participants in experiment 1 assessing the production of aspectual adverbs

Participants with aphasia	*Perfektif*	*Duratif*	Future-aspectual	Total	NBDs	*Perfektif*	*Duratif*	Future-aspectual	Total
A1	13	8	11	32	C1	20	16	18	54
					C2	19	19	12	50
					Mean	*19.5*	*17.5*	*15*	*52*
A5	19	20	19	58	C3	19	16	15	50
					C4	15	17	13	45
					Mean	*17*	*16.5*	*14*	*47.5*
A3	17	13	8	38	C5	18	19	15	52
A2	19	15	14	38	C6	20	19	16	55
					Mean	*19*	*19*	*15.5*	*53.5*
A4	18	20	15	53	C7	20	20	16	56
					C8	17	20	16	53
					Mean	*18.5*	*20*	*16*	*54.5*

At the group level, the scores of the agrammatic participants in all time frames were not significantly different from the scores of the NDBs (for *perfektif* z=-1.98, p>0.05; for *duratif* z= -0.897, p > 0.05; for future aspectual z=-1.036, p > 0.05).

At the individual level, three agrammatic participants had scores that were significantly different than the scores of their matched NBDs. Using the software singlims.exe from Crawford and Garthwaite (2002), it was found out that P1 performed significantly worse than his NBDs in the *perfektif* condition (p=0.042, and 4,22% of normal population were expected to score lower). P3 and P4 scored significantly lower than their NBDs in the *duratif* condition (p<0.01 and 0.01% of normal population were predicted to score lower than both P3 and P4).

From Table 5-2, it is apparent that the NBDs scored low on the future-aspectual condition compared to the other two conditions. It seems that the photographs used in this condition did not elicit as many correct answers as the other two conditions, which necessitates improvements to them.

5.4.2 Qualitative analysis

The qualitative analysis is presented below.

In Table 5-3, the classification of errors by the NBDs can be observed. The NBDs' errors were mostly within word class errors. In other words, they substituted the target aspectual adverbs with other aspectual adverbs.

Table 5-3. Classification of the errors made by NBDs in experiment 1

Participant	Time frame	#Total errors	#Within word class errors	#Across word class errors	Other
C1	*Perfektif*	0	0	0	0
	Duratif	4	4	0	0
	Future-asp.	2	2	0	0
C2	*Perfektif*	1	1	0	0
	Duratif	1	1	0	0
	Future-asp.	8	8	0	0
C3	*Perfektif*	1	1	0	0
	Duratif	4	4	0	0
	Future-asp.	5	5	0	0
C4	*Perfektif*	5	4	1	0
	Duratif	3	3	0	0
	Future-asp.	7	7	0	0
C5	*Perfektif*	2	2	0	0
	Duratif	1	0	0	1
	Future-asp.	5	5	0	0
C6	*Perfektif*	0	0	0	0
	Duratif	1	1	0	0
	Future-asp.	4	4	0	0
C7	*Perfektif*	0	0	0	0
	Duratif	0	0	0	0
	Future-asp.	4	4	0	0
C8	*Perfektif*	3	3	0	0
	Duratif	0	0	0	0
	Future-asp.	4	4	0	0
Total errors			63	1	1

Table 5-4. Classification of the errors made by agrammatic participants in experiment 1

Participant	Time frame	#Total errors	#Within word class errors	#Across word class errors	Other
A1	*Perfektif*	7	7	0	0
	Duratif	12	10	0	2
	Future-asp.	9	8	0	1
A5	*Perfektif*	1	1	0	0
	Duratif	0	0	0	0
	Future-asp.	1	1	0	0
A3	*Perfektif*	3	2	0	1
	Duratif	7	4	0	3
	Future-asp.	12	7	0	5
A2	*Perfektif*	1	1	0	0
	Duratif	5	5	0	0
	Future-asp.	6	6	0	0
A4	*Perfektif*	2	2	0	0
	Duratif	0	0	0	0
	Future-asp.	5	5	0	0
Total errors			59	0	12

The agrammatic participants also substituted the target aspectual adverbs with other aspectual adverbs (Table 5-4). However, unlike the NBDs, the agrammatic participants

produced many more "other" errors. These were errors like: other kinds of adverbs, verbs, nil reactions, and sentences not containing any answer in the target slot (omissions), amounting to almost 17% of all errors.

5.4.3 Interrim discussion for experiment 1 (production of aspectual adverbs)

In experiment 1 the participants with agrammatism, like their matched NBDs, produced substitution errors and the errors were mostly other aspectual adverbs. They were aware of the experiment instructions to supply an aspectual adverb before the verbal predicate in each sentence even though the adverbs were optional. No lexical adverbs were produced by the agrammatic participants as substitutions for aspectual adverbs.

5.5 Results of experiment 2 (production of lexical adverbs of time)

5.5.1 Quantitative analysis

The correct answers of the NBDs and the agrammatic participants are presented in Table 5-5.

At the group level, the NBDs were not significantly different from the agrammatic participants ($z=-1.036$ for past condition, $z=-0.747$ for present condition and $z=-0.222$ for future lexical condition with all $ps > 0.05$).

Table 5-5. Correct scores of all participants in experiment 2 assessing the production of lexical adverbs of time

Participants with aphasia	Past	Present	Future	Total	NBDs	Past	Present	Future	Total
A1	8	13	14	33	C1	19	6	12	37
					C2	18	18	16	52
					Mean	*18.5*	*12*	*14*	*44.5*
A5	19	20	13	52	C3	12	17	10	39
					C4	14	20	3	37
					Mean	*13*	*18.5*	*6.5*	*38*
A3	7	1	4	12	C5	18	18	13	49
A2	17	15	12	44	C6	20	18	13	51
					Mean	*19*	*18*	*13*	*50*
A4	18	18	17	53	C7	19	20	14	53
					C8	16	13	14	43
					Mean	*17.5*	*16.5*	*14*	*48*

At the individual level, three agrammatic participants scored significantly lower than their matched NBDs. Just like in experiment 1, the statistical comparisons at the individual level for experiment 2 were also done using singlims.exe following Crawford and Garthwaite (2002). P1 scored significantly lower than his NBDs ($p < 0.05$) in the past condition with 2.63% of normal population estimated to score lower than his score. A3 scored significantly lower than his NBDs in all three time frames (all ps < 0.05 and 4.55%, 0%, and 0% of normal population estimated to score lower in the past, present, and future lexical conditions respectively). A2 scored significantly lower than his NBDs in the present and future lexical conditions (both ps < 0.05 and less than 0.05% of normal population estimated to score lower). Compared to experiment 1, at the individual level, more time frames were impaired in experiment 2 (3 VS. 6 time frames).

The scores of the NBDs in the second experiment were lower than their scores in the first experiment. The range of their correct answer in experiment 1 according to the subgroups (Table 3) was 47.5-54.5, and the range in experiment 2 is 38-50. The scores for the future condition is quite low compared to the scores in the other two conditions. This was also found in experiment 1.

5.5.2 Qualitative analysis

In Table 5-6 we present the three groupings of errors of the NBDs: errors within word class, errors across word classes, and other errors. As a group, across the time frames the large majority of the NBDs errors were within word class errors or other lexical adverbs.

The NBDs produced more than twice as many other lexical adverbs than aspectual adverbs to substitute for the target lexical adverbs. The ratio is 2.4 : 1. Unlike in experiment 1 where the NBDs only produced 1 other error, in experiment 2 they produced quite many other errors, amounting to almost 17% of all errors.

Table 5-6. Classification of the errors made by NBDs in experiment 2

Participant	Time frame	#Total errors	#Within word class errors	#Across word class errors	Others
C1	Past	1	0	**1**	0
	Present	14	2	**11**	1
	Future	8	**4**	3	1
C2	Past	2	**2**	0	0
	Present	2	**1**	**1**	0
	Future	4	**4**	0	0
C3	Past	8	**7**	0	1
	Present	3	**3**	0	0
	Future	10	**5**	0	**5**
C4	Past	6	**3**	1	2
	Present	0	0	0	0
	Future	17	**12**	0	5
C5	Past	2	**2**	0	0
	Present	2	**2**	0	0
	Future	7	**7**	0	0
C6	Past	0	0	0	0
	Present	2	**2**	0	0
	Future	7	**7**	0	0
C7	Past	1	**1**	0	0
	Present	0	0	0	0
	Future	6	**3**	**3**	0
C8	**Past**	**4**	1	**2**	1
	Present	7	1	**5**	1
	Future	6	1	2	**3**
Total errors			70	29	20

Table 5-7. Classification of the errors made by participants with agrammatic aphasia in experiment 2

Participant	*Time* frame	#Total errors	#Within word class errors	#Across word class errors	Other
A1	Past	12	6	4	2
	Present	7	6	1	0
	Future	6	1	0	5
A5	Past	1	0	0	1
	Present	0	0	0	0
	Future	7	7	0	0
A3	Past	13	1	8	4
	Present	19	2	8	9
	Future	16	2	9	5
A2	Past	3	3	0	0
	Present	5	5	0	0
	Future	8	8	0	0
A4	Past	2	2	0	0
	Present	2	2	0	0
	Future	3	3	0	0
Total errors			*48*	*30*	*26*

The participants with agrammatic aphasia produced more other lexical adverbs than aspectual adverbs as substitutions for the targets, just like the NBDs (Table 5-7). However, the ratio between the lexical adverbs and aspectual adverbs is 1.6 : 1, smaller than the ratio in the NBDs. This means that the agrammatic participants had a tendency to produce

proportionately more aspectual adverbs than lexical adverbs compared to the NBDs. The percentage of other errors produced by the agrammatic participants is 25% of all errors.

If we take a closer look, there seemed to be a relationship between how successful an agrammatic participant could produce the intended target lexical adverbs and what kinds of errors he/she produced. From Table 5-5, we know that A5 and A4 performed the best, and from Table 5-7 we learn that they substituted target lexical adverbs with other lexical adverbs; they made time reference errors. P4 performed rather well and his errors were also time reference errors. A1 performed worse than A2, and he produced time reference errors, word class errors, and random answers relatively as frequently. A3 was the poorest, and his errors consisted of word class errors and guessing. To sum up, the more unsuccessful the agrammatic aphasic speakers were in producing the target lexical adverbs, the more they opted for non-lexical-adverb answers and random answers. This relation between number of correct lexical adverbs and what kinds of errors produced is shown in Table 5-8.

Table 5-8. Ranking of the participants with agrammatic aphasia based on number of correct answer in experiment 2 (from best to worst), and summary of their errors

Participants	Kinds of majority of errors
A5, A4	Substitutions with other lexical adverbs
A2	Substitutions with other lexical adverbs
A1	Substitutions with other lexical adverbs, substitutions with aspectual adverbs with similar meaning as the target adverbs, and random answers.
A3	Substitutions with aspectual adverbs and words with similar meanings as the target adverbs, and random answers.

In relation to the production pattern of the NBDs, the better-performing agrammatic aphasic participants had a similar pattern. They still tried to access lexical adverbs as

instructed by the experimenter. However, the worse-performing agrammatic aphasic participants seemed to give up trying to access lexical adverbs.

5.5.3 Interrim discussion for experiment 2

Knowing that lexical adverbs of time are not an obligatory part of SI sentences, it is remarkable that the great majority of errors that the agrammatic aphasic participants produced were substitutions. This showed that they were sensitive to the instructions and tried to fill the slot. However, what responses were finally produced depended on the level of performance of the participants. Some participants produced another lexical adverbs in order to comply with the condition of the experiment, while some others produced aspectual adverbs or other words with similar meanings to the target lexical adverbs.

5.6 General discussion

Quantitatively, the correct answers produced by both groups of participants in experiment 2 were fewer than correct answers produced in experiment 1. To say that this was an effect of adverb type (aspectual or lexical), in that the participants produced fewer correct sentences containing lexical adverbs than aspectual adverbs, is problematic because the NBDs did not score at ceiling in both experiments. Furthermore, there was no statistically significant difference within each of the groups between the two experiments (the agrammatic group: Wilcoxon Z=-.0552, $p > 0.05$; the NBD group: Wilcoxon Z=-2.383, $p>0.05$).

There was, however, a qualitative difference between the patterns of answers in experiment 2 and experiment 1. The most notable difference was that many of the target lexical adverbs in experiment 2 were substituted by aspectual adverbs, but only very few target aspectual adverbs were substituted by lexical adverbs in experiment 1.

After observing the data in the previous part of the chapter, it is apparent that the production test of the Indonesian version of the TART is not suitable to test production of aspectual adverbs and lexical adverbs of time in Standard Indonesian. The NBDs did not perform at ceiling in the future condition of experiment 1 and their scores were lower

overall in experiment 2. With this is mind, we cannot put too much confidence on the results of the agrammatic participants.

However, by using the software singlims.exe which takes into account the scores of the NBDs and compares them to the scores of the agrammatic participants, some very careful conclusions could still be drawn.

It was predicted that both the aspectual adverbs and the lexical adverbs are difficult to produce by agrammatic participants. This prediction was confirmed, although it only applied to three of the five agrammatic participants at an individual level. The second prediction, that the agrammatic individuals will not be selectively impaired in one of the time frames, was also confirmed. The agrammatic participants who performed significantly worse than their NBDs were not selectively impaired in one time frame. This can be explained by the assumption that all the used adverbs are linked to the immediate context. The condition in which the agrammatic participants were impaired varied from participant to participant and the time frame that was impaired in experiment 1 was not always impaired in experiment 2. These results are in line with the comprehension results.

Yet, the answers to the remaining two predictions are not very straightforward. The two predictions are repeated here for convenience.

Both the aspectual adverbs and the lexical adverbs will be difficult to produce by agrammatic participants.

The agrammatic individuals will not be selectively impaired in one of time frames because in SI time reference is always processed as being discourse linked, as these adverbs are only used when the time frame is not clear from the context.

The answers for the two predictions come from the qualitative analyses. At a general level, it was shown that the across word class substitution patterns differ between the two experiments. In experiment 1, aspectual adverbs were not substituted by lexical adverbs, but in experiment 2, lexical adverbs were often substituted by aspectual adverbs. This happened even though the lexical experiment was conducted before the aspectual experiment for all participants. Both groups of participants did this. At the individual level, the agrammatic participants had more impaired time frames/conditions in experiment 2 than in experiment 1. Furthermore, in experiment 2, there was a suggestion for a negative correlation between the number of correct answers that the agrammatic participants made and their susceptibility to substitute the target lexical adverbs with aspectual adverbs. The fewer correct answers were made, the more susceptible the agrammatic participants were to across-word-class substitutions in experiment 2. Also in experiment 2,

the ratio between the within word class errors and the across word class errors was smaller in the agrammatic group, suggesting a proneness to use aspectual adverbs in the contexts that necessitated the use of lexical adverbs. All these results suggest that the lexical adverbs posed more burden than the aspectual adverbs on the impaired linguistic system of the agrammatic participants. They suggest that link to discourse mattered more than morphosyntax in Standard Indonesian time reference.

Due to the less-than-optimal performance of the NBDs in the two experiments, we will not press on the significance of the aforementioned results. However, these results are in line with other data in the literature that show a marked decrease in the performance of agrammatic speakers when they need to integrate discourse-linked and morphosyntactic information (cf. Avrutin's 2006 weak syntax model). The lexical adverbs of time are also discourse-linked and referential because they refer to a specific stretch of time in the physical world. Yet, these adverbs are usually not defined as grammatical morphemes. Recall that in chapter 4 it was discussed that these adverbs are categorically classified as nouns and functionally as adverbs.

The qualitative data of the production experiment revealed results that could not be shown by the comprehension experiment. They showed that in production discourse-linked information and referentiality mattered and caused an extra burden to the agrammatic linguistic system.

In chapter 4, we suggested an integration problem that caused the agrammatic participants to have problems with the optional time reference adverbs. In comprehension, the kinds of adverbs did not matter. Both kinds of adverbs were difficult to understand for the agrammatic participants. A similar integration problem was also evident in production, even though it showed up only qualitatively. However, the kinds of adverbs mattered in production. Lexical adverbs were qualitatively more difficult to produce than aspectual adverbs.

5.7 Clinical implications

Our current results have the potential to be used in rehabilitation efforts of agrammatic speakers of Standard Indonesian. First of all, the observation that time reference adverbs are difficult to produce by agrammatic speakers helps clinicians to recognize that the

problem exists. A recognition is a start to developing rehabilitation programs. Secondly, therapists need to assess the performance of each agrammatic speaker in comprehension and production, and compare how well he or she does in the aspectual adverb task compared to the lexical adverbs of time task, within and across modalities. An appreciation of a possible better performance in comprehension compared to production, and in aspectual adverbs compared to lexical adverbs in production needs to be kept in mind. Thirdly, the impairment needs to be treated in a systematic way and the progress needs to be evaluated periodically.

Chapter 6
Comparison across studies

Overall, there were five agrammatic participants who participated in all four experimental studies. These were the participants deignated by A1, A2, A3, A4, and A5. In general across the studies, three of these five agrammatic participants performed significantly worse than their matched Non-Brain-Damaged (NBD) control participants. They are A1, A2, and A3.

In chapter 2, it was shown that these three agrammatic participants were worse than the NBDs on the variables that clearly characterized agrammatism in Standard Indonesian: speech rate, MLU in words, number of minor utterances, and percentage per utterance of syntactic particles. For speech rate, MLU in words, and percentage per utterance of syntactic particles, these agrammatic participants had numbers that were lower than the lower end of the range of their NBDs. They produced a much higher percentage of minor utterances than the higher end of the range of their NBDs. It is, therefore, fair to say that their agrammatism was most severe of the agrammatic participants tested.

The performance of these three agrammatic participants in the comprehension and production studies was also worse than the performance of their NBDs. Especially the individual analyses in chapters 4 and 5 demonstrated that these participants had significant difficulties in comprehending and producing sentences containing the aspectual and lexical adverbs which were tested.

The data reported in chapter 3 were not very enlightening as to whether these three agrammatic participants also performed worse than their NBDs in the verb and time reference study. This was because all the agrammatic participants in the study, not just these three, showed a trade-off between the variability of their verbal predicates, indexed by their Type-Token Ratios, and the percentage of aspectual adverbs that appeared with

the verbal predicates. Summarizing the results of chapter 3, all the five agrammatic participants showed a problem and were different from the NBDs. Restricting ourselves to A1, A2, and A3, they did not show the same pattern for this trade-off. A1 and A3 had a high rank on TTR but a low rank on the percentage of aspectual adverbs that appeared with the verbal predicates, while A2 had low rank on TTR but a high rank on percentage of aspectual adverbs that appeared with the verbal predicates.

To summarize, the same three participants performed worse than their NBDs across studies. It was apparent that referring to time by aspectual adverbs and lexical adverbs of time was difficult for them, in spontaneous speech, comprehension study, and production study. However, while all five participants who participated in all the experimental studies showed a trade-off effect in the spontaneous speech task, it is interesting to observe that two of them did not have problems in the comprehension and production studies. It is thus possible that they truly did not have problems in comprehending and producing sentences containing aspectual and lexical adverbs tested. Their problems were restricted to the (more cognitively demanding) spontaneous speech task. Probably their relatively mild problems with time reference could not be picked up by the SI version of the TART, but they were demonstrated by a spontaneous speech analysis. This once more shows the value of the method. Spontaneous speech analysis may be time consuming but it reveals important information about the aphasic deficits.

Chapter 7
Discussion and conclusion

In this chapter, we bring together important points from the previous chapters. The chapter is organized as follows: characterisation of agrammatic speech in Standard Indonesian, summary of the results in relation to the research questions, implications of the results for current theories on agrammatism and time reference in aphasia, conclusion, and clinical implications.

7.1 Characterisation of agrammatic speech in Standard Indonesian

Several variables from the literature and several additional variables unique to Standard Indonesian were selected in order to characterize agrammatic speech in Standard Indonesian. The selection process was difficult because the classical definition of agrammatism is mainly based on Indo-European languages, from which SI differs. For example, low proportion of inflected verbs, which is one of the classical characterizations, cannot be used as in SI verb inflections can be optionally omitted, so 'agrammatic' productions are not ungrammatical. Furthermore, there are no inflections to create finite verbs, which are typically the most affected by agrammatism. Therefore, we chose adverbs, more specifically aspectual adverbs and lexical adverbs of time into account to compensate for the lack of tense and aspect inflections in SI. We also looked at sentence structure, more specifically at word order, a measure that is hardly ever taken into account in spontaneous speech analyses in Dutch, English and Italian, the languages that have been investigated most often. At least some of these chosen variables were useful: all or some of the agrammatic speakers deviated from their NBDs.

Discussion and conclusion

Of the variables from the literature, 'speech rate', 'mean length of utterances (MLU) in words', 'number of minor utterances', and 'percentage of syntactic particles per utterance' were found to be suitable to characterize SI agrammatic speech. The 'percentage of verbs' (verbal predicates) in the speech samples was not found to distinguish agrammatic from non-agrammatic speech. Therefore, it was concluded that the SI agrammatic speakers did not have problems with verbs at the level of analysis presented in chapter 2. One variable is 'omitted objects after accusative markers'; three of the agrammatic participants omitted more objects than their NBDs. This variable may also be used to characterize agrammatic speech in SI although difficulty in realizing grammatical objects in combination with accusative markers may not be experienced by all agrammatic speakers of SI. Among the variables that were unique to SI, 'number of reduplicated words' is promising for the characterization of agrammatism, because three of the six agrammatic participants produced fewer reduplicated words than their NBDs. Therefore, this variable and the variable 'number of omitted objects after accusative markers' need to be investigated in more participants with Broca's aphasia and in more controlled experiments in order to see how the aphasic participants produced them. Some might argue that reduplication problems are caused by longer words or phonology in the case of reduplications with sound changes. More controlled experiments should shed some light on this.

One issue that needed to be dealt with is the question of what an ungrammatical sentence is in SI. We stated that in the strict sense, only the minor sentences were actually ungrammatical. Other sentences that lacked some words or constituents, such as objects after accusative markers, can be contextually licensed. The NBDs also omitted some parts or words and what differentiated them from the agrammatic participants was that they did this less frequently than the agrammatic participants. We, therefore, suggest that in SI, agrammatic speakers are able to rely more on pragmatics, such as assuming that conversation partners know what the omitted objects refer to, than on syntax which taxes their compromised system.

Agrammatic speech in SI also seems frequently to be characterized by a difficulty in integrating information from two levels of representations when they refer to a time frame. The trade-off between the variability of the verbal predicates and the percentage of aspectual adverbs produced with these predicates suggests that it is difficult for the agrammatic participants to produce both the lexical level information and the grammatical level information at the same time.

7.2 Summary of the results in relation to research questions

In this dissertation, four experimental studies were presented, three of which were set up to answer the four research questions posed at the end of the Introductory Remarks chapter.

The first research question is "Will Standard Indonesian (SI) aspectual adverbs be difficult for agrammatic speakers?" It is clear from the results that Standard Indonesian (SI) aspectual adverbs tested here were difficult for the group of agrammatic speakers studied. In the spontaneous speech, comprehension, and production experiments there was a discrepancy between the performance of the agrammatic participants and the NBDs. In spontaneous speech, the problem manifested itself as a trade-off between the variability of the verbal predicates and the percentage of aspectual adverbs produced with these predicates. In comprehension and production, the problem was shown by the worse performance of the agrammatic participants compared to that of the NBDs.

The answer to the second research question (Will lexical adverbs be difficult for agrammatic speakers?) is that lexical adverbs are also difficult for the agrammatic participants. In spontaneous speech, if lexical adverbs posed no difficulty, we might have expected that they were used to compensate for the difficult aspectual adverbs. This did not occur in the production task; the need to refer to time, which was difficult when done by aspectual adverbs as shown by the trade off, was not replaced by overproduction of lexical adverbs of time. In comprehension, lexical adverbs of time were as difficult as the aspectual adverbs. The performance of the agrammatic participants in the two comprehension tasks (lexical land aspectual) was significantly correlated. In other words, they were equally poor in comprehending sentences containing aspectual adverbs and lexical adverbs of time.

In production, there was even a suggestion that lexical adverbs of time are more difficult than aspectual adverbs. The lexical adverbs were replaced by aspectual adverbs, both by the agrammatic participants and the NBDs, although the lexical adverb task was administered before the aspectual task. It seemed that lexical adverbs of time were more difficult than the aspectual adverbs when they need to be produced. This result answers our third research question: Are the difficulties caused by these two kinds of adverbs

similar or different? The difficulties are similar in comprehension, but differ in degree, although not pattern, in production.

Answering our fourth research question (If they are different, are the differences related to the modality?), the difference in the difficulties caused by these two kinds of adverbs seemed to be related to the modality. The difference arose only in production, in the studies reported in chapters 3 and 5. While we cannot yet explain why this was the case, in chapter 5 we suggested that the referentiality of lexical adverbs of time is possibly the source of their being more difficult than the aspectual adverbs. Both kinds of adverbs are discourse-linked, but only the lexical adverbs are referential.

Problems with the lexical adverbs of time have never, as far as we are aware, been reported in the literature before. Apparently in a language without verbal inflections for tense and aspect, these adverbs which are discourse-bound and referential tax the agrammatic impaired linguistic system. Seen from another perspective, the agrammatic participants seemed to lack the resources to comprehend and produce these adverbs. Time reference is a weak spot for agrammatic participants cross-linguistically and in SI this is made even weaker when referentiality is called into play than when only discourse-linked information is processed.

The current results were obtained from a language without verbal inflections for tense or aspect. Thus independently of inflection, aspectual adverbs and lexical adverbs of time were difficult for the agrammatic participants, in spontaneous speech, comprehension, and production. Therefore, the problems with time reference are not related solely to tense inflections. We can be quite confident in saying that similar problems may also be encountered in other Austronesian languages that refer to time by using aspectual adverbs and lexical adverbs of time. This statement has two consequences. The first is that it demonstrates that the field needs to be concerned with cross-linguistic differences. Hypotheses generated on the basis of data from a limited set of languages may focus on the wrong aspect of the linguistic phenomenon, such as processing of inflection, when the more semantic dimension of time and aspect is more relevant. This point will be discussed further in the next section. Additionally, there is a possibility that similar problems exist in other language families which mark time reference in ways not yet explored (e.g., by tones such as in Kisi, spoken in Tanzania). The second is that it encourages us to investigate other languages within the Austronesian family, especially those which are less studied but have a significant number of speakers. With the knowledge gathered in the current research, clinicians can be better informed as to the time reference problems and

more research is encouraged. It is our hope that aphasic patients can benefit from this research.

7.3 Implication of the results for current theories on agrammatism and on time reference in aphasia.

At the outset, this research project was an exploratory and pioneering endeavor. We had to start from the very beginning, to characterize agrammatism in Standard Indonesian, in order to classify the participants. Our work proved to be very fruitful.

Our first analysis showed that some generally occurring variables such as fluency (number of words per minute), Mean Length of Utterance, syntactic particles, sentence structures (i.e., minor, simple, and compound sentences), and the relationship between accusative markers and the number of omitted object after accusative markers were useful in differentiating agrammatic from non-agrammatic speech.

A second point that came out of this preliminary survey was that the agrammatic participants' speech was syntactically simpler. For example, when a syntactic variable like the accusative marker necessitates the presence of another, in this case an object, a realization of only one may occur. In our case, some agrammatic participants produced accusative markers within or above normal range, but they dropped the objects more frequently than the NBD controls. There seems to be a trade-off here between the production of accusative markers and the production of objects. This suggests a problem with linguistic items whose correct processing depends solely on syntax (Friederici, 1981).

An important point is that our findings regarding inflectional and derivational affixes in SI did not help to differentiate the speech of all agrammatic participants from the speech of non-agrammatic participants. This could be the case because there are differences between the inflectional system in SI and Indo-European languages, such as English and Dutch. Recall that SI does not have inflectional affixes for aspect and tense. If the problems encountered by agrammatic speakers of Indo-European languages are due to time reference, it is no wonder that the problems do not surface in all agrammatic speakers sampled. Furthermore, Goodglass and Berko's (1960) observation that the English inflectional suffix '–s' can be differentially affected in agrammatic production depending on which of its three different functions is meant, suggests that it is necessary for us to be more fine-grained when talking about impairment to inflectional morphology.

Discussion and conclusion

The possessive and third person singular verb '–s' were both more frequently omitted than the plural "-s". Therefore, it is possible that in future research of SI agrammatic speech, we need to break down the inflectional and derivational suffixes according to well-defined criteria rather than lumping them together in one analysis. In this way, we predict we can capture the different processing requirements needed by the affixes and show which ones be used to characterize agrammatism in SI.

Based on the results of our first study, we suggest some modifications to the characterisation of agrammatism. Firstly, problems with verbs and passive constructions, two notorious problems discussed in the literature, were not evident in our data. For the passives, it is possible that canonicity somehow interacted with semantics that rendered passives in SI less impaired than in other languages studied so far. The different meanings communicated by SI passives make them more strongly rooted in the system and less susceptible to damage to the grammatical system. Assuming that agrammatism has the same underlying cause(s) cross-linguistically, we agree with Paradis' (2001) statement " … the same underlying deficit may cause different surface manifestations in different languages" (p. 5). Therefore, the statement that agrammatism is characterized by problems with verbs and passives needs to be hedged by looking more closely at other parts of a given language's linguistic system to see how they interact. Syntactically non-canonical structures may not be difficult for agrammatic speakers when they are important semantically. Secondly, it was evident that the aphasic participants overused some pragmatic possibilities, such as producing minor sentences more frequently than the NBDs. As the NBDs also typically omitted parts of sentences, it can be said that pragmatic skills are important in SI. By omitting parts of sentences more often than the NBDs, the agrammatic participants seemed to rely even more strongly on pragmatics. In other words, as agrammatism by defition is a grammatical / syntactic impairment, our agrammatic participants had to rely more on the intact pragmatic processing in their spontaneous speech. Hence, agrammatism can alter the balance between syntactic and pragmatic processing. This observation was perhaps not evident in Indo-European languages due to differences in the division of labor between syntax and pragmatics in their systems.

The data from the participants classified as agrammatic were taken to a next level of analysis which was presented in chapter 3. We showed that there was a trade-off between the production of aspectual adverbs and the variability of the verbal predicates. The trade-off was explained as a consequence of the difficulty experienced by agrammatic participants when they needed to simultaneously express conceptual-semantic information concerning the event (verbal predicates) and grammatical information about the time frame and time course of the event (aspectual adverbs). The integration of these two layers of information burdened the impaired system of the agrammatic participants.

Our results correspond to the Dutch results of Bastiaanse and Jonkers (1998). In this respect we demonstrated once again how fruitful it can be if we can extend our research to a very different language which has relevant features for the issue at hand. The mention of integration as a problem is a recurrent theme in the literature (e.g., Yarbay Duman, 2009; Avrutin, 2000; Green, 1986). Our results add to this body of literature.

The impairment affecting lexical adverbs of time seen in the comprehension and production studies is new and important. It is new because this impairment has never been reported in the literature. It is important for two reasons. First, it showed that we need to go beyond the classical descriptions in terms of function and content words or grammatical and lexical morphemes to make predictions for agrammatic comprehension and production. As mentioned in chapter 1, the words that we called 'lexical adverbs of time' are classified as nouns by the most authoritative Indonesian dictionary (Kamus Besar Bahasa Indonesia, Pusat Bahasa Departemen Pendidikan Nasional, 2005). Nouns are usually not considered to be seriously affected in agrammatism (Kim and Thompson, 2000). However, our results encouraged us to look beyond this. A more fine-grained analysis regarding function (i.e., referring to time) and other characteristics (i.e., discourse-linked, referential) needs to be used as a basis for our predictions for a given variable.

Recall that in the Introductory Remarks, two theories were selected to be tested in this research project. The first was the weak syntax model proposed by Avrutin (2000) and the second was the PADILIH by Bastiaanse et al. (2011). Our results show that indeed referring to time is a weak spot for agrammatic speakers and that this problem is not restricted just to syntactic means for expressing it such as tense. They lend support to Bastiaanse et al.'s conclusion that regardless of how time reference is manifested, either by bound inflectional morphemes or free-standing morphemes, it is difficult for agrammatic speakers in spontaneous speech, comprehension, and production. We have implicated discourse-linking as a possible cause of the difficulties with both kinds of adverbs and further suggested a role for referentiality to explain why the lexical adverbs of time were more difficult in production than aspectual markers.

The PADILIH made a specific prediction that past time reference is more vulnerable than other time reference. The discrepancy between speech time and event time, emerging when the *perfektif* aspectual adverbs and past lexical adverbs of time are decoded or encoded, is neutralized and does not cause a selective difficulty in referring to the past. This appears to be a consequence of optionality of reference to time and aspect, making the production of all adverbs dependent upon (conversational) context.

Discussion and conclusion

In light of our current findings, we offer a revision to the theories of Avrutin (2000) and Bastiaanse et al. (2011). We suggest that:

1. There is a selective difficulty in referring to the past when time reference is obligatorily marked (e.g., in English, Dutch), because present reference does not require access to discourse.

2. Referring to the past is not selectively difficult when time reference is optionally realized and is thus always used to link the event to discourse.

3. In the case of optional time reference markers, the markers that need more integration with discourse level representations will be more impaired than the markers that require less of this, at least in production.

To falsify these predictions, a variety of methods needs to be employed. We are aware that some studies in languages with inflectional morphemes for time reference mentioned in chapter 1 (e.g., Wenzlaff and Clahsen, 2004) did not find a selective deficit to the past. In order to reliably characterize time reference problems in agrammatic aphasia, cross-linguistic results from different methodologies need to be pulled together. It is of course possible that there is variability in whether agrammatic speakers have problems with time reference, as evident in the work reported here. This raises an issue about why they frequently do co-occur. A future challenge is to characterize how time reference interacts with other factors in a given language and cross-linguistically.

7.4 Conclusion

The work reported in this dissertation is pioneering in characterizing agrammatism and investigating time reference in SI. Now we have no doubt that agrammatism exists in SI. The variables we chose can characterize the speech of aphasic speakers. These findings help to quantify the "simplified" non-fluent speech which has been observed in clinical settings in Indonesia. The trade-off between the variability of verbal predicates and the percentage of aspectual adverbs produced with the verbs also characterize agrammatic SI speech. Coupled with the results of the comprehension and production tests, it is clear that the time reference problems reported in the literature, faced by both monolingual and bilingual speakers (Abuom et al., 2011), also occur in SI. The problems in SI appear to

result from the interplay among time reference, syntactic level representations, and discourse level representations.

7.5 Clinical implications

Knowing which problems can occur in SI agrammatic speakers, our findings can be operationalized to be used in clinical therapies. The results of chapters 2 and 3 help in screening agrammatic speech, therapy activities, and assessments of the results of the therapies. Our findings in chapters 4 and 5 provide important information on tests that can be developed in assessing time reference problems in agrammatic aphasia and on performance that can occur in agrammatic speakers of SI. Better tests can be developed and standardized in the near future.

In a situation where linguistic insights are urgently needed by clinicians in Indonesia in order to treat clients with agrammatism or other forms of aphasia, the body of knowledge presented in this dissertation is indispensable. This is because Standard Indonesian is a language spoken by millions of people, some as a first language and many more as a second. Since the clinicians are mostly educated in Standard Indonesian, this language being the language of instruction throughout the country, testing largely occurs in this language rather than local languages.

References

Abuom, T., and Bastiaanse, R. (2012). Characteristics of Swahili-English bilingual agrammatic spontaneous speech and the consequences for understanding agrammatic aphasia. *Journal of Neurolinguistics, 25, 276-293*.

Abuom, T., Obler, L., and Bastiaanse, R. (2011). Using Swahili and English to test explanations of agrammatism. *Aphasiology*, *25*, 559-576.

Alexiadou, A., and Stavrakaki, S. (2006). Clause structure and verb movement in a Greek–English speaking bilingual patient with Broca's aphasia: Evidence from adverb placement. *Brain and Language*, *96*, 207–220.

Alieva, N.F., Arakin, V.D., Oglobin, A.K., and Sirk, Y.H. (1991). *Bahasa Indonesia: Deskripsi dan Teori*. Yogyakarta: Kanisius.

Alwi, H., Dardjowidjojo, S., Lapoliwa, H., and Moeliono, A. (2003). *Tata Bahasa Baku Bahasa Indonesia* (third edition). Jakarta: Balai Pustaka.

Anjarningsih, H.Y., and Bastiaanse, R. (2009). *Test for Assessing Reference of Time (TART, Indonesian version).* Groningen: University of Groningen.

Anjarningsih, H.Y., and Bastiaanse, R. (2011). Verbs and time reference in Standard Indonesian agrammatic speech, *Aphasiology*, *25*, 1562-1578. DOI:10.1080/02687038.2011.626844

Anjarningsih, H.Y., Haryadi-Soebadi, R., Gofir, A., and Bastiaanse, R. (2012). Characterizing agrammatism in Standard Indonesian. *Aphasiology*, *i-First*, 1-28. DOI: 10.1080/02687038.2011.648370.

Avrutin, S. (2000). Comprehension of discourse-linked and non-discourse-linked questions by children and agrammatic aphasics. In Grodzinksy, Y., Shapiro,

L. and Swinney, D. (Eds.), *Language and the Brain: Representation and Processing*. (295-313). San Diego: Academic Press.

Avrutin, S. (2006) Weak syntax. In Amunts, K., and Grodzinsky, Y. (Eds.), *Broca's Region.* (49-62). New York: Oxford Press.

Bastiaanse, R. (1995). Broca's aphasia: A syntactic and/or morphological disorder? A case study. *Brain and Language*, *48*, 1-32.

Bastiaanse, R., and Jonkers, R. (1998). Verb retrieval in action naming and spontaneous speech in agrammatic and anomic aphasia. *Aphasiology*, *12*, 951-969. DOI: 10.1080/02687039808249463

Bastiaanse, R. and van Zonneveld, R. (1998). On the relation between verb inflection and verb position in Dutch agrammatic aphasics. *Brain and Language*, *64*, 165-181.

Bastiaanse, R., and Bol, G. (2001). Verb inflection and verb diversity in three populations: Agrammatic speakers, normally developing children, and children with Specific Language Impairment (SLI). *Brain and Language*, *77*, 274-282.

Bastiaanse, R., Hugen, J., Kos, M., and van Zonneveld, R. (2002). Lexical, morphological, and syntactic aspects of verb production in agrammatic aphasics. *Brain and Language*, *80*, 142-159.

Bastiaanse, R., and Thompson, C.K. (2003). Verb and auxiliary movement in agrammatic Broca's aphasia. *Brain and Language*, *84*, 286-305.

Bastiaanse, R. (2008). Production of verbs in base position by Dutch agrammatic speakers: Inflection versus finiteness. *Journal of Neurolinguistics*, *21*, 104-119.

Bastiaanse, R. and Van Zonneveld, R. (2005). Sentence production with verbs of alternating transitivity in agrammatic Broca's aphasia. *Journal of Neurolinguistics*, *18*, 57-66.

References

Bastiaanse, R., Bouma, G., and Post, W. (2009). Linguistic complexity and frequency in agrammatic speech production. *Brain and Language*, *109*, 18-28.

Bastiaanse, R., Bamyaci, E., Hsu, C.-J., Yarbay Duman, T., Lee, J., and Thompson, C.K. (2011). Time reference in agrammatic aphasia. A cross-linguistic study. *Journal of Neurolinguistics, 24,* 652-673.

Bastiaanse, R., Hurkmans, J., and Links, P. (2006). The training of verb production in Broca's aphasia: A multiple-baseline across-behaviours study. *Aphasiology*, *20*, 298-311.

Bastiaanse, R., Jonkers, R., and Thompson, C.K. (2008). *Test for Assessing Reference of Time (TART)*. Groningen: University of Groningen.

Brookshire, R. and Nicholas, L. (1994). Speech sample size and test-retest stability of connected speech measures for adults with aphasia. *Journal of Speech and Hearing Research*, *37*, 399-417.

Burchert, F., Swoboda-Moll, M., and De Bleser, R. (2005). Tense and agreement dissociations in German agrammatic speakers: Underspecification vs. hierarchy. *Brain and Language*, *94*, 188-199.

Butar-Butar, M. (1976). *Some Movement Transformations and Their Constraints in Indonesian.* (unpublished PhD dissertation). Indiana University, Department of Linguistics.

Cameron, R.M., Wambaugh, J.L., and Shannon, C. (2010). Individual variability on discourse measures over repeated sampling times in persons with aphasia. *Aphasiology, 24,* 671-684.

Caplan, D. (1987). *Neurolinguistics and linguistic aphasiology: An introduction*. Cambridge: Cambridge University Press.

Caplan, D. (2006). Aphasic deficits in syntactic processing. *Cortex, 42*, 797-804.

Caramazza, A., and Zurif, E.B. (1976). Dissociation of algorithmic and heuristic processes in sentence comprehension: Evidence from aphasia. *Brain and Language*, *3*, 572-582.

Caramazza, A., Capasso, R., Capitani, E., and Miceli, G. (2005). Patterns of comprehension performance in agrammatic Broca's. *Brain and Language*, *94*, 43-53.

Chaer, A. (1994). *Linguistik Umum.* Jakarta: Rineka Cipta.

Chomsky, N. (1995). *The Minimalist Program*. London: MIT Press.

Clahsen, H., and Ali, M. (2009). Formal Features in Aphasia: Tense, Agreement, and Mood in English agrammatism. *Journal of Neurolinguistics, 22*, 436-450.

Comrie, B. (1985). *Tense*. Cambridge: Cambridge University Press.

Crawford, J.R., and Garthwaite, P.H. (2002). Investigation of the single case in neuropsychology: confidence limits on the abnormality of test scores and test score differences, *Neuropsychologia*, *40*, 1196–1208

Crepaldi, D., Ingignoli, C., Verga, R., Contardi, A., Semenza, C., and Luzzatti, C. (2011). On nouns, verbs, lexemes, and lemmas: Evidence from the spontaneous speech of seven aphasic patients. *Aphasiology*, *25*, 71–92.

Crystal, D. (2003). *A Dictionary of Linguistics and Phonetics* (Fifth edition). Malden: Blackwell Publishing.

Dahl, Ö. (1985). *Tense and Aspect Systems*. Oxford: Basil Blackwell Ltd.

Dharmaperwira-Prins, R.I.I. (1996). *Tes Afasia untuk Diagnosis, Informasi, dan Rehabilitasi.* Jakarta: Balai Penerbit Fakultas Kedokteran Universitas Indonesia.

Faroqi–Shah, Y., and Dickey, M.W. (2009). On-line processing of tense and temporality in agrammatic aphasia. *Brain and Language, 108,* 97-111.

Faroqi–Shah, Y., and Thompson, C. K. (2007). Verb inflections in agrammatic aphasia: encoding of tense features. *Journal of Memory and Language*, *56*, 129–151.

References

Friederici, A. (1981). Production and Comprehension of Prepositions in Aphasia, *Neuropsychologia*, *19*, 191-199.

Friedmann, N. (2000). Moving verbs in agrammatic production. In R. Bastiaanse and Y. Grodzinsky, (Eds.), Grammatical *disorders in aphasia: A neurolinguistic perspective* (152-170). London: Whurr.

Friedmann, N. and Grodzinsky, J. (1997). Tense and agreement in agrammatic production: Pruning the syntactic tree. *Brain and Language*, *56*, 397-425.

Goldstein, K. (1948). *Language and Language Disturbances: Aphasic Symptomp Complexes and their Significance for Medicine and Theory of Language.* New York: Grune and Stratton.

Goodglass, H. (1976). Agrammatism. In Whitaker, H., and Whitaker, H.A. (Eds.), *Studies in neurolinguistics*, Vol. 1. New York: Academic Press.

Grangé, P. (2003). Aspect and modality in Indonesian: The case of *sudah, telah*, *pernah*, *sempat*. A paper presented at the 7th International Symposium on Malay/Indonesian Linguistics, Nijmegen, the Netherlands.

Grangé, P. (2006). *Temps et aspect et indonésien.* Unpublished doctoral dissertation. Poitiers: Université de Poitiers.

Green, D.W. (1986). Control, Activation, and Resource: A Framework and a Model for the Control of Speech in Bilinguals. *Brain and Language*, *27*, 210-223.

Grodzinsky, Y. (1990). *Theoretical perspectives on language deficits.* Cambridge, MA: MIT-Press.

Grodzinsky, Y., Wexler, K., Chien, Y.-C., Marakovitz, S., andSolomon, J. (1993). The breakdown of binding relations. *Brain and Language, 45*, 396-42.

Hagiwara, H. (1995). The breakdown of functional categories and the economy of derivation. *Brain and Language*, *50*.

Haji Omar, A. (1980). *Nahu Melayu Mutakhir*. Kuala Lumpur: Dewan Bahasa dan Pustaka.

Hidajat, L. (2010). *The Acquisition of Verb Argument Structure in Basilectal Jakarta Indonesian*. (Unpublished doctoral dissertation). University of Delaware, Newark, Delaware, the United States of America.

Ho, W.-M. (2008) *The Trade off Relationship in Agrammatism: Evidence from Mandarin Chinese*. (unpublished master thesis). Rijksuniversiteit Groningen.

Huang, Y. (1995). On null subjects and null objects in generative grammar. *Linguistics*, *33*, 1081-1124.

Jalil, S.B., Liow, S.J.R., and Keng, T.S. (2011). Semantic assessment battery for Malay-speaking adults with aphasia. *Aphasiology*, *25*, 415-433.

Jonkers, R. (1998). *Comprehension and production of verbs in aphasic speakers*. (Unpublished doctoral dissertation). University of Groningen, Groningen, the Netherlands.

Jonkers, R., and Bruin, A. de (2009). Tense processing in agrammatic and Wernicke's aphasia. *Aphasiology*, *23*, 1252-1265.

Keraf, G. (1991). *Tata Bahasa Rujukan Bahasa Indonesia.* Jakarta: Grasindo.

Kim, M., and Thompson, C.K. (2000). Patterns of Comprehension and Production of Nouns and Verbs in Agrammatism: Implications for Lexical Organization. *Brain and Language*, *74*, 1-25.

Kirmess, M., and Maher, L.M. (2010). Constraint induced language therapy in early aphasia rehabilitation. *Aphasiology*, *24*, 725-736.

Knoph, M.I.K. (2011). Language assessment of a Farsi–Norwegian bilingual speaker with aphasia. *Clinical Linguistics & Phonetics*, *25*, 530–539.

Kolk, H.H.J., and van Grunsven, M.F. (1985). Agrammatism as a variable phenomenon. *Cognitive Neuropsychology*, *2*, 347–384.

Kridalaksana, H. (2007). *Kelas Kata dalam Bahasa Indonesia* (Second edition). Jakarta: Gramedia Pustaka Utama.

References

Kridalaksana, H. and Linguistic Research Team of the Faculty of Letters, University of Indonesia. (1999). *Tata Wacana Deskriptif Bahasa Indonesia*. Unpublished manuscript.

Lee, J., Milman, L. & Thompson, C.K. (2008). Functional category production in English agrammatism. *Aphasiology, 22*, 239-264.

Lewis, M. Paul (Ed.). (2009). *Ethnologue: Languages of the World*, Sixteenth edition. Dallas, Tex.: SIL International.

Lichtheim, L. (1885). On aphasia. (2006, English translation) In: Grodzinsky, Y., and Amunts, K (Eds.), *Broca's Region* (318-347). Oxford: Oxford University Press.

Links, P, Hurkmans, J. & Bastiaanse**,** R. (2010). Training verb and sentence production in agrammatic Broca's aphasia. *Aphasiology, 24,* 1303-1325.

Lubis, H.H. (1991). *Jenggala Bahasa Indonesia* (Ambiguitas, Pragmatik, Problematik). FakultasMedan: Pendidikan Bahasa dan Seni IKIP Medan.

Luzzatti, C., Toraldo, A., Guasti, M.T., Ghirardi, G., Lorenzi, L., and Guarnaschelli, C. (2001). Comprehension of reversible active and passive sentences in agrammatism, *Aphasiology*, *15*, 419-441.

Macdonald, R. (1976). *Indonesian Reference Grammar*. Washington D.C.: Georgetown University Press.

Martohardjono, G. (1993). *WH-movement in the acquisition of a second language: A cross-linguistic study of three languages with and without overt movement* (Unpublished Doctoral Dissertation). Cornell University.

McCall, D., Virata, T., Linebarger, M., and Berndt, R.S. (2009). Integrating technology and targeted treatment to improve narrative production in aphasia: A case study. *Aphasiology*, *23*, 438-461.

Mehri, A, Tahan Zadeh, B., and Jahani, Y. (2010). Use of Tense in Persian agrammatic aphasia. *Audiology*, *19*, 78-85.

Miceli, G., Mazzucchi, A., Menn, L., and Goodglass, H. (1983). Contrasting cases of Italian agrammatic aphasia without comprehension disorder. *Brain and Language*, *19*, 65-97.

Nanousi, V., Masterson, J, Druks, J., and Atkinson, M. (2006). Interpretable vs. uninterpretable features: Evidence from six Greek-speaking agrammatic patients. *Journal of Neurolinguistics, 19,* 209-238.

Novaes, C., and Braga, M. (2005). Agrammatic aphasia and aspect. *Brain and Language*, *95*, 121-122.

Paradis, M. (2001). The need for awareness of aphasia symptoms in different languages. *Journal of Neurolinguistics*, *14*, 85-91.

Platt, J.T. (1975). The Singaporean English speech continuum and its basilect 'Singlish'as a 'Creolid'. *Anthropological Linguistics*, *17*, 363-374.

Pollock, J-Y. (1989). Verb Movement, Universal Grammar, and the Structure of IP. *Linguistic Inquiry*, *20*, 365-424.

Postman, W.A. (2002). *Thematic Role Assignment in Indonesian: A Case Study of Agrammatic Aphasia*. (Unpublished doctoral dissertation). Cornell University.

Postman, W.A. (2004). Processing of complex sentences in a case of aphasia in Indonesian: thematic vs. linear strategies. *Journal of Neurolinguistics*, *17*, 455-489.

Pusat Bahasa Departemen Pendidikan Nasional. (2005). *Kamus Besar Bahasa Indonesia* (Third edition). Jakarta: Balai Pustaka.

Quinn, G. (2001). *The learner's dictionary of today's Indonesian*. Sydney: Allen and Unwin.

Rossi, E. & Bastiaanse, R. (2008). Spontaneous speech in Italian agrammatic aphasia: A focus on verb production. *Aphasiology*, *22*, 347-362. DOI:10.1080/02687030701407093

References

Ruiter, M.B., Kolk, H.H.J., and Rietveld, A.C.M. (2010). Speaking in ellipses: The effect of a compensatory style of speech on functional communication in chronic agrammatism. *Neuropsychological Rehabilitation*, *20*, 423-458.

Saffran, E.M., Berndt, R.S., and Schwartz, M.F. (1989). The quantitative analysis of agrammatic production: Procedure and data. *Brain and Language*, *37*, 440-479.

Sanchez, M.E. (1996). *Syntactic Features in Agrammatic Production* (Unpublished doctoral dissertation).University of British Colombia, Vancouver, Canada.

Sanossa, E. *Fajar Siddiq*. Accessed from http://naskahdrama-rps.blogspot.com/2010/08/fajar-siddiq-emil-sanossa.html on 5 May 2012.

Schwartz, M., Saffran, E., and Marin, O. (1980). The Word Order Problem in Agrammatism: I. Comprehension. *Brain and language*, *10*, 249-262.

Shapiro, L.P. (2000). The processing of long-distance dependencies in normal listeners: Evidence for form-driven activation. In Bastiaanse, R. & Grodzinsky, Y. (eds.) *Grammatical disorders in aphasia: A neurolinguistic perspective*(pp. 35-50). London: Whurr Publishers.

Sie, I. D. (1989). *The Syntactic Passive in Bahasa Indonesia: A Study in Government-Binding Theory*. (Unpublished doctoral dissertation). University of Amsterdam, Amsterdam, The Netherlands.

Simonsen, H.G. and Lind, M. (2002). Past tense expression in a Norwegian man with agrammatic aphasia. In Windsor, F., Kelly, M.L. and Hewkett, N. (eds.) *Investigations in clinical linguistics and phonetics*. (pp. 44-56) London: Lawrence Erlbaum.

Smith, C.S. (1997). *The Parameter of Aspect* (Second edition). Dordrecht: Kluwer.

Sneddon, J. (1996). *Indonesian, a Comprehensive Grammar*. London: Routledge.

Springer, L., Huber, W. Schlenck, K.-J. & Schlenck, C. (2000). Agrammatism: Deficit or compensation? Consequences for aphasia therapy. *Neuropsychological Rehabilitation*, *10*, 279-309.

Stack, M. (unpublished manuscript). Word Order and Intonation in Indonesian. Accessed at http://ling.wisc.edu/lso/wpl/5.1/LSOWP5.1-13-Stack.pdf on 22 July 2011.

Stark, J.A. (2010). Content analysis of the fairy tale Cinderella – A longitudinal single-case study of narrative production: From rags to riches." *Aphasiology*, *24*, 709-724.

Stavrakaki, S. and Kouvava, S. (2003). Functional categories in agrammatism: Evidence from Greek. *Brain and Language, 86,* 129-141.

Subroto, E. (1985). Infleksi dan derivasi: Kemungkinan penerapannya dalam pemerian morfologi Bahasa Indonesia. In PIBSI VII. Yogyakarta: Universitas Sarjanawiyata Tamansiswa.

Thompson, C.K., Choy, J.J., Holland, A. and Cole, R. (2010). Sentactics: Computer-automated treatment of underlying forms. *Aphasiology*, *24*, 1242-1266.

Thompson, C.K., Shapiro, L.P., Li, L., and Schendel, L. (1995). Analysis of verbs and verb-argument structure: A method for quantification of aphasic language production. *Clinical Aphasiology*, *23*, 121-140.

Tissot, R.J., Mounin, G. & Lhermitte, F. (1973). *L'agrammatism.* Brussels: Dessart.

Tjung, Y. (2006). *The Formation of Relative Clauses in Jakarta Indonesian language: A Subject-Object Asymmetry*. (Unpublished doctoral dissertation). University of Delaware, Newark, Delaware, the United States of America.

Tsapkini, K, Jarema, G., and Kehayia, E. (2001). Manifestations of morphological impairments in Greek aphasia: A case study. *Journal of Neurolinguistics*, *14*, 281-296.

Varlokosta, S., Valeonti, N., Kakavoulia, M., Lazaridou, M., Economou, A., and Protopapas, A. (2006). The breakdown of functional categories in Greek aphasia: Evidence from agreement, tense, and aspect. *Aphasiology*, *20*, 723-743.

References

Vermeulen, J. Bastiaanse, R., and Wageningen, B. van (1989). Spontaneous speech in aphasia: A correlational study. *Brain and Language, 36*, 252-274.

Wenzlaff, M. and Clahsen, H. (2004). Tense and agreement in German agrammatism. *Brain and Language*, *89*, 57-68.

Wenzlaff, M. & Clahsen, H. (2005). Finiteness and verb-second in German agrammatism. *Brain and Language, 92,* 33-44.

Wernicke, C. (1874). *The aphasic symptom complex: A psychological study on a neurological basis*. Breslau: Kohn and Weigert.

Wieczorek, R., Huber, W., and Darkow, R. (2011). Tense/aspect category in fluent and nonfluent German aphasia: An experimental training programme for verb production. *Aphasiology*, *25*, 851–875.

Yarbay Duman, T. and Bastiaanse, R. (2009). Time reference through verb inflection in Turkish agrammatic aphasia. *Brain and Language*, *108*, 30-39.

Yarbay Duman, T., Altıınok, N., Özgirgin, N., and Bastiaanse, R. (2011). Sentence comprehension in Turkish Broca's aphasia: An integration problem. *Aphasiology, 25,* 908-926.

Yiu, E. and Worrall, L. (1996). Agrammatic production: A cross-linguistic comparison of English and Cantonese. *Aphasiology*, *10*, 623-647.

Zagona, K. (2003). Tense and anaphora: Is there a tense-specific theory of coreference. In Barrs, A. (ed.) *Anaphora: A Reference Guide*. (pp. 140-171). Oxford: Blackwell.

Electronic resources:

Encyclopædia Britannica Online. (2011) Encyclopædia Britannica Inc. Web. Accessed on 29 Dec 2011.

http://www.let.rug.nl/neurolinguistics/?pagina=./projects/time. Accessed on 5 May 2012

http://www.unicef.org/indonesia/id/education.html. Accessed on 5 May 2012.

Appendices

Chapter 2 and chapter 3

The speech sample comprises of the first ten utterances of all participants in the study reported in chapter 2 (Anjarningsih, Haryadi-Soebadi, Gofir, and Bastiaanse, 2012), and chapter 3 (Anjarningsih and Bastiaanse, 2011).

A1

1.

Kalau	ada	tamu	datang	tanya	hei	ada	apa.
If	exist	guest	come	ask	hey	exist	what.

"If a guest comes, asked what their business."

2.

Perlu	sama	bos.
Need	with	bos.

"Need the boss."

3.

Perlu	apa?
Need	what?

"What do you need?"

4.

Ayo	masuk	silakan	masuk.
Come	in	do	come in.

"Please come in."

5.

Lapor	sama	bos.
Report	to	bos.

"Reported to the boss."

6.	Ada	tamu	bos.
	Exist	guest	boss

"There is a guest boss."

7.

Oh,	siapa?
Oh,	who

"Oh, who?"

8.	Ini.
	This

"This."

9.	Masuk, masuk.
	Enter enter

"Enter, enter."

10.

Lama,	sepuluh tahunan.

Longtime, about ten years.

"For a long time, about ten years."

C1

1.

Saya	sebenarnya	kalau	bersaudara	itu	empat	bersaudara.
I	The truth	if	brotherhood	that	four	siblings.

"The truth is we are four brothers."

2.

Cuma yang satu saudara yang paling bontot satu ibu lain bapak.

But the one brother the youngest one mother different father.

"But the youngest brother has a different father."

3.

Cuma yang satu ibu satu bapak tiga bersaudara saya yang paling bontot.

But the one mother one father three brothers, I the youngest.

"But the ones who have the same mother and father, I am the youngest."

4.

Saya waktu itu ya namanya keajak-ajak teman sama saudara

bahwa	di	Jakarta	itu	gampang	nyari	duit	apa.	
I	time	that	well		passive-take	friend	and	family
that	in	Jakarta	that	easy	active-find	money	what.	

"I was persuaded by friends and family that it was easy to find money in Jakarta."

5.

Nyatanya	kan	tidak	begitu.
Truth	well	not	like that.

"Well the truth is not like that."

6.

Yang	gampang	kan	yang	punya	Pendidikan,	yang	punya	modal,
pengalamannya	mencukupi,		sedangkan	saya	sekolah	saja	tidak.	
The	easy	well	the	have	education,	the	have	capital,
experience	Active-	enough	but	I	school	even	not.	

"Well it is easy for those who have education, who have capital, who have enough experience, but I did not even go to school."

7.

Jangankan	sekolah,	ijazah,	baca	saja	tidak	bisa.
Let alone	school,	certificate,	read	even	not	can

"Let alone school proven by a certificate, I cannot even read."

8.

Ya	bagaimana	mau	kerja	enak	apa.
Well	how	get	work	good	what.

"Well how can I get good work and others."

9.

Ya	akhirnya	daripada	saya	nganggur	di	Jakarta,	nelangsa,	ya
kerja	apa	saja	yang	penting	halal.			
Well	finally	Rather than	I	jobless	in	Jakarta,	unhappy,	well
do	anything		the	important	halal	(not	doing	crimes)

"Well finally rather than being jobless, unhappy, I did anything as long as it was halal (good in the eyes of God/not doing crimes)."

10.

Tidak	merugikan	orang.
Not	disadvantage	people.

"Not disadvantaging other people."

C2

1.

Bapak	kan	sekarang	bawa	mobil.	
Father	well	now	drive	car.	

"Well now I drive cars."

2.

Kalau	lagi	rambu-rambu	lalu-lintasnya	itu	kadang-kadang
Bapak	suka	tidak	mengerti.		
If	Dur-asp.	signs	traffic	that	sometimes
Father	sometimes	not	understand.		

"Sometimes I do not understand the traffic signs."

3. Gitu, ngebacanya.

Like that, read those

“Like that, reading those (signs).”

4.

Bawa mobil truk.

Drive car truck.

“Drive trucks.”

5.

Bawa-bawa barang gitu kirim-kirim ke daerah-daerah gitu.

Take things like that send to provinces like that

“Taking things sending to provinces like that.”

6.

Ke Jakarta kadang-kadang ke Jawa Kadang-kadang ke Sumatra.

To Jakarta sometimes to Java sometimes to Sumatra.

“To Jakarta, sometimes to Java, sometimes to Sumatra.”

7.

Jadi sopirnya sih sudah lama, kalau di truknya sih baru lima tahun.

Become driver perf-asp. long if at truck just five years.

“I have become a driver for a long time, if at the truck company just five years.”

8.

Sopir angkot.

Driver city transport.

"Driver of city transport (cars)."

9.

Kadang jualan juga.

Sometimes trade as well.

"Sometimes trading as well."

10.

Kalau misalkan lagi sepi, narik angkot dulu.

If let's say dur-asp. quiet drive city transport

"If let's say there are few buyers, I drive the city transport cars."

C3

1.

Paling dulu pernah juga tipes, kena tipes.

At most past asp-experience also typhoid, suffer from typhoid.

"My worst is in the past (I) experienced typhoid, suffered from typhoid."

2.

Waktu itu saya kan waktu musim durian.

Time that I well time season durian.

"At that time I experienced a durian season."

3.

Habis itu tidak lama panas.

After that not long hot.

"Not long after that fever."

4.

Akhirnya	saya	panas	tinggi	sampai	tidak	sadar
diri,	saya	dibawa	ke	rumah	sakit.	
Finally	I	hot	high	until	not	conscious
	I	Passive-take	to	house	sick	

"Finally I suffered from a high fever until (I became) unconscious, I was taken to the hospital."

5.

Kata	dokter	habis	itu	saya	sadar	dibilang	sakit	tipes.
Say	doctor	after	that	I	conscious	passive-say	suffer from	typhoid.

"The doctor told me after that I (became) conscious, diagnosed as suffering from typhoid."

6.

Sudah	itu	kena	lagi	tipes,	itu	gara-gara	makan	mi	ayam.
After	that	suffer	from	typhoid,	that	because	eat	noodle	chicken.

"After that (I) suffered from typhoid again, that was because of eating chicken noodles."

7.

Saban	hari	makan	mi	ayam,	tahu-tahu	waktu	terakhir	itu
makan	mi	ayam	saya	sampai	dua	piring	habis.	
Every	day	eat	noddle	chicken	suddenly	time	last	that
eat	noodle	chicken	I	up to	two	plate	finish.	

"Every day I ate chicken noodles, suddenly at the last time I ate chicken noodles up to two servings."

8.

Langsung	malam	saya	sudah	tidak	sadar	juga.
Directly	evening	I	perf-esp.	not	conscious	also.

"Directly in the evening I already became unconscious also."

9.

Capek	juga	dulu-dulunya	tapi	kebanyakan	dari
makanan	saya	itu.			
Tired	also	in the past	but	mostly	from
food	I	that.			

"(I was) also tired in the past, but mostly (my problem) was from food."

10.

Dari	mulai	mandiri,	saya	dagang.
From	start	independent,	I	trade.

"From the moment started to be independent, I traded."

A2

1.

Waktu	itu	ada	penumpang	mau	ke	sana
ke	jalan	Sekolahan	ini.			
Time	that	exist	passanger	want	to	there
to	street	Sekolahan	this.			

"At that time there was a passanger who wanted (to go) to this Sekolahan street."

2.

Terus	saya	jatuh	di	situ.
Then	I	fall down	at	there.

"Then I fell down there."

3.

Sudah	jatuh	terus	banyak	orang	ngerumunin,
kenapa,	kenapa.				
Perf-asp.	Fall down	then	A lot	people	surround
What's wrong	What's wrong.				

"After falling down then a lot of people surrounded me, (asking) what's wrong, what's wrong."

4.

Aduh	sakit,	saya	tidak	bisa	begini.
Ouch	hurt,	I	not	can	like this.

"Ouch (it) hurts, I could not do like this."

5.

Terus	saya	digotong,	dibawa	ke	sini.
Then	I	passive-carry	passive-take	to	here.

"Then I was carried, taken here."

6.

Ada	orang	tenang	Pak	motornya	tidak	hilang,
nanti	saya	anterin	ke	rumahnya.		
Exist	person	calm	Sir	motorcycle	not	gone,
later	I	deliver	to	your house.		

"Somebody (said) (stay) calm Sir your motorcycle is not gone, I will deliver it to your house later."

7.

Oh	ya	Jalan	Pajajaran	Ini,	Perumnas	Bandar	Kemang.
Oh	yes	Street	Pajajaran	This,	Housing complex	Bandar	Kemang.

"Oh yes this Pajajaran street, Bandar Kemang housing complex."

8.

Sampai	di	sini	saya	sadar	juga.
Up to	at	here	I	conscious	also.

"Here I (became) conscious."

9.

Digotong	ramai-ramai	sama	orang.
Passive-carry	together	by	people.

"Carried together by people."

10.

Sudah	Itu,	terima kasih	ya.
After	that,	thank you.	

"After that, thank you."

A3

1.

Sebelum	stroke	kerja	di	pabrik	gelas	kemudian	mengojek.

Before	stroke	work	at	factory	glass	then	drive motorcycle-taxi.

"Before the stroke (I) worked at a glass factory then drove motorcycle-taxi."

2.

Bapak	ngojek	terus	di	Babadak	sini.
Father	drive	all the time	in	Babadak	here.

"I drove all the time here in Babadak."

3.

Kemudian	Bapak	mondar-mandir	dari	sana	ke	bawah.
Then	Father	back and forth	from	there	to	down.

"Then I (drove) back and forth from there to down (there)."

4.

Dari	pagi	sampai	siang	kira-kira	pendapatan
waktu	kemarin	ini	lima belas ribu	per	setengah hari
From	morning	up to	afternoon	approximately	earning
time	yesterday	this	fifteen thousand	per	half day.

"From morning up to afternoon in the past, my earning was approximately fifteen thousand rupiahs per a half day."

5.

Jadi,	kalau	satu	hari	tiga puluh	ribu	dapat.
So,	if	one	day	thirty	thousand	get.

"So, in one day I could get thirty thousand."

6.

Per	satu	hari.
Per	one	day.

"Per one day."

7.

Kegiatan	ngojek	ya	tidak	ada	lagi.
Activity	drive motorcycle-taxi	well	not	exist	anymore.

"The activity of driving motorcycle-taxi does not exist anymore."

8.

Bapak	pagi	langsung	turun	terus	narik.
Father	morning	directly	go down	then	drive

"In the morning I directly went down and drove."

9.

Kemudian	pulang	ke	rumah	sore	langsung	tidur	saja.
Then	go back	to	home	afternoon	diretly	sleep	just.

"Then after going back home in the morning (I) just directly (went to) sleep."

10.

Sudah	gitu	karena	di	bedeng	Itu	kurang
memuaskan	jadi	terpaksa	Bapak	nyari	lagi.	
After	that	because	at	temporary housing	that	less
satisfying	so	passive-force	Father	active-look	again.	

"After that because at the temporary housing was not very satisfying I was forced to look again."

C4

1.

Ya	sekarang	lebih	enak	karena	terfokus
ya	sama	general	manager	karena	Sekarang
saya	diangkat	jadi	sopir	manajer.	
Well	now	more	comfortable	because	passive-focus
well	to	general	manager	because	now
I	passive-promote	become	driver	manager.	

“Well now (I am) more comfortable because (I am) focused to just the general manager because I was promoted to the manager’s driver.”

2.

Kalau	dulu	kan	saya	serabutan.
If	past	well	I	odd work.

“Well in the past I (did) odd work.”

3.

Siapa	saja	yang	perlu,	ya	manajer,	ya	bagian	keuangan.
Whoever		that	need,		manager		section	finance.

“Whoever that needed (me), the manager, the finance section.”

4.

Kalau	sekarang	terfokus	satu.
If	now	Passive-focus	one.

“Now I am focused to one.”

5.

Karena	saya	juga	di	samping	Itu

juga	dapat	gaji	tambahan	dari	keluarga
manajer	itu.				
Because	I	also	at	beside	that
also	get	salary	extra	from	family
manager	that.				

"Because beside that I also get an extra salary from the family of the manager."

6. Lebih enak.
   More comfortable

"More comfortable."

7.

Ya	kalau	tidak	lebih	enak,	saya	
ngapain	karena	saya	sudah	kerja	lama	mungkin.
Well	if	not	more	comfortable	I	
What for	because	I	perf-asp.	work	long	maybe

"Well if not more comfortable, what for because I had worked for a long time maybe."

8.

Ya	prosesnya	kerja	dengan	baik	saja.
Well	the process	work	by	well	just.

"Well the process is (I) just work well."

9.

Saya	tunjukkan	dengan	baik.

I	show	by	well.

"I show (my work) well."

10.

Ya	nanti	yang	nilai	kan	perusahaan	itu	sendiri.
Well	later	who	judge	well	company	that	Itself.

"Well the one who judges is the company itself."

C5

1.

Berawal	kena	masalahnya	waktu	dulu	Bapak
dinas	itu	mungkin	karena	makanan	kurang
teratur	dan	terlalu	capek	kemungkinan.	
Start	experience	The troble	time	past	Father
work	that	maybe	because	food	less
regular	and	too	tired	possibly.	

"The trouble started in the past when I worked maybe because the food was not regular and possibly too tired."

2.

Tapi	memang	kalau	menurut	dokter	Bapak	kena
penyempitan	nadi	jantung,	waktu	inputnya	bagus	tapi
waktu	output	keluarnya	ada	sumbatan.		
But	indeed	if	according to	doctor	Father	get
narrowing	bloodvessel	heart	time	the input	good	but
time	output	out	exist	blockage.		

"But indeed according to the doctor I got a narrowing of the heart bloodvessel, the input is good but there is a blockage at the output."

3.

Dulu	ya	hernia	dulu.
Past	well	hernia	past.

"Well in the past hernia."

4.

Hernia	itu	kan	dari	capek	dari	makanan	juga	menurut	dokter.
Hernia	that		from	tired	from	food	as well	according to	doctor.

"Hernia according to the doctor is from tiredness and food as well."

5.

Yang	dasar	utama	itu	makan	sama	capek,
terlalu	banyak	kesibukan,	banyak	capek.		
The	base	primary	that	eat	and	tired,
too	many	activities,	too	tired.		

"The primary cause is eating and tiredness, too many activities, too tired."

6.

Sekarang	tinggal	yang	jantung	saja,	hernia	sudah	dioperasi.
Now	remain	the	heart	just,	hernia	perf-asp.	passive-operate.

"Now what remains is the heart problem, the hernia has been operated."

7.

Ya	kita	rajin	kontrol	ke	dokter,	terus
ya	mengurangi	makanan	yang	mengandung	kolesterol	dan

hanya	sedikit	olahraga.				
Well	we	regularly	check up	to	doctor,	then
well	active-reduce	food	that	contain	cholesterol	and
only	little	sports.				

"Well we regularly do check up to the doctor, and reduce food that contains cholasterol and (do) just a little sports."

8.

Waktu	itu	saya	setelah	dua	tahun	tidak
pernah	kontrol,	timbul	waktu	bulan	kemarin	itu
yang	terakhir	itu	waktu	jalan	terlalu	capek
balik	lagi	timbul	pening-pening	lalu	hampir	pingsan.
Time	that	I	after	two	year	not
asp-ever	check up	happen	time	month	previous	that
the	last	that	time	walk	too	tired
come	back	happen	headache	then	almost	faint.

"At that time after two years I never did check up, last month the last time (I was) too tired, headache happened and (I) almost fainted."

9.

Masalah	pekerjaan	kalau	dulu	karena	Baba
seorang	teknisi	jadi	pekerjaannya	merencanakan	dan
mengerjakan	pekerjaan	teknis	masalah	pemasangan.	
Regarding	work	if	past	Father	because
a	techician	so	the job	active-plan	and
active-do	work	technical	problem	installation.	

"Regarding work, in the past because I was a technician, so my job was planning and doing tecnical work related to installation."

10.

Kebetulan	Baba	tugas	di	bagian	teknik
umum	tahun	delapan puluh	sampai	sembilan puluh	karena
di	teknik	umum	itu	untuk	mengatasi
sentral	AC,	sentral	listrik,	genset,	itu
di	Baba	semuanya.			
Accidentally	Father	work	at	section	technical
general	year	eighty	up to	ninety	because
at	techical	general	that	for	deal with
central	AC,	central	electricity	generator,	that
at	Father	all.			

"Accidentally I worked at general technical section from the year eighty up to ninety because at the general technical section dealt with the centers for AC, electricity and generator, all the responsibilities were mine."

P4

1.

Saya	tidak	punya	basic	saya	harus	menyelesaikan	apa	begitu.
I	not	have	basic	I	must	active-finish	what	like that.

"I do not have the basic (that says) I must finish something."

2.

Jadi	semua	diselesaikan	seperti	ya	kira-kira	seenaknya
saja	gitu.					

So all passive-finish like well approximately comfortable

just like that.

"So all is finished according to my will."

3.

Saya	ya	sholat,	kemudian	sholat	terus.
I	well	pray,	then	pray	then.

"Well I pray, and then I pray."

4. Seperti perangsang.

Like appetizer

"(It is) like appetizer."

5.

Habis	minum	saya	diserahkan	makanan	suruh	dimakan	gitu.
After	drink	I	passive-give	food	tell	passive-eat	like that.

"After drinking, I am given food to eat."

6.

Terus	saya	ke	kamar	mandi.
Then	I	to	room	bath.

"Then I (go) to the bathroom."

7.

Menyelesaikan	minum	kemudian.
Active-finish	drink	later.

"Finish drinking later."

8.

Saya	kadang-kadang	ya	menyelesaikan	pekerjaan	hari	itu.
I	sometimes	well	active-finish	work	day	that.

"Well I sometimes finish the work for that day."

9.

Ya	saya	itu	nonton	TV.
Well	I	that	watch	TV.

"Well I watch TV."

10.

Nonton	berita.
Active-watch	news.

"Watch news."

C6

1.

Saya	dulu	waktu	masih	bujang	kan	jarang	di	rumah.
I	past	time	asp-still	single		seldom	at	home.

"When I was still single I was seldom at home."

2.

Tahun	delapan puluhan	ketemu	sama	Ibu.
Year	eighties	meet	with	Mother.

"(I) met my wife in the eighties."

3.

Satu	tahun	kita	hubungan,	istilahnya	seperti	pacaran.
One	year	we	relationship,	so called	like	going out.

"One year we (had) a relationship, went out together."

4.

Terus	tahun	delapan puluh	saya	menikah.
Then	year	eighty	I	get married.

"Then I got married in 1980."

5.

Delapan tiga	baru	melahirkan	anak	saya	yang	pertama,	Niken
Eight three	only	active-give birth	child	I	the	first,	Niken.

"Only in 1983 (my wife) gave birth to my first child, Niken."

6.

Sekarang	sudah	lulus	sarjana	dan	sekarang	kerja	di	Serang.
Now	perf-asp	graduate	bachelor	and	now	work	in	Serang.

"Now (she) has graduated from bachelor degree and now is working in Serang."

7.

Itu	di	Kopi Kapal Api,	bagian	administrasi.
That	at	Kopi Kapal Api (company),	section	administration.

"(She works) at the Kopi Kapal Api company, at the administration section."

8.

Waktu	Niken	kerja	di	sana	kan	masih	bujangan
terus	istilahnya	pacaran	sama	Nardi.			
Time	Niken	work	at	there	well	asp-still	single,

then	so called	went out	with	Nardi.	

"When Niken worked there she was still single, then (she) went out together with Nardi."

9.

Menikahnya	baru	kemarin,	Oktober	dua ribu	sembilan
Wedding the	only	yesterday,	October	two thousand	nine.

"The wedding was not long ago, October 2009."

10.

Jadi,	anak	saya	ikut	suaminya	masalahnya	rumahnya	di	sana.
So,	child	I	follow	her husband	the problem	his house	at	there.

"So, my child follows her husband because his house is there."

C7

1.

Saya	lulus	sekolah	tahun	satu	sembilan	tujuh	lima.
I	graduate	school	year	one	nine	seven	five.

"I graduated from school in 1975."

2.

Selama	saya	lulus	sekolah	saya	merantau	bekerja
wiraswasta,	jualan	pindah	kota	ke	kota.	
When	I	graduate	school	I	migrate	work
independently,	trade	move	city	to	city.	

"When I graduated from school I migrated worked independently, trading from one city to another."

3.

Terus	tahun	sembilan puluh	dua	saya	diterima	sebagai
pegawai	negeri.					
Then	year	ninety	two	I	passive-accept	as
employee	state.					

"Then in 1992 I was accepted as a public servant."

4.

Saya	bekerja	di	instansi	pemerintahan	di	Departemen
Kesehatan	Indonesia,	unit	kerja	Balai	Pengobatan	Penyakit
Paru-paru	Surakarta.					
I	work	at	institution	government	at	Ministry
Health	Indonesia	section	work	Center	Medication	Diseases
Pulmonary	Surakarta					

"I work at a government institution at the Ministry of Health of the Republic of Indonesia, work section Center for Pulmonary Diseases Medication Surakarta."

5.

Saya	sebagai	pegawai	negeri	diberi	jabatan	bendahara	gaji.
I	as	employee	state	passive-give	position	treasurer	salary.

"I (work) as a public servant given the position as a salary treasurer."

6.

Saya	mulai	diangkat	tanggal	satu	bulan	tiga
satu	sembilan	sembilan	dua,	itu	sebagai	CPNS.
I	begin	passive-promote	date	one	month	three
one	nine	nine	two,	that	as	candidate public servant

"I began to be promoted on the first of March 1992, as a candidate public servant."

7.

Lalu	tahun	sembilan puluh	empat	diangkat		sebagai
pegawai	negeri	tetap	atau	pegawai	negeri	sipil.
Then	year	ninety	four	passive-	promote	as
employee	state	permanent	or	employee	state	civil.

"Then in the year 1994 (I was) promoted as a permanent civil servant."

8.

Di	situ	saya	menjabat	bendahara	gaji,	
tugas	saya	mengelola	pembayaran	gaji	seluruh	instansi.
At	there	I	active-work	treasurer	salary,	
job	I	coordinate	payment	salary	all	institution.

"There I work as a salary treasurer, my job is coordinating the payment of salary for all institution."

9.

Saya	berkeluarga	kawin	tahun	satu	sembilan	tujuh puluh	sembilan.
I	family	get married	year	one	nine	seventy	nine.

"I got married in 1979."

10.

Kemudian	saya	diberi	empat	anak.
Then	I	passive-give	four	child.

"Then I was given four children."

C8

1.

Waktu	masih	remaja,	tiga	kali	tipes	kemudian
setelah	umur	enam puluh	lebih,	diabetes.		
Time	asp-still	teenager,	three	times	typhoid	then
after	age	sixty	more,	diabetes.		

"When still a teenager, (I got) three times typhoid then after more that sixty years olds, diabetes."

2.

Jadi,	selama	hampir	empat puluh	tahun	hampir	tidak
pernah	sakit,	terutama	setelah	saya	bertugas	di
Jakarta	tapi	setelah	umur	enam puluh	baru	terkena
diabates	sebagai	akibat	kurang	teraturnya	gaya	hidup,
karena	banyak	di	lapangan.			
So,	during	almost	forty	year	almost	not
asp-ever	ill	especially	after	I	work	in
Jakarta	but	after	age	sixty	only	affected
diabetes	as	effect	less	regular	way	life,
because	a lot	at	field.			

"So, during almost forty years I was almost never ill especially after I worked in Jakarta but only after age sixty (I was) affected by diabetes as an effect of the irregularity of life, because (I was) often in the field."

3.

Kalau	tipes	karena	kegemaran	saya	sampai	sekarang
itu	sangat	senang	makan	cabai,	pedas.	

If	typhoid	because	favorite	I	up to	now
that	very	like	eat	chilli,	hot.	

"The typhoid was because my favorite up to now is eating chilli, hot (food)."

4.

Nah,	tipes	itu	juga	punya	karena	waktu
muda	pun	saya	sebagai	seorang	aktivis	yang
terlalu	memforsir	pada	pekerjaan.			
So,	typhoid	the	also	have	because	time
young	particle	I	as	an	activist	whoo
too	force	to	work.			

"So, (I) also had typhoid because when young I was an activist who forced (myself) too much to work."

5.

Sejak	masih	muda,	terutama	waktu	masih	mahasiswa,
saya	di	Sastra	Indonesia	seperti	Anda,	kepada
dosen	saya	mengatakan	saya	merasa	bosan	mempelajari
linguistik	dengan	filologi	yang	hanya	berurusan	dengan
naskah.						
Since	asp-still	young,	especially	when	asp-still	student,
I	in	Literature	Indonesia	like	you,	to
lecturers	I	active-say	I	active-feel	bored	study
linguistics	and	philology	that	only	deal	with
scripts.						

"Since (I was young), especially when (I was) still a university student, I was at the Indonesian Literature department like you, to my lecturers I said I was bored studying linguistics and philology that oly dealt with scripts."

6.

Bagaimana	seandainya	saya	diberikan	suatu	tugas	untuk
meneliti	sesuatu	budaya	yang	hidup	dalam	masyarakat.
How about	if	I	passive-give	a	task	yo
active-research	a	culture	that	live	in	society.

"How about if I am given a task to research a culture that lives in a society."

7.

Waktu	itu	yang	masih	dikenal	baru	antropologi
yang	baru	berganti	nama	dari	etnologi.	
Time	that	that	asp-still	passive-know	just	anthropology
that	just	change	name	from	ethnology .	

"At that time (the study) that was known was only anthropology that had just changed name from ethnology."

8.

Nah	dekan	saya	mengatakan	ada	suatu	ilmu
yang	Indonesia	sudah	ketinggalan	dua	ratus	tahun
yaitu	folklore.					
Well	dean	I	active-say	exist	a	discipline
that	Indonesia	perf-asp	passive-leave behind	two	hundred	year
is	folklore.					

"Well my dean said that there was a discipline concerning which Indonesia had been left behind for two hundred years, which is folklore."

9.

Kalau	Anda	ingin	mendalami	masalah	folklore,	itu
dosen	Anda	ya	Anda	sendiri.		
If	you	want	active-study	problem	folklore,	that
lecturer	you	well	you	yourself.		

"If you want to study folklore, well your lecturer is you yourself."

10.

Kami	akan	membimbing	dengan	dosen	antropologi,	asal	
Anda	rajin	sebanyak	mungkin	ke	lapangan.		
We	fut-asp	active-guide	with	lecturer	anthropology,	as as	long
you	diligent	a lot	as possible	to	field.		

C9

1.

Pernah	usus buntu.
Asp-experience	appendicitis.

"I have experienced appendicitis."

2.

Itu	makanya	berkesan	buat	saya	karena	saya
dibawa	dari	pabrik	di	daerah	Citereup	ke
rumah	sakit	Cipto	itu	seolah-olah	perasaan	saya

itu	bekerja.					
That	why	impressive	for	I	because	I
passive-take	from	factory	in	area	Citereup	to
house	sick	Cipto	that	as if	feeling	I
that	work.					

"That is why (it was) impressive for me because I was taken from the factory in the Citereup area to Cipto hospital as if I were working."

3.

Begitu	buka	mata	ternyata	saya	di	rumah	sakit.
When	open	eye	turn out	I	at	house	sick.

"When I opened my eyes (it) turned out I was at the hospital."

4.

Begitu	diperiksa	oleh	dokter	ternyata	usus buntu.
When	passive-check	by	doctor	turn out	appendicitis.

"When checked by the doctor (it) turned out I suffered from appendicities."

5.

Pada	waktu	itu	besar-besarnya	produksi	yang
kita	jalani	di	PT German Motor	karena	banyak
pemesanan	untuk	Pemilu.			
At	time	that	biggest	production	that
we	have	at	Ltd. German Motor	because	a lot
order	for	general election.			

"At that time we had the biggest production at German Motor Ltd. because there were a lot of orders for the general elections."

6.

Tahu-tahu	saya	laporan,	di	pikiran	saya	seolah-olah	masih
bekerja,	ternyata	saya	sudah	di	rumah	sakit.	
Suddenly	I	report,	in	mind	I	as if	asp-still
work,	turn out	I	perf-asp	at	house	sick.	

"Suddenly I was doing my report, in my mind as if I were still working, (it) turned out I was already at the hospital."

7.

Saya	pada	waktu	itu	memegang	bagian	pengadaan
untuk	material	keperluan	assembling	Mercedes.		
I	at	time	that	active-in charge	section	supply
for	material	necessity	assembly	Mercedes.		

"I was at that time in charge of the supply section for the material necessary for assembling Mercedes."

8.

Saya	pernah	di	Java Motor,	itu	juga	assembling
tapi	benar-benar	di	lapangan	merakit	mobil	Landrover.
I	asp-experience	at	Java Motor	that	also	assembly
but	really	at	field	active-assemble	car	Landrover.

"I have experienced being at Java Motor, that was also assembling but really in the field essembling Landrover cars."

9.

Kalau	German Motor	sudah	jelas	dari	Jerman	karena
mobilnya	Mercy.					
If	German Motor	perf-asp	clear	from	Germany	because
the car	Mercy.					

"If German Motor it is clear from Germany because the cars are Mercy."

10.

Sedangkan	Java Motor	produksinya	Landrover	dari	Inggris.
However	Java Motor	the production	Landrover	from	the UK.

"However the production of Java Motor is Landrover from the UK."

A4

1.

Itu	ya	cuma	susah	nelan	terus	saya
bilang	sama	Ibu	"Bu	aku	kok	suaranya
kayak	gini."					
That	well	only	difficulty	active-swallow	then	I
tell	to	Mother	"Mother	I	why	the voice
like	this."					

"Well the only difficulty was difficulty in swallowing then I tell my wife "Why is my voice like this?"

2.

Terus	langsung	dibawa	sama	istri	saya
ke	rumah	sakit.			
Then	directly	passive-take	by	wife	I

to house sick.

"Then I was directly taken to the hospital by my wife."

3.

Ini sudah tidak bisa nelan.

This perf-asp not able active-swallow.

"At that time (I) was already not able to swallow."

4.

Pakai sonde itu.

Use sonde that.

"(I) used a sonde."

5. Dua minggu.

Two week

"Two weeks."

6. Di Sardjito.

At Sardjito

"At Sardjito (hospital)."

7. Ya seperti ini.

Well like this

"Well (it was) like this."

8.

Tidak bisa makan.

Not able eat.

"Not able to eat."

9.

Makan	itu	pakai	bubur	sumsum.
Eat	that	use	porridge	*sumsum*.

"(I) ate *sumsum* porridge."

10.

Terus	sekarang	makannya	sudah	nasi	lembut	nasi	lembek.
Then	now	eat	perf-asp	rice	soft,	rice	soft.

"Then now (I) already eat soft rice."

C10

1.

Saya	seorang	bapak	dari	dua	anak	laki-laki,
dan	seorang	suami	dari	seorang	istri.	
I	a	father	of	two	child	male,
and	a	husband	of	a	wife.	

"I am the father of two sons and the husband of a wife."

2.

Saya	pernah	sakit,	tapi	sebetulnya	bukan	sakit.
I	asp-experience	ill,	but	in truth	not	ill.

"I have been ill, but in truth (it was) not an illness."

3.

Itu	karena	ulah	saya	sendiri.

That because action I myself.

"That was because of my own action."

4.

Pada	waktu	kira-kira	saya	berusia	dua puluh	tiga
dua puluh	lime	tahun,	waktu	itu	latihan	ikut
lomba	motocross.					
At	time	about	I	age	twenty	three
twenty	five	year,	time	that	exercise	participate
competition	motocross.					

"At the time I was twenty three or twenty five years old, (I) exercised to participate in a motocross competition."

5.

Saya	jatuh	dari	ketinggian	tiga	meter	dari	atas	tanah.
I	fall	from	height	three	meter	from	above	ground.

"I fell from a height of three meters above the ground."

6.

Saya	pingsan	selama	tiga	hari	tiga	malam.
I	unconscious	for	three	day	three	night.

"I was unconscious for three days and three nights."

7.

Ya	alhamdulillah	sejauh	ini	tidak	pernah
sakit	parah	karena	dari	virus	
atau	dari	ditularkan	oleh	orang	lain.

Well	praise be to God	so far	this	not	asp-ever
ill	severe	because	from	virus	
or	from	passive-transmit	by	people	other.

"Well praise be to God so far (I) have never (suffered from) severe illnesses becauseof from virus or transmitted by other people."

8.

Sebelum	saya	mengajar	perguruan tinggi,	saya	
dulu	kerja	di	perusahaan.		
Before	I	active-teach	university,	I	
past	work	at	company.		

"Before I taught university level, in the past I worked at companies."

9.

Beberapa	dulu	perusahaan	swasta,	perusahaan	minyak,
perusahaan	kontraktor	bangunan.			
Some	past	company	private,	company	oil,
company	contractor	building.			

"There were some private companies in the past, oil companies, building contractor companies."

10.

Setelah	itu	saya	pindah	ke	perusahaan
Amerika,	pembangunan	juga,	lama	sebelas	tahun.
After	that	I	move	to	company
America,	building	too,	long time	eleven	year.

"After that I moved to an American company, a building company too, for a long time eleven years."

C11

1.

Waktu	kecil	batuknya	tiap	enam	bulan	sekali.
Time	small	the cough	every	six	month	once.

"When (I was) small, the cough was once every six months."

2.

Yang	dimaksud	dengan	mata	itu	ya	dari
kecil	periksa	ke	dokter	terus,	disikat.	
The	meant	by	eye	that	well	from
small	check	to	doctor	always,	passive-brush.	

"What is meant by eye (problem) is that from (I was) small I always checked to the doctor, then (my eyes) were brushed."

3.

Ada	teknik	pengobatan	dengan	disikat	dan	lain-lain.
Exist	technique	treatment	by	passive-brush	and	others.

"There was a treatment technique by brushing and others."

4.

Ya	itu	bertahun-tahun	itu.
Well	that	years	that.

"Well that was for years."

5.

Secara rutin	diperiksa	di	rumah	sakit.

Routinely passive-check at house sick.

"(My eyes) were checked at the hospital."

6.

Apakah	kaitan	dengan	yang	dulu,	ya	sekarang
mata	sudah	kurang	enak	dipakai	untuk	membaca
karena	perkembangannya	mungkin	juga	ada	minus	yang
tidak	seimbang.					
Whether	relation	with	the	past,	well	now
eye	perf-asp	less	comfortable	passive-use	for	active-read
because	development	maybe	also	exist	minus	that
not	balanced.					

"Whether (there is) any relation with the past, well now my eyes are not comfortabe for reading because (in the) development maybe there was a minus that was not balanced."

7.

Ada	ketimpangan,	misalnya	nol	koma	tiga	lawan	dua,	berapa...
Exist	imbalance,	such as	zero	point	three	versus	two,	how many...

"There is an imbalance, such as point three versus two, how many..."

8.

Dulu	tahun	delapan puluhan	sampai	sembilan puluhan	itu	ya
kita	tangani	sesuai	kemampuan.			
Past	year	eighty	up to	ninety	that	well
we	take care	according to	capability.			

"In the past in the eighties up to nineties we took care according to our capability."

9.

Perbedaannya apa?

the difference what?

"What is the difference?"

10.

Apa yang ingin digali?

What the want passive-extract?

"What (do you) want to extract?"

C12

1.

Nama saya Herry Kusnandi.

Name I Herry Kusnandi.

"My name is Herry Kusnandi."

2.

Posisi saya sekarang sebagai dosen di Fakultas Ekonomi, Universitas Nasional.

Position I now as lecturer at Faculty Economics, University Nasional.

"My position now is lecturer at the Faculty of Economics, Nasional University."

3.

Kebetulan saya menjabat sebagai Wakil Dekan.

Accidentally	I	hold position	as	Vice	Dean.	

"Accidentally I hold the position as a Vice Dean."

4.

Jadi	bisa	menjawab	beberapa	pertanyaan	di	sini.
So	can	answer	some	question	at	here.

"So (I) can answer some questions here."

5.

Alhamdulillah	sampai	hari	ini	saya	belum
mengalami	sakit	parah	dan	saya	tidak
pernah	masuk	rumah	sakit,	kecuali	kalau
misalnya	yang	flu-flu	ringan,	saya	mengalami
flu.					
Praise be to God	up to	day	this	I	not yet
active-experience	ilness	severe	and	I	not
asp-ever	enter	house	sick,	except	if
for example	the	flus	light,	I	suffer from
flu.					

"Praise be to God that up to today I have never severe illnesses and I have never been hospitalized, except flus, I suffer from flu."

6.

Belum	pernah	ya	kalau	mengenai	sakit	parah.
Not yet	asp-ever	well	if	regarding	ilness	severe.

"Well (I have) never (had) severe illnesses."

7.

Kalau	flu-flu	itu	kan	dengan	obat	generik	saja	sembuh.
If	flus	that	well	with	medicine	generic	just	recover.

"Well flus recover just by generic medicine."

8.

Sebetulnya	juga	tidak	parah,	ringan-ringan	saja.
In truth,	also	not	severe,	light	just.

"In truth (the flu) is not severe, just light."

9.

Alhamdulillah	Tuhan	memberikan	kesehatan.
Praise be to God	God	active-give	health.

"Praise be to God, God gives health."

10.

Kalau	dulu,	saya	di	peneliti	sebagai	sekretaris	penelitian.
If	past,	I	at	researcher	as	secretary	research.

"In the past, I was a researcher as a research secretary."

A5

1.

Aku	stroke	dirawat	di	William Booth
I	stroke	passive-take care	at	William Booth.

"I (had) stroke was taken care of at William Booth (hospital)."

2.

Itu	susahnya	berbicara,	susah	mengaji.
That	the difficulty	speak,	difficult	recite the Qur'an.

"The difficulty was to speak, difficulty to recite the Qur'an."

3.

Susah	mengucapkan	kata-kata.
Difficult	active-say	words.

"(It is) difficult to say words."

4.

Keluarga	mengerti	semuanya.
Family	active-understand	all.

"(My) family understand all."

5.

Buy	myself.
Beli	sendiri.

"(I) buy (things) myself."

6.

Setelah	dari	William Booth,	lancar.
After	from	William Booth,	fluent.

"After from William Booth, (I was) fluent."

7.

Yang	stroke	kedua	belum.
The	stroke	second	not yet.

"The second stroke not yet."

8.

Aku	stroke	dirawat	di	William Booth.
I	stroke	passive-take care	at	William Booth.

"I (had) stroke was taken care at William Booth (hospital)."

9.

Stroke	pertama	dan	stroke	kedua.
Stroke	first	and	stroke	second.

"The first and the second stroke."

10.

Aku	itu	susahnya	berbicara,	susah	mengaji.
I	that	difficulty	speak,	difficulty	recite the Qur'an.

"I (had) the difficulty to speak, the difficulty to recite the Qur'an."

C13

1.

Nama	saya	Lisda	Handayani.
Name	I	Lisda	Handayani.

"My name is Lisda Handayani."

2.

Umur	saya	empat puluh.
Age	I	forty.

"My age is forty."

3.

Saya	tinggal	di	Perumnas	tiga	jalan	Pulo Timur
tiga,	RT[22]	empat	RW[23]	sembilan,	kelurahan[24]	Aren Jaya,
Bekasi Timur.						
I	live	in	complex	three	street	Pulo Timur
three,	RT	four	RW	nine,	kelurahan	Aren Jaya
Bekasi East.						

"I live in the third complex, third Pulo Timur street, RT four RW nine, kelurahan Aren Jaya, East Bekasi."

4.

Saya	punya	anak	satu.
I	have	child	one.

"I have one child."

5.

Usianya	sembilan	tahun.
The age	nine	year.

"The age is nine years old."

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[22] Rukun Tetangga (lit. Peaceful Neighbors), an informal administrative area consisting of about thirty houses

[23] Rukun Warga (lit. Peaceful Residents), an informal administrative area consisting of about fifteen RTs

[24] The smallest formal administrative unit in Indonesia consisiting of about ten RWs

6.

Hobi	saya	nonton	TV.
Hobby	I	watch	TV.

"My hobby is watching TV."

7.

Saya	tidak	pernah	sakit.
I	not	asp-ever	ill.

"I have never been ill."

8.

Ya	sakit	pernah	sakit	tapi	tidak	pernah	separah-parah.
Well	ill	asp-ever	ill	but	not	asp-ever	severe.

"Well I have been ill but never severe."

9.

Yang	parah-parah	tidak,	cuma	masuk	angin	saja.
The	severe	not,	just	enter	wind	only.

"Not the severe ones, just cold/flu."

10.

Pekerjaan	saya	dulu	kerja	di	garmen,	dulu
lagi	masih	sendiri.				
Work	I	past	work	at	garment,	past
dur-asp	asp-still	single.				

"My work in the past was working at a garment (industry), in the past when still single."

C14

1.

Nama	Ibu	Ibu	Erna.
Name	mother	mother	Erna.

"My name is Ernai."

2.

Tempat	tanggal	lahir	Yogyakarta.
Place	date	birth	Yogyakarta

"Place and date of birth Yogyakarta."

3.

Alamat	rumah	Ibu	jalan	Pulo Timur	lima	nomor
seratus	lima puluh,	kelurahan	Aren Jaya,	Bekasi Tumur.		
Address	house	mother	street	Pulo Timur	five	number
hundred	fifty,	kelurahan	Aren Jaya,	Bekasi East.		

"My house address is Pulo Timur five street number hundred fifty, kelurahan Aren Jaya, East Bekasi."

4.

Alamat	dulu	tinggal	di	belakang	Komdak,	tidak
tahu	alamatnya,	lupa.				
Address	past	live	at	behind	Komdak,	not
know	the address,	forget.				

"In the past (I) lived behind Komdak, (I) do not know the address, (I) forget."

5.

Tinggal	di	rumah	sekarang	sudah	dua puluh	tahun.
Live	at	house	now/current	perf-asp	twenty	year.

"(I) have lived in the current house for twenty years."

6.

Pengalaman	sekolah	menyenangkan.
Experience	school	nice.

"(My) school experience is nice."

7.

SD	di	SD Kanisius,	Bogor.
Elementary school	at	Elementary School Kanisius,	Bogor.

"My elementary school was SD Kanisius, Bogor."

8.

Terus	SMP	juga	SMP Kanisius,	Bogor
Then	Junior High School	also	Junior High School Kanisius,	Bogor.

"Then junior high school was also SMP Kanisius."

9.

Hobi	Ibu	hobi	membikin	mote.
Hobby	mother	hobby	active-make	beads.

"My hobby is making (things) from beads."

10.

Cita-cita	Ibu	dulu	sebenarnya	sih	ingin	jadi

guru,	cuma	kan	gagal	sekolahnya.		
Dream	mother	past	in truth	well	want	become
teacher,	but	well	fail	the school.		

"My dream in the past was to become a teacher, but well (I) failed the school."

C15

1.

Nama	Ibu	Ibu	Rani,	nama	panjang.
Name	mother	mother	Rani,	name	long.

"My full name is Rani."

2.

Tempat	tanggal	lahir	Ibu	di	Jakarta,	tanggal
lima	bulan	enam	sembilan belas	tujuh puluh.		
Place	date	birth	mother	in	Jakarta,	date
five	month	six	nineteen	seventy.		

"My place and date of birth is Jakarta, the fifth of June 1970."

3.

Alamat	rumah	Ibu	sekarang	di	Bekasi Timur	Perumnas	tiga.
Address	house	mother	current	at	Bekasi East	housing complex	three.

"My current house address is in East Bekasi the third housing complex."

4.

Dulu	Ibu	tinggal	di	Jakarta,	Jakarta Selatan.
Past	mother	live	in	Jakarta,	Jakarta South.

"In the past I lived in Jakarta, South Jakarta."

5.

Sudah	lama	tinggal	di	rumah,	eh	berapa	
lama	tinggal	di	rumah	sudah	sekitar	lima belas	tahunan.
Perf-asp	long	live	in	house,	eh	how many	
long	live	in	house,	perf-asp	about	fifteen	years.

“Already long live in the house, eh how long live in the house, already about fifteen years long.”

6.

Rumah	dulu	kira-kira	dari	nikah	dua puluh	tahunan.
House	past/old	about	from	get married	twenty	years.

“(I lived) in the old house from getting married for about twenty years.”

7.

Pengalaman	sekolah,	SMEA	tapi	tidak	selesai.
Experience	school,	SMEA	but	not	finish.

“School experience, SMEA but not finished.”

8.

Anak	Ibu	ada	tiga,	putri	dua	laki-laki
satu	tapi	yang	laki-laki	ini	ampun	nakalnya.
Child	mother	exist	three,	daughter	two	son
one	but	the	son	this	very	naughty.

“I have three children, two daughters one son, but the son is very naughty.”

9.

Kalau	minta	apa-apa	harus	diturutin.

If	ask for	whatever	must		passive-obey.

"If (he) asks for whatever must be obeyed."

10.

Kadang	Ibu	pikir	anak	ini	diapain
ya	biar	tidak	bandel.		
Sometimes	mother	think	child	this	passive-what
	so that	not	naughty.		

"Sometimes I think what should be done so that this child is not naughty."

Chapter 4

Appendix 4-A. Demographic data of the individuals with agrammatic aphasia

Participant	Gender	Age	Handed-ness	Years of education	Professional background	Native language	Time post onset
A1	Male	55	Left	1	Security guard	Indonesian	> 3 months
P2	Female	60	Right	9	Baby sitter	Javanese	1 month
A5	Female	41	Right	9	Housewife	Javanese	> 1 year
A2	Male	65	Right	6	Owner of a grocery store	Javanese	> 2 years
A3	Male	65	Right	12	Worker at glass factory	Sundanese	> 3 years
P6	Male	60	Right	12	Headmaster of a primary school	Sundanese	> 3 years
A4	Male	55	Right	18	University lecturer	Javanese	> 3 months

Appendix 4-B. Demographic data of the non-brain-damaged participants.

Participants with agrammatism	Gender	NBD participants	Gender	Age	Handed-ness	Years of education	Professional background	Native language
A1	Male	C1	Male	50	Right	1	Second-hand shop keeper	Javanese
				52	Right	1	Owner of a second-hand	Betawi
		C3		51	Right	6	Truck driver	Sundanese
P2	Female	C4	Female	56	Right	9	Administrative staff at a	Indonesian
		C5	Female	57	Right	9	Administrative staff at a	Indonesian
A5	Female	C6	Female	40	Right	9	Housewife	Indonesian
		C7	Female	40	Right	9	Housewife	Indonesian
A2 and A3	Male	C10	Male	63	Right	12	Technician at a	Indonesian
		C11	Male	55	Right	10	Private driver of a	Indonesian
		C12	Male	68	Right	12	Administrative staff at an	Indonesian
P6	Male	C13	Male	68	Right	13	Researcher at a	Javanese
		C14	Male	63	Right	12	Assistant manager	Javanese
		C15	Male	52	Right	12	Staff at a post office	Indonesian
A4	Male	C16	Male	53	Right	16	Staff at a government	Indonesian
		C17	Male	49	Right	16	Staff at a government	Indonesian
		C18	Male	53	Right	16	Staff at a government	Indonesian

Appendix 4-C. List of verbal predicates used in the experiments

(1) melipat	to fold
(2) menyetrika	to iron
(3) merajut	to knit
(4) menjahit	to sew
(5) mendorong	to push
(6) menulis	to write
(7) menggambar	to draw
(8) memasukkan	to put sth into
(9) mengupas	to peel
(10)makan	to eat
(11)melukis	to paint
(12)menyobek	to tear
(13)mengelem	to glue
(14)menuang	to pour
(15)meminum	to drink
(16)membaca	to read
(17)mengeluarkan	to take sth out of
(18)meraut	to sharpen
(19)menyapu	to sweep
(20)mengepel	to mop

Summary

Agrammatic aphasia is a complex of language problems that occurs after damage of the language areas of the brain's left hemisphere. The areas usually are or include Broca's area (Brodmann Areas 44 and 45). Generally, agrammatic speakers have problems with grammatical features of language in production and comprehension. In experimental production and spontaneous speech studies of agrammatic speakers of various inflectional languages, such as Dutch, English, German, Greek, and Turkish, time reference has been found to be a weak spot. However, more data are needed to see if the time reference problems are due to difficulties in inflecting the verbs, in referring to a certain time frame (e.g., past), or they are due to some other reasons not yet known.

It is interesting to investigate time reference in Standard Indonesian (SI) for three main reasons. First, time reference in SI is done in two ways, both of which are words or free standing morphemes, not bound like inflectional morphemes. The first way is through the syntactic aspectual adverbs (e.g., sudah, sedang, and akan) and the second by lexical adverbs of time (e.g., baru saja, sekarang). By investigating them, we tease apart the confound of time reference and inflection. Second, related to the first reason, by studying SI we can see if there is a central problem faced by agrammatic speakers when they need to refer to time. In other words, we want to know if the problem arises regardless of how time reference is done linguistically. The third, less related, but not less important reason, is the fact that SI has hardly been studied. Belonging to a different language family than other languages reported so far in aphasiological, neurolinguistic, or psycholinguistic literature and having a large number of speakers make SI a language that can contribute considerably to the field(s).

The work discussed here is a part of the cross-linguistic study on time reference in the Neurolinguistics group in Groningen. Apart from looking to time reference in SI, we also evaluated the test battery which is also used in more than fifteen languages. Thus, our results also informed this large scale study as to whether the test is valid to be used for investigating time reference in SI.

Chapter 1 gives background information about SI that is needed to understand the following chapters. Some theoretical accounts related to time reference in agrammatic aphasia were presented, two of which were chosen to be tested in the current project. Four general research questions were formulated at the end of this chapter.

Will the Standard Indonesian (SI) aspectual adverbs be difficult for the agrammatic speakers?

The weak syntax model predicts that they should be difficult because they are discourse-linked. Meanwhile, the PADILIH predicts that only the *perfektif* aspectual adverbs will be difficult.

Will the lexical adverbs be difficult for the agrammatic speakers?

Classically, these adverbs have never been documented as impaired in the literature. However, the fact that they are used to refer to time and are discourse-linked predicts that they can be difficult for the SI agrammatic speakers.

Are the difficulties caused by these two kinds of adverbs similar or different?

If they are different, are the differences related to the modality (spontaneous speech, comprehension, and production)?

Chapter 2 aims to characterize agrammatic speech in SI because there was no test or method to screen SI-speaking participants with agrammatic aphasia who could participate in our time reference studies. Based on some variables that have been widely published in the literature and some variables that are unique to Standard Indonesian, we concluded that SI agrammatic speech is characterized by short and syntactically simple sentences, slow speech rate, low proportion of particles in general and syntactic particles in particular, problems in realizing grammatical objects after accusative markers, possible problems with derivational affixes and reduplication, and no problems with verbal predicates and derived word order (passives). The participants of this study, who had

agrammatic speech, participated in the time reference studies discussed in chapters 3, 4, and 5.

In chapter 3, the study investigating the relationship between the diversity of verbal predicates (as measured by Type Token Ratio) and the aspectual adverbs produced with the verbal predicates is presented. When the performance of the agrammatic participants was compared among one another, the results showed a trade-off between the two variables. On the one hand, the agrammatic speakers who had higher Type Token Ratios produced aspectual adverbs less frequently. On the other hand, the agrammatic participants who had lower Type Token Ratio produced aspectual adverbs more frequently. The agrammatic speakers who produced aspectual adverbs less frequently did not overuse lexical adverbs to compensate. Therefore, research question number 1 can be answered affirmatively (the SI aspectual adverbs are difficult) and there is a trade-off between the diversity of verbal predicates (as measured by Type Token Ratio) and the percentage of aspectual adverbs produced with the verbal predicates, without an overproduction of lexical adverbs of time to compensate the need to refer to time.

The dissertation continues to chapter 4 which presents the comprehension study. The non-brain-damaged (NBD) participants performed at ceiling in the TART comprehension test. The agrammatic participants performed significantly worse than the NBDs at the group level in both the aspectual adverbs and lexical adverbs of time tasks. At the individual level, five agrammatic participants scored significantly worse than the NBDs in both tasks. For the scores of the agrammatic participants, there was a strong correlation between the scores on both tasks. In other words, they were similarly impaired in understanding sentences containing aspectual adverbs and sentences containing lexical adverbs of time. At both levels and both tasks, no time frame was selectively impaired. We attributed this to the fact that in SI the use of the adverbs is optional and these adverbs are used when context does not provide enough time reference information. Therefore, all the adverbs are equally vulnerable in comprehension. Based on these results, we can answer research questions 1 and 2. In comprehension, the time reference problems affect both ways of referring to time and there was no statistically attested difference posed by the aspectual adverbs and lexical adverbs of time.

The production study is presented in chapter 5. With this study, we wanted to answer all four questions, especially regarding the comparison with the results of the comprehension study. Here, the results showed that the agrammatic participants also had problems producing sentences containing aspectual adverbs and lexical adverbs of time. In production, there seemed to be a qualitative difference between the two kinds of adverbs that made the lexical adverbs more susceptible to be substituted by aspectual adverbs

than the other way around. We suggested that this was because of the referentiality of the lexical adverbs of time which made the agrammatic participants integrate between linguistic level and context. The non-referentiality of the aspectual adverbs did not necessitate this integration. However, since the NBDs did not perform at ceiling, suggesting that the production test is not the optimal means for SI, we did not draw further conclusions.

Chapter 6 presents a comparison across the four studies discussed in the previous chapters. Five agrammatic participants participated in the three time reference studies and three of them were impaired in all those studies. This means that these five agrammatic participants showed the trade-off in chapter 3, but only 3 were impaired in comprehension and production.

In chapter 7 the results were discussed in relation to the literature and some suggestions for adaptation of the two theories were suggested.

There is a selective difficulty in referring to the past when time reference is obligatorily marked (e.g., in English, Dutch).

2. Referring to the past is not selectively difficult when time reference is optionally realized and is used to link the event to discourse.

3. In the case of optional time reference markers, the markers that need more integration with discourse level representations will be more impaired than the markers that require less of this, at least in production.

This revision needs to be tested in other languages. In the interest to advance knowledge in aphasiology and to inform aphasia therapy, we believe our results encourage more research to be carried out in Standard Indonesian, other dialects of Indonesian, and other Austronesian languages.

Rangkuman

Afasia agrammatik adalah sekumpulan kesulitan bahasa yang terjadi setelah kerusakan pada daerah-daerah bahasa di belahan kiri otak. Daerah-daerah ini biasanya adalah atau termasuk daerah Broca (daerah Brodmann 44 dan 45). Secara umum, penutur dengan afasia agrammatik mempunyai masalah dengan fitur-fitur grammatikal bahasa pada produksi dan pemahaman bahasa. Pada studi eksperimental produksi bahasa dan pembicaraan spontan dengan peserta penutur agrammatik bermacam-macam bahasa infleksional, seperti bahasa Belanda, bahasa Inggris, bahasa Jerman, bahasa Yunani, dan bahasa Turki, referensi waktu ditemukan sebagai sisi lemah. Walaupun demikian, lebih banyak data diperlukan untuk melihat apakah kesulitan-kesulitan dalam referensi waktu merupakan masalah dalam menginfleksi kata kerja, dalam merujuk kepada waktu tertentu (misalnya, masa lampau), atau mereka disebabkan oleh alasan-alasan lain yang belum diketahui.

Menarik untuk meneliti referensi waktu di Bahasa Indonesia Standard (BI) karena tiga alasan utama. Alasan pertama, referensi waktu di BI dilakukan dengan dua cara, keduanya merupakan kata atau morfem bebas, tidak terikat seperti morfem infleksional. Cara pertama adalah dengan adverbia aspektual sintaktik (misalnya, sudah, sedang, akan) dan cara kedua adalah dengan adverbia waktu leksikal (misalnya, baru saja, sekarang). Dengan meneliti mereka, kita memisahkan kemungkinan akibat dari infleksi. Alasan kedua, terkait dengan alasan pertama, dengan meneliti BI kita dapat melihat apakah ada masalah sentral yang dialami oleh para penutur agrammatik ketika mereka perlu merujuk kepada waktu. Dengan kata lain, kita ingin tahu apakah masalahnya muncul tanpa memperhatikan bagaimana referensi waktu dilakukan secara linguistik. Alasan ketiga, kurang berkaitan, tapi tidak kurang penting adalah fakta bahwa bahwa BI belum banyak diteliti. Merupakan anggota famili bahasa yang berbeda dari bahasa-bahasa yang sudah dilaporkan di literatur afasiologi, neurolinguistik, atau psikolinguistik dan memiliki banyak penutur menjadikan BI sebuah bahasa yang dapat banyak berkontribusi kepada disiplin-disiplin ilmu tersebut.

Penelitian yang dibahas di sini adalah bagian dari penelitian lintas bahasa referensi waktu yang dilaksanakan oleh grup Neurolinguistik di Groningen. Selain melihat referensi waktu, kami juga mengevaluasi rangkaian tes yang digunakan juga pada lebih dari lima belas bahasa. Dengan demikian, hasil-hasil kami juga memberi informasi kepada penelitian skala besar ini mengenai apakah tesnya valid untuk digunakan meneliti referensi waktu di BI.

Bab 1 memberikan latar belakang mengenai BI yang diperlukan untuk memahami bab-bab selanjutnya. Beberapa penjelasan teoretis mengenai referensi waktu disajikan di sana, dua di antaranya dipilih untuk dites di proyek penelitian ini. Empat pertanyaan riset yang umum diformulasikan di akhir bab ini.

Apakah adverbia aspektual Bahasa Indonesia Standard (BI) sulit untuk para penutur agrammatik?

Model sintaksis lemah memprediksikan bahwa kemungkinan sulit karena mereka terkait dengan wacana. Di sisi lain, PADILIH memprediksikan bahwa hanya adverbia aspektual perfektif yang sulit.

Apakah adverbia leksikal sulit untuk para penutur agrammatik?

Secara klasik, adverbia-adverbia ini belum pernah dilaporkan membuat kesulitan. Namun demikian, fakta bahwa mereka digunakan untuk merujuk kepada waktu dan terkait dengan wacana memprediksikan bahwa mereka mungkin sulit untuk para penutur BI agrammatik.

Apakah kesulitan-kesulitan yang disebabkan oleh kedua jenis adverbia ini sama atau berbeda?

Jika mereka berbeda, apakah perbedaan-perbedaan itu terkait dengan modalitas (pembicaraan spontan, pemahaman, dan produksi)?

Bab 2 bertujuan untuk mengkarakterisasikan kalimat agrammatik di BI karena belum ada tes atau metode untuk menyeleksi penutur-penutur BI dengan afasia agrammatik yang dapat berpartisipasi di penelitian referensi waktu kami. Berdasarkan beberapa variabel

yang sudah dipublikasikan secara luas di literatur dan beberapa variabel yang unik di BI, kami menyimpulkan bahwa kalimat agrammatik di BI dicirikan oleh kalimat-kalimat yang pendek dan sederhana secara sintaksis, kecepatan bicara yang rendah, proporsi partikel secara umum dan partikel sintaktik secara khusus yang rendah, masalah-masalah mewujudkan obyek-obyek grammatikal setelah penanda akusatif, kemungkinan masalah dengan imbuhan derivasional dan pengulangan, dan tidak adanya masalah dengan predikat verbal dan urutan kata turunan (pasif). Peserta-peserta studi ini, yang memiliki kalimat-kalimat agrammatik, berpartisipasi di studi referensi waktu yang dibahas di bab 3, 4, dan 5.

Di bab 3, dibahas studi yang meneliti hubungan antara keragaman predikat verbal (sebagaimana diukur dengan Rasio Tipe dan Tanda) dan adverbia aspektual yang diproduksi bersama predikat verbal. Ketika performa para peserta agrammatik dibandingkan satu sama lain, hasilnya menunjukkan trade-off di antara kedua variabel. Di satu sisi, para penutur agrammatik yang memiliki rasio Tipe dan Tanda yang lebih tinggi kurang sering memproduksi adverbia aspektual. Di sisi lain, para peserta agrammatik yang yang memiliki Rasio Tipe dan Tanda yang lebih rendah lebih sering memproduksi adverbia aspektual. Para penutur agrammatik yang kurang sering memproduksi adverbia aspektual tidak memproduksi adverbia leksikal secara berlebihan sebagai kompensasi. Dengan demikian, pertanyaan penelitian nomor 1 dapat dijawab secara afirmatif (adverbia aspektual BI sulit) dan ada trade-off antara keberagaman predikat verbal (sebagaimana diukur oleh Rasio Tipe dan Tanda) dan persentase adverbia aspektual yang diproduksi bersama predikat verbal, tanpa produksi adverbia leksikal pemarkah waktu untuk mengkompensasi kebutuhan untuk merujuk kepada waktu.

Disertasi ini berlanjut ke bab 4 yang mendiskusikan studi pemahaman. Para peserta yang tidak mengalami masalah neurologis (NBD) berprestasi sempurna di tes pemahaman TART. Pada level grup, para peserta agrammatik berprestasi lebih rendah secara bermakna dibanding peserta NBD di tugas adverbia aspektual dan tugas adverbia leksikal. Pada level individual, lima peserta agrammatik mendapatkan nilai yang lebih rendah secara bermakna di kedua tugas dibandingkan dengan nilai para peserta NBD. Untuk nilai para peserta agrammatik, ada korelasi yang kuat antara nilai di kedua tugas. Dengan kata lain, mereka kesulitan memahami kalimat-kalimat yang mengandung adverbia aspektual dan kalimat-kalimat yang mengandung adverbia leksikal untuk merujuk kepada waktu. Pada kedua level dan tugas, tidak ada bingkai waktu yang sulit secara selektif. Penyebab yang

kami sebutkan adalah fakta bahwa penggunaan adverbia di BI adalah opsional dan adverbia-adverbia ini digunakan ketika konteks tidak menyediakan cukup informasi mengenai referensi waktu. Dengan demikian, semua adverbia sama rentannya di pemahaman. Berdasarkan hasil-hasil ini kita dapat menjawab pertanyaan riset 1 dan 2. Di pemahaman, masalah-masalah referensi waktu mempengaruhi kedua cara merujuk kepada waktu dan tidak ada perbedaan yang bermakna secara statistik antara adverbia aspektual dan adverbia leksikal untuk merujuk kepada waktu.

Penelitian produksi dibicarakan di bab 5. Dengan penelitian ini, kami ingin menjawab keempat pertanyaan riset, terutama yang berkenaan dengan perbandingan dengan hasil penelitian pemahaman. Di sini, hasil-hasil kami menunjukkan bahwa para peserta agrammatik juga mengalami masalah dalam memproduksi kalimat-kalimat yang mengandung adverbia aspektual dan adverbia leksikal. Di produksi, kelihatannya ada perbedaan kualitatif antara kedua jenis adverbia yang menyebabkan adverbia leksikal lebih rentan untuk digantikan oleh adverbia aspektual daripada sebaliknya. Kami menyarankan bahwa ini dikarenakan oleh sifat referensial adverbia leksikal yang membuat para peserta agrammatik mengintegrasikan level linguistik dan konteks. Sifat non-referensial adverbia aspektual tidak mengharuskan integrasi ini. Walaupun demikian, karena para peserta NBD tidak berperforma sempurna, yang mengesankan bahwa tes produksi ini bukanlah alat yang optimal untuk BI, kami tidak mengambil kesimpulan lebih lanjut.

Bab 6 memberikan sebuah perbandingan antara keempat penelitian yang didiskusikan di bab-bab sebelumnya. Lima peserta agrammatik berpartisipasi di ketiga penelitian referensi waktu dan tiga di antaranya mengalami masalah di penelitian-penelitian tersebut. Ini berarti bahwa kelima peserta agrammatik ini menunjukkan efek *trade-off* di bab 3, tapi hanya tiga yang mengalami kesulitan di penelitian pemahaman dan produksi.

Di bab 7 hasil-hasil didiskusikan berkenaan dengan literatur dan beberapa saran untuk penyesuaian teori diajukan.

Ada kesulitan selektif untuk merujuk kepada waktu lampau ketika referensi waktu harus diekspresikan (misalnya di bahasa Inggris, bahasa Belanda).

Rangkuman

Referensi kepada waktu lampau tidak sulit secara selektif ketika referensi waktu adalah opsional dan digunakan untuk menghubungkan peristiwa dengan wacana.

Untuk pemarkah referensi waktu yang opsional, pemarkah yang membutuhkan integrasi dengan representasi pada level wacana akan lebih sulit dibandingkan dengan pemarkah yang kurang membutuhkan integrasi tersebut, paling tidak di produksi.

Revisi ini perlu diteskan di bahasa-bahasa lainnya. Dengan semangat untuk memajukan pengetahuan di bidang afasiologi dan untuk memberi informasi untuk terapi afasia, kami yakin bahwa hasil-hasil kami mendorong penelitian lebih lanjut di Bahasa Indonesia Standard, Bahasa Indonesia dialek-dialek yang lain, dan bahasa-bahasa Austronesia yang lain.

Nederlandse Samenvatting

Agrammatische afasie is een ingewikkeld taalprobleem dat doorgaans veroorzaakt wordt door beschadiging van hersenweefsel in de linkerhemisfeer. In het geval van agrammatische afasie is het gebied van Broca dikwijls bij de beschadiging betrokken (Brodmanngebieden 44 en 45). Agrammatische sprekers hebben vaak moeite met zowel de productie als het begrip van grammaticale kenmerken van taal. Uit experimenteel onderzoek naar de (spontane) taalproductie door agrammatische sprekers van verschillende verbogen talen, zoals Nederlands, Engels, Duits, Grieks en Turks, is verwijzing naar tijd een zwak punt gebleken. Toch moeten er meer gegevens worden verzameld om na te gaan of problemen met tijdverwijzing worden veroorzaakt door problemen met het verbuigen van werkwoorden, door moeilijkheden met het verwijzen naar een bepaald moment in tijd (bijv. verleden tijd), of door andere, nog onbekende elementen.

De tijdsverwijzing in Standaard Indonesisch (SI) is om drie redenen interessant om te onderzoeken. Ten eerste kan tijdsverwijzing in SI worden uitgedrukt op twee verschillende manieren, namelijk met woorden of met vrije morfemen die niet gebonden zijn als verbogen morfemen. In het eerste geval wordt tijd weergegeven met behulp van een syntactisch aspectueel bijwoord (bijvoorbeeld sudah, sedang of akan). In het tweede geval wordt een lexicaal bijwoord van tijd gebruikt (bijvoorbeeld baru saja of sekarang). Dankzij deze eigenschappen van SI zijn interfererende effecten door inflectie dan ook uitgesloten. Ten tweede kunnen we met dit onderzoek nagaan of er bij agrammatische sprekers sprake is van een centraal probleem bij verwijzing naar tijd. Met andere woorden: deze studie stelt ons in staat te onderzoeken of problemen met tijdverwijzing nog steeds bestaan als er geen linguïstische operaties worden toegepast. Ten derde gaat het om een taal die moeilijk te bestuderen is. SI behoort tot een andere taalfamilie dan de talen die tot dusver zijn beschreven in de afasiologie, neurolinguïstiek en psycholinguïstiek. Echter, omdat SI een groot aantal sprekers heeft, kan onderzoek naar deze taal op deze terreinen een belangrijke bijdrage leveren.

Het onderwerp dat in dit proefschrift wordt behandeld staat centraal in een cross-linguïstisch project over tijdsverwijzing dat wordt uitgevoerd binnen de onderzoeksgroep Neurolinguïstiek in Groningen. Naast het bestuderen van tijdsverwijzing in SI, hebben we testen geëvalueerd die al in meer dan vijftien talen worden gebruikt. De resultaten van dit grootschalige onderzoek geven dan ook aan in hoeverre deze testen geschikt zijn voor bijvoorbeeld toepassing bij onderzoek naar tijdsverwijzing in SI.

Hoofdstuk 1 geeft achtergrondinformatie over SI die nodig is om de volgende hoofdstukken te begrijpen. Hier wordt een aantal theoretische verklaringen gepresenteerd die verband houden met agrammatische afasie. Twee ervan werden geselecteerd om in dit project getest te worden. Aan het eind van dit hoofdstuk worden vier algemene onderzoeksvragen geformuleerd.

1. Zouden aspectuele bijwoorden van Standaard Indonesisch (SI) moeilijk zijn voor agrammatische sprekers?

Het zwakke-syntaxis-model voorspelt dat alle aspectuele bijwoorden moeilijk zouden zijn omdat ze verbonden zijn met de context,terwijl de PADILIH voorspelt dat alleen de voltooid aspectuele bijwoorden moeilijk gevonden zouden worden.

2. Zouden lexicale bijwoorden moeilijk zijn voor agrammatische sprekers?

Tot op heden zijn lexicale bijwoorden in de literatuur nog nooit gedocumenteerd als problematisch. Het feit dat ze gebruikt worden om naar tijd te verwijzen en dat ze verbonden zijn met de context, voorspelt echter dat ze moeilijk kunnen zijn voor agrammatische SI-sprekers.

3. Zijn de moeilijkheden die veroorzaakt worden door deze twee soorten bijwoorden hetzelfde of verschillend?

4. Als ze verschillend zijn, hebben de verschillen dan te maken met de modaliteit (spontane taal, begrip of productie)?

Hoofdstuk 2 geeft kenmerken van agrammatische spraak in SI, omdat er tot op heden geen test of methode bestaat die kan worden toegepast om SI-sprekende deelnemers met agrammatische afasie te selecteren. Gebaseerd op een aantal variabelen die uitvoerig in de literatuur zijn besproken en een aantal variabelen die alleen in SI voorkomen, concluderen we dat SI agrammatische spraak wordt gekenmerkt door korte en syntactisch eenvoudige zinnen, een traag spraaktempo, een lage proportie van partikels in het

algemeen en syntactische partikels in het bijzonder, problemen bij het realiseren van grammaticale objecten na accusatief-markeerders, mogelijke problemen met derivationele affixen en reduplicatie, maar geen problemen met werkwoordelijke gezegden en afgeleide woordvolgorden (bijvoorbeeld passieven). In hoofdstuk 3, 4 en 5 wordt het onderzoek naar tijdsverwijzing bij agrammatische sprekers in SI besproken

Hoofdstuk 3 gaat over de relatie tussen de verscheidenheid van werkwoordelijk gezegden (zoals gemeten met de Type Token Ratio) en de aspectuele bijwoorden die gebruikt worden in de werkwoordelijk gezegden. Wanneer de taalproductie van de agrammatische deelnemers wordt vergeleken, valt er een zekere wisselwerking tussen de twee variabelen te ontdekken. Aan de ene kant produceren de agrammatische sprekers die een hoger Type Token Ratio hadden, aspectuele bijwoorden minder frequent. Aan de andere kant produceren de agrammatische sprekers die een lager Type Token Ratio hadden, aspectuele bijwoorden met een hogere frequentie. Door agrammatische sprekers die aspectuele bijwoorden minder frequent produceerden werden de lexicale bijwoorden niet als compensatie overdreven vaak gebruikt. Daarom kan de eerste onderzoeksvraag (de aspectuele bijwoorden zijn moeilijk) bevestigend worden beantwoord. Er is een wisselwerking tussen de variatie van werkwoordelijke gezegdes (zoals gemeten met de Type Token Ratio) en het percentage van aspectuele bijwoorden die gebruikt worden met de werkwoordelijke gezegdes, zonder een overproductie van lexicale bijwoorden van tijd om de noodzaak aan tijdsverwijzing te compenseren.

Dit proefschrift gaat verder door met hoofdstuk 4 waarin een begripstudie wordt besproken. De deelnemers zonder hersensbeschadiging (NBD = non-brain-damaged) deden de het begripsonderdeel van de tijdsverwijzingstest TART (Test for Assessing Reference of Time) in zijn geheel, met een taak voor aspectuele en voor lexicale bijwoorden van tijd. De agrammatische deelnemers hadden op groepsniveau significant slechtere resultaten dan de NBD op zowel de taak met aspectuele bijwoorden als de taak met lexicale bijwoorden. Op individueel niveau scoorden vijf agrammatische deelnemers significant slechter dan de NBD op beide taken. Bij de agrammatische deelnemers was er een sterke onderlinge correlatie tussen de scores op beide taken. Met andere woorden: ze hebben in gelijke mate een stoornis in het begrijpen van zowel zinnen met aspectuele bijwoorden als van zinnen met lexicale bijwoorden van tijd. Op beide niveaus in beide

taken was er geen tijdsraam selectief gestoord. We schrijven dit toe aan het feit dat het gebruik van bijwoorden in SI fakultatief is en dat deze bijwoorden worden gebruikt als de context niet genoeg tijdsinformatie verzorgt. Daarom zijn alle bijwoorden even kwetsbaar in begripskwesties. Gebaseerd op deze resultaten kunnen we de de eerste en tweede onderzoeksvraag beantwoorden. Bij begripskwesties beïnvloeden de tijdsverwijzingproblemen beide tijdsverwijzingsmanieren en er zijn geen statistisch significante verschillen tussen de aspectuele en lexicale bijwoorden van tijd.

Het onderzoek naar productie van tijdsverwijzing wordt in hoofdstuk 5 behandeld. Met dit onderzoek beoogden we de vier bovenstaande vragen te beantwoorden, met name met betrekking tot de vergelijking van de resultaten met die van de begripstudie. Hier tonen de resultaten aan dat de agrammatische deelnemers ook problemen hebben met het produceren van zinnen die aspectuele en lexicale bijwoorden van tijd bevatten. Bij productie lijkt het of er een kwalitatief verschil is tussen de twee soorten bijwoorden waardoor er een grotere neiging is de lexicale bijwoorden te vervangen door aspectuele bijwoorden dan andersom. We suggereren dat dit wegens het verwijzende karakter van lexicale bijwoorden van tijd is, waardoor de deelnemers het linguïstische niveau en de context aan elkaar moeten koppelen. De niet-verwijzende aspectuele bijwoorden vereisen deze koppeling niet. Maar omdat de NBDs geen plafondeffect in hun scores vertonen, lijkt het zo te zijn dat de productietest niet optimaal is voor SI en trekken we verder geen conclusies.

Hoofdstuk 6 behandelt een vergelijking tussen de vier in de vorige hoofdstukken besproken studies. Vijf agrammatische deelnemers namen deel aan de drie tijdsverwijzingsonderzoeken en drie van hen zijn zwak in alle onderzoeken. Dit betekent dat deze vijf agrammatische deelnemers de verschijnselen van compensatie van hoofdstuk 3 vertonen, maar slechts drie van hen zwak zijn in begrip en productie.

In hoofdstuk 7 worden de resultaten besproken met betrekking tot de literatuur en er worden een paar suggesties voor aanpassing van de twee theorieën gedaan.

1. Er is een specifieke moeite in het verwijzen naar het verleden als de tijdsverwijzing verplicht is gemarkeerd (bijv. in het Engels, Nederlands).

2. Het verwijzen naar het verleden is niet bijzonder moeilijk als de tijdsverwijzing facultatief is gerealiseerd en wordt gebruikt om de gebeurtenis aan de context te koppelen.

3. In het geval van de facultatieve tijdsverwijzingmarkeerders, zouden de markeerders die meer integratie met het context-niveau vereisen problematischer zijn dan die markeerders die dat minder vereisen, tenminste in productie.

Deze revisie zal eerst in andere talen getoetst moeten gaan worden. Wegens het belang om de kennis op het gebied van afasiologie te vergroten en afasietherapie te verbeteren, geloven we dat onze resultaten een stimulans kunnen zijn meer onderzoek te doen naar SI, andere Indonesische dialecten en andere Austronesische talen.

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