Production Grammars for the Kinship Terminologies of Burmese and several Indonesian Languages

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Abstract

Previously, J. Lambek et al. have used Production Grammars to study the kinship terminology of English, Hindi, Sanskrit and Malagasy. This technique is applied here to the kinship terminology of Burmese and four closely related Indonesian languages: Indonesian, Javanese, Madurese and Sundanese. The production grammars are then compared, noting differences between Burmese and the others, and differences within the group of Indonesian languages. Particular attention is paid to the reduction rules, as they are indicative of the structure of the grammar. It was found that although differing in the structure of its kinship descriptions, Burmese is quite similar to the Indonesian languages on the level of reduction rules. A computer program was used to check the grammars and to generate sample derivations. Finally, kinship data is included for four other Indonesian languages.

Resumé

J. Lambek et al. ont déjà utilisé des <<grammaires de production>> pour analyser les termes de parenté en anglais, hindi, sanskrit et malgache. Leur technique est appliquée ici aux termes de parenté en birman et en quatre langues indonésiennes: l'indonésien, le javanais, le madurais, et le sundanais. Les différences entre le birman et les autres seront étudiées, ainsi que les différences à même le groupe des langues indonésiennes. En particulier, les règles de réduction, qui sont indicatives de la structure de la grammaire, seront étudiées. Il fut découvert, bien qu'il y ait des différences dans la structure des <<descriptions de parenté>>, que le birman est très similaire aux langues indonésiennes au niveau des règles de réduction. Un program d'ordinateur a été utilisé pour vérifier les grammaires et pour engendrer des exemples de dérivation. Enfin, des termes de parenté en quatre autres langues indonésiennes sont inclus.

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Chapter 1

Introduction

1.1 The languages

Indonesia, an archipelago of approximately 13,000 islands, is one of the most linguistically diverse areas of the world. We will be examining the kinship terminologies of four languages spoken in Indonesia, as well as Burmese, using the method of Production Grammars previously used by Lambek in his examination of English [18], by Bhargava and Lambek for Sanskrit [4] and Hindi [3], and by Lambek and Lambek for Malagasy [19]. Caldwell applied the same method to Romance languages [6]. We now examine a group of four Indonesian languages: Indonesian, Madurese, Javanese, and Sundanese, as well as Burmese, the language of Burma.

Burmese, belonging to the Tibeto-Burmese group of the Sino-Tibetan family of languages, has no close connection with the Indonesian languages studied, which belong to the Malayo-Polynesian branch of the Austronesian family. Sundanese is spoken by approximately 20 milion people in west Java, Javanese by 75 million inhabitants of central and eastern Java, Madurese by about 8 million, primarily on the island of Madura off the northeast coast of Java, and Indonesian by approximately 180 million people, although only a small portion of these have Indonesian as their mother tongue.

Data was gathered from a combination of literary sources and informants. In the case of Burmese, we solely used the paper cited. With the other four languages,

informants were used as well as literary sources (articles, books, and dictionaries). Although the author has some experience with Indonesian and Javanese, all data was checked with several native speakers, during time spent in Indonesia in 1996. For many kinship terms from the Indonesian languages, there were several alternate terms. An effort was made to select the most prevalent, but in several cases this was quite difficult. Alternate terms are included in the grammars in a couple of cases, but for the sake of simplicity, usually a single term was selected. A list of informants can be found in Appendix B.

Our goal in devising the grammars is to accurately account for the observed data with a set of productions. When deciding whether to use one formulation or another, we do also try to minimize the number of rules involved, and, if possible, to mimic the way a speaker may process the data. However, this desire for "psychological reality" is not our foremost goal.

Each of the grammars are presented individually, with some general information repeated at the beginning, and minimal reference made to the other grammars. In this way, one can examine one or the other grammar without having to constantly refer to other sections. However, this means that there is some repetition, so we hope the reader will bear this in mind.

We now outline a couple of theoretical tools, following Caldwell's [6] and Bhargava and Lambek's [4] exposition of the same material.

1.2 Relations

A **relation** R on a set **A** is a set of ordered pairs (a,b) of elements of **A**. If (a,b)$\in$ R, we say that a is R-related to b, or aRb. We will be examining kinship relations, for example P, the parent relation, where aPb if and only if b is a parent of a. Relations can be composed. The composition of relations M and N is the relation Q, such that xQz if and only if there exists y such that xMy and yNz. Now if we use C and S, the child relation and the sibling relation respectively (aCb iff b is a child of a; aSb iff b is a sibling of a), we can compose these relations to describe many

consanguineous (related by blood) kinship relations. For example, aPSCCb means that a's cousin's child is b. We also need M and F, where aMb means b is male and a=b, and aFb means b is female and a=b. Once equipped with these, and Σ, $^{>}$S, and $^{<}$S, referring to spouse, elder sibling and younger sibling respectively, we can express most consanguineous and affinal kinship relations (affinal relations are those which cannot be described without using the symbol Σ). Some examples: P$^{<}$SM (parent's younger brother), ΣPPF (spouse's grandmother), $^{>}$SΣF (older brother's wife), PPPSCCC (third cousin). We refer to the string of symbols describing the kinship relation as the **kinship description.**

In our Indonesian grammars, we deal with steprelations. Steprelations could be dealt with without new symbols; for instance stepfather is PΣ- P. We will introduce new symbols for ease of explanation. The new symbols are P′ (stepparent), C′ (stepchild), S′ (stepsibling) , $^{>}$S′ (older stepsibling) , and $^{<}$S′ (younger stepsibling). It should be noted that for the purposes of the grammars, $^{>}$S, $^{<}$S, P′, C′, S′, $^{>}$S′, and $^{<}$S′ are each considered to be a single symbol.

In producing kinship descriptions, we wish to avoid generating certain combinations, because of ambiguity or redundancy, as expressed by the following equations:

SP=P

CS=C

SS=S$\cup$I, where I is the identity relation

PC=S$\cup$I

CP=$\Sigma\cup$I

PΣ=P$\cup$P′

ΣC=C$\cup$C′

Accordingly, each grammar will be designed so as to not allow these combinations to occur, or be equipped to alter them (in the case of the final two).

1.3 Production Grammars

A **Production Grammar**, also called a Semi-Thue system or a rewriting system, consists of a finite set $\mathbf{V}$, the **vocabulary**, and a finite set of **productions** of the form $\Gamma \longrightarrow \Delta$, where Γ and Δ are strings of symbols from $\mathbf{V}$. We also specify two nonempty subsets of $\mathbf{V}$, Ω and Ω', called the **initial** and **terminal** vocabularies, respectively. A production grammar is said to be **context-free** if Γ is always of length one. If not, the grammar is said to be **context-sensitive**. Referring to the productions as rules, in a context-sensitive grammar, we can express the rules in the following form (where Ψ, Φ, Γ, and Δ are strings of symbols from $\mathbf{V}$):

$\Gamma \longrightarrow \Delta$ in context $\Psi \ldots \Phi$ for $\Psi\Gamma\Phi \longrightarrow \Psi\Delta\Phi$

$\Gamma \longrightarrow \Delta$ before Φ for $\Gamma\Phi \longrightarrow \Delta\Phi$

$\Gamma \longrightarrow \Delta$ after Ψ for $\Psi\Gamma \longrightarrow \Psi\Delta$

The productions may be viewed as axioms in a deductive system, when supplemented by the reflexive law $\Gamma \longrightarrow \Gamma$ and the transitive and substitution laws, which, stated as rules of inference, appear thus:

$$\frac{\Gamma \rightarrow \Delta \quad \Delta \rightarrow \Psi}{\Gamma \rightarrow \Psi} \quad ; \quad \frac{\Gamma \rightarrow \Delta \quad \Psi \rightarrow \Phi}{\Gamma\Psi \rightarrow \Delta\Phi}$$

Using this deductive system, we wish to be able to deduce all valid kinship terms. Along the way, we will have to deduce relevant kinship descriptions, and then translate them into the appropriate kinship terms. A relevant kinship description is one which describes the main meaning of some kinship term, according to our data.

In the present work, the initial vocabulary consists of the symbol R, representing "relative", and the # representing the space between words. The terminal vocabulary consists of the letters of the language in question (or of the accepted transliteration), with accents, along with the symbols # and & representing the spaces between words. The vocabulary itself is composed of the terminal vocabulary along with an **auxiliary** vocabulary which consists of the symbols R, S, C, P, $^{>}$S, $^{<}$S, M, F, Σ, P′, S′, $^{>}$S′, $^{<}$S′, C′, and possibly several additional symbols

required by the language under consideration (these will be specified in each section). These production grammars for kinship terminologies will be referred to as **kinship grammars.**

G and G′ are used as markers representing M or F. Thus a rule stated with G in it actually representes two rules; one with M and one with F. In the same way, we use *S as a marker to represent $^{>}$S and $^{<}$S. Brackets represent something optional. Thus, if a rule has (P) in it, then it represents two rules; one with P present and one with P absent. For example, the rule

(P)*SG$\longrightarrow$P*S

actually represents 8 separate rules, as follows (*S cannot take a different value before and after the arrow):

P$^{>}$SM$\longrightarrow$P$^{>}$S

P$^{<}$SM$\longrightarrow$P$^{<}$S

P$^{>}$SF$\longrightarrow$P$^{>}$S

P$^{<}$SF$\longrightarrow$P$^{<}$S

$^{>}$SM$\longrightarrow$$^{>}$S

$^{<}$SM$\longrightarrow$$^{<}$S

$^{>}$SF$\longrightarrow$$^{>}$S

$^{<}$SF$\longrightarrow$$^{<}$S

The # symbol is used to represent a space between words, usually marking the beginning or the end of a kinship term. We also use the symbol & to represent the space between two words of a single kinship term, eg. "#bapak&mertua#". It seems that the & symbol indeed represents something different from the # symbol, as speakers distinguish between bapak# and bapak& using intonation differences. The & symbol will be used in some of our productions to prevent incorrect kinship terms from being produced (for example bapak mertua mertua). The symbol is only used in those cases where it is necessary in order to avoid such invalid compounds.

A derivation is not considered to be complete until no more rules are applicable. We will occasionally be able to generate a terminal string which is not a valid kinship

term, but only when the derivation is not complete. A kinship grammar should be able to produce all valid kinship terms, and all of the terminal strings which it generates (by way of complete derivations) should be valid kinship terms. That is, no invalid kinship terms should be produced. However, sometimes productions will arrive at a dead-end, where the final string produced is non-terminal but no other rules may be applied. This may be because there is no kinship term for a certain relation (eg. P^8 or PPPSCCCCC). Often, during the process of translating the kinship description into the kinship term, the insertion of an extra Σ can cause the termination of the production (eg. #ΣPM&mertua#). However, the fact that in the grammars to be discussed, there are infinitely many kinship descriptions and only finitely many kinship terms allows us to see that we must indeed focus on those productions which do end up generating a kinship term.

In each kinship grammar, we will group the rules into consanguineous productions, steprelation productions, and affinal productions. Consanguineal productions deal with kinship descriptions not involving the symbol Σ; affinal productions deal with kinship descriptions containing Σ. In each section, we have **structure rules** to allow us to derive kinship descriptions, **reduction rules** to reduce these kinship descriptions to relevant kinship descriptions, **word assignments** to assign kinship terms to certain kinship descriptions, and **morphological rules** to assist in this translation to kinship terms. Steprelation productions are dealt with in a separate section. We will abbreviate using the first letter of each word, for example CS4 would be the fourth consanguineous structure rule, and AM3 the third affinal morphological rule.

After presenting all of the grammars, we compare them. First we make a general comparison between Burmese and the Indonesian languages, followed by comments on the differences between the four Indonesian languages themselves. Here we will pay particular attention to the reduction rules, since they seem to effectively characterize a grammar.

A BASIC program was used to test the rules of each grammar. The main purposes of the program were to check for mistakes in the rules of each grammar and

to generate sample productions. A mistake would be either that the grammar fails to produce a particular valid kinship term, or else a complete derivation results in a terminal string which is not a valid kinship term. In addition, the program focused attention on the number of rules used for each grammar. Other things being equal, it was deemed worthwhile to keep this number to a minimum, considering the finite capacity of human memory. The sample productions included with each grammar were generated by the program. The program itself is included as Appendix A.

In addition to the languages which are studied in the following chapters, data was collected on the kinship terminologies of several other Indonesian languages. This data is presented in Appendix C.

Chapter 2

Burmese

2.1 Kinship Data

We obtained our kinship data from Burling's **Burmese Kinship Terminology** [5]. His transliteration of Burmese, followed here, is based on that of Cornyn [8] with several exceptions, notably that here q represents an initial glottal stop and ? represents a final glottal stop. θ represents an interdental fricative.

Cooke, in his account of Burmese kinship terminology [7], differs with Burling in several cases. For instance, Cooke lists qadó for aunt and qû for uncle, whereas in following Burling, we have no terms for aunt and uncle (without seniority information), and Burling in fact states that the morpheme qû is never used alone. Cooke also lists jîdó for $P^{>}SF$, kóu for husband, hnamà for $F^{<}SF$ and nyímà for $M^{<}SF$, whereas Burling lists nyímà for both male and a female speaker. Apart from these differences, the data agree.

[a] is considered to be a single symbol. As mentioned previously, we choose to represent "b is the child of a" as aCb rather than bCa. As with Sanskrit, in Bhargava and Lambek's analysis [4], the Burmese data seems to fit this method better than the reverse one. The constituents of many kinship terms correspond in proper order to the kinship descriptions if written in this order.

The tables are not complete. It seems that terms for generations higher than +4 and lower than -5 are not part of the vocabulary of Burmese speakers, or were not

listed by Burling. We have also omitted kinship descriptions which may be reduced to ones on the table, by means of reduction rules.

In the rules following, a context restriction "before Burmese letters" appears several times. This refers to letters in the transliteration being used, but specifically to the letters c and l, as that context only appears in rules to be used with the two suffixes cî and lêi. Thus we could rewrite the context restriction as "before c or l". Similarly, the context restriction written as "before cousin suffix" could be rewritten as "before -", as the cousin suffix is preceded by a hyphen in our grammar. Indeed, we did use the alternate formulations mentioned here in the BASIC program used to check our productions.

In the tables, and in the rules following, brackets represent something optional. Primarily consanguineous terms (terms whose primary meaning refers to a blood relation) are presented in Table 2.1, and affinal terms in Table 2.2.

2.2 The Consanguineous Productions

2.2.1 Structure Rules

CS1 R$\longrightarrow$RC, PR, S

CS2 R$\longrightarrow$C after #

CS3 R$\longrightarrow$P before #

CS4 #$\longrightarrow$G# after S, C, or P

CS5 S$\longrightarrow{}^{>}$S, $^{<}$S in context #(P)(P)...G(cousin suffix)#

CS6 $^{<}$SM$\longrightarrow$G$^{<}$SM in context #...(cousin suffix)#

2.2.2 Reduction Rules

CR1 PS$\longrightarrow$P in context PP ...G#

CR2 SC$\longrightarrow$C in context #(Σ)...C

4	(Σ)PPPP(S)M	pînqaphôu	(Σ)PPPP(S)F	pînqaphwâ
3	(Σ)PPP(S)M	pîqaphôu	(Σ)PPP(S)F	pîqaphwâ
2	(Σ)PPM	qaphôu	(Σ)PPF	qaphwâ
	(Σ)PP>SM	qaphéicî	(Σ)PP>SF	qaméicî
	(Σ)PP<SM	qaphôulêi	(Σ)PP<SF	qaphwâlêi
1	PM	qaphéi	PF	qaméi
	(Σ)P>S(Σ)M	bácî	(Σ)P>S(Σ)F	cîtó
	(Σ)P<S(Σ)M	qûlêi	(Σ)P<S(Σ)F	dólêi
0	>SM	qakóu	>SF	qamà
	M<SM	nyî	<SF	nyímà
	F<SM	máun		
-1	CM	*θ*â	CF	*θ*amî
	(Σ)SC(Σ)M	tú	(Σ)SC(Σ)F	túmà
-2	(S)CC(Σ)M	myîyau?câlêi	(S)CC(Σ)F	myîmêinkhalêi
-3	(S)CCC(Σ)M	myî?yau?câlêi	(S)CCC(Σ)F	myî?mêinkhalêi
-4	(S)CCCC(Σ)M	cu?yau?câlêi	(S)CCCC(Σ)F	cu?mêinkhalêi
-5	(S)CCCCC(Σ)M	tîyau?câlêi	(S)CCCCC(Σ)F	tîmêinkhalêi

Table 2.1: Burmese Primarily Consanguineous Kinship Terms

1	ΣPM	yau?khamàqaphóu	ΣPF	yau?khamà
0	ΣM	yau?câ	ΣF	mêimà
	M>SΣM, MΣ>SM	yau?phàcî	M>SΣF, MΣ>SF	mayî
	M<SΣM, MΣ<SM	yau?phàlêi	M<SΣF, MΣ<SF	khémà
	FSΣM, FΣSM	khêqóu	FSΣF, FΣSF	yâumà
-1	CΣM	*θ*ame?	CΣF	chwêimà

Table 2.2: Burmese Affinal Kinship Terms

2.2.3 Word Assignments

in context #...G# unless otherwise specified

CW1 PPḾ ⟶qaphôu in context #...(Burmese letters)#

CW2 PPF ⟶qaphwâ in context #...(Burmese letters)#

CW3 PM ⟶qaphéi in context #...(Burmese letters)#

CW4 PF ⟶qaméi in context #...(Burmese letters)#

CW5 PPP ⟶pí

CW6 PPPP ⟶pín

CW7 CC ⟶myî

CW8 CCC ⟶myî?

CW9 CCCC ⟶cu?

CW10 CCCCC ⟶tî

CW11 F<SM ⟶máun in context #...(cousin suffix)#

2.2.4 Morphological Rules

CM1 CG⟶θ[a]G after #

CM2 SCG⟶túG in context #...(cousin suffix)#

CM3 >SG⟶qaG in context #...(cousin suffix)#

CM4 <S⟶nyî in context M...M or #...F

for the next rules, the context is #...(cousin suffix)#, unless otherwise stated

CM5 PP>SG⟶PGcî

CM6 PP<SG⟶PPGlêi

CM7 P$^{<}$SG$\longrightarrow$Glêi

CM8 P$^{>}$SM$\longrightarrow$Mcî

CM9 P$^{>}$SF$\longrightarrow$cîF

CM10 M$\longrightarrow$

qû	in context #...lêi
kóu	after qa
bá	in context #...cî
qaphôu	after pî or pîn
yau?câlêi	after myî, myi?, cu?, tî
	before nyî, or after tú, [a], or nyî

CM11 F$\longrightarrow$

dó	in context #...lêi
mà	after qa, tú, or nyî
tó	after cî
mî	after [a]
qaphwâ	after pí or pín
mêinkhalêi	after myî, myi?, cu?, or tî

CM12 [a]$\longrightarrow$

a	before m
â	otherwise

2.3 The Affinal Productions

2.3.1 Structure Rules

AS1 G$\longrightarrow\Sigma$G before # and after S, C, or P

AS2 #$\longrightarrow$#Σ before S, C, or P

AS3 R$\longrightarrow\Sigma$ in context #...#

AS4 S$\Sigma\longrightarrow$SΣS in context #...G#

AS5 S$\longrightarrow{}^{>}$S, $^{<}$S in context M...ΣG#

AS6 $\Sigma \longrightarrow \Sigma G$ in context #...#

AS7 $S\Sigma \longrightarrow GS\Sigma$ in context #...G'#

2.3.2 Reduction Rules

AR1 $P\Sigma \longrightarrow P$

AR2 $\Sigma P \longrightarrow P$ before P or (*)S

AR3 $\Sigma C \longrightarrow C$

AR4 $C\Sigma \longrightarrow C$ after C or S

AR5 $S\Sigma \longrightarrow S$ after P

AR6 $\Sigma S \longrightarrow S$ before C

AR7 $\Sigma S \longrightarrow S\Sigma$ in context #...G#

AR8 $\Sigma S\Sigma \longrightarrow S$ in context #...G(cousin suffix)#

AR9 $S\Sigma S \longrightarrow S$ in context #...G#

2.3.3 Word Assignments

in context #...# unless otherwise specified

AW1 $\Sigma M \longrightarrow$ yau?câ

AW2 $\Sigma F \longrightarrow$ mêimà also after ch

AW3 $M^{>}S\Sigma F \longrightarrow$ mayî

AW4 $\Sigma P \longrightarrow$ yau?khamà in context #...G#

2.3.4 Morphological Rules

in context #...# unless otherwise specified

AM1 CΣM⟶CMme?

AM2 MSΣM⟶yau?phà after #

AM3 M$^{>}$SΣM⟶MSΣMcî

AM4 M$^{<}$SΣM⟶MSΣMlêi

AM5 CΣF⟶chΣF

AM6 chmêimà⟶chwêimà

AM7 FSΣF⟶yâuF

AM8 FSΣM⟶khêM

AM9 M$^{<}$SΣF⟶khéF

AM10 M⟶ { qóu after khê ; qaphôu after khamà

AM11 F⟶ { mà after yâu or khé ; after khamà

2.4 Discussion of Consanguineous Productions

2.4.1 Structure Rules

The structure rules generate the provisional kinship descriptions:

R⟶P^{m+1}G, C^{n+1}G, P^{m}SC^{n}G, PP*SG, P*SG, (G)*SG

where m and n are non-negative integers. Many such kinship descriptions do not appear in the data, for one of two reasons. Either they can be reduced to kinship descriptions which are in the table, or they belong to generations which are not

accounted for in the table. While the production grammar allows kinship descriptions to be generated for any generation, the ones which do not appear in the table do not seem to correspond to terms which are a part of the day to day vocabulary of a native speaker. Thus they are not dealt with here. The native speaker would understand the kinship description P^8, for example, but may not have a kinship term for it. The grammar is the same in this respect.

We replace S with $^{>}S$ or $^{<}S$ after carrying out reductions, and only in those descriptions where the distinction has meaning. Thus our reduction rules will generally be free of $^{>}S$ and $^{<}S$, since reductions will take place before our older-younger rule is used. We also must be able to use rule CS5 when we have a suffix present, due to using one of the cousin production rules. We use the rule only when gender has already been inserted.

There is often more than one way to generate a given kinship description. We give several ways to generate PPSC:

$R \longrightarrow PR \longrightarrow PPR \longrightarrow PPRC \longrightarrow PPSC$

$R \longrightarrow RC \longrightarrow PRC \longrightarrow PPRC \longrightarrow PPSC$

$R \longrightarrow PR \longrightarrow PRC \longrightarrow PPRC \longrightarrow PPSC$

In the Introduction, certain combinations of symbols were mentioned as being ambiguous or redundant. The context restrictions prevents those combinations (SP, CS, SS, PC, CP, $P\Sigma$, ΣC) from occuring, except for the final two. The final two undesirable combinations are for steprelations, which we are not dealing with for Burmese.

The gender insertion rules give a final gender to every kinship description (rule CS4), and an extra gender to "younger brother" (rule CS6) as one must distinguish between a female and male speaker when referring to one's younger brother. We need the (cousin suffix) in rule CS6 because some cousin terms will be reduced to sibling terms, so in this case the rule must be used after a suffix has been added. This context restriction is also present in rule CW11, CM2, CM3, and CM5-CM8. Cousin terms are explained in section 6.

2.4.2 Reduction Rules

Rule CR1 accounts for the siblings of great-grandparents being referred to as great-grandparents themselves. In fact, all males of the third ascending generation are referred to by the one term, which has a primary meaning of "great-grandfather" (the same happens with the females). This is true for all higher generations as well. This rule has its partner in rule CR2, which merges grandchildren of one's siblings with one's own grandchildren.

After performing all possible reductions, our kinship descriptions will be of one of the following forms:

$R \longrightarrow P^{m+1}G$, $C^{n+1}G$, $P^{m+1}SC^{n+1}G$, (G)*SG, P*SG, PP*SG, SCG

where m and n are non-negative integers. P^mSC^nG can be further reduced using the cousin rules, which are explained in section 6.

2.4.3 Word Assignments

The context restriction for the first four word assignments allow the possibility of the rule being used before Burmese letters. This is because there are other terms which are composed of one of these four terms along with a suffix indicating relative age. From the kinship description, the suffix is generated first, then one of rule CW1 - CW4 is used.

2.4.4 Morphological Rules

We considered "qa" to be the stem for "qakóu" and "qamà" (rule CM3). The stem "qa" is actually present in many of the kinship terms, but always for older relations. Indeed "qakóu" is "elder brother" and "qamà" is "elder sister". The morpheme kóu is only used for male relatives, and mà only for female.

The suffix -cî means "little" and the suffix lêi means "big". Thus, referring to rules CM5 and CM6, we see that "grandparent's younger brother (sister)" receives the kinship term equivalent to "little grandfather (grandmother)" and "grandparent's elder brother (sister)" receives the equivalent of "big father (mother)". For

the parent's generation, these suffixes are again present, but this time the roots qû, dó, ba, and tó do not have discernable meanings. The term cîtó has a structure opposite to the rest, as if the two morphemes have been interchanged.

For older relatives the masculine ending is -qaphôu, and the feminine ending is -qaphwâ. For younger relatives, the masculine ending is - yau?câlêi, and the feminine is -mêinkhalêi. We see some familiar morphemes in the use of "qa" for older relatives, and "lêi" for younger. "yau?" appears here as well as in several affinal terms, all referring to males. Yau?câlêi is composed of yau?câ ("husband") and lêi ("little"). Perhaps yau?câ can mean "male", thus making yau?câlêi "little male". We will see later in Madurese that the term for "male" also serves as the term for "husband". Mêinkhalêi contains lêi ("little") and also mêi, which appears in several other terms referring to females.

The phonetic rule for [a] allows us to properly form the terms θâ and θamî.

2.5 Discussion of Affinal Productions

2.5.1 Structure Rules

Using rules AS1 and AS2, we can generate kinship descriptions of the following forms:

$(\Sigma)P^{m+1}(\Sigma)G$, $(\Sigma)C^{n+1}(\Sigma)G$, $(\Sigma)P^{m}SC^{n}(\Sigma)G$, $\Sigma P^{*}SG$, $\Sigma PP^{*}SG$

where m and n are non-negative integers. The possibility of deriving $\Sigma P^{*}SG$ explains the (*) in the context for rule AR2; we use this rule to eliminate the Σ.

In general it is possible to generate affinal kinship descriptions from unreduced consanguineous descriptions. The consanguineous reduction rules can be used at this point (as well as before the insertion of Σ). This is considered more complete than only allowing the insertion of Σ into completely reduced kinship descriptions. However, some of the consanguineous reductions cannot be performed until after certain of the affinal reduction rules are used (eliminating Σ).

Rule AS3 is used to produce the kinship description $\#\Sigma\#$, not produced by

rule AS1 or AS2. With rule AS4, we can produce kinship descriptions for sibling's spouse's sibling. We only add Σ before adding seniority of sibling. Rules AS1 and AS2 could be used after using rule AS4, producing such kinship descriptions as SΣSΣ, ΣSΣS, or ΣSΣSΣ. These descriptions can not be interpreted in our grammar. Rule AS5 allows us to distinguish between older and younger sibling, precisely in that context where we need to, after using reduction rules. Male speakers differentiate between older and younger siblings in law, but female speakers do not. All other affinal terms which need to distinguish between older and younger sibling can be reduced to consanguineous terms, thus using Rule CS5 instead.

Since genders were present before we appended Σ to the end of a kinship description, we only need rules for adding gender to the description Σ (rule AS6), and adding gender before SΣG (rule AS7). In the other cases speaker's sex doesn't influence the kinship term. We do not add gender before SΣS as this will reduce to S, thus enabling us to add speaker's gender (if necessary) using the consanguineous gender insertion rule. We do not add gender before ΣSG as this will reduce to SΣG.

2.5.2 Reduction Rules

AR1 One's parent's spouse is considered one's parent.

AR2 The grandparents, uncles, and aunts of one's spouse are considered one's own grandparents, uncles, and aunts.

AR3 One's spouse's child is considered one's child. Thus we are not accounting for step relations for Burmese (rules AR1 and AR3).

AR4 The spouse of one's grandchild, niece, or nephew is considered one's own grandchild, niece, or nephew.

AR5 The spouse of one's uncles and aunts are considered ones own uncles and aunts.

AR6 The nieces and nephews of one's spouse are considered one's own nieces and nephews.

AR7 Since one's spouse's sibling and one's sibling's spouse are referred to with the same kinship term, we reduce the former to the latter. We do not know which is the more "primary" meaning; it was an arbitrary decision.

AR8 One's spouse's sibling's spouse is considered one's sibling. This may seem strange since one's spouse's sibling is not considered one's sibling. We have the possibility of a cousin suffix in the context restriction because with our cousin rules it will be possible to reduce $\Sigma PSC\Sigma$ to $\Sigma S\Sigma$ by appending a cousin suffix. In this case we will reduce $\Sigma S\Sigma$ to S, and end up with a sibling term with a cousin suffix. This is a somewhat dubious production.

AR9 One's sibling's spouse's sibling is considered one's sibling. Again, it is notable that one's sibling's spouse is not considered one's sibling, and moreover, there are potential marriage partners among one's sibling's spouse's siblings. The difficulty with this reduction is in deciding which term to use. Clearly one's older sibling's spouse's older sibling would be considered one's own older sibling. But what about one's older sibling's spouse's younger sibling? In the end, it seemed best to only insert seniority of sibling after the reduction had taken place, as the article from which the data was taken was not clear on the matter.

2.5.3 Word Assignments

The term for father-in-law is the term for mother-in-law with a suffix conveying the meaning "male".

2.5.4 Morphological Rules

The term θame? (child's husband) is considered to be derived from θâ (child). Our rule CM12, for [a], serves us again here. Chwêimà (child's wife) is considered to be formed from ch-, a prefix expressing "child's", and mêimà ("wife"), with the "ch-" causing the m in mêimà to be expressed as a "w" (rules AM5, AM6, and AW2).

Thus it seems that the term for "child's husband" comes from that for "child", but the term for "child's wife" comes from that for "wife".

The suffixes -cî and lêi are in use again, this time to differentiate a male's older and younger sibling's husband (also a male's spouse's older and younger male sibling).

For FSΣM and MΣSF, respectively, we have khê and khé as in-law stems, with masculine ending qóu and feminine ending mà as seen before.

With FSΣF as yâumà and MSΣM as yau?phà, we would extract a morpheme similar to yâu in both cases if we had evidence that phà was a masculine ending.

2.6 Cousin Terms

Burmese has three suffixes for cousins: -tawûnkwê ("one womb removed"), -hnawûnkwê ("two wombs removed"), and -θôunwûnkwê ("three wombs removed"), for use with collateral terms only (but for affinal relations which are given consanguineous (collateral) terms, one supposes we do use the suffixes). First cousins are referred to by the sibling terms, but with the suffix -tawûnkwê added. Which sibling term to be used is determined not by the relative age of the cousins but by the relative age of the siblings (their parents). Second cousins and third cousins also are referred to as siblings, with the appropriate suffix. As there are no suffixes after the third, higher order cousins will be referred to as third cousins. Thus we have the following rule:

C1 $PP^3SC^3C \longrightarrow P^3SC^3$

> First cousins of parents are referred to as uncles/aunts, with the suffix -tawûnkwê added. Second cousins of parents and third cousins of parents are also, but with the appropriate suffix (-hnawûnkwê and -θôunwûnkwê, respectively). First cousins' children are referred to as nieces/nephews, with the suffix -tawûnkwê, and the pattern continues with second cousins' children and third cousins' children. Again, beyond this, reckoning generally ceases, so we use the suffix for third cousins for more distant relations.

The context for rules C2, C5, and C8 is #(Σ)...(Σ)G#, so that we have the choice to eliminate Σ from the description before or after creating the suffix. This is so that P^nSC^n can be reduced to S, retaining the Σ throughout, then giving the description an affinal term and dropping the cousin suffix. Indeed it seems more consistent that FPSCΣM be khêqóu rather than máun-tawûnkwê. The context for the other rules is #...G#.

We understand that a suffix is added at the end of the term. Thus Rule 2 really means (Σ)PSC(Σ)G⟶(Σ)S(Σ)G-tawûnkwê, and so on.

C2 PSC⟶S-tawûnkwê

C3 PPSC⟶PS-tawûnkwê

C4 PSCC⟶SC-tawûnkwê

C5 PPSCC⟶S-hnawûnkwê

C6 PPPSCC⟶PS-hnawûnkwê

C7 PPSCCC⟶SC-hnawûnkwê

C8 PPPSCCC⟶S-*θ*ôunwûnkwê

C9 PPPPSCCC⟶PS-*θ*ôunwûnkwê

C10 PPPSCCCC⟶SC-*θ*ôunwûnkwê

Now in the case of ΣSG and SΣG, we want to drop the suffix and use an affinal term. Thus we have:

C11 ΣSG-cousin suffix ⟶ΣSG in context #...#

C12 SΣG-cousin suffix ⟶SΣG in context #...#

To elaborate on the comment above, note that we could use affinal reduction rules to drop the Σ before adding the suffix, thus ending up with a consanguineous term. For example, MΣPP<SCCF could end up as either yau?phàlêi or as nyímà-tawûnkwê. It seems to me that the former is more appropriate.

In the case of ΣPSCΣG, we reduce this to ΣSΣG, then use rule AR8 to get SG, still with the suffix. Thus ΣPSCΣG is given a consanguineous term, as for ΣSΣG. The context restrictions in the production rules for siblings, uncles, aunts, nephews, and nieces allow the possibility of the rule being used when a suffix is already in place.

2.7 Examples

The following examples were generated by the BASIC program which was written to simulate the production grammar. The program itself is discussed in Appendix 1. Accents essential to the production in question were substituted with a special symbol; other accents were omitted in the running of the program. The accents have been reinserted below. Substitute symbols were used for the symbols of more than one character (eg. <S). The number of the rule used at each step is given below. Sometimes an unnecessary step occurs in the examples, and then is corrected with one of the reduction rules. This reflects the random nature of the program; it chose randomly among all rules which were applicable at any time. Productions which came to a dead-end without generating a kinship term have been omitted. Some loops within a single production were also omitted.

- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PS# ⟶ (CS4) ⟶ #PSM# ⟶ (CS5) ⟶ #P<SM# ⟶ (AS2) ⟶ #ΣP<SM# ⟶ (AR2) ⟶ #P<SM# ⟶ (CM7) ⟶ #Mlêi# ⟶ (CM10) ⟶ #qûlêi#

- #R# ⟶ (CS2) ⟶ #C# ⟶ (CS4) ⟶ #CM# ⟶ (CM1) ⟶ #θ[a]M# ⟶ (CM10) ⟶ #θ[a]# ⟶ (CM12) ⟶ #θâ#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS3) $\longrightarrow$ #PP# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣPP# $\longrightarrow$ (CS4) $\longrightarrow$ #ΣPPM# $\longrightarrow$ (AR2) $\longrightarrow$ #PPM# $\longrightarrow$ (CW1) $\longrightarrow$ #qaphôu#

- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (CS4) $\longrightarrow$ #CF# $\longrightarrow$ (AS1) $\longrightarrow$ #CΣF# $\longrightarrow$ (AM5) $\longrightarrow$ #chΣF# $\longrightarrow$ (AW2) $\longrightarrow$ #chmêimà# $\longrightarrow$ (AM6) $\longrightarrow$ #chwêimà#

- #R# $\longrightarrow$ (AS3) $\longrightarrow$ #Σ# $\longrightarrow$ (AS6) $\longrightarrow$ #ΣF# $\longrightarrow$ (AW2) $\longrightarrow$ #mêimà#

- #R# $\longrightarrow$ (AS3) $\longrightarrow$ #Σ# $\longrightarrow$ (AS6) $\longrightarrow$ #ΣM# $\longrightarrow$ (AW1) $\longrightarrow$ #yau?câ#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (CS4) $\longrightarrow$ #PSF# $\longrightarrow$ (AS1) $\longrightarrow$ #PSΣF# $\longrightarrow$ (AR5) $\longrightarrow$ #PSF# $\longrightarrow$ (CS5) $\longrightarrow$ #P$^<$SF# $\longrightarrow$ (CM7) $\longrightarrow$#Flêi# $\longrightarrow$ (CM11) $\longrightarrow$ #dólêi#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PF# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣPF# $\longrightarrow$ (AS1) $\longrightarrow$ #ΣPΣF# $\longrightarrow$ (AR1) $\longrightarrow$ #ΣPF# $\longrightarrow$ (AW4) $\longrightarrow$ #yau?khamàF# $\longrightarrow$ (AM11) $\longrightarrow$ #yau?khamà#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PF# $\longrightarrow$ (CW4) $\longrightarrow$ #qaméi#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS3) $\longrightarrow$ #PP# $\longrightarrow$ (CS4) $\longrightarrow$ #PPM# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣPPM# $\longrightarrow$ (AS1) $\longrightarrow$ #ΣPPΣM# $\longrightarrow$ (AR1) $\longrightarrow$ #ΣPPM# $\longrightarrow$ (AR2) $\longrightarrow$ #PPM# $\longrightarrow$ (CW1) $\longrightarrow$ #qaphôu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣS# $\longrightarrow$ (CS4) $\longrightarrow$ #ΣSF# $\longrightarrow$ (AS1) $\longrightarrow$ #ΣSΣF# $\longrightarrow$ (AR8) $\longrightarrow$ #SF# $\longrightarrow$ (CS5) $\longrightarrow$ #$^<$SF# $\longrightarrow$ (CM4) $\longrightarrow$ #nyîF# $\longrightarrow$ (CM11) $\longrightarrow$ #nyímà#

- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣC# $\longrightarrow$ (CS4) $\longrightarrow$ #ΣCF# $\longrightarrow$ (AR3) $\longrightarrow$ #CF# $\longrightarrow$ (CM1) $\longrightarrow$ #θ[a]F# $\longrightarrow$ (CM11) $\longrightarrow$ #θ[a]mi# $\longrightarrow$ (CM12) $\longrightarrow$ #θami#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PM# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣPM# $\longrightarrow$ (AW4) $\longrightarrow$ #yau?khamàM# $\longrightarrow$ (AM10) $\longrightarrow$ #yau?khamàqaphôu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS4) $\longrightarrow$ #SM# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣSM# $\longrightarrow$ (AS1) $\longrightarrow$ #ΣSΣM# $\longrightarrow$ (AR8) $\longrightarrow$ #SM# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{<}$SM# $\longrightarrow$ (CS6) $\longrightarrow$ #M$^{<}$SM#$\longrightarrow$ (CM4) $\longrightarrow$ #MnyîM# $\longrightarrow$ (CM10) $\longrightarrow$ #nyîM# $\longrightarrow$ (CM10) $\longrightarrow$ #nyî#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PM# $\longrightarrow$ (CW3) $\longrightarrow$ #qaphéi#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣPRC# $\longrightarrow$ (CS4) $\longrightarrow$ #ΣPRCF# $\longrightarrow$ (CS1) $\longrightarrow$ #ΣPSCF# $\longrightarrow$ (C2) $\longrightarrow$ #ΣSF-tawûnkwê#$\longrightarrow$ (C11) $\longrightarrow$ #ΣSF# $\longrightarrow$ (AR7) $\longrightarrow$ #SΣF# $\longrightarrow$ (AS7) $\longrightarrow$ #MSΣF# $\longrightarrow$ (AS5) $\longrightarrow$ #M$^{<}$SΣF# $\longrightarrow$ (AM9) $\longrightarrow$ #kheF# $\longrightarrow$ (AM11) $\longrightarrow$ #khémà#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSC# $\longrightarrow$ (CS4) $\longrightarrow$ #PSCF# $\longrightarrow$ (C2) $\longrightarrow$ #SF-tawûnkwê# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{>}$SF-tawûnkwê#$\longrightarrow$ (CM3) $\longrightarrow$ #qaF-tawûnkwê# $\longrightarrow$ (CM11) $\longrightarrow$ #qamà-tawûnkwê#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS4) $\longrightarrow$ #SF# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣSF# $\longrightarrow$ (AR7) $\longrightarrow$ #SΣF# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣSΣF#$\longrightarrow$ (AR8) $\longrightarrow$ #SF# $\longrightarrow$ (CS5) $\longrightarrow$#$^{>}$SF# $\longrightarrow$ (CM3) $\longrightarrow$ #qaF# $\longrightarrow$ (CM11) $\longrightarrow$ #qamà#

- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣC# $\longrightarrow$ (CS4) $\longrightarrow$ #ΣCM# $\longrightarrow$ (AS1) $\longrightarrow$ #ΣCΣM# $\longrightarrow$ (AR3) $\longrightarrow$ #CΣM# $\longrightarrow$(AM1) $\longrightarrow$ #CMme?# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣCMme?# $\longrightarrow$ (AR3) $\longrightarrow$ #CMme?# $\longrightarrow$ (CM1) $\longrightarrow$ #θ[a]Mme?# $\longrightarrow$ (CM10) $\longrightarrow$ #θ[a]me?# $\longrightarrow$ (CM12) $\longrightarrow$ #θame?#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS4) $\longrightarrow$ #RCM# $\longrightarrow$ (CS1) $\longrightarrow$ #SCM# $\longrightarrow$ (CM2) $\longrightarrow$ #túM# $\longrightarrow$ (CM10) $\longrightarrow$ #tú#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS4) $\longrightarrow$ #RCF# $\longrightarrow$ (CS2) $\longrightarrow$ #CCF# $\longrightarrow$ (CW7) $\longrightarrow$ #myîF# $\longrightarrow$ (CM11) $\longrightarrow$ #myîmêinkhalêi#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS4) $\longrightarrow$ #RCM# $\longrightarrow$ (AS1) $\longrightarrow$ #RCΣM# $\longrightarrow$ (CS2) $\longrightarrow$ #CCΣM# $\longrightarrow$ (AR4) $\longrightarrow$ #CCM#$\longrightarrow$ (CW7) $\longrightarrow$ #myîM#

$\longrightarrow$ (CM10) $\longrightarrow$ #myîyau?câlêi#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣS# $\longrightarrow$ (CS4) $\longrightarrow$ #ΣSF# $\longrightarrow$ (AR7) $\longrightarrow$ #SΣF# $\longrightarrow$ (AS7) $\longrightarrow$ #MSΣF# $\longrightarrow$ (AS5) $\longrightarrow$ #M$^{>}$SΣF# $\longrightarrow$ (AW3) $\longrightarrow$ #mayî#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #SC# $\longrightarrow$ (CS4) $\longrightarrow$ #SCF# $\longrightarrow$ (CM2) $\longrightarrow$ #túF# $\longrightarrow$ (CM11) $\longrightarrow$ #túmà#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPSC# $\longrightarrow$ (CS4) $\longrightarrow$ #PPSCM# $\longrightarrow$ (C3) $\longrightarrow$#PSM-tawûnkwê# $\longrightarrow$ (CS5) $\longrightarrow$ #P$^{<}$SM-tawûnkwê# $\longrightarrow$ (CM7) $\longrightarrow$ #Mlêi-tawûnkwê# $\longrightarrow$ (CM10) $\longrightarrow$ #qûlêi-tawûnkwê#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS3) $\longrightarrow$ #PPP# $\longrightarrow$ (CS4) $\longrightarrow$ #PPPM# $\longrightarrow$ (CW5) $\longrightarrow$ #pîM# $\longrightarrow$ (CM10) $\longrightarrow$ #pîqaphôu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPS# $\longrightarrow$ (CS4) $\longrightarrow$ #PPSF# $\longrightarrow$ (CS5) $\longrightarrow$ #PP$^{>}$SF# $\longrightarrow$ (CM5) $\longrightarrow$ #PFcî# $\longrightarrow$ (CW4) $\longrightarrow$ #qaméicî#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRC# $\longrightarrow$ (CS4) $\longrightarrow$ #PPRCF# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPRCF# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPRCCF#$\longrightarrow$ (CS1) $\longrightarrow$ #PPPRCCCF# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPPRC-CCF# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPPSCCCF# $\longrightarrow$ (C9) $\longrightarrow$ #PSF-θôunwûnkwê# $\longrightarrow$(CS5) $\longrightarrow$ #P$^{>}$SF-θôunwûnkwê#$\longrightarrow$ (CM9) $\longrightarrow$ #cîF-θôunwûnkwê# $\longrightarrow$ (CM11) $\longrightarrow$ #cîtó-θôunwûnkwê#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRC# $\longrightarrow$ (CS4) $\longrightarrow$ #PPRCF# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRCCF# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPRCCF#$\longrightarrow$ (CS1) $\longrightarrow$ #PPPSCCF# $\longrightarrow$ (C6) $\longrightarrow$ #PSF-hnawûnkwê# $\longrightarrow$ (CS5) $\longrightarrow$ #P$^{>}$SF-hnawûnkwê# $\longrightarrow$ (CM9) $\longrightarrow$ #cîF-hnawûnkwê# $\longrightarrow$ (CM11) $\longrightarrow$ #cîtó-hnawûnkwê#

- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PPR# ⟶ (CS1) ⟶ #PPS# ⟶ (CS4) ⟶ #PPSM# ⟶ (CS5) ⟶ #PP$^{>}$SM# ⟶ (AS2) ⟶ #§PP$^{>}$SM# ⟶ (AR2) ⟶ #PP$^{>}$SM# ⟶ (CM5) ⟶ #PMcî# ⟶ (CW3) ⟶ #qaphéicî#

- #R# ⟶ (CS1) ⟶ #RC# ⟶ (CS1) ⟶ #RCC# ⟶ (CS2) ⟶ #CCC# ⟶ (CS4) ⟶ #CCCM# ⟶ (CW8) ⟶ #myî?M# ⟶ (CM10) ⟶ #myî?yau?câlêi#

- #R# ⟶ (CS1) ⟶ #RC# ⟶ (CS1) ⟶ #RCC# ⟶ (CS2) ⟶ #CCC# ⟶ (CS4) ⟶ #CCCF# ⟶ (CW8) ⟶ #myî?F# ⟶ (CM11) ⟶ #myî?mêinkhalêi#

- #R# ⟶ (CS1) ⟶ #S# ⟶ (CS4) ⟶ #SM# ⟶ (AS1) ⟶ #SΣM# ⟶ (AS7) ⟶ #FSΣM# ⟶ (AM8) ⟶ #kheM# ⟶ (AM10) ⟶ #khêqóu#

- #R# ⟶ (CS1) ⟶ #S# ⟶ (CS4) ⟶ #SM# ⟶ (AS1) ⟶ #SΣM# ⟶ (AS7) ⟶ #MSΣM# ⟶ (AS5) ⟶ #M$^{<}$S ΣM# ⟶ (AM4) ⟶ #MSΣMlêi# ⟶ (AM2) ⟶ #yau?phàlêi#

- #R# ⟶ (CS1) ⟶ #S# ⟶ (CS4) ⟶ #SM# ⟶ (AS1) ⟶ #SΣM# ⟶ (AS2) ⟶ #ΣSΣM# ⟶ (AR8) ⟶ #SM# ⟶ (CS5) ⟶ #$^{>}$SM# ⟶ (CM3) ⟶#qaM# ⟶ (CM10) ⟶ #qakóu#

- #R# ⟶ (CS1) ⟶ #RC# ⟶ (CS1) ⟶ #PRC# ⟶ (CS4) ⟶ #PRCF# ⟶ (AS2) ⟶ #ΣPRCF# ⟶ (CS1) ⟶ #ΣPRCCF# ⟶ (AS1) ⟶ #ΣPRCCΣF# ⟶ (CS1) ⟶#ΣPSCCΣF# ⟶ (AR4) ⟶ #ΣPSCCF# ⟶ (AS1) ⟶ #ΣPSCCΣF# ⟶ (AR2) ⟶ #PSCCΣF# ⟶ (AS2) ⟶ #ΣPSCCΣF# ⟶ (AR2) ⟶ #PSCCΣF# ⟶ (AR4) ⟶ #PSCCF#⟶ (C4) ⟶ #SCF-tawûnkwê# ⟶ (CM2) ⟶ #túF-tawûnkwê# ⟶ (CM11) ⟶ #túmà-tawûnkwê#

- #R# ⟶ (CS1) ⟶ #RC# ⟶ (CS1) ⟶ #PRC# ⟶ (AS2) ⟶ #ΣPRC# ⟶ (CS1) ⟶ #ΣPPRC# ⟶ (CS4) ⟶ #ΣPPRCM# ⟶ (CS1) ⟶ #ΣPPRCCM# ⟶ (CS1) ⟶#ΣPPSCCM# ⟶ (AR2) ⟶ #PPSCCM#

$\longrightarrow$ (C5) $\longrightarrow$ #SM-hnawûnkwê# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{>}$SM-hnawûnkwê# $\longrightarrow$ (CM3) $\longrightarrow$ #qaM-hnawûnkwê# $\longrightarrow$ (CM10) $\longrightarrow$ #qakóu-hnawûnkwê#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSC# $\longrightarrow$ (CS4) $\longrightarrow$ #PSCF# $\longrightarrow$ (AS1) $\longrightarrow$ #PSCΣF# $\longrightarrow$ (C2) $\longrightarrow$ #SΣF-tawûnkwê#$\longrightarrow$ (AS2) $\longrightarrow$ #ΣSΣF-tawûnkwê# $\longrightarrow$ (AR8) $\longrightarrow$ #SF-tawûnkwê# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{<}$SF-tawûnkwê# $\longrightarrow$ (CM4) $\longrightarrow$ #nyîF-tawûnkwê#$\longrightarrow$ (CM11) $\longrightarrow$ #nyímà-tawûnkwê#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣPRC# $\longrightarrow$ (CS4) $\longrightarrow$ #ΣPRCF# $\longrightarrow$ (CS1) $\longrightarrow$ #ΣPSCF# $\longrightarrow$(AR2) $\longrightarrow$ #PSCF# $\longrightarrow$ (AS1) $\longrightarrow$ #PSCΣF#$\longrightarrow$ (C2) $\longrightarrow$ #SΣF-tawûnkwê# $\longrightarrow$ (C12) $\longrightarrow$ #SΣF# $\longrightarrow$ (AS7) $\longrightarrow$ #MSΣF# $\longrightarrow$ (AS5) $\longrightarrow$ #M$^{>}$SΣF# $\longrightarrow$ (AW3) $\longrightarrow$ #mayî#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS4) $\longrightarrow$ #PRCM# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRCM# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRCCM# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPRCCM# $\longrightarrow$ (AS2) $\longrightarrow$#ΣPPPRCCM# $\longrightarrow$ (CS1) $\longrightarrow$ #ΣPPPRCCCM# $\longrightarrow$ (CS1) $\longrightarrow$ #ΣPPPSCCCM# $\longrightarrow$ (AS1) $\longrightarrow$ #ΣPPPSCCCΣM# $\longrightarrow$ (C8) $\longrightarrow$ #ΣSΣM-θôunwûnkwê# $\longrightarrow$ (AR8) $\longrightarrow$#SM-θôunwûnkwê# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{>}$SM-θôunwûnkwê# $\longrightarrow$ (CM3) $\longrightarrow$ #qaM-θôunwûnkwê#$\longrightarrow$ (CM10) $\longrightarrow$ #qakóu-θôunwûnkwê#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSC# $\longrightarrow$ (CS4) $\longrightarrow$ #PSCM# $\longrightarrow$ (C2) $\longrightarrow$ #SM-tawûnkwê#$\longrightarrow$ (CS5) $\longrightarrow$ #$^{<}$SM-tawûnkwê#$\longrightarrow$ (CS6) $\longrightarrow$ #F$^{<}$SM-tawûnkwê# $\longrightarrow$ (CW11) $\longrightarrow$ #máun-tawûnkwê#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPS# $\longrightarrow$ (AS2) $\longrightarrow$ #§PPS# $\longrightarrow$ (CS4) $\longrightarrow$ #§PPSF# $\longrightarrow$ (AR2) $\longrightarrow$ #PPSF# $\longrightarrow$ (CS5) $\longrightarrow$ #PP$^{<}$SF# $\longrightarrow$ (CM6) $\longrightarrow$#PPFlêi# $\longrightarrow$ (AS2) $\longrightarrow$ #ΣPPFlêi# $\longrightarrow$ (AR2) $\longrightarrow$ #PPFlêi# $\longrightarrow$ (CW2) $\longrightarrow$ #qaphwâlêi#

Chapter 3

Indonesian

3.1 Kinship Data

Data was obtained by the author while living in Indonesia in 1994 and 1996, and checked with various Indonesian speakers.

The tables are not complete. It seems that terms for generations higher than +3 and lower than -3 are not part of the vocabulary of Indonesian speakers. We have also omitted kinship descriptions which may be reduced to ones on the table, by means of reduction rules.

In the tables, as well as in the rules which follow, brackets represent something optional. Primarily consanguineous terms (terms whose primary meaning refers to a blood relation) are presented in Table 3.1, steprelation terms in Table 3.2, and affinal terms in Table 3.3.

3.2 The Consanguineous Productions

3.2.1 Structure Rules

CS1 R$\longrightarrow$RC, PR, S

CS2 R$\longrightarrow$C after #

3	(Σ)PPP(S)(Σ)M	kakek buyut	(Σ)PPP(S)(Σ)F	nenek buyut
2	(Σ)PP(S)(Σ)M	kakek	(Σ)PP(S)(Σ)F	nenek
1	PM (Σ)P$^{>}$S(Σ)M (Σ)P$^{<}$S(Σ)M	bapak pak dhé pak lik, paman	PF (Σ)P$^{>}$S(Σ)F (Σ)P$^{<}$S(Σ)F	ibu bu dhé bu lik, bibi
0	$^{>}$S $^{<}$S (Σ)PSC(Σ)		kakak adik sepupu	
-1	C (Σ)SC(Σ)		anak keponakan	
-2	(Σ)(S)CC		cucu	
-3	(Σ)(S)CCC(Σ)		cicit	

Table 3.1: Indonesian Primarily Consanguineous Kinship Terms

1	P′M	bapak tiri	P′F	ibu tiri
0	$^{>}$S′ $^{<}$S′		kakak tiri adik tiri	
-1	C′		anak tiri	

Table 3.2: Indonesian Steprelation Terms

1	ΣPM	bapak mertua	ΣPF	ibu mertua
0	ΣM	suami	ΣF	isteri
	SΣ, ΣS $^{>}$SΣ, Σ$^{>}$S $^{<}$SΣ, Σ$^{<}$S CΣP		ipar kakak ipar adik ipar bésan	
-1	CΣ		menantu	
-2	CCΣ		cucu menantu	

Table 3.3: Indonesian Affinal Kinship Terms

CS3 R$\longrightarrow$P before #

CS4 #$\longrightarrow$G# after #(P)(P)P or #PS

CS5 S$\longrightarrow{}^{>}$S, $^{<}$S in context #P...G# or #...#

3.2.2 Reduction Rules

CR1 SC$\longrightarrow$C in context #...C

CR2 PS$\longrightarrow$P in context P...#

CR3 PSC$\longrightarrow$S before C or after P

3.2.3 Word Assignments

in context #...#unless otherwise specified

CW1 PPM$\longrightarrow$kakek

CW2 PPF$\longrightarrow$nenek

CW3 PM$\longrightarrow$bapak also in context #...&

CW4 PF$\longrightarrow$ibu also in context #...&

CW5 P$^{<}$SM$\longrightarrow$paman

CW6 P$^{<}$SF$\longrightarrow$bibi

CW7 $^{>}$S$\longrightarrow$kakak

CW8 $^{<}$S$\longrightarrow$adik

CW9 PSC$\longrightarrow$sepupu

CW10 C$\longrightarrow$anak also in context #kep...an# or #...&

CW11 CC$\longrightarrow$cucu also in context #...&

CW12 CCC$\longrightarrow$cicit

3.2.4 Morphological Rules

in context #...# unless otherwise specified

CM1 PPPG⟶PPG#buyut

CM2 P$^{>}$SG⟶PG&dhé

CM3 P$^{<}$SG⟶PG&lik

CM4 SC⟶kepCan

CM5 kepanakan⟶keponakan

CM6 bapak⟶pak before &dhé or &lik

CM7 ibu⟶bu before &dhé or &lik

3.3 Steprelation Productions

S1 P⟶P′ in context #...#

S2 P′ ⟶P′G in context #...#

S3 S⟶$^{>}$S′ , $^{<}$S′ in context #...#

S4 C⟶C′ in context #...#

S5 P′G ⟶PG&tiri

S6 *S′ ⟶*S#tiri

S7 C′ ⟶C&tiri

3.4 The Affinal Productions

3.4.1 Structure Rules

AS1 R⟶Σ in context #...#

AS2 R$\longrightarrow$CΣP in context #...#

AS3 #$\longrightarrow$#Σ before P, S, or C

AS4 #$\longrightarrow\Sigma$# after P, S, or C

AS5 #$\longrightarrow$G# after #Σ or #ΣP

AS6 S$\longrightarrow^{>}$S, $^{<}$S in context #...Σ#

3.4.2 Reduction Rules

AR1 P$\Sigma\longrightarrow$P

AR2 P$\Sigma\longrightarrow$P′ in context #...#

AR3 ΣP$\longrightarrow$P before P or (*)S

AR4 C$\Sigma\longrightarrow$C after CC or S

AR5 ΣC$\longrightarrow$C

AR6 ΣC$\longrightarrow$C′ in context #...#

AR7 S$\Sigma\longrightarrow$S after P

AR8 ΣS$\longrightarrow$S before C

AR9 ΣS$\longrightarrow$SΣ in context #...#

3.4.3 Word Assignments

in context #...# unless otherwise specified

AW1 ΣM$\longrightarrow$suami

AW2 ΣF$\longrightarrow$isteri

AW3 C$\Sigma\longrightarrow$menantu also in context &...#

AW4 S$\Sigma \longrightarrow$ipar

AW5 CΣP$\longrightarrow$bésan

3.4.4 Morphological Rules

in context #...#

AM1 ΣPG$\longrightarrow$PG&mertua

AM2 CC$\Sigma \longrightarrow$CC&CΣ

AM3 *S$\Sigma \longrightarrow$*S#ipar

3.5 Discussion of Consanguineous Productions

3.5.1 Structure Rules

The pure stucture rules generate the provisional kinship descriptions:

R$\longrightarrow$P^{m+1}, C^{n+1}, P^{m}SC^n, PG, PPG, PPPG, *S, P*SG

where m and n are non-negative integers. The only kinship descriptions which actually differentiate between older and younger siblings are the two final ones listed; *S and P*SG. Thus we allow S to be changed to $^>$S or $^<$S only for these kinship descriptions. We notice the seniority distinction occurs only for our own generation and the one before, and that this also holds for affinal relations.

CS1-CS3 are generally used in production grammars for kinship terminology, originally by Lambek [18].

Many kinship descriptions of the form outlined above do not appear in the data, for one of two reasons. Either they can be reduced to kinship descriptions which are in the table, or they belong to generations which are not accounted for in the table. While the production grammar allows kinship descriptions to be generated for any generation, the ones which do not appear in the table do not seem to correspond to terms which are a part of the day to day vocabulary of a native speaker. Thus

they are not dealt with here. The native speaker would understand the kinship description P^8, for example, but may not have a kinship term for it. The grammar is the same in this respect.

There is often more than one way to generate a given kinship description. We give several ways to generate PPSC:

R$\longrightarrow$PR$\longrightarrow$PPR$\longrightarrow$PPRC$\longrightarrow$PPSC

R$\longrightarrow$RC$\longrightarrow$PRC$\longrightarrow$PPRC$\longrightarrow$PPSC

R$\longrightarrow$PR$\longrightarrow$PRC$\longrightarrow$PPRC$\longrightarrow$PPSC

In the Introduction, certain combinations of symbols were mentioned as being ambiguous or redundant. The context restrictions prevents those combinations (SP, CS, SS, PC, CP, PΣ, ΣC) from occuring, except for the final two. We will have reduction rules for dealing with those two, as we wish to deal with both possibilities for PΣ, namely P and P$'$, and both possibilities for ΣC, namely C and C$'$).

We insert a gender after only those kinship descriptions which distinguish on the basis of gender. These are P, PS, PP, and PPP. For both consanguineous and affinal relations, and apart from the terms for husband and wife, only relations from an older generation are distinguished on the basis of gender.

3.5.2 Reduction Rules

Grandchildren of one's siblings are considered one's own grandchildren. The same happens for generations below this one. Thus the term for great- grandchild also means "child in the third descending generation". Siblings of grandparents are considered one's own grandparents, so the reduction is symmetric. Rules CR1 and CR2 express this. Rule CR3 expresses the fact that although there is a separate term for cousin, in some cases a cousin is considered as a sibling, within certain kinship descriptions. For instance, we have PSCC$\longrightarrow$SC, ie, one's cousin's child is considered one's nephew or niece. Also we have PPSC$\longrightarrow$PS, ie, one's parent's cousin is considered one's uncle or aunt. With this last reduction, we must convert PS to P*S before it can be assigned a kinship term. PSCCC reduces to SCC, which

then reduces to CC; ie, one's cousin's grandchild is considered one's own grandchild. Similarly one's grandparent's cousin is considered one's own grandparent. Thus many relations of a single generation are referred to with the same term. This reduction rule also serves to reduce nth cousins to first cousins, all of which are called "sepupu".

After performing all possible reductions, our kinship descriptions will be of one of the following forms:

R$\longrightarrow$P^{m+1}, C^{n+1}, PSC, PG, PPG, PPPG, P*SG, *S, SC

where m and n are non-negative integers.

3.5.3 Word Assignments

"Paman" and "bibi" are alternate terms for parent's younger brother and parent's younger sister, respectively. The other terms, "pak lik" and "bu lik", come from Javanese, as does paman [1].

For our own generations and younger generations, relatives are not distinguished by sex. In conversation, one might ask how many of one's "kakak"s are male and how many are female. The answer would be, for example, "three female, one male"; ie, there is no specific term for "male older brother" etc. Although the term "kakak laki-laki" would be understood as older brother ("laki-laki" means "male" or "man"), it is more normal usage to say only "kakak", and then the sex can be asked in a separate question if necessary.

Although the terms "kakak", "kakek", "nenek" seem very similar, there is no identifiable root which two of them share.

The & in certain contexts here prevents the formation of invalid kinship terms. If & were not used, we could form, for example, bapak mertua mertua from PM#mertua, by appending an extra Σ. But with the use of & we have PM&mertua, which cannot then be used to produce bapak mertua mertua, because of the context restriction in rule AM1. The & indicates that there is already a kinship term following it, so we cannot form another compound preceding it.

3.5.4 Morphological Rules

Great-grandparents are given the term for grandparent along with the suffix "buyut". There is a similar construction in Javanese. In Madurese, "buyut" is used alone for great-grandparent.

Uncle and aunt are differentiated further according to the relative age of the relative and the parent. Older uncle becomes "pak dhé". The adjective "dhé" comes from the Javanese "gedhé", meaning "big". Similarly, "lik" comes from the Javanese "cilik", "little". Thus older uncle is "big father", younger aunt is "little mother", and so on.

The word for niece/nephew, "keponakan", seems to contain the word for child, "anak". The affix ke- -an is common in Indonesian, usually used to convert to a noun, for example, "fast" becomes "speed", "happy" becomes "happiness", "wrong" becomes "mistake". However, the p is not normally a part of this construction.

Bapak and ibu are shortened to pak and bu, respectively, when combined with a modifier (rules CM6 and CM7). These shortened forms are also the usual terms of address for father and mother.

3.6 Discussion of Steprelation Productions

The terms for steprelations are just the normal terms, with the suffix "tiri" added. As an example,

$R \longrightarrow S \longrightarrow {}^{>}S' \longrightarrow {}^{>}S\#tiri \longrightarrow$ kakak tiri

We have rules S1 and S2 separately instead of just having $P \longrightarrow P'G$ since we can also get P' from $P\Sigma$ (rule AR2), and then we need to be able to add the gender. The term for step- ("tiri") can only be used with immediate family relations, thus the context of $\#...\#$ in rules S1 to S4.

The use of & also prevents incorrect derivations with the steprelation terms. For instance, before & was used, it was possible to generate the invalid term anak tiri tiri, among others (the BASIC program discussed in Appendix 1 actually generated

such terms). With the use of & however, we first generate C&tiri, and then cannot generate an additional "tiri" because of the context restriction in rule S4.

3.7 Discussion of Affinal Productions

3.7.1 Structure Rules

Using rules AS3 and AS4, we can generate kinship descriptions of the following forms:

$(\Sigma)P^{m+1}(\Sigma)$, $(\Sigma)C^{n+1}(\Sigma)$, $(\Sigma)P^{m}SC^{n}(\Sigma)$, $\Sigma P^{*}S$, ΣPG, ΣPPG, $\Sigma PPPG$

where m and n are non-negative integers. Rules AS1 and AS5 are used for generating ΣM, and ΣF. Rule AS2 generates the kinship description for the symmetric term "bésan", which means "child's parent-in-law", or "co-parent-in-law". As a result of this rule we can derive $(\Sigma)C\Sigma P(\Sigma)$, using rules AS3 and AS4. We can reduce these resulting descriptions using rules AR1 and AR5. The possibility of deriving $\Sigma P^{*}S$ explains the (*) in the context for rule AR3; we use this rule to eliminate the Σ.

Rule AS4 cannot be used on a kinship description already containing M or F. Rule AS3, however, can, producing ΣPG, ΣPSG, ΣPPG, $\Sigma PPPG$, and $\Sigma P^{*}SG$. ΣPG is a relevant kinship description, and Σ is dropped from the other kinship descriptions with rule AR3 as above.

With rule AS5 we add gender to the only two affinal descriptions which require it. For $P^{*}S\Sigma G$, we first drop the Σ from $PS\Sigma$ using rule AR7, only then adding gender and then seniority using the consanguineous production rules. In this way we reduce $P^{*}S\Sigma G$ before fully forming it. Thus there is only one affinal term which requires a new seniority rule, namely $S\Sigma$ (since ΣS will be reduced to $S\Sigma$ with rule AR9).

3.7.2 Reduction Rules

Rules AR1 and AR2 interpret parent's spouse as either parent or step-parent. As the term for step- ("tiri") can only be used with immediate family relations, we

have the context of #...# in rules AR2 and AR6.

Rule AR3 indicates that the grandparent, uncle, or aunt of one's spouse is considered one's own grandparent, uncle or aunt. Rule AR4 is not quite the reciprocal of this: the spouse of one's niece, nephew or great-grandchild is considered one's own niece, nephew, or great-grandchild.

Rules AR5 and AR6 interpret one's spouse's child as one's own child or stepchild. The spouse of one's uncle or aunt is considered one's own uncle or aunt (rule AR7), and the niece or nephew of one's spouse is considered one's own niece or nephew (rule AR8).

Finally, rule AR9 expresses the equivalence of the two expressions for sibling-in-law. Neither is more primary than the other; the decision of which way to state the rule was arbitrary.

For such kinship descriptions as ΣPPPSΣ, the S and the two occurences of Σ can be removed with rules AR3, AR7, and then CR2. In the case of such descriptions as ΣSCCCΣ, we use rules AR4, AR8, and then CR1. These rules are also used to remove S and Σ from various other kinship descriptions in Table 1.

After using the reduction rules, we have affinal kinship descriptions of the following forms:

ΣG, ΣPG, SΣ, *SΣ, CΣP, CΣ, CCΣ.

3.7.3 Word Assignments

The terms for husband and wife are the only consanguineous or affinal terms in one's own generation which are differentiated on the basis of gender. Otherwise, all terms in higher generations do depend on sex of relative, and no terms in one's own or lower generations do. The term for sibling-in-law, ipar, can be used alone or in conjunction with a sibling term (rule AM3).

3.7.4 Morphological Rules

Indonesian has four words for "in-law". For parents-in-law, "mertua" is used; for siblings-in-law we have "ipar"; for children-in-law, "menantu"; and for co-parent-in-law, "bésan". Menantu is used alone for child-in-law, whereas mertua is used together with the consanguineous term for parent. Ipar can be used either alone or with the sibling term. It should be noted that whether we use the term "kakak ipar" or "adik ipar" depends not on the relative age of the speaker and the relative, but rather on the relative age of the siblings. Thus a woman's husband's younger brother is referred to as "adik ipar" even if he is older than the woman herself. Menantu can also be used with "cucu" (grandchild), to give us "grandchild-in-law".

3.8 Examples

The following examples were generated by the BASIC program which was written to simulate the production grammar. The program itself is discussed in Appendix 1. Substitute symbols were used for the symbols of more than one character (eg. $^{<}$S). The number of the rule used at each step is given below. Sometimes an unnecessary step occurs in the examples, and then is corrected with one of the reduction rules. This reflects the random nature of the program; it chose randomly among all rules which were applicable at any time. Productions which came to a dead-end without generating a kinship term have been omitted. Some loops within a single production were also omitted.

- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (S4) $\longrightarrow$ #C'# $\longrightarrow$ (S7) $\longrightarrow$ #C&tiri# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣC&tiri# $\longrightarrow$ (AR5) $\longrightarrow$ #C&tiri# $\longrightarrow$ (CW10)$\longrightarrow$ #anak&tiri#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (S1) $\longrightarrow$ #P'# $\longrightarrow$ (S2) $\longrightarrow$ #P'F# $\longrightarrow$ (S5) $\longrightarrow$ #PF&tiri# $\longrightarrow$ (CW4) $\longrightarrow$ #ibu&tiri#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (CS4) $\longrightarrow$ #PSF# $\longrightarrow$ (CS5) $\longrightarrow$ #P$^{>}$SF# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣP$^{>}$SF#$\longrightarrow$ (AR3) $\longrightarrow$ #P$^{>}$SF#

$\longrightarrow$ (CM2) $\longrightarrow$ #PF&dhe# $\longrightarrow$ (CW4) $\longrightarrow$ #ibu&dhe# $\longrightarrow$ (CM7) $\longrightarrow$ #bu&dhe#

- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (AS4) $\longrightarrow$ #CΣ# $\longrightarrow$ (AW3) $\longrightarrow$ #menantu#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS3) $\longrightarrow$ #PP# $\longrightarrow$ (CS4) $\longrightarrow$ #PPM# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPPM# $\longrightarrow$ (AR3) $\longrightarrow$ #PPM# $\longrightarrow$ (CW1) $\longrightarrow$ #kakek#
- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PF# $\longrightarrow$ (CW4) $\longrightarrow$ #ibu#
- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣP# $\longrightarrow$ (AS5) $\longrightarrow$ #ΣPF# $\longrightarrow$ (AM1) $\longrightarrow$ #PF&mertua# $\longrightarrow$ (CW4) $\longrightarrow$ #ibu&mertua#
- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (CW10) $\longrightarrow$ #anak#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (AS4) $\longrightarrow$ #SΣ# $\longrightarrow$ (AS6) $\longrightarrow$ #$^{>}$SΣ# $\longrightarrow$ (AM3) $\longrightarrow$ #$^{>}$S#ipar# $\longrightarrow$ (CW7) $\longrightarrow$ #kakak#ipar#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS2) $\longrightarrow$ #CC# $\longrightarrow$ (AS4) $\longrightarrow$ #CCΣ# $\longrightarrow$ (AM2) $\longrightarrow$ #CC&CΣ# $\longrightarrow$ (AS3) $\longrightarrow$#ΣCC&CΣ# $\longrightarrow$ (AR5) $\longrightarrow$ #CC&CΣ# $\longrightarrow$ (AW3) $\longrightarrow$ #CC&menantu# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣCC&menantu# $\longrightarrow$ (AR5) $\longrightarrow$ #CC&menantu# $\longrightarrow$ (CW11) $\longrightarrow$ #cucu&menantu#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{>}$S# $\longrightarrow$ (CW7) $\longrightarrow$ #kakak#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #SC# $\longrightarrow$ (CM4) $\longrightarrow$ #kep-Can# $\longrightarrow$ (CW10) $\longrightarrow$ #kepanakan# $\longrightarrow$ (CM5) $\longrightarrow$ #keponakan#
- #R# $\longrightarrow$ (AS2) $\longrightarrow$ #CΣP# $\longrightarrow$ (AW5) $\longrightarrow$ #bésan#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{<}$S# $\longrightarrow$ (CW8) $\longrightarrow$ #adik#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR#$\longrightarrow$ (CS3) $\longrightarrow$ #PP# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPP# $\longrightarrow$ (AR3) $\longrightarrow$ #PP# $\longrightarrow$ (CS4) $\longrightarrow$ #PPF# $\longrightarrow$ (CW2) $\longrightarrow$ #nenek#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (AS4) $\longrightarrow$ #SΣ# $\longrightarrow$ (AW4) $\longrightarrow$ #ipar#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (S3) $\longrightarrow$ #$^{<}$S'# $\longrightarrow$ (S6) $\longrightarrow$ #$^{<}$S#tiri# $\longrightarrow$ (CW8) $\longrightarrow$ #adik#tiri#

- #R# $\longrightarrow$ (AS1) $\longrightarrow$ #Σ# $\longrightarrow$ (AS5) $\longrightarrow$ #ΣM# $\longrightarrow$ (AW1) $\longrightarrow$ #suami#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PM# $\longrightarrow$ (CW3) $\longrightarrow$ #bapak#

- #R# $\longrightarrow$ (AS1) $\longrightarrow$ #Σ# $\longrightarrow$ (AS5) $\longrightarrow$ #ΣF# $\longrightarrow$ (AW2) $\longrightarrow$ #istri#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (S3) $\longrightarrow$ #W# $\longrightarrow$ (S6) $\longrightarrow$ #$^{>}$S#tiri# $\longrightarrow$ (CW7) $\longrightarrow$ #kakak#tiri#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS2) $\longrightarrow$ #CC# $\longrightarrow$ (CW11) $\longrightarrow$ #cucu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSC# $\longrightarrow$ (CW9) $\longrightarrow$ #sepupu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (CS4) $\longrightarrow$ #PSF# $\longrightarrow$ (CS5) $\longrightarrow$ #P$^{<}$SF# $\longrightarrow$ (CM3) $\longrightarrow$ #PF&lik# $\longrightarrow$ (CW4) $\longrightarrow$ #ibu&lik# $\longrightarrow$ (CM7) $\longrightarrow$ #bu&lik#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS3) $\longrightarrow$ #PPP# $\longrightarrow$ (CS4) $\longrightarrow$ #PPPM# $\longrightarrow$ (CM1) $\longrightarrow$ #PPM#buyut# $\longrightarrow$ (CW1) $\longrightarrow$ #kakek#buyut#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #RCC# $\longrightarrow$ (CS2) $\longrightarrow$ #CCC# $\longrightarrow$ (CW12) $\longrightarrow$ #cicit#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSCC# $\longrightarrow$ (CR3) $\longrightarrow$ #SC#$\longrightarrow$ (CM4) $\longrightarrow$ #kepCan# $\longrightarrow$ (CW10) $\longrightarrow$ #kepanakan# $\longrightarrow$ (CM5) $\longrightarrow$ #keponakan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSC# $\longrightarrow$ (CW9) $\longrightarrow$ #sepupu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRCC# $\longrightarrow$ (AS4) $\longrightarrow$ #PPRCC§# $\longrightarrow$ (AS3) $\longrightarrow$

#§PPRCC§# $\longrightarrow$ (CS1) $\longrightarrow$ #§PPSCC§# $\longrightarrow$ (CR3) $\longrightarrow$ #§PSC§#$\longrightarrow$ (AR4) $\longrightarrow$ #§PSC# $\longrightarrow$ (AR3) $\longrightarrow$ #PSC# $\longrightarrow$ (CW9) $\longrightarrow$ #sepupu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSCCC# $\longrightarrow$ (CR3) $\longrightarrow$ #SCC# $\longrightarrow$ (CR1) $\longrightarrow$ #CC# $\longrightarrow$ (CW11) $\longrightarrow$ #cucu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPPRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPPRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPPSCC# $\longrightarrow$ (CR3) $\longrightarrow$ #PPPSC#$\longrightarrow$ (CR3) $\longrightarrow$ #PPS# $\longrightarrow$ (CR2) $\longrightarrow$ #PP# $\longrightarrow$ (CS4) $\longrightarrow$ #PPM# $\longrightarrow$ (CW1) $\longrightarrow$ #kakek#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPSC# $\longrightarrow$ (CR3) $\longrightarrow$ #PS# $\longrightarrow$ (CS4) $\longrightarrow$ #PSF# $\longrightarrow$ (CS5) $\longrightarrow$ #P$^{>}$SF# $\longrightarrow$ (CM2) $\longrightarrow$ #PF&dhe# $\longrightarrow$ (CW4) $\longrightarrow$ #ibu&dhe# $\longrightarrow$ (CM7) $\longrightarrow$ #bu&dhe#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPSC# $\longrightarrow$ (CR3) $\longrightarrow$ #PS# $\longrightarrow$ (CS4) $\longrightarrow$ #PSM# $\longrightarrow$ (CS5) $\longrightarrow$ #P$^{<}$SM# $\longrightarrow$ (CW5) $\longrightarrow$ #paman#

Chapter 4

Javanese

4.1 Kinship Data

Data was obtained from a number of literary sources, and checked with various Javanese speakers. Javanese has several distinct hierarchical levels, with different nouns, verbs, and adjectives depending on the level of respect to be shown. Here we are using kinship terms at the familiar ("ngoko") level. There are alternate terms, notably at the most formal ("krama inggil") level. These will not be dealt with here.

There was some disagreement in the literature over the terms "misanan" and "mindhoan". Geertz [10] lists misanan as PSC and mindhoan as PPSCC, whereas Koentjaraningrat [15] lists misanan as PPSCC and mindhoan as PPPSCCC. Robson [22] lists misan for PPSCC and mindho for PPPSCCC, whereas Syafri Sairin [23] gives PSCC for misanan and PPSCC for mindhoan. We have followed Koentjaraningrat in this case. According to one informant, PSC for misanan is more usual usage in East Java, and PPSCC in central Java and the sultanates of Solo and Yogyakarta.

We require the extra symbol D, for deriving the suffixes for ancestors and descendents.

The tables are not complete. It seems that terms for generations higher than +10 and lower than -10 are not part of the vocabulary of Javanese speakers. In

fact many of the terms listed for ancestors and descendants are not well known. We have also omitted kinship descriptions which may be reduced to ones on the table, by means of reduction rules.

In the tables, as well as in the rules which follow, brackets represent something optional. Primarily consanguineous terms (terms whose primary meaning refers to a blood relation) are presented in Table 4.1, steprelation terms in Table 4.2, and affinal terms in Table 4.3.

4.2 The Consanguineous Productions

4.2.1 Structure Rules

CS1 R$\longrightarrow$RC, PR, S

CS2 R$\longrightarrow$C after #

CS3 R$\longrightarrow$P before #

CS4 #$\longrightarrow$G# after #P(S), or #S

CS5 &$\longrightarrow$G& after #$^{>}$S

CS6 S$\longrightarrow{}^{>}$S, $^{<}$S in context #PP...#, #(P)...G#, #PP...CC#, or #PPP...CCC#, or #...C#

4.2.2 Reduction Rules

CR1 SC$\longrightarrow$C in context #...CC

CR2 PS$\longrightarrow$P in context PP...#

4.2.3 Word Assignments

in context #...# unless otherwise specified

CW1 PP $\longrightarrow$mbah also in context #...&

10	$(\Sigma)P^{10}(S)(\Sigma)$		mbah galih-asem	
9	$(\Sigma)P^{9}(S)(\Sigma)$		mbah debok-bosok	
8	$(\Sigma)P^{8}(S)(\Sigma)$		mbah gropak-senté	
7	$(\Sigma)P^{7}(S)(\Sigma)$		mbah gantung-siwur	
6	$(\Sigma)P^{6}(S)(\Sigma)$		mbah udeg-udeg	
5	$(\Sigma)P^{5}(S)(\Sigma)$		mbah warèng	
4	$(\Sigma)P^{4}(S)(\Sigma)$		mbah canggah	
3	$(\Sigma)P^{3}(S)(\Sigma)$		mbah buyut	
2	PP $PP^{>}S(\Sigma)$ $PP^{<}S(\Sigma)$		mbah mbah dhé mbah lik	
1	PM $P^{>}S(\Sigma)M$ $P^{<}S(\Sigma)M$	bapak pak dhé pak lik	PF $P^{>}S(\Sigma)F$ $P^{<}S(\Sigma)F$	ibu bu dhé bu lik
0	$^{>}SM$	kangmas	$^{>}SF$	mbakyu
	$^{<}S$ PSC PPSCC		adhi naksanak misanan	
	$PP^{>}SCCM$	kangmas misanan	$PP^{>}SCCF$	mbakyu misanan
	$PP^{<}SCC$ PPPSCCC		adhi misanan mindhoan	
	$PPP^{>}SCCCM$	kangmas mindhoan	$PPP^{>}SCCCF$	mbakyu mindhoan
	$PPP^{<}SCCC$		adhi mindhoan	
-1	C $(\Sigma)^{>}SC(\Sigma)$ $(\Sigma)^{<}SC(\Sigma)$		anak keponakan perunan	
-2	CC SCC		putu putu (ke)ponakan	
-3	$(\Sigma)(S)C^{3}(\Sigma)$		putu buyut	
-4	$(\Sigma)(S)C^{4}(\Sigma)$		putu canggah	
-5	$(\Sigma)(S)C^{5}(\Sigma)$		putu warèng	
-6	$(\Sigma)(S)C^{6}(\Sigma)$		putu udeg-udeg	
-7	$(\Sigma)(S)C^{7}(\Sigma)$		putu gantung-siwur	
-8	$(\Sigma)(S)C^{8}(\Sigma)$		putu gropak-senté	
-9	$(\Sigma)(S)C^{9}(\Sigma)$		putu debok-bosok	
-10	$(\Sigma)(S)C^{10}(\Sigma)$		putu galih-asem	

Table 4.1: Javanese Primarily Consanguineous Kinship Terms

1	P′M	bapak kuwalon	P′F	mbok kuwalon
0	$^{>}$S′M	kangmas kuwalon	$^{>}$S′F	mbakyu kuwalon
	$^{<}$S′		adhi kuwalon	
-1	C′		anak kuwalon	

Table 4.2: Javanese Steprelation Terms

2	ΣPP ΣPP$^{>}$S ΣPP$^{<}$S		mbah maratuwa mbah dhé maratuwa mbah lik maratuwa	
1	ΣPM ΣP$^{>}$S(Σ)M ΣP$^{<}$S(Σ)M	bapak maratuwa pak dhé maratuwa pak lik maratuwa	ΣPF ΣP$^{>}$S(Σ)F ΣP$^{<}$S(Σ)F	ibu maratuwa bu dhé maratuwa bu lik maratuwa
0	Σ ΣS, SΣ		bojo ipé	
	$^{>}$SΣM, Σ$^{>}$SM	kangmas ipé	$^{>}$SΣF, Σ$^{>}$SF	mbakyu ipé
	$^{<}$SΣ, Σ$^{<}$S ΣSΣ		adhi ipé pripéan	
	Σ$^{>}$SΣM	kangmas pripéan	Σ$^{>}$SΣF	mbakyu pripéan
	Σ$^{<}$SΣ CΣP		adhi pripéan bésan	
-1	CΣ		mantu	
-2	CCΣ		putu mantu	

Table 4.3: Javanese Affinal Kinship Terms

CW2 PM $\longrightarrow$bapak also in context #...&

CW3 PF $\longrightarrow$ibu also in context #...&

CW4 $^{>}$SM $\longrightarrow$kangmas also in context #...&

CW5 $^{>}$SF $\longrightarrow$mbakyu also in context #...&

CW6 $^{<}$S $\longrightarrow$adhi in context #...(G)#or #...&

CW7 PPSCC $\longrightarrow$misanan also in context &...#

CW8 PPPSCCC $\longrightarrow$mindhoan also in context &...#

CW9 C $\longrightarrow$anak in context #...# , #...sanak , kep...an or #...&

CW10 $^{<}$SC$\longrightarrow$perunan

CW11 CC $\longrightarrow$putu also in context #...&

CW12 D^3 $\longrightarrow$buyut

CW13 D^4 $\longrightarrow$canggah

CW14 D^5 $\longrightarrow$warèng

CW15 D^6 $\longrightarrow$udeg-udeg

CW16 D^7 $\longrightarrow$gantung-siwur

CW17 D^8 $\longrightarrow$gropak-senté

CW18 D^9 $\longrightarrow$debok-bosok

CW19 D^{10} $\longrightarrow$galih-asem

4.2.4 Morphological Rules

in context #...# unless otherwise specified

CM1 $P^n \longrightarrow$mbah#D^n for $3 \leq n \leq 10$

CM2 $C^n \longrightarrow$putu#D^n for $3 \leq n \leq 10$

CM3 $PP^{>}S \longrightarrow$PP&dhé also in context #...&

CM4 $PP^{<}S \longrightarrow$PP&lik also in context #...&

CM5 $P^{>}SG \longrightarrow$PG&dhé also in context #...&

CM6 $P^{<}SG \longrightarrow$PG&lik also in context #...&

CM7 PSC $\longrightarrow$Csanak in context #...#

CM8 PP*SCC $\longrightarrow$*S&PPSCC

CM9 PPP*SCCC $\longrightarrow$*S&PPPSCCC

CM10 $^{>}$SC$\longrightarrow$kepCan also in context &...#

CM11 SCC $\longrightarrow$CC&$^{>}$SC

CM12 G$\longrightarrow$ after adhi

CM13 kepanakan$\longrightarrow$keponakan in any context

CM14 bapak$\longrightarrow$pak before &dhé or &lik

CM15 ibu$\longrightarrow$bu before &dhé or &lik

CM16 keponakan$\longrightarrow$ponakan after &

CM17 anaksanak$\longrightarrow$naksanak

4.3 Steprelation Productions

S1 P$\longrightarrow$P′ in context #...#

S2 P′$\longrightarrow$P′G in context #...#

S3 S$\longrightarrow^{>}$S′, $^{<}$S′ in context #...G#

S4 C$\longrightarrow$C′ in context #...#

S5 P′G$\longrightarrow$PG&kuwalon

S6 *S′G$\longrightarrow$*SG#kuwalon

S7 C′$\longrightarrow$C&kuwalon

S8 ibu$\longrightarrow$mbok before &k

4.4 The Affinal Productions

4.4.1 Structure Rules

AS1 R$\longrightarrow\Sigma$ in context #...#

AS2 R$\longrightarrow$CΣP in context #...#

AS3 #$\longrightarrow$#Σ before P, S, or C

AS4 #$\longrightarrow\Sigma$# after P, S, or C

AS5 #$\longrightarrow$G# after #SΣ or #ΣSΣ

AS6 S$\longrightarrow^{>}$S, $^{<}$S in context #...ΣG# or #Σ...ΣG#

4.4.2 Reduction Rules

AR1 P$\Sigma\longrightarrow$P

AR2 P$\Sigma\longrightarrow$P′ in context #...#

AR3 $\Sigma P \longrightarrow P$ before PP or S

AR4 $C\Sigma \longrightarrow C$ after CC or S or *S

AR5 $\Sigma C \longrightarrow C$

AR6 $\Sigma C \longrightarrow C'$ in context #...#

AR7 $S\Sigma \longrightarrow S$ after P

AR8 $\Sigma S \longrightarrow S$ before C

AR9 $\Sigma S \longrightarrow S\Sigma$ in context #...#

4.4.3 Word Assignments

in context #...# unless otherwise specified

AW1 $\Sigma \longrightarrow$bojo

AW2 $C\Sigma \longrightarrow$mantu also in context &...#

AW3 $C\Sigma P \longrightarrow$bésan

AW4 $S\Sigma \longrightarrow$ipé

AW5 $\Sigma S\Sigma \longrightarrow$pripéan

4.4.4 Morphological Rules

in context #...#

AM1 $\Sigma PG \longrightarrow$PG&maratuwa

AM2 $\Sigma PP \longrightarrow$PP&maratuwa

AM3 $\Sigma PP^*S \longrightarrow$PP*S&maratuwa

AM4 $\Sigma P^*SG \longrightarrow$P*SG&maratuwa

AM5 CCΣ⟶CC&CΣ

AM6 *SΣG⟶*SG#ipé

AM7 Σ*SΣG⟶*SG#pripéan

4.5 Discussion of Consanguineous Productions

4.5.1 Structure Rules

The pure stucture rules generate the provisional kinship descriptions:

R⟶P^{m+1}, C^{n+1}, P^mSC^n, PSG, PG, PP*SCC, PPP*SCCC, *SG, P*SG, PP*S, *SC

where m and n are non-negative integers. The kinship descriptions which differentiate between older and younger siblings are the six final ones listed. Thus we allow S to be changed to $^>$S or $^<$S only for these kinship descriptions. It is typical of Indonesian languages that only relatives who are older but close in generation (or of the same generation) to the speaker are distinguished on the basis or seniority (here this is true with the exception of *SC). Rule CS5 is for when we reduce (P)PP$^>$SCC(C) to $^>$S#(P)PPSCC(C) and need to add gender. Otherwise we insert gender first, then seniority. Javanese has more distinctions based on seniority than the other Indonesian languages studied, with distinctions occuring at the +2, +1, 0, and -1 generations. In fact, Javanese is the only language of the five to have a distinction at a generation below 0.

Many kinship descriptions of the form outlined above do not appear in the data, for one of two reasons. Either they can be reduced to kinship descriptions which are in the table, or they belong to generations which are not accounted for in the table. While the production grammar allows kinship descriptions to be generated for any generation, the ones which do not appear in the table do not seem to correspond to terms which are a part of the day to day vocabulary of a native speaker. Thus they are not dealt with here. The native speaker would understand

the kinship description P^8SC^5, for example, but may not have a kinship term for it. The grammar is the same in this respect.

There is often more than one way to generate a given kinship description. We give several ways to generate PPSC:

$R \longrightarrow PR \longrightarrow PPR \longrightarrow PPRC \longrightarrow PPSC$

$R \longrightarrow RC \longrightarrow PRC \longrightarrow PPRC \longrightarrow PPSC$

$R \longrightarrow PR \longrightarrow PRC \longrightarrow PPRC \longrightarrow PPSC$

In the Introduction, certain combinations of symbols were mentioned as being ambiguous or redundant. The context restrictions prevents those combinations (SP, CS, SS, PC, CP, $P\Sigma$, ΣC) from occuring, except for the final two. We will have reduction rules for dealing with those two, as we wish to deal with both possibilities for $P\Sigma$, namely P and P′, and both possibilities for ΣC, namely C and C′).

We insert a gender after only those kinship descriptions which distinguish on the basis of gender. These are P, PS, $^{>}$S, and S. For both consanguineous and affinal relations, only relations from the speaker's own generation or an older generation are distinguished on the basis of gender.

4.5.2 Reduction Rules

Great grandchildren of one's siblings are considered one's own great grandchildren. The same happens for generations below this one. Thus the term for great-grandchild also means "child in the third descending generation". Siblings of great grandparents are considered one's own great grandparents, so the reduction is symmetric. Rules CR1 and CR2 express this. In Indonesian, this reduction occurs at the +2 and -2 generations also. So the Javanese language distinguishes siblings of ancestors and descendents a little more than does Indonesian.

There is no cousin reduction rule, as we had for Indonesian. In Javanese, one distinguishes first, second, and third cousins, and after that, the relationship is considered distant. According to one informant, the term "naksanak" is sometimes used to refer to all cousins, regardless of how distant.

After performing all possible reductions, our kinship descriptions will be of one of the following forms:

R$\longrightarrow$P^{m+2}, C^{n+1}, P^{m+1}SC^{n+1}, PP*S, P*SG, PG, *S(G), SC, *SC, SCC, PP*SCC, PPP*SCCC

where m and n are non-negative integers.

4.5.3 Word Assignments

The term "mbah" is a shortened form of "simbah", which is still used in some parts of Java. For father and mother, we have the same terms as for Indonesian. "kangmas" and "mbakyu" are oftened shortened to "mas" and "mbak" respectively, and these latter terms also function as respectful terms of address for non- relatives of one's approximate age. The term "adhi" is obviously similar to the Indonesian "adik"; the "dh" sound is not a part of the Indonesian language.

In Javanese, older siblings are distinguished by gender, whereas in Indonesian they are not. In both languages, younger siblings are not distinguished by gender. With respect to gender distinctions in general, in conversation one might ask how many of one's "adhi"s are male and how many are female. The answer would be, for example, "three female, one male"; ie, there is no specific term for "male younger brother" etc. Although the term "adhi lanang" would be understood as younger brother ("lanang" means "male" or "man"), it is more normal usage to say only "adhi", and then the sex can be asked in a separate question if necessary.

The term for second cousin, "misanan", comes from "pisan" roughly meaning "once", with the suffix "-an" which converts the word to a noun. The term for third cousin, "mindhoan", similarly comes from "pindo" ("twice").

Javanese has terms for ancestors and descendents up to ten generations from the speaker. The terms for the ascendents are the same as for the descendents but with "mbah" added to the ascendent terms and "putu" to the descendent terms. Some of the terms seem rather creative, for instance "debok-bosok", which means "rotten banana tree". We see buyut again, being used in similar fashion as in Indonesian.

The & in certain contexts here prevents the formation of invalid kinship terms.

If & were not used, we could form, for example, bapak maratuwa maratuwa from PM#maratuwa, by appending an extra Σ. But with the use of & we have PM&maratuwa, which cannot then be used to produce bapak maratuwa maratuwa, because of the context restriction in rule AM1. The & indicates that there is already a kinship term following it, so we cannot form another compound preceding it.

4.5.4 Morphological Rules

As in Indonesian, uncle and aunt are differentiated according to the relative age of the relative and the parent. Older uncle becomes "pak dhé". The adjective "dhé" comes from the Javanese "gedhé", meaning "big". Similarly, "lik" comes from the Javanese "cilik", "little". Thus older uncle is "big father", younger aunt is "little mother" and so on. In Javanese we have a similar construction for siblings of grandparents. Grandparents are not distinguished according to gender, so we have "big grandparent" and "little grandparent". According to informant testimony, the cousin of one's parent is often referred to with a term for uncle/aunt (seniority determined by relative age of intervening siblings as usual). Similarly, the child of one's cousin is often referred to with a term for niece/nephew. Thus it seems that we could postulate a reduction rule similar to that in Indonesian, PSC$\longrightarrow$S, in certain contexts. But here it would not be used to reduce nth cousins to first cousins, as the Javanese distinguish up to third cousins.

The term for first cousin, "naksanak", can be broken into two morphemes, "nak", meaning "child", and "sanak", meaning "sibling" [14], as carried out in rules CM7 and CM17. Second and third cousins can be referred to by a combination of a sibling term and the appropriate cousin term, for example "kangmas mindhoan". It is important to note that the term used is determined not by the relative age between speaker and relative, but by the seniority between the intervening siblings. Thus if my grandfather's older brother has a granddaughter, I will refer to her as my mbakyu misanan, even though she may be younger than me (her "roots" are older). As in Indonesian, we have "keponakan" for nephew or niece, but in Javanese we also have the compound form "putu ponakan" for SCC, in which "keponakan"

is shortened. This production is accomplished by rules CM11, CM10, CW9, CM13, and CM16.

Rule CM12 allows us to drop gender after adhi, as younger siblings are not distinguished on the basis of gender (gender is assigned before seniority in the production of $^{<}$SG; also, $^{<}$SG can result from a steprelation production).

Bapak and ibu are shortened to pak and bu, respectively, by rules CM14 and CM15. These shortened forms are the usual terms of address for father and mother.

4.6 Discussion of Steprelation Productions

The terms for steprelations are just the normal terms, with the suffix "kuwalon" added. As an example,

R$\longrightarrow$S$\longrightarrow$SM$\longrightarrow{}^{>}$S'M$\longrightarrow{}^{>}$SM#kuwalon$\longrightarrow$kangmas kuwalon

As for Indonesian, we have rules S1 and S2 separately instead of just having P$\longrightarrow$P'G since we can also get P' from PΣ (rule AR2), and then we need to be able to add the gender. The term for step- ("kuwalon") can only be used with immediate family relations, thus the context of #...# in rules S1 to S4.

The use of & also prevents incorrect derivations with the steprelation terms. For instance, before & was used, it was possible to generate the invalid term anak kuwalon kuwalon, among others (the BASIC program discussed in Appendix 1 actually generated such terms). With the use of & however, we first generate C&kuwalon, and then cannot generate an additional "kuwalon" because of the context restriction in rule S4.

Rule S8 allows for the generation of the term "mbok kuwalon" rather than "ibu kuwalon".

4.7 Discussion of Affinal Productions

4.7.1 Structure Rules

Using rules AS3 and AS4, we can generate kinship descriptions of the following forms:

$(\Sigma)P^{m+1}(\Sigma)$, $(\Sigma)C^{n+1}(\Sigma)$, $(\Sigma)P^{m}SC^{n}(\Sigma)$, (Σ)PP*SCC(Σ), (Σ)PPP*SCCC(Σ), ΣPP*S, ΣP*S, ΣPS, PSΣ, *SCΣ

where m and n are non-negative integers. (Σ)PPP*SCCC(Σ) can be reduced to PPP*SCCC using rules AR3 and AR4. (Σ)PP*SCC(Σ) cannot be assigned a kinship term. I am not certain whether one's wife's second cousin (or indeed third cousin) should be referred to as one's own second (third) cousin or as one's sibling-in-law, or neither. PSΣ is reduced to PS by AR7, ΣP*S and ΣPS are reduced to the same thing, by AR3. *SCΣ can be reduced to *SC with rule AR4. ΣPP*S is a relevant kinship description.

Rule AS1 is for generating Σ. Rule AS2 generates the kinship description for the symmetric term "bésan", which means "child's parent-in-law", or "co-parent-in-law", also used in Indonesian.

Rule AS4 cannot be used on a kinship description already containing M or F. Rule AS3, however, can, producing ΣPG, ΣPSG, ΣP*SG, and ΣSG. ΣPG and ΣP*SG are relevant, and Σ is dropped from ΣPSG with rule AR3 (this goes on to be given a consanguineous term; if we want to form the affinal one, we must append Σ to P*SG). ΣSG is a dead end since seniority can only be added after converting ΣS to SΣ, but we cannot do this because of the context restriction (before adding gender). We could add (G) to the context, but we do not since there is an alternate way of dealing with Σ*S. We generate the term for Σ>SG by converting ΣS directly to SΣ and continuing on to get >SΣG.

With rule AS5 we add gender to two affinal descriptions which require it, and cannot get it from anywhere else (for instance, we can get ΣPG by appending Σ to PG). To generate the correct term for P*SΣG, we first drop the Σ from PSΣ using rule AR7, only then adding gender and then seniority using the consanguineous

production rules. P*SΣG itself is never generated; but we arrive at the correct kinship term for it. Thus there are only two affinal terms which require a new seniority rule, namely SΣG (since ΣS will be reduced to SΣ with rule AR9) and ΣSΣG. We could even eliminate this last one, only inserting seniority after using rule AM7 (without the *).

4.7.2 Reduction Rules

The reduction rules here are similar to those for Indonesian. We will point out several differences. Rules AR1 and AR2 interpret parent's spouse as either parent or step-parent. As the term for step- ("kuwalon") can only be used with immediate family relations, we have the context of #...# in rules AR2 and AR6.

Rule AR3 indicates that the great grandparent of one's spouse is considered one's own great grandparent. The S is present in the context restriction only to prevent a dead end in the case of generating ΣPS; the uncles and aunts of one's spouse are not reduced to one's own uncles and aunts. This rule is different to Indonesian in that Javanese has a term for spouse's grandparent, so the reduction rule only comes into effect at the +3 generation; and also in Indonesian we do merge spouse's uncles and aunts with our own uncles and aunts. Rule 4 is the same as for Indonesian; the spouse of one's niece, nephew or great- grandchild is considered one's own niece, nephew, or great-grandchild. So now there is symmetry where in Indonesian there was not. This suggests several possibilities: that "cucu menantu" has been introduced into Indonesian from Javanese (from "putu mantu"), or that perhaps there was also a term in Indonesian for ΣPP which has fallen out of use.

Rules AR5 and AR6 interpret one's spouse's child as one's own child or step-child. The spouse of one's uncle or aunt is considered one's own uncle or aunt (rule AR7), and the niece or nephew of one's spouse is considered one's own niece or nephew (rule AR8). Thus Σ*SC is never produced; we reduce ΣSC directly to SC.

Finally, rule AR9 expresses the equivalence of the two expressions for sibling-in-law. Neither is more primary than the other; the decision of which way to state the rule was arbitrary.

For such kinship descriptions as ΣPPPPPPSΣ, the S and the two occurences of Σ can be removed with rules AR3, AR7, and then CR2. In the case of such descriptions as ΣSCCCCΣ, we use rules AR4, AR8, and then CR1.

After using the reduction rules, we have affinal kinship descriptions of the following forms:

Σ, ΣPG, ΣP*SG, ΣPP, ΣPP*S, *SΣG, SΣ, ΣSΣ, Σ*SΣG, CΣP, CΣ, CCΣ.

4.7.3 Word Assignments

Javanese has one term for "spouse" rather than separate terms for husband and wife as in Indonesian. Javanese "ipé" resembles Indonesian "ipar". Javanese has the term "pripéan" for ΣSΣ, which Indonesian has no separate term for (it seems that "ipar" is often used). One could suppose that "pripéan" is also used for SΣS.

4.7.4 Morphological Rules

Javanese has five terms for "in-law". For parents- in-law and grandparents-in-law (and siblings of each), "maratuwa" is used; for siblings-in-law we have "ipé"; for children-in-law, "mantu"; for co-parent-in-law, we have "bésan"; and "pripéan" for the spouse of one's spouse's sibling. Mantu is used alone for child-in-law, or with "putu" (grandchild), to give us grandchild-in-law. Maratuwa is used together with the consanguineous term for parent, sibling of parent, grandparent or sibling of grandparent. Ipé can be used alone, or with the consanguineous sibling terms (rule AM5). As with the other Indonesian languages studied here, whether we use the term "kangmas ipé" or "adhi ipé" depends not on the relative age of the speaker and the relative, but rather on the relative age of the siblings. Thus a woman's husband's younger brother is referred to as "adhi ipé" even if he is older than the woman herself. "Pripéan" can be assumed to have "ipé" as a root, and can also be used alone or with the consanguineous sibling terms (rule AM6).

4.8 Examples

The following examples were generated by the BASIC program which was written to simulate the production grammar. The program itself is discussed in Appendix 1. Accents were omitted in the computer generations, but have been since inserted below. Substitute symbols were used for the symbols of more than one character (eg. $^{<}$S). The number of the rule used at each step is given below. Sometimes an unnecessary step occurs in the examples, and then is corrected with one of the reduction rules. This reflects the random nature of the program; it chose randomly among all rules which were applicable at any time. Productions which came to a dead-end without generating a kinship term have been omitted. Some loops within a single production were also omitted.

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣS# $\longrightarrow$ (AS4) $\longrightarrow$ #ΣSΣ# $\longrightarrow$ (AW5) $\longrightarrow$ #pripéan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #RCC# $\longrightarrow$ (AS4) $\longrightarrow$ #RCCΣ# $\longrightarrow$ (CS2) $\longrightarrow$ #CCCΣ# $\longrightarrow$ (AR4) $\longrightarrow$ #CCC# $\longrightarrow$ (CM2) $\longrightarrow$ #putu#DDD# $\longrightarrow$ (CW12) $\longrightarrow$ #putu#buyut#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS4) $\longrightarrow$ #SM# $\longrightarrow$ (S3) $\longrightarrow$ #$^{<}$S'M# $\longrightarrow$ (S6) $\longrightarrow$ #$^{<}$SM#kuwalon# $\longrightarrow$ (CW6) $\longrightarrow$ #adhiM#kuwalon# $\longrightarrow$ (CM12) $\longrightarrow$ #adhi#kuwalon#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (AS4) $\longrightarrow$ #PΣ# $\longrightarrow$ (AR2) $\longrightarrow$ #P'# $\longrightarrow$ (S2) $\longrightarrow$ #P'F# $\longrightarrow$ (S5) $\longrightarrow$ #PF&kuwalon# $\longrightarrow$ (CW3) $\longrightarrow$ #ibu&kuwalon# $\longrightarrow$ (S8) $\longrightarrow$ #mbok&kuwalon#

- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (CW9) $\longrightarrow$ #anak#

- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (AS4) $\longrightarrow$ #CΣ# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣCΣ# $\longrightarrow$ (AR5) $\longrightarrow$ #CΣ# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣCΣ# $\longrightarrow$ (AR5) $\longrightarrow$ #CΣ# $\longrightarrow$ (AW2) $\longrightarrow$ #mantu#

- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (S4) $\longrightarrow$ #C'# $\longrightarrow$ (S7) $\longrightarrow$ #C&kuwalon# $\longrightarrow$ (CW9) $\longrightarrow$ #anak&kuwalon#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (AS4) $\longrightarrow$ #PΣ# $\longrightarrow$ (AR1) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PF# $\longrightarrow$ (CW3) $\longrightarrow$ #ibu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #RCC# $\longrightarrow$ (CS1) $\longrightarrow$ #SCC# $\longrightarrow$ (CM11) $\longrightarrow$ #CC&$^{>}$SC# $\longrightarrow$ (CW11) $\longrightarrow$ #putu&$^{>}$SC# $\longrightarrow$ (CM10) $\longrightarrow$ #putu&kepCan# $\longrightarrow$ (CW9) $\longrightarrow$#putu&kepanakan# $\longrightarrow$ (CM13) $\longrightarrow$ #putu&keponakan# $\longrightarrow$ (CM16) $\longrightarrow$ #putu&ponakan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS2) $\longrightarrow$ #CC# $\longrightarrow$ (CW11) $\longrightarrow$ #putu#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PF# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPF# $\longrightarrow$ (AM1) $\longrightarrow$ #PF&maratuwa# $\longrightarrow$ (CW3) $\longrightarrow$ #ibu&maratuwa#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS4) $\longrightarrow$ #SM# $\longrightarrow$ (CS6) $\longrightarrow$ #$^{>}$SM# $\longrightarrow$ (CW4) $\longrightarrow$ #kangmas#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS4) $\longrightarrow$ #SM# $\longrightarrow$ (S3) $\longrightarrow$ #$^{>}$S'M# $\longrightarrow$ (S6) $\longrightarrow$ #$^{>}$SM#kuwalon# $\longrightarrow$ (CW4) $\longrightarrow$ #kangmas#kuwalon#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (S1) $\longrightarrow$ #P'# $\longrightarrow$ (S2) $\longrightarrow$ #P'M# $\longrightarrow$ (S5) $\longrightarrow$ #PM&kuwalon# $\longrightarrow$ (CW2) $\longrightarrow$ #bapak&kuwalon#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS4) $\longrightarrow$ #SF# $\longrightarrow$ (CS6) $\longrightarrow$ #$^{<}$SF# $\longrightarrow$ (CW6) $\longrightarrow$ #adhiF# $\longrightarrow$ (CM12) $\longrightarrow$ #adhi#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (AS4) $\longrightarrow$ #PRCCΣ# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRCCΣ# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPPRCCΣ#$\longrightarrow$ (CS1) $\longrightarrow$ #ΣPPPRCCΣ# $\longrightarrow$ (CS1) $\longrightarrow$ #ΣPPPRCCCΣ# $\longrightarrow$ (CS1) $\longrightarrow$ #ΣPPPSCCCΣ# $\longrightarrow$ (AR3) $\longrightarrow$ #PPPSCCCΣ# $\longrightarrow$ (AR4) $\longrightarrow$ #PPPSCCC# $\longrightarrow$ (CS6) $\longrightarrow$#PPP$^{<}$SCCC# $\longrightarrow$ (CM9) $\longrightarrow$ #$^{<}$S&PPPSCCC# $\longrightarrow$ (CW8) $\longrightarrow$ #$^{<}$S&mindhoan# $\longrightarrow$ (CW6) $\longrightarrow$ #adhi&mindhoan#

- #R# ⟶ (CS1) ⟶ #S# ⟶ (AS4) ⟶ #SΣ# ⟶ (AW4) ⟶ #ipé#
- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PRC# ⟶ (AS4) ⟶ #PRCΣ# ⟶ (CS1) ⟶ #PSCΣ# ⟶ (AS3) ⟶ #ΣPSCΣ# ⟶ (AR4) ⟶ #ΣPSC# ⟶ (AR3) ⟶ #PSC#⟶ (CM17) ⟶ #naksanak#
- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS3) ⟶ #PP# ⟶ (CW1) ⟶ #mbah#
- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PPR# ⟶ (CS1) ⟶ #PPPR# ⟶ (AS3) ⟶ #ΣPPPR# ⟶ (CS1) ⟶ #ΣPPPS# ⟶ (CR2) ⟶ #ΣPPP# ⟶ (AR3) ⟶ #PPP# ⟶ (AS4) ⟶ #PPPΣ# ⟶ (AR1) ⟶ #PPP#⟶ (CM1) ⟶ #mbah#DDD# ⟶ (CW12) ⟶ #mbah#buyut#
- #R# ⟶ (CS1) ⟶ #S# ⟶ (AS3) ⟶ #ΣS# ⟶ (AS4) ⟶ #ΣSΣ# ⟶ (AS5) ⟶ #ΣSΣF# ⟶ (AS6) ⟶ #Σ$^{<}$SΣF# ⟶ (AM7) ⟶ #$^{<}$SF#pripéan# ⟶ (CW6) ⟶ #adhiF#pripéan# ⟶ (CM12) ⟶ #adhi#pripéan#
- #R# ⟶ (CS1) ⟶ #RC# ⟶ (AS4) ⟶ #RCΣ# ⟶ (CS1) ⟶ #RCCΣ# ⟶ (CS2) ⟶ #CCCΣ# ⟶ (AR4) ⟶ #CCC# ⟶ (CM2) ⟶ #putu#DDD# ⟶ (CW12) ⟶ #putu#buyut#
- #R# ⟶ (AS2) ⟶ #CΣP# ⟶ (AW3) ⟶ #bésan#
- #R# ⟶ (CS1) ⟶ #RC# ⟶ (CS1) ⟶ #SC# ⟶ (CS6) ⟶ #AC# ⟶ (CW10) ⟶ #perunan#
- #R# ⟶ (CS1) ⟶ #RC# ⟶ (AS4) ⟶ #RCΣ# ⟶ (CS1) ⟶ #RCCΣ# ⟶ (CS1) ⟶ #RCCCΣ# ⟶ (CS2) ⟶ #CCCCΣ# ⟶ (AR4) ⟶ #CCCC# ⟶ (CM2) ⟶ #putu#DDDD#⟶ (CW13) ⟶ #putu#canggah#
- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PPR# ⟶ (CS1) ⟶ #PPS# ⟶ (CS6) ⟶ #PP$^{>}$S# ⟶ (AS3) ⟶ #§PP$^{>}$S# ⟶ (AM3) ⟶ #PP$^{>}$S&maratuwa# ⟶ (CM3) ⟶#PP&dhé&maratuwa# ⟶ (CW1) ⟶ #mbah&dhé&maratuwa#

- #R# ⟶ (CS1) ⟶ #S# ⟶ (AS3) ⟶ #ΣS# ⟶ (AR9) ⟶ #SΣ# ⟶ (AW4) ⟶ #ipé#

- #R# ⟶ (CS1) ⟶ #RC# ⟶ (CS2) ⟶ #CC# ⟶ (AS4) ⟶ #CCΣ# ⟶ (AM5) ⟶ #CC&CΣ# ⟶ (CW11) ⟶ #putu&CΣ# ⟶ (AW2) ⟶ #putu&mantu#

- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PS# ⟶ (CS4) ⟶ #PSF# ⟶ (CS6) ⟶ #P$^{>}$SF# ⟶ (AS3) ⟶ #ΣP$^{>}$SF# ⟶ (AM4) ⟶ #P$^{>}$SF&maratuwa# ⟶ (CM5) ⟶ #PF&dhé&maratuwa# ⟶ (CW3) ⟶ #ibu&dhé&maratuwa# ⟶ (CM15) ⟶ #bu&dhé&maratuwa#

- #R# ⟶ (CS1) ⟶ #S# ⟶ (AS4) ⟶ #SΣ# ⟶ (AS3) ⟶ #ΣSΣ# ⟶ (AS5) ⟶ #ΣSΣM# ⟶ (AS6) ⟶ #Σ$^{>}$SΣM# ⟶ (AM7) ⟶ #$^{>}$SM#pripéan# ⟶ (CW4) ⟶ #kangmas#pripéan#

- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PPR# ⟶ (CS1) ⟶ #PPPR# ⟶ (CS1) ⟶ #PPPPR# ⟶ (CS1) ⟶ #PPPPPR#(CS3) ⟶#PPPPPP# ⟶ (CM1) ⟶ #mbah#DDDDDD# ⟶ (CW15) ⟶ #mbah#udeg-udeg#

- #R# ⟶ (CS1) ⟶ #RC# ⟶ (CS1) ⟶ #RCC# ⟶ (CS1) ⟶ #RCCC# ⟶ (CS1) ⟶ #RCCCC# ⟶ (CS1) ⟶ #RCCCCC# ⟶ (CS1) ⟶ #RCCCCCC#⟶ (CS1) ⟶ #RCCCCCCC# ⟶ (CS2) ⟶ #CCCCC-CCC# ⟶ (CM2) ⟶ #putu#DDDDDDDD# ⟶ (CW17) ⟶ #putu#gropak-senté#

- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PS# ⟶ (CS4) ⟶ #PSM# ⟶ (CS6) ⟶ #PAM# ⟶ (CM6) ⟶ #PM&lik# ⟶ (CW2) ⟶ #ba-pak&lik# ⟶ (CM14) ⟶ #pak&lik#

- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PS# ⟶ (CS4) ⟶ #PSF# ⟶ (AS3) ⟶ #ΣPSF# ⟶ (AR3) ⟶ #PSF# ⟶ (CS6) ⟶ #P$^{>}$SF# ⟶ (CM5) ⟶ #PF&dhé# ⟶ (CW3) ⟶ #ibu&dhé# ⟶ (CM15) ⟶ #bu&dhé#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPS# $\longrightarrow$ (CS6) $\longrightarrow$ #PP$^{>}$S# $\longrightarrow$ (CM3) $\longrightarrow$ #PP&dhé# $\longrightarrow$ (CW1) $\longrightarrow$ #mbah&dhé#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPS# $\longrightarrow$ (CS6) $\longrightarrow$ #PP$^{<}$S# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPP$^{<}$S# $\longrightarrow$ (AM3) $\longrightarrow$ #PP$^{<}$S&maratuwa# $\longrightarrow$ (CM4) $\longrightarrow$ #PP&lik&maratuwa# $\longrightarrow$ (CW1) $\longrightarrow$ #mbah&lik&maratuwa#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPS# $\longrightarrow$ (CS6) $\longrightarrow$ #PP$^{<}$S# $\longrightarrow$ (CM4) $\longrightarrow$ #PP&lik# $\longrightarrow$ (CW1) $\longrightarrow$ #mbah&lik#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣS# $\longrightarrow$ (AR9) $\longrightarrow$ #SΣ# $\longrightarrow$ (AS5) $\longrightarrow$ #SΣF# $\longrightarrow$ (AS6) $\longrightarrow$ #$^{<}$SΣF#$\longrightarrow$ (AM6) $\longrightarrow$ #$^{<}$SF#ipé# $\longrightarrow$ (CW6) $\longrightarrow$ #adhiF#ipé#$\longrightarrow$ (CM12) $\longrightarrow$ #adhi#ipé#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPSCC# $\longrightarrow$ (CS6) $\longrightarrow$ #PP$^{<}$SCC# $\longrightarrow$ (CM8) $\longrightarrow$ #$^{<}$S&PPSCC# $\longrightarrow$ (CW6) $\longrightarrow$ #adhi&PPSCC#$\longrightarrow$ (CW7) $\longrightarrow$ #adhi&misanan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPSCC# $\longrightarrow$ (CW7) $\longrightarrow$ #misanan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPS# $\longrightarrow$ (CS6) $\longrightarrow$ #PP$^{<}$S# $\longrightarrow$ (AS3) $\longrightarrow$ #§PP$^{<}$S# $\longrightarrow$ (AM3) $\longrightarrow$ #PP$^{<}$S&maratuwa# $\longrightarrow$ (CM4) $\longrightarrow$#PP&lik&maratuwa# $\longrightarrow$ (CW1) $\longrightarrow$ #mbah&lik&maratuwa#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (CS4) $\longrightarrow$ #PSM# $\longrightarrow$ (CS6) $\longrightarrow$ #P$^{<}$SM# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣP$^{<}$SM# $\longrightarrow$ (AM4) $\longrightarrow$ #P$^{<}$SM&maratuwa# $\longrightarrow$ (CM6) $\longrightarrow$ #PM&lik&maratuwa# $\longrightarrow$ (CW2) $\longrightarrow$ #bapak&lik&maratuwa#$\longrightarrow$ (CM14) $\longrightarrow$ #pak&lik&maratuwa#

Chapter 5

Madurese

5.1 Kinship Data

Data was obtained by the author while living in Indonesia in 1996, from various Madurese speakers. An apostrophe represents a glottal stop, similar to the k used previously with Indonesian and Javanese, here always occurring at the end of a word (except for pana'an, which we convert to penakan).

The tables are not complete. It seems that terms for generations higher than +4 and lower than -3 are not part of the vocabulary of Madurese speakers, or were not known by my informants. We have also omitted kinship descriptions which may be reduced to ones on the table, by means of reduction rules.

In the tables, as well as in the rules which follow, brackets represent something optional. Primarily consanguineous terms (terms whose primary meaning refers to a blood relation) are presented in Table 5.1, steprelation terms in Table 5.2, and affinal terms in Table 5.3.

5.2 The Consanguineous Productions

5.2.1 Structure Rules

CS1 R$\longrightarrow$RC, PR, S

4	(Σ)PPPP(S)		juju'	
3	(Σ)PPP(S)		buyut	
2	PP(S)M	embah lakeh	PP(S)F	embah bini
1	PM	eppa'	PF	embu
	PS P>S		majedi' obe'	
	P<SM	gutteh	P<SF	bibbi'
0	>SM	kaka'	>SF	embhu'
	<S PSC		ale' sepopo	
-1	C SC		ana' penakan	
-2	(S)CC		kompoy	
-3	(S)CCC(Σ)		juju'	

Table 5.1: Madurese Primarily Consanguineous Kinship Terms

1	P'M	pa' kabellun	P'F	ebo' kabellun
0	S'		trétan kabellun	
-1	C'		ana' kabellun	

Table 5.2: Madurese Steprelation Terms

2	ΣPPM	jei	ΣPPF	nyai
1	ΣPM	pa' mattua	ΣPF	embu mattua
	PSΣ, ΣPS		mattua majedi'	
0	ΣM	lakeh	ΣF	bini
	SΣ, ΣS, SΣS, ΣSΣ		epar	
	$^{>}$SΣM, Σ$^{>}$SM, Σ$^{>}$SΣM	kaka' epar	$^{>}$SΣF, Σ$^{>}$SF, Σ$^{>}$SΣF	embhu' epar
	$^{<}$SΣ, Σ$^{<}$S, Σ$^{<}$SΣ		ale' epar	
	CΣP		bhisan	
-1	CΣ		mantoh	

Table 5.3: Madurese Affinal Kinship Terms

CS2 R⟶C after #

CS3 R⟶P before #

CS4 #⟶G# after #(P)P or #P$^{<}$S or #$^{>}$S

CS5 S⟶$^{>}$S, $^{<}$S in context #(P)...#

5.2.2 Reduction Rules

CR1 SC⟶C in context #...C

CR2 PS⟶P in context P...#

5.2.3 Word Assignments

in context #...# unless otherwise specified

CW1 PPPP⟶juju'

CW2 PPP⟶buyut

CW3 PM⟶eppa' also in context #...&

CW4 PF⟶embu also in context #...&

CW5 PS⟶majedi' also in context &...#

CW6 P<SM⟶gutteh

CW7 P<SF⟶bibbi'

CW8 P>S ⟶obe'

CW9 >SM⟶kaka'

CW10 >SF⟶embhu'

CW11 <S⟶ale'

CW12 PSC⟶sepopoh

CW13 C⟶ana' also in context #p...an# or #...&

CW14 CC⟶kompoy

5.2.4 Morphological Rules

in context #...# unless otherwise specified

CM1 PPG ⟶embah#G

CM2 CCC⟶PPPP

CM3 SC⟶pCan

CM4 pana'an⟶penakan

CM5 M⟶lakeh after #

CM6 F⟶bini after #

5.3 Steprelation Productions

S1 P$\longrightarrow$P′ in context #...#

S2 P'$\longrightarrow$P′G in context #...#

S3 S$\longrightarrow$S′ in context #...#

S4 C$\longrightarrow$C′ in context #...#

S5 P′G$\longrightarrow$PG&kabellun

S6 S′$\longrightarrow$tretan#kabellun

S7 C′$\longrightarrow$C&kabellun

S8 embu $\longrightarrow$ebo' before &kabellun

S9 eppa' $\longrightarrow$pa' before &kabellun

5.4 The Affinal Productions

5.4.1 Structure Rules

AS1 R$\longrightarrow\Sigma$ in context #...#

AS2 R$\longrightarrow$CΣP in context #...#

AS3 #$\longrightarrow$#Σ before P, S, or C

AS4 #$\longrightarrow\Sigma$# after P, S, or C

AS5 #$\longrightarrow$G# after #Σ or #ΣP

AS6 S$\longrightarrow^{>}$S, $^{<}$S in context #...Σ#

5.4.2 Reduction Rules

AR1 $P\Sigma \longrightarrow P$

AR2 $P\Sigma \longrightarrow P'$ in context #...#

AR3 $\Sigma P \longrightarrow P$ before PP

AR4 $C\Sigma \longrightarrow C$ after C

AR5 $\Sigma C \longrightarrow C$

AR6 $\Sigma C \longrightarrow C'$ in context #...#

AR7 $\Sigma S \longrightarrow S\Sigma$ in context #...#

AR8 $S\Sigma S \longrightarrow S\Sigma$ in context #...#

AR9 $\Sigma S\Sigma \longrightarrow S\Sigma$ in context #...#

AR10 $\Sigma P^{<}S(G) \longrightarrow \Sigma PS$ in context #...#

AR11 $\Sigma P^{>}S \longrightarrow \Sigma PS$ in context #...#

AR12 $PS\Sigma \longrightarrow \Sigma PS \longrightarrow$ in context #...#

5.4.3 Word Assignments

in context #...#

AW1 $\Sigma PPM \longrightarrow$ jei

AW2 $\Sigma PPF \longrightarrow$ nyai

AW3 $S\Sigma \longrightarrow$ epar

AW4 $C\Sigma P \longrightarrow$ bhisan

AW5 $C\Sigma \longrightarrow$ mantoh

5.4.4 Morphological Rules

in context #...# unless otherwise specified

AM1 $\Sigma G \longrightarrow G$

AM2 $\Sigma PG \longrightarrow PG\&mattua$

AM3 $\Sigma PS \longrightarrow mattua\&PS$

AM4 $*S\Sigma \longrightarrow *S\#epar$

AM5 eppa' $\longrightarrow$pa' before &mattua

5.5 Discussion of Consanguineous Productions

5.5.1 Structure Rules

The pure stucture rules generate the provisional kinship descriptions:

$R \longrightarrow P^{m+1}$, C^{n+1}, P^mSC^n, PG, PPG, $^{>}S(G)$, $^{<}S$, $P^{>}S$, $P^{<}S(G)$

where m and n are non-negative integers. The only kinship descriptions which actually differentiate between older and younger siblings are the four final ones listed. Thus we allow S to be changed to $^{>}S$ or $^{<}S$ only for these kinship descriptions. Again, we notice the seniority distinction occurs only for our own generation and the one before.

Many kinship descriptions of the form outlined above do not appear in the data, for one of two reasons. Either they can be reduced to kinship descriptions which are in the table, or they belong to generations which are not accounted for in the table. While the production grammar allows kinship descriptions to be generated for any generation, the ones which do not appear in the table do not seem to correspond to terms which are a part of the day to day vocabulary of a native speaker. Thus they are not dealt with here. The native speaker would understand the kinship description P^8, for example, but may not have a kinship term for it. The grammar is the same in this respect.

There is often more than one way to generate a given kinship description. We give several ways to generate PPSC:

$R \longrightarrow PR \longrightarrow PPR \longrightarrow PPRC \longrightarrow PPSC$

$R \longrightarrow RC \longrightarrow PRC \longrightarrow PPRC \longrightarrow PPSC$

$R \longrightarrow PR \longrightarrow PRC \longrightarrow PPRC \longrightarrow PPSC$

In the Introduction, certain combinations of symbols were mentioned as being ambiguous or redundant. The context restrictions prevents those combinations (SP, CS, SS, PC, CP, $P\Sigma$, ΣC) from occuring, except for the final two. We will have reduction rules for dealing with those two, as we wish to deal with both possibilities for $P\Sigma$, namely P and P′, and both possibilities for ΣC, namely C and C′).

We insert a gender after only those kinship descriptions which distinguish on the basis of gender. These are P, PP, $P^{<}S$, and $^{>}S$. For both consanguineous and affinal relations, only relations from our own or an older generation are distinguished on the basis of gender. Most terms in higher generations do depend on sex of relative (except for $PS\Sigma$ and ΣPS), and no terms in generations lower than one's own depend on sex of relative.

5.5.2 Reduction Rules

Grandchildren of one's siblings are considered one's own grandchildren. The same happens for generations below this one. Thus the term for great- grandchild also means "child in the third descending generation". Siblings of grandparents are considered one's own grandparents, so the reduction is symmetric. Rules CR1 and CR2 express this.

After performing all possible reductions, our kinship descriptions will be of one of the following forms:

$R \longrightarrow P^{m+1}$, C^{n+1}, $P^{m+1}SC^{n+1}$, PG, PPG, $^{>}S(G)$, $^{<}S$, $P^{>}S$, $P^{<}S(G)$, PS, SC

where m and n are non-negative integers.

5.5.3 Word Assignments

Here we see buyut again, but used alone, as opposed to being combined with the term for grandparent as in Indonesian and Javanese. Grandparents are distinguished by sex, as in Indonesian but not in Javanese. The terms for uncles and aunts are somewhat different. In Madurese, as in Sundanese, one distinguishes by sex only in the case of parent's younger siblings, whereas Indonesian and Javanese distinguish by sex for both older and younger siblings of a parent. This is in contrast to the terms for siblings; the usual pattern, which holds for both Sundanese and Madurese, is to distinguish older siblings by sex and not younger ones, which also fits in with the general pattern of distinguishing for older generations and not for younger ones.

In Madurese we also have a term for parent's sibling, which we do not have in Indonesian or Javanese. eppa' and embu are noticeably similar to the shortened forms pa' and bu from previous chapters. bibbi' is familiar, as are several other terms from the 0 and -1 generations.

For younger generations, relatives are not distinguished by sex. In conversation, one might ask how many of one's children are male and how many are female. The answer would be, for example, "three female, one male"; ie, there is no specific term for "male child" etc. Although the term "ana' lakeh" would be understood as male child (since "lakeh" means "male" or "man"), it is more normal usage to say only "ana' ", and then the sex can be asked in a separate question if necessary.

The & in certain contexts here prevents the formation of invalid kinship terms. If & were not used, we could form, for example, pak mattua mattua from PM#mattua, by appending an extra Σ. But with the use of & we have PM&mattua, which cannot then be used to produce pak mattua mattua, because of the context restriction in rule AM1. The & indicates that there is already a kinship term following it, so we cannot form another compound preceding it.

5.5.4 Morphological Rules

For grandparents, we use embah, similar to Javanese mbah, along with a word to indicate gender. Curiously, there is an asymmetry in that great great grandparent and great grandchild are referred to by the same term (juju'). We have a similar construction for keponakan as in Javanese. The last two morphological rules serve in the production of the terms for grandparents, and also the terms for husband and wife, which are also the words for man and woman.

Madurese has notably fewer morphological rules, and more word assignments, than either Indonesian or Javanese.

5.6 Discussion of Steprelation Productions

For steprelation terms we have the suffix "kabellun". The terms for mother and sibling used here are new. Tretan is a term for "sibling". There are various alternate terms for mother, and with kabellun we use ebok. Also eppa' is shortened to pa', as happened in Indonesian and Javanese for uncle terms. The term kabellun itself bears a resemblance to the Javanese kuwalon.

We have rules S1 and S2 separately instead of just having $P \longrightarrow P'G$ since we can also get P' from $P\Sigma$ (rule AR2), and then we need to be able to add the gender. The term for step- ("kabellun") can only be used with immediate family relations, thus the context of $\#...\#$ in rules S1 to S4.

The use of & also prevents incorrect derivations with the steprelation terms. For instance, before & was used, it was possible to generate the invalid term ana' kabellun kabellun, among others (the BASIC program discussed in Appendix 1 actually generated such terms). With the use of & however, we first generate C&kabellun, and then cannot generate an additional "kabellun" because of the context restriction in rule S4.

5.7 Discussion of Affinal Productions

5.7.1 Structure Rules

Using rules AS3 and AS4, we can generate kinship descriptions of the following forms:

$(\Sigma)P^{m+1}(\Sigma)$, $(\Sigma)C^{n+1}(\Sigma)$, $(\Sigma)P^{m}SC^{n}(\Sigma)$, ΣPG, ΣPPG, $\Sigma P^{>}S$, $\Sigma P^{<}S(G)$

where m and n are non-negative integers. Rules AS1 and AS5 generate ΣM, and ΣF. Rule AS2 generates the kinship description for the symmetric term "bhisan", which means "child's parent-in-law", or "co-parent-in-law". As a result of this rule we can derive $(\Sigma)C\Sigma P(\Sigma)$, using rules AS3 and AS4. We can reduce these resulting descriptions using rules AR1 and AR5. The possibility of generating $\Sigma P^{>}S$ and $\Sigma P^{<}S(G)$ account for the inclusion of rules AR10 and AR11, which are used to convert these to ΣPS. Rule AS5 also allows us to generate ΣPG from ΣP, although it can also be generated from PG.

Rule AS4 cannot be used on a kinship description already containing M or F. Rule AS3, however, can, producing ΣPG and ΣPPG (and $\Sigma P^{<}S(G)$, which has been discussed above). ΣPG and ΣPPG are both relevant kinship descriptions, and are assigned affinal kinship terms. Because of these derivations, already with gender, our gender insertion rule AS5 only needs to be used for Σ.

There is only one context for the seniority rule AS6. This provides seniority for the kinship description $S\Sigma$. The other kinship descriptions which require seniority distinctions, namely ΣS and $\Sigma S\Sigma$, will be reduced to $S\Sigma$ by means of reduction rules AR7 and AR9 respectively) and then have seniority added.

5.7.2 Reduction Rules

Rules AR1 and AR2 interpret parent's spouse as either parent or step-parent. As the term for step- ("kabellun") can only be used with immediate family relations, we have the context of #...# in rules AR2 and AR6.

Rule AR3 indicates that the great grandparent of one's spouse is considered

one's own great grandparent. Rule AR4 is not quite the reciprocal of this: the spouse of one's grandchild is considered one's own grandchild. It is possible that a term like kompoy mantoh, equivalent to Indonesian cucu menantu or Javanese putu mantu, is used. Although my informants did not identify such a usage, it would render these reduction rules both symmetric and more similar to the Indonesian and Javanese equivalents.

Rules AR5 and AR6 interpret one's spouse's child as one's own child or step-child. Rule AR7 expresses the equivalence of the two expressions for sibling-in-law. Neither is more primary than the other; the decision of which way to state the rule was arbitrary. Rule AR8 reduces SΣS to SΣ, similar to rule AR9 for ΣSΣ. Rules AR10 and AR11 have been discussed already. Rule AR12 establishes a reduction, which is really an equivalence, between PSΣ and ΣPS. We have no rule reducing PSΣ or ΣPS to PS, as we did with other Indonesian languages, since in Madurese we have separate affinal terms for these kinship descriptions.

For such kinship descriptions as ΣPPPS, the S and the Σ can be removed with rules AR3 and CR2. In the case of such descriptions as SCCCΣ, we use rules AR4 and CR1. These rules are also used to remove S and Σ from various other kinship descriptions in Table 1.

After using the reduction rules, we have affinal kinship descriptions of the following forms:

ΣPPG, ΣPG, ΣPS, ΣG, (*)SΣ, CΣP, CΣ.

5.7.3 Word Assignments

Madurese, like Javanese, has terms for spouse's grandparent. But here the terms are not compounds containing consanguineous terms.

The term for sibling-in-law, epar, can be used alone.

5.7.4 Morphological Rules

The terms for husband and wife also mean man and woman, respectively.

Madurese has a more extensive group of terms expressing affinal relations than Indonesian or Javanese. For parents-in-law, "mattua" is used; for siblings-in-law we have "epar"; and for children-in-law, "mantoh". Mantoh is used alone for child-in-law, whereas mattua is used together with the consanguineous term for parent. Epar can be used either alone or with the sibling term. We can also combine mattua with the term for parent's sibling, to give us uncle-in-law and aunt-in-law (one term only). Furthermore, there are separate terms for grandmother-in-law and grandfather-in-law, not using "mattua". When combined with "mattua", eppa' is shortened to pa'. It should be noted that whether we use the term "kaka' epar" or "ale' epar" depends not on the relative age of the speaker and the relative, but rather on the relative age of the siblings. Thus a woman's husband's younger brother is referred to as "ale' epar" even if he is older than the woman herself.

5.8 Examples

The following examples were generated by the BASIC program which was written to simulate the production grammar. The program itself is discussed in Appendix 1. Substitute symbols were used for the symbols of more than one character (eg. $^{<}$S). The number of the rule used at each step is given below. Sometimes an unnecessary step occurs in the examples, and then is corrected with one of the reduction rules. This reflects the random nature of the program; it chose randomly among all rules which were applicable at any time. Productions which came to a dead-end without generating a kinship term have been omitted. Some loops within a single production were also omitted.

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{>}$S# $\longrightarrow$ (CS4) $\longrightarrow$ #$^{>}$SF# $\longrightarrow$ (CW10) $\longrightarrow$ #embhu'#
- #R# $\longrightarrow$ (AS1) $\longrightarrow$ #Σ# $\longrightarrow$ (AS5) $\longrightarrow$ #ΣF# $\longrightarrow$ (AM1) $\longrightarrow$ #F# $\longrightarrow$ (CM6) $\longrightarrow$ #bini#
- #R# $\longrightarrow$ (AS2) $\longrightarrow$ #CΣP# $\longrightarrow$ (AW4) $\longrightarrow$ #bhisan#

- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS3) ⟶ #PP# ⟶ (CS4) ⟶ #PPM# ⟶ (AS3) ⟶ #§PPM# ⟶ (AW1) ⟶ #jei#
- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS3) ⟶ #PP# ⟶ (CS4) ⟶ #PPM# ⟶ (CM1) ⟶ #embah#M# ⟶ (CM5) ⟶ #embah#lakeh#
- #R# ⟶ (CS2) ⟶ #C# ⟶ (CW13) ⟶ #ana'#
- #R# ⟶ (CS2) ⟶ #C# ⟶ (AS3) ⟶ #ΣC# ⟶ (AS4) ⟶ #ΣCΣ# ⟶ (AR5) ⟶ #CΣ# ⟶ (AW5) ⟶ #mantoh#
- #R# ⟶ (CS3) ⟶ #P# ⟶ (CS4) ⟶ #PF# ⟶ (CW4) ⟶ #embu#
- #R# ⟶ (AS1) ⟶ #Σ# ⟶ (AS5) ⟶ #ΣM# ⟶ (AM1) ⟶ #M# ⟶ (CM5) ⟶ #lakeh#
- #R# ⟶ (CS1) ⟶ #S# ⟶ (AS4) ⟶ #SΣ# ⟶ (AS6) ⟶ #$^{<}$SΣ# ⟶ (AM4) ⟶ #$^{<}$S#epar# ⟶ (CW11) ⟶ #ale'#epar#
- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PS# ⟶ (CS5) ⟶ #P$^{<}$S# ⟶ (CS4) ⟶ #P$^{<}$SF# ⟶ (CW7) ⟶ #bibbi'#
- #R# ⟶ (CS3) ⟶ #P# ⟶ (AS4) ⟶ #PΣ# ⟶ (AS3) ⟶ #ΣPΣ# ⟶ (AR1) ⟶ #ΣP# ⟶ (AS5) ⟶ #ΣPM# ⟶ (AM2) ⟶ #PM&mattua# ⟶ (CW3) ⟶ #eppa'&mattua#⟶ (AM5) ⟶ #pa'&mattua#
- #R# ⟶ (CS3) ⟶ #P# ⟶ (CS4) ⟶ #PM# ⟶ (CW3) ⟶ #eppa'#
- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PPR# ⟶ (CS1) ⟶ #PPPR# ⟶ (AS3) ⟶ #ΣPPPR# ⟶ (CS3) ⟶#ΣPPPP# ⟶ (AS4) ⟶ #ΣPPPPΣ# ⟶ (AR3) ⟶ #PPPPΣ# ⟶ (AR1) ⟶ #PPPP# ⟶ (CW1) ⟶ #juju'#
- #R# ⟶ (CS1) ⟶ #S# ⟶ (AS4) ⟶ #SΣ# ⟶ (AW3) ⟶ #epar#
- #R# ⟶ (CS1) ⟶ #S# ⟶ (AS3) ⟶ #ΣS# ⟶ (AS4) ⟶ #ΣSΣ# ⟶ (AR9) ⟶ #SΣ# ⟶ (AW3) ⟶ #epar#

- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS3) ⟶ #PP# ⟶ (CS4) ⟶ #PPF# ⟶ (AS3) ⟶ #§PPF# ⟶ (AW2) ⟶ #nyai#

- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PS# ⟶ (CS5) ⟶ #P$^{<}$S# ⟶ (CS4) ⟶ #P$^{<}$SM# ⟶ (CW6) ⟶ #gutteh#

- #R# ⟶ (CS2) ⟶ #C# ⟶ (S4) ⟶ #C′# ⟶ (S7) ⟶ #C&kabellun# ⟶ (CW13) ⟶ #ana'&kabellun#

- #R# ⟶ (CS1) ⟶ #RC# ⟶ (CS1) ⟶ #SC# ⟶ (CM3) ⟶ #pCan# ⟶ (CW13) ⟶ #pana'an# ⟶ (CM4) ⟶ #penakan#

- #R# ⟶ (CS1) ⟶ #PR# ⟶ (CS1) ⟶ #PS# ⟶ (CW5) ⟶ #ma-jedi'#

- #R# ⟶ (CS1) ⟶ #RC# ⟶ (CS2) ⟶ #CC# ⟶ (AS4) ⟶ #CCΣ# ⟶ (AS3) ⟶ #ΣCCΣ# ⟶ (AR4) ⟶ #ΣCC# ⟶ (AR5) ⟶ #CC# ⟶ (CW14) ⟶ #kompoy#

- #R# ⟶ (CS3) ⟶ #P# ⟶ (AS4) ⟶ #PΣ# ⟶ (AS3) ⟶ #ΣPΣ# ⟶ (AR1) ⟶ #ΣP# ⟶ (AS5) ⟶ #ΣPF# ⟶ (AM2) ⟶ #PF&mattua# ⟶ (CW4) ⟶ #embu&mattua#

- #R# ⟶ (CS3) ⟶ #P# ⟶ (S1) ⟶ #P′# ⟶ (S2) ⟶ #P′F# ⟶ (S5) ⟶ #PF&kabellun# ⟶ (CW4) ⟶ #embu&kabellun# ⟶ (S8) ⟶ #ebo'&kabellun#

- #R# ⟶ (CS1) ⟶ #S# ⟶ (CS5) ⟶ #$^{>}$S# ⟶ (CS4) ⟶ #$^{>}$SM# ⟶ (CW9) ⟶ #kaka'#

- #R# ⟶ (CS1) ⟶ #S# ⟶ (AS3) ⟶ #ΣS# ⟶ (AR7) ⟶ #SΣ# ⟶ (AS6) ⟶ #$^{>}$SΣ# ⟶ (AM4) ⟶ #$^{>}$S#epar# ⟶ (CS4) ⟶ #$^{>}$SM#epar# ⟶ (CW9) ⟶ #kaka'#epar#

- #R# ⟶ (CS1) ⟶ #RC# ⟶ (CS2) ⟶ #CC# ⟶ (CW14) ⟶ #kom-poy#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (S3) $\longrightarrow$ #S'# $\longrightarrow$ (S6) $\longrightarrow$ #trétan#kabellun#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣS# $\longrightarrow$ (AS4) $\longrightarrow$ #ΣSΣ# $\longrightarrow$ (AR9) $\longrightarrow$ #SΣ# $\longrightarrow$(AS6) $\longrightarrow$ #$^{<}$SΣ# $\longrightarrow$ (AM4) $\longrightarrow$ #$^{<}$S#epar# $\longrightarrow$ (CW11) $\longrightarrow$ #ale'#epar#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{<}$S# $\longrightarrow$ (CW11) $\longrightarrow$ #ale'#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPS# $\longrightarrow$ (AM3) $\longrightarrow$ #mattua&PS# $\longrightarrow$ (CW5) $\longrightarrow$ #mattua&majedi'#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (CS5) $\longrightarrow$ #P$^{>}$S# $\longrightarrow$ (CW8) $\longrightarrow$ #obe'#

Chapter 6

Sundanese

6.1 Kinship Data

The tables are not complete. It seems that terms for generations higher than +4 and lower than -4 are not part of the vocabulary of Sundanese speakers. We have also omitted kinship descriptions which may be reduced to ones on the table, by means of reduction rules.

In the tables, as well as in the rules which follow, brackets represent something optional. Primarily consanguineous terms (terms whose primary meaning refers to a blood relation) are presented in Table 6.1, steprelation terms in Table 6.2, and affinal terms in Table 6.3.

6.2 The Consanguineous Productions

6.2.1 Structure Rules

CS1 R$\longrightarrow$RC, PR, S

CS2 R$\longrightarrow$C after #

CS3 R$\longrightarrow$P before #

CS4 #$\longrightarrow$G# after #(P)P, &PP, #P$^{<}$S, or #$^{>}$S

4	(Σ)PPPP(S)(Σ)		bao	
3	(Σ)PPP(S)(Σ)		uyut	
2	(Σ)PPM	aki	(Σ)PPF	nini
	(Σ)PPS(Σ)M	kapi aki	(Σ)PPS(Σ)F	kapi nini
1	PM	abah	PF	emak
	(Σ)P>S(Σ)		ua	
	(Σ)P<S(Σ)M	emang	(Σ)P<S(Σ)F	embi, bibi
0	>S		lanceuk	
	>SM	akang	>SF	teteh
	<S PSC P>SC		adi misan lanceuk misan	
	P>SCM	akang misan	P>SCF	teteh misan
	P<SC PPSCC PP>SCC		adi misan mindo lanceuk mindo	
	PP>SCCM	akang mindo	PP>SCCF	teteh mindo
	PP<SCC		adi mindo	
-1	C (Σ)SC(Σ)		anak alo	
-2	CC(Σ) (Σ)SCC(Σ)		incu kapi incu	
-3	(Σ)(S)CCC(Σ)		buyut	
-4	(Σ)(S)CCCC(Σ)		bao	

Table 6.1: Sundanese Primarily Consanguineous Kinship Terms

1	P′M	abah tere	P′F	emak tere
0	$^{>}$S′M	akang tere	$^{>}$S′F	teteh tere
	$^{>}$S′		lanceuk tere	
	$^{<}$S′		adi tere	
-1	C′		anak tere	

Table 6.2: Sundanese Steprelation Terms

1	ΣPM	abah mitoha	ΣPF	emak mitoha
0	ΣM	salaki	ΣF	pamajikan
	$^{>}$SΣ, Σ$^{>}$S		dahuan	
	$^{<}$SΣ, Σ$^{<}$S		adi beuteng	
	CΣP		besan	
-1	CΣ		minantu	

Table 6.3: Sundanese Affinal Kinship Terms

CS5 &$\longrightarrow$G& after #$^{>}$S

CS6 S$\longrightarrow$$^{>}$S, $^{<}$S in context #P...#, #...#, #P...C#, or #PP...CC#.

6.2.2 Reduction Rules

CR1 SC$\longrightarrow$C in context #...CC

CR2 PS$\longrightarrow$P in context PP...#

6.2.3 Word Assignments

in context #...# unless otherwise specified

CW1 PPPP$\longrightarrow$bao

CW2 PPP$\longrightarrow$uyut in context #...# or b...#

CW3 PPM$\longrightarrow$aki in context #...# or &...#

CW4 PPF⟶nini in context #...# or &...#

CW5 PM⟶abah in context #...# or #...&

CW6 PF⟶emak in context #...# or #...&

CW7 P>S⟶ua

CW8 P<SM⟶emang

CW9 P<SF⟶embi

CW10 P<SF⟶bibi

CW11 >S⟶lanceuk in context #...# or #...&

CW12 >SM⟶akang in context #...# or #...&

CW13 >SF⟶teteh in context #...# or #...&

CW14 <S⟶adi in context #...# or #...&

CW15 PSC⟶misan in context #...# or &...#

CW16 PPSC⟶mindo in context #...# or &...#

CW17 C⟶anak in context #...# or #...&

CW18 SC⟶alo

CW19 CC⟶incu in context #...# or &...#

6.2.4 Morphological Rules

in context #...# unless otherwise specified

CM1 PPS⟶kapi&PP

CM2 P*SC⟶*S&PSC

CM3 PP*SCC⟶*S&PPSCC

CM4 SCC$\longrightarrow$kapi&CC

CM5 CCC$\longrightarrow$bPPP

CM6 CCCC$\longrightarrow$PPPP

6.3 Steprelation Productions

S1 P$\longrightarrow$P′ in context #...#

S2 P′$\longrightarrow$P′G in context #...#

S3 S$\longrightarrow$$^{>}$S′, $^{<}$S′ in context #...#

S4 $^{>}$S′$\longrightarrow$$^{>}$S′G in context #...#

S5 $^{>}$S′G$\longrightarrow$$^{>}$SG#tere

S6 C$\longrightarrow$C′ in context #...#

S7 P′G$\longrightarrow$PG&tere

S8 *S′$\longrightarrow$*S#tere in context #...#

S9 C′$\longrightarrow$C&tere

6.4 The Affinal Productions

6.4.1 Structure Rules

AS1 R$\longrightarrow\Sigma$ in context #...#

AS2 R$\longrightarrow$CΣP in context #...#

AS3 #$\longrightarrow$#Σ before P, S, or C

AS4 #$\longrightarrow\Sigma$# after P, S, or C

AS5 #⟶G# after #Σ or #ΣP

AS6 S⟶$^{>}$S, $^{<}$S in context #...Σ#

6.4.2 Reduction Rules

AR1 PΣ⟶P

AR2 PΣ⟶P′ in context #...#

AR3 ΣP⟶P before P or (*)S

AR4 CΣ⟶C after C or S

AR5 ΣC⟶C

AR6 ΣC⟶C′ in context #...#

AR7 SΣ⟶S after P

AR8 ΣS⟶S before C

AR9 ΣS⟶SΣ in context #...#

6.4.3 Word Assignments

in context #...#

AW1 ΣM⟶salaki

AW2 ΣF⟶pamajikan

AW3 $^{>}$SΣ⟶dahuan

AW4 CΣP⟶besan

AW5 CΣ⟶minantu

6.4.4 Morphological Rules

in context #...#

AM1 ΣPG$\longrightarrow$PG&mitoha

AM2 $^{<}$S$\Sigma\longrightarrow{}^{<}$S#beuteng

6.5 Discussion of Consanguineous Productions

6.5.1 Structure Rules

The pure stucture rules generate the provisional kinship descriptions:

R$\longrightarrow$P^{m+1}, C^{n+1}, P^{m}SC^{n}, PPG, PG, P*S(G), *S(G), P*SC, PP*SCC

where m and n are non-negative integers. The only kinship descriptions which actually differentiate between older and younger siblings are the four final ones listed; *S, P*SG, P*SC, and PP*SCC. Thus we allow S to be changed to $^{>}$S or $^{<}$S only for these kinship descriptions. Again, we notice the seniority distinction only occurs only for our own generation and the one before, for both consanguineous and affinal terms.

Many kinship descriptions of the form outlined above do not appear in the data, for one of two reasons. Either they can be reduced to kinship descriptions which are in the table, or they belong to generations which are not accounted for in the table. While the production grammar allows kinship descriptions to be generated for any generation, the ones which do not appear in the table do not seem to correspond to terms which are a part of the day to day vocabulary of a native speaker. Thus they are not dealt with here. The native speaker would understand the kinship description P^{8}, for example, but may not have a kinship term for it. The grammar is the same in this respect.

There is often more than one way to generate a given kinship description. We give several ways to generate PPSC:

R$\longrightarrow$PR$\longrightarrow$PPR$\longrightarrow$PPRC$\longrightarrow$PPSC

R$\longrightarrow$RC$\longrightarrow$PRC$\longrightarrow$PPRC$\longrightarrow$PPSC

R$\longrightarrow$PR$\longrightarrow$PRC$\longrightarrow$PPRC$\longrightarrow$PPSC

In the Introduction, certain combinations of symbols were mentioned as being ambiguous or redundant. The context restrictions prevents those combinations (SP, CS, SS, PC, CP, PΣ, ΣC) from occuring, except for the final two. We will have reduction rules for dealing with those two, as we wish to deal with both possibilities for PΣ, namely P and P$'$, and both possibilities for ΣC, namely C and C$'$).

We insert a gender after only those kinship descriptions which distinguish on the basis of gender. These are P, PP, P$^{<}$S, and $^{>}$S (PPS will later use the rule for PP to generate its gender). For both consanguineous and affinal relations, only relations from an equal or older generation are distinguished on the basis of gender. Interestingly, uncles and aunts older than the parent are not distinguished on the basis of gender, and younger ones are, whereas for siblings, the reverse is true (older siblings are distinguished, younger ones are not).

6.5.2 Reduction Rules

Great grandchildren of one's siblings are considered one's own great grandchildren. The same happens for generations below this one. Thus the term for great- grandchild also means "child in the third descending generation". Siblings of great grandparents are considered one's own great grandparents, so the reduction is symmetric. Rules CR1 and CR2 express this.

After performing all possible reductions, our kinship descriptions will be of one of the following forms:

R$\longrightarrow$P^{m+1}, C^{n+1}, P^{m+1}SC^{n+1}, PPS, P$^{<}$SG, P$^{>}$S, PG, $^{>}$SG, $^{<}$S, SC, SCC

where m and n are non-negative integers.

6.5.3 Word Assignments

For younger generations than our own, relatives are not distinguished by sex. In conversation, one might ask how many of one's "incu"s are male and how many are female. The answer would be, for example, "three female, one male"; ie, there is no specific term for "male grandchild" etc. Although the term "incu lalaki" would be understood as grandson ("lalaki" means "male" or "man") , it is more normal usage to say only "incu", and then the sex can be asked in a separate question if necessary.

We see some familiar terms, such as anak, adi, misan, and mindo, although here misan(an) is PSC not PPSCC as in Javanese, and mindo(an) is PPSCC not PPPSCCC as in Javanese. This Sundanese usage corresponds to reported usage of Javanese in East Java.

The term "abah", for father, comes from Arabic [25]. In fact this term is often recognized as an alternate term for father in the other Indonesian languages studied.

Sundanese buyut is for CCC only; PPP is given the term uyut, presumably a shortened form of buyut. Sundanese has the greatest number of word assignments of all the Indonesian languages studied, indicating fewer morphological connections between the kinship terms.

Sundanese has a term for "older sibling" (lanceuk) as well as two separate terms for older brother and older sister. The term akang resembles Javanese kangmas.

The & in certain contexts here prevents the formation of invalid kinship terms. If & were not used, we could form, for example, abah mitoha mitoha from PM#mitoha, by appending an extra Σ. But with the use of & we have PM&mitoha, which cannot then be used to produce abah mitoha mitoha, because of the context restriction in rule AM1. The & indicates that there is already a kinship term following it, so we cannot form another compound preceding it.

6.5.4 Morphological Rules

Siblings of grandparents are given the term for grandparent along with the term "kapi". Grandchildren of siblings are given the term for grandchild along with "kapi". There is no similar construction in the other languages we have examined. In Indonesian and Madurese we do not distinguish siblings of grandparents from grandparents, whereas in Javanese we do, and we further distinguish based on relative age.

We have the term buyut, as in all three other Indonesian languages, but here we also have the additional term uyut, used to distinguish between CCC and PPP. Buyut is used alone, without the term for grandparent, similarly as in Madurese.

Sundanese has the cousin construction, otherwise found only in Javanese. Again, which sibling term is used with the cousin term is determined not by the relative age of the cousins, but by the relative age of the intervening siblings.

6.6 Discussion of Steprelation Productions

The terms for steprelations are just the normal terms, with the suffix "tere" added. As an example,

R$\longrightarrow$S$\longrightarrow^{>}$S'$\longrightarrow^{>}$S#tere$\longrightarrow$lanceuk tere

We have rules S1 and S2 separately instead of just having P$\longrightarrow$P'G since we can also get P' from PΣ (rule AR2), and then we need to be able to add the gender. The term for step- ("tere") can only be used with immediate family relations, thus the contexts of #...#.

The usage of & also prevents the generation of such terms as "abah mitoha tere" and "anak tere tere" which were generated by the BASIC program, before & was used. With the use of & however, we first generate C&tere, and then cannot generate an additional "tere" because of the context restriction in rule S6.

6.7 Discussion of Affinal Productions

6.7.1 Structure Rules

Using rules AS3 and AS4, we can generate kinship descriptions of the following forms:

$(\Sigma)P^{m+1}(\Sigma)$, $(\Sigma)C^{n+1}(\Sigma)$, $(\Sigma)P^{m}SC^{n}(\Sigma)$, $\Sigma P^{*}S(G)$, $(\Sigma)P^{*}SC(\Sigma)$, $(\Sigma)PP^{*}SCC(\Sigma)$, ΣPG, ΣPPG

where m and n are non-negative integers. Rules AS1 and AS5 are used for generating ΣM, and ΣF. Rule AS2 generates the kinship description for the symmetric term "besan", which means "child's parent-in-law", or "co-parent-in-law". As a result of this rule we can derive $(\Sigma)C\Sigma P(\Sigma)$, using rules AS3 and AS4. We can reduce these resulting descriptions using rules AR1 and AR5. The possibility of deriving $\Sigma P^{*}S$ explains the (*) in the context for rule AR3; we use this rule to eliminate the Σ.

Rule AS4 cannot be used on a kinship description already containing M or F. Rule AS3, however, can, producing ΣPG, ΣPPG, and $\Sigma P^{<}G$. ΣPG is a relevant kinship description, and Σ is dropped from ΣPPG and from $\Sigma P^{<}G$ (rule AR3).

With rule AS5 we add gender to the only two affinal descriptions which require it. To generate the kinship term for $P^{*}S\Sigma G$, we first drop the Σ from $PS\Sigma$ using rule AR7, only then adding gender and then seniority using the consanguineous production rules. $P^{*}S\Sigma G$ itself is never fully generated; rather, we reduce it before then and still assign it the correct kinship term.

Thus there is only one affinal term which requires a new seniority rule, namely $S\Sigma$ (since ΣS will be reduced to $S\Sigma$ with rule AR9).

6.7.2 Reduction Rules

Rules AR1 and AR2 interpret parent's spouse as either parent or step-parent. As the term for step- ("tere") can only be used with immediate family relations, we have the context of $\#\ldots\#$ in the rules.

Rule AR3 indicates that the grandparent, uncle, or aunt of one's spouse is

considered one's own grandparent, uncle or aunt. Rule AR4 is the reciprocal of this: the spouse of one's niece, nephew or grandchild is considered one's own niece, nephew, or grandchild.

Rules AR5 and AR6 interpret one's spouse's child as one's own child or step-child. The spouse of one's uncle or aunt is considered one's own uncle or aunt (rule AR7), and the niece or nephew of one's spouse is considered one's own niece or nephew (rule AR8).

Finally, rule AR9 expresses the equivalence of the two expressions for sibling-in-law. Neither is more primary than the other; the decision of which way to state the rule was arbitrary.

For such kinship descriptions as $\Sigma PPPS\Sigma$, the S and the two occurences of Σ can be removed with rules AR3, AR7, and then CR2. In the case of such descriptions as $\Sigma SCCC\Sigma$, we use rules AR4, AR8, and then CR1. These rules are also used to remove S and Σ from various other kinship descriptions in Table 1.

After using the reduction rules, we have affinal kinship descriptions of the following forms:

ΣG, ΣPG, $^*S\Sigma$, $C\Sigma P$, $C\Sigma$, $CC\Sigma$.

6.7.3 Word Assignments

The terms for husband and wife are the only affinal terms in one's own generation which are differentiated on the basis of gender. Otherwise, all terms in higher generations do depend on sex of relative, and no terms in one's own or lower generations depend on sex of relative.

Sundanese differs from the other languages studies in its treatment of siblings-in-law. The other languages uniformly use a term for "in-law" along with the regular sibling term. In Sundanese we have, for $^{>}S\Sigma$ and $\Sigma^{>}S$, the term "dahuan". Then for $^{<}S\Sigma$ and $\Sigma^{<}S$, we do use the term "adi" along with "beuteng". Is "akang beuteng" or "teteh beuteng" ever used? It seems not.

6.7.4 Morphological Rules

Sundanese has "mitoha" for parents-in-law, and for children-in-law, "minantu". Minantu is used alone for child-in-law, whereas mitoha is used together with the consanguineous term for parent. We also have the term "beuteng", only for use with younger siblings-in-law (ie, younger siblings' spouses or spouses' younger siblings, even if the sibling-in-law is actually older than the speaker). Older siblings-in-law are given the self-contained term "dahuan". Finally, we have "besan" for co-parent-in-law. Unlike the other languages studied, the two terms for siblings-in-law are unrelated.

6.8 Examples

The following examples were generated by the BASIC program which was written to simulate the production grammar. The program itself is discussed in Appendix 1. Substitute symbols were used for the symbols of more than one character (eg. $^{<}$S). The number of the rule used at each step is given below. Sometimes an unnecessary step occurs in the examples, and then is corrected with one of the reduction rules. This reflects the random nature of the program; it chose randomly among all rules which were applicable at any time. Productions which came to a dead-end without generating a kinship term have been omitted. Some loops within a single production were also omitted.

- #R# $\longrightarrow$ (AS1) $\longrightarrow$ #Σ# $\longrightarrow$ (AS5) $\longrightarrow$ #ΣF# $\longrightarrow$ (AW3) $\longrightarrow$ #pamajikan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPSCC# $\longrightarrow$ (CS6) $\longrightarrow$ #PP$^{>}$SCC# $\longrightarrow$ (CM3) $\longrightarrow$ #$^{>}$S&PPSCC# $\longrightarrow$ (CW16) $\longrightarrow$ #$^{>}$S&mindo# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{>}$SM&mindo# $\longrightarrow$ (CW12) $\longrightarrow$ #akang&mindo#

- #R# $\longrightarrow$ (AS2) $\longrightarrow$ #CΣP# $\longrightarrow$ (AW4) $\longrightarrow$ #besan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS3) $\longrightarrow$ #PP# $\longrightarrow$ (CS4) $\longrightarrow$ #PPM# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPPM# $\longrightarrow$ (AR3) $\longrightarrow$ #PPM# $\longrightarrow$ (CW3) $\longrightarrow$ #aki#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (AS4) $\longrightarrow$ #PΣ# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPΣ# $\longrightarrow$ (AR1) $\longrightarrow$ #ΣP# $\longrightarrow$ (AS5) $\longrightarrow$ #ΣPM# $\longrightarrow$ (AM1) $\longrightarrow$ #PM&mitoha# $\longrightarrow$ (CW5) $\longrightarrow$ #abah&mitoha#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PF# $\longrightarrow$ (CW6) $\longrightarrow$ #emak#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS2) $\longrightarrow$ #CC# $\longrightarrow$ (CW19) $\longrightarrow$ #incu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #SC# $\longrightarrow$ (CW18) $\longrightarrow$ #alo#

- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (CW17) $\longrightarrow$ #anak#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPSCC# $\longrightarrow$ (CS6) $\longrightarrow$ #PP$^{>}$SCC# $\longrightarrow$ (CM3) $\longrightarrow$ #$^{>}$S&PPSCC# $\longrightarrow$ (CW16) $\longrightarrow$#$^{>}$S&mindo# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{>}$SF&mindo# $\longrightarrow$ (CW13) $\longrightarrow$ #teteh&mindo#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPSCC# $\longrightarrow$ (CS6) $\longrightarrow$ #PP$^{<}$SCC# $\longrightarrow$ (CM3) $\longrightarrow$ #$^{<}$S&PPSCC# $\longrightarrow$ (CW16) $\longrightarrow$#$^{<}$S&mindo# $\longrightarrow$ (CW14) $\longrightarrow$ #adi&mindo#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS6) $\longrightarrow$ #$^{<}$S# $\longrightarrow$ (CW14) $\longrightarrow$ #adi#

- #R# $\longrightarrow$ (AS1) $\longrightarrow$ #Σ# $\longrightarrow$ (AS5) $\longrightarrow$ #ΣM# $\longrightarrow$ (AW2) $\longrightarrow$ #salaki#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (CS6) $\longrightarrow$ #P$^{<}$S# $\longrightarrow$ (CS4) $\longrightarrow$ #P$^{<}$SF# $\longrightarrow$ (CW10) $\longrightarrow$ #embi#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (CS6) $\longrightarrow$ #P$^{>}$S# $\longrightarrow$ (CW7) $\longrightarrow$ #ua#

- #R# $\longrightarrow$ (CS2) $\longrightarrow$ #C# $\longrightarrow$ (S6) $\longrightarrow$ #C′# $\longrightarrow$ (S9) $\longrightarrow$ #C&tere# $\longrightarrow$ (CW17) $\longrightarrow$ #anak&tere#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PM# $\longrightarrow$ (CW5) $\longrightarrow$ #abah#
- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (S1) $\longrightarrow$ #P'# $\longrightarrow$ (S2) $\longrightarrow$ #P'F# $\longrightarrow$ (S7) $\longrightarrow$ #PF&tere# $\longrightarrow$ (CW6) $\longrightarrow$ #emak&tere#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS6) $\longrightarrow$ #$^{>}$S# $\longrightarrow$ (CS4) $\longrightarrow$ #$^{>}$SM# $\longrightarrow$ (CW12) $\longrightarrow$ #akang#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSC# $\longrightarrow$ (CS6) $\longrightarrow$ #P$^{>}$SC# $\longrightarrow$ (CM2) $\longrightarrow$ #$^{>}$S&PSC#$\longrightarrow$ (CW11) $\longrightarrow$ #lanceuk&PSC# $\longrightarrow$ (CW15) $\longrightarrow$ #lanceuk&misan#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (S3) $\longrightarrow$ #$^{<}$S'# $\longrightarrow$ (S8) $\longrightarrow$ #$^{<}$S#tere# $\longrightarrow$ (CW14) $\longrightarrow$ #adi#tere#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #RCC# $\longrightarrow$ (CS1) $\longrightarrow$ #SCC# $\longrightarrow$ (CM4) $\longrightarrow$ #kapi&CC# $\longrightarrow$ (AS4) $\longrightarrow$ #kapi&CCΣ# $\longrightarrow$ (AR4) $\longrightarrow$ #kapi&CC# $\longrightarrow$ (CW19) $\longrightarrow$ #kapi&incu#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (CS6) $\longrightarrow$ #P$^{<}$S# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣP$^{<}$S# $\longrightarrow$ (AR3) $\longrightarrow$ #P$^{<}$S#$\longrightarrow$ (CS4) $\longrightarrow$ #P$^{<}$SM# $\longrightarrow$ (CW8) $\longrightarrow$ #emang#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPR# $\longrightarrow$ (CS1) $\longrightarrow$ #ΣPPR# $\longrightarrow$ (CS3) $\longrightarrow$ #ΣPPP# $\longrightarrow$ (AR3) $\longrightarrow$ #PPP# $\longrightarrow$ (CW2) $\longrightarrow$ #uyut#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS3) $\longrightarrow$ #PP# $\longrightarrow$ (CS4) $\longrightarrow$ #PPM# $\longrightarrow$ (CW3) $\longrightarrow$ #aki#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPS# $\longrightarrow$ (CM1) $\longrightarrow$ #kapi&PP# $\longrightarrow$ (CS4) $\longrightarrow$ #kapi&PPM# $\longrightarrow$ (CW3) $\longrightarrow$ #kapi&aki#
- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSC# $\longrightarrow$ (CS6) $\longrightarrow$ #P$^{>}$SC# $\longrightarrow$ (CM2) $\longrightarrow$ #$^{>}$S&PSC# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{>}$SM&PSC# $\longrightarrow$ (CW15) $\longrightarrow$ #$^{>}$SM&misan#$\longrightarrow$ (CW12) $\longrightarrow$ #akang&misan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSC# $\longrightarrow$ (CS6) $\longrightarrow$ #P$^{<}$SC# $\longrightarrow$ (CM2) $\longrightarrow$ #$^{<}$S&PSC#$\longrightarrow$ (CW14) $\longrightarrow$ #adi&PSC# $\longrightarrow$ (CW15) $\longrightarrow$ #adi&misan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPR# $\longrightarrow$ (CS1) $\longrightarrow$ #PPPR# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPPPR# $\longrightarrow$ (CS3) $\longrightarrow$ #ΣPPPP# $\longrightarrow$ (AR3) $\longrightarrow$ #PPPP# $\longrightarrow$ (CW1) $\longrightarrow$ #bao#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (CS4) $\longrightarrow$ #PF# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPF# $\longrightarrow$ (AM1) $\longrightarrow$ #PF&mitoha# $\longrightarrow$ (CW6) $\longrightarrow$ #emak&mitoha#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (AS4) $\longrightarrow$ #SΣ# $\longrightarrow$ (AS6) $\longrightarrow$ #$^{<}$SΣ# $\longrightarrow$ (AM2) $\longrightarrow$ #$^{<}$S#beuteng# $\longrightarrow$ (CW14) $\longrightarrow$ #adi#beuteng#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (CS6) $\longrightarrow$ #$^{>}$S# $\longrightarrow$ (CS4) $\longrightarrow$ #$^{>}$SF# $\longrightarrow$ (CW13) $\longrightarrow$ #teteh#

- #R# $\longrightarrow$ (CS3) $\longrightarrow$ #P# $\longrightarrow$ (AS4) $\longrightarrow$ #PΣ# $\longrightarrow$ (AR1) $\longrightarrow$ #P# $\longrightarrow$ (S1) $\longrightarrow$ #P′# $\longrightarrow$ (S2) $\longrightarrow$ #P′M# $\longrightarrow$ (S7) $\longrightarrow$ #PM&tere# $\longrightarrow$ (CW5) $\longrightarrow$ #abah&tere#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS2) $\longrightarrow$ #CC# $\longrightarrow$ (AS4) $\longrightarrow$ #CCΣ# $\longrightarrow$ (AR4) $\longrightarrow$ #CC# $\longrightarrow$ (CW19) $\longrightarrow$ #incu#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (S3) $\longrightarrow$ #$^{>}$S′# $\longrightarrow$ (S8) $\longrightarrow$ #$^{>}$S#tere# $\longrightarrow$ (CW11) $\longrightarrow$ #lanceuk#tere#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #S# $\longrightarrow$ (AS4) $\longrightarrow$ #SΣ# $\longrightarrow$ (AS6) $\longrightarrow$ #$^{>}$SΣ# $\longrightarrow$ (AW5) $\longrightarrow$ #dahuan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSC# $\longrightarrow$ (CW15) $\longrightarrow$ #misan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (AS4) $\longrightarrow$ #PRCΣ# $\longrightarrow$ (AS3) $\longrightarrow$ #ΣPRCΣ# $\longrightarrow$ (CS1) $\longrightarrow$ #ΣPRCCΣ# $\longrightarrow$ (CS1) $\longrightarrow$

#ΣPPRCCΣ# $\longrightarrow$ (CS1) $\longrightarrow$ #ΣPPSCCΣ# $\longrightarrow$ (AR3) $\longrightarrow$ #PPSCCΣ# $\longrightarrow$ (AR4) $\longrightarrow$ #PPSCC# $\longrightarrow$ (CW16) $\longrightarrow$ #mindo#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (CS6) $\longrightarrow$ #P$^{<}$S# $\longrightarrow$ (CS4) $\longrightarrow$ #P$^{<}$SF# $\longrightarrow$ (CW9) $\longrightarrow$ #bibi#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PS# $\longrightarrow$ (CS6) $\longrightarrow$ #P$^{<}$S# $\longrightarrow$ (CS4) $\longrightarrow$ #P$^{<}$SM# $\longrightarrow$ (CW8) $\longrightarrow$ #emang#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #RC# $\longrightarrow$ (CS1) $\longrightarrow$ #RCC# $\longrightarrow$ (CS2) $\longrightarrow$ #CCC# $\longrightarrow$ (CM5) $\longrightarrow$ #bPPP# $\longrightarrow$ (CW2) $\longrightarrow$ #buyut#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS3) $\longrightarrow$ #PP# $\longrightarrow$ (CS4) $\longrightarrow$ #PPF# $\longrightarrow$ (CW4) $\longrightarrow$ #nini#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PSC# $\longrightarrow$ (CS6) $\longrightarrow$ #P$^{>}$SC# $\longrightarrow$ (CM2) $\longrightarrow$ #$^{>}$S&PSC# $\longrightarrow$ (CS5) $\longrightarrow$ #$^{>}$SF&PSC# $\longrightarrow$ (CW13) $\longrightarrow$ #teteh&PSC# $\longrightarrow$ (CW15) $\longrightarrow$ #teteh&misan#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPSCC# $\longrightarrow$ (CS6) $\longrightarrow$ #PP$^{>}$SCC# $\longrightarrow$ (CM3) $\longrightarrow$ #$^{>}$S&PPSCC# $\longrightarrow$ (CW16) $\longrightarrow$#$^{>}$S&mindo# $\longrightarrow$ (CW11) $\longrightarrow$ #lanceuk&mindo#

- #R# $\longrightarrow$ (CS1) $\longrightarrow$ #PR# $\longrightarrow$ (CS1) $\longrightarrow$ #PRC# $\longrightarrow$ (CS1) $\longrightarrow$ #PRCC# $\longrightarrow$ (CS1) $\longrightarrow$ #PPSCC# $\longrightarrow$ (CW16) $\longrightarrow$ #mindo#

Chapter 7

Comparison of the Grammars

7.1 Comparison of Burmese with the Indonesian Languages

The structure of Burmese kinship descriptions differs from the other languages studied here. In Burmese, we always differentiate male from female relatives, whereas in the Indonesian languages this is usually not done for generations lower than our own. Some terms in Burmese depend on the sex of the speaker, whereas no terms in the Indonesian languages do. Other than this, there are many similarities between Burmese and the others. In Burmese, siblings of parents and grandparents are differentiated by seniority. There is even a "big father" construction, similar to that used in Javanese and Indonesian, but in Burmese it is present at the +2 generation. We distinguish based on seniority only for generations 0 and above, as is generally true for the Indonesian languages. $S\Sigma$ is considered the same as ΣS in all of the languages studied.

We have developed the cousin productions for Burmese to a degree not found in the Indonesian languages.

Now we turn our attention to the reduction rules. Examining the reduction rules will allow us to focus on the differences in the structure of the kinship terminologies.

In Burmese, the term for great grandparent encompasses siblings of great grand-

parents also, and so on for higher generations. This also happens in Javanese and Sundanese, and even happens a generation earlier for Indonesian and Madurese. The collapsing begins at the -2 generation for Burmese (siblings of grandchildren are referred to by the term for grandchildren), similar to Indonesian and Madurese this time, and Sundanese and Javanese start at the -3 generation.

For cousins, the reduction rules of Burmese resemble those of Indonesian, in that we end up assigning terms for sibling, uncle/aunt, and nephew/niece, but in Burmese we also append a cousin suffix. Similarly to Javanese and Sundanese cousin productions, we can end up with sibling terms plus a term to indicate "cousin"; in the case of Burmese, a suffix, in the case of Javanese and Sundanese, the word for cousin. However, in Burmese this construction holds for more than just sibling terms, but also for uncle, aunt, niece and nephew.

Burmese reduces one's spouse's aunts, uncles and grandparents to one's own aunts, uncles and grandparents, and similarly for higher generations. Similar reductions are found in the Indonesian languages, although not always beginning as soon as for Burmese. Notably Javanese and Madurese do not reduce spouse's uncles, aunts, or grandparents, but begin in a higher generation.

The symmetric reduction occurs in Burmese: the spouse of one's grandchild, niece or nephew is considered one's own grandchild, niece or nephew, and so on for lower generations. There is not always symmetry in tis reduction in the Indonesian languages; but by the +3 and -3 generations it is always in place.

The spouse of one's uncle or aunt is considered one's own uncle or aunt, both in Burmese and the Indonesian languages, with the exception of Madurese. The nephew or niece of one's spouse is considered one's own nephew or niece, again with the exception of Madurese.

As mentioned above, in all languages studies ΣS and $S\Sigma$ are given the same term.

In Burmese we have the curious reduction of $S\Sigma S$ and $\Sigma S\Sigma$ to S. This reduction is not present in any of the Indonesian languages studied; for Javanese we have a separate term for $\Sigma S\Sigma$, while for Madurese, we reduce $S\Sigma S$ and $\Sigma S\Sigma$ to $S\Sigma$.

7.2 Comparison among the Indonesian Languages

Focusing our attention on the four Indonesian languages studied, we shall endeavour to clarify the differences in the structure of their kinship terminologies.

In all of the languages, seniority is determined not by relative age of the speaker and the relative, but rather by relative age of the intervening siblings. Thus one could end up using the term for "older sibling" for a cousin who is in fact younger than the speaker (but whose parent is older than that of the speaker). Generally, seniority and gender only affect the choice of term for relatives of the same or higher generation than the speaker. Javanese distinguishes based on seniority for more kinship terms than do the other languages.

Javanese is unique among the languages in its possession of terms up to the +10 and down to the -10 generations.

Javanese and Indonesian have more morphological rules than Madurese and Sundanese; the latter two have more word assignments, indicating fewer morphological relationships between their kinship terms.

Each of the grammars has rules for steprelations. Usually, these involve a word for steprelation, combined with the usual consanguineous terms for father, mother, sibling, and child. In several cases a variation of one of the regular terms is the one used when referring to a steprelation.

Affinal relations involve several terms for in-law, to be combined with the consanguineous terms; usually one for parents, one for siblings, one for children, and another separate term for "parent of child-in-law", or "co-parent-in-law". This last term is present in all four of our Indonesian grammars, and, although there is no such term in English, there was in Latin [6]. Sometimes we have affinal terms for generations +2 and -2. $S\Sigma$ is always given the same term as ΣS, but $\Sigma S\Sigma$ and $S\Sigma S$ are treated differently among the languages.

Many of the terms are similar among the four languages, as shown below.

Indonesian	Javanese	Madurese	Sundanese
bapak	bapak	eppa'	abah
ibu	ibu	embu	ema'
kakak	kangmas	kaka'	akang
adik	adhi	ale'	adi
anak	anak	ana'	anak
keponakan	keponakan	penakan	kaponakan
tiri	kuwalon	kabellun	tere
mertua	maratuwa	mattua	mitoha
ipar	ipé	epar	
bésan	bésan	bhisan	besan
menantu	mantu	mantoh	minantu

Several of these terms have been traced back to Proto Malayic. Adelaar [1] gives as Proto Malayic: kakak, adik, anak, mintuha, baisan, and binantu. Nothofer [21] has reconstructed Proto Malayo Javanic based on Indonesian, Javanese, Madurese, and Sundanese; and according to Dyen [9], these four languages, along with several others, form the tightly knit Javo-Sumatran Hesion of the West Indonesian Cluster of the Hesperonesian Linkage. Thus we trace these similar terms to a common ancestor.

Now we turn again to the reduction rules. The Indonesian languages all show a tendency to have terms for relatives of a certain generation; for instance, the term for great grandfather refers to great grandfather, great grandfather's brother, great grandmother's brother, spouse's great grandfather, spouse's great grandfather's brother, and spouse's great grandmother's brother. This is true for all higher generations also. This "collapsing" of consanguineous terms begins at the +2 generation in Indonesian and Madurese, and at the +3 generation for Javanese and Sundanese. For the descending generations, there is similar collapsing, beginning at the -2 generation for Indonesian and Madurese, and at the -3 generation for

Javanese and Sundanese. Thus all four languages have symmetry in this respect. Collapsing of affinal terms is discussed below.

For cousin reduction rules, Indonesian reduces more distant cousins to closer relations (cousin, uncle, aunt, niece, nephew). In Javanese and Sundanese, there are separate terms for first and second cousins (in Javanese, also for third cousins). These terms can stand alone or can be combined with sibling terms to provide a more exact description of the relationship. In Madurese, we gave neither a reduction rule nor terms for anything beyond first cousins. I would presume that their usage of the term "sepopo" is somewhat loose, as in Indonesian, but we have not included a reduction rule here.

Collapsing of affinal terms (spouse's grandfather being given the term for grandfather, etc) occurs at the +2 generation for Indonesian and Sundanese, and at the +3 generation for Javanese and Madurese. Thus for Indonesian, all collapsing in the ascending generations is already in place at the +2 level, and for Javanese, all is in place at the +3 level. But for Madurese, consanguineous collapsing occurs one generation before affinal collapsing, and for Sundanese the reverse is true. This may be because terms for spouse's grandparent or for grandparent's sibling have fallen into disuse, or alternatively, because a term which is used for spouse's grandparent or for grandparent's sibling has been borrowed from one of the other languages (and adapted). The latter does not seem to be true in the case of the Madurese terms jei and nyai (spouse's grandparents) or in the case of the Sundanese terms kapi aki and kapi nini (grandparent's siblings) as they bear little resemblance to the equivalent terms in the other languages.

Collapsing of affinal terms in the descending generations (grandchild's spouse being referred to as one's own grandchild, etc) begins at the -2 generation for Madurese and Sundanese and at the -3 generation for Indonesian and Javanese. Thus for affinal collapsing, the rules are symmetrical for Javanese (generation +3 and -3) and Sundanese (generation +2 and -2). Symmetry is upset in Indonesian, because of the presence of the term "cucu menantu", which may have been borrowed from the Javanese "putu mantu". In Madurese, on the other hand, we would need

a term like cucu menantu in order to have symmetry.

The above information is summarized in the following table, where the placement of the C and A indicate the first generation where consanguineous or affinal collapsing takes place for the language in question.

Generation	Indonesian	Javanese	Madurese	Sundanese
+3		C, A	A	C
+2	C, A		C	A
-2	C		C, A	A
-3	A	C, A		C

Madurese and Javanese have separate terms for the uncle and aunt of one's spouse. Madurese also uses these terms for the spouse of one's uncle or aunt ($PS\Sigma$ is equivalent to ΣPS), but Javanese reduces spouse of one's uncle or aunt to the term for one's own uncle or aunt. The other two languages reduce all of these relations to the consanguineous ones (uncle or aunt). Similarly, the three languages other than Madurese all reduce the spouse of one's niece or nephew, and the niece or nephew of one's spouse, to one's own niece or nephew. However in Madurese we have not listed separate terms for these relations, so either such a reduction takes place after all, or perhaps there are indeed such terms, albeit not well known.

As previously mentioned, the equivalence between $S\Sigma$ and ΣS is present in all four of the Indonesian languages studied.

Finally we discuss the kinship descriptions $S\Sigma S$ and $\Sigma S\Sigma$. Madurese reduces each of these to $S\Sigma$, sibling in law. In Javanese, we have a term for $\Sigma S\Sigma$, pripéan , but none for $S\Sigma S$. Neither Indonesian nor Sundanese have a term for either. Perhaps in practice, the term for sibling in law is used, as in Madurese, for those languages which do not have an alternate term (ie, all but Javanese).

7.3 Conclusion

The computer program provided many examples of productions from the rules given. The computer productions, due to the random method of choosing between rules

which were applicable at a particular time, sometimes went in circles. Also, by appending a Σ after we had already started generating the kinship term from the kinship description, sometimes a dead end production was caused. One could avoid this in several ways. Extra reduction rules could be included, to eliminate the unwanted Σ which caused the dead end. Alternatively, one could employ the type of affinal structure rules previously used in Bhargava and Lambek's [3] account of Hindi, where K can become ΣR, RΣ, ΣRΣ, etc, only in certain combinations, afterwards using consanguineous structure rules on R. In this way we are prevented from adding Σ at an inappropriate time. In the present work, we just eliminated those dead end productions from the computer output.

The program was useful both in terms of checking the production rules to make sure they generated all of the kinship terms, and only genuine kinship terms; and also to keep track of how many rules were used, as few as possible being the ideal. It remains the ideal way to check one's proposed grammar.

We have seen that there are considerable similarities in the production grammars of the Indonesian languages, and yet characteristic differences between them. Although the actual kinship descriptions differ, especially in the degree to which gender is used, the reduction rules of Burmese are quite similar to those of the Indonesian group Of the Indonesian languages, the kinship terminology of Javanese seems to be the most developed, and is also the most symmetric, perhaps indicating that it has undergone less change.

It remains to be seen how languages of other families compare to the ones studied here.

It should be emphasized that I have attempted to provide a description of the data obtained; no claim is made to having accurately represented the mental processes occuring in a speaker's mind.

Appendix A

BASIC Program

The program which was used is based on the one in Caldwell [6]. Written in BASIC, it is the ideal tool for verifying the rules of the proposed grammar and generating sample productions. The running of the program pointed to several errors in rule formulations, either valid kinship terms which had not been generated, or derivations which produced an erroneous kinship term. The program was used to find all such errors. In addition, by having to type out the specific contexts for the rules, attention was focused on keeping the number of rules to a minimum, in keeping with the finite space available in human memory. When we enter a rule as data for the program, we must specify each context explicitly, without using G or *S. The rules are entered in the following form:

1010 DATA RN, LS, RS, LC, RC

where RN is the rule number, LS is the left side of the rule, RS is the right side, LC is the left context for the rule, and RC is the right context. In the case of a rule having no context restriction, we write "" for the context. Thus Javanese rule CS4, which was:

#$\longrightarrow$G# after #P(S), or #S

appears as six rules, as follows:

```
1060 DATA CS4, P, PM, #, #
1070 DATA CS4, S, SM, #P, #
1080 DATA CS4, P, PF, #, #
1090 DATA CS4, S, SF, #P, #
1100 DATA CS4, S, SM, #, #
1110 DATA CS4, S, SF, #, #
```

The data are entered after the end of the program code. We do not include a copy of the rules for the grammars. It is interesting to compare the number of rules used in each of the grammars. Burmese has 233, Indonesian 101, Javanese 182, Madurese 97, and Sundanese 117. Burmese has many because of its extra use of gender compared with Indonesian languages, and because of the cousin productions. Javanese was the next highest because it has many morphological rules. Indonesian and Madurese have the smallest number of rules as they have a greater number of word assignments than the other grammars.

We include here the BASIC code for the program. A flow chart for the program, from Caldwell [6], can be found in figure 1.

```
10 REM PRODUCTION GRAMMAR EVALUATION TOOL
20 open "data.bas" for output as #1
50 N = 233
60 DIM R$(250, 5)
70 DIM T$(5)
80 FOR I = 1 TO N
85 FOR J = 0 TO 4
90 READ R$(I, J)
95 NEXT J
100 NEXT I

150 D = 0
160 K$ = " #R# "
165 REM D COUNTS NUMBER OF INITIALIZED PRODUCTIONS
170 D = D + 1
```

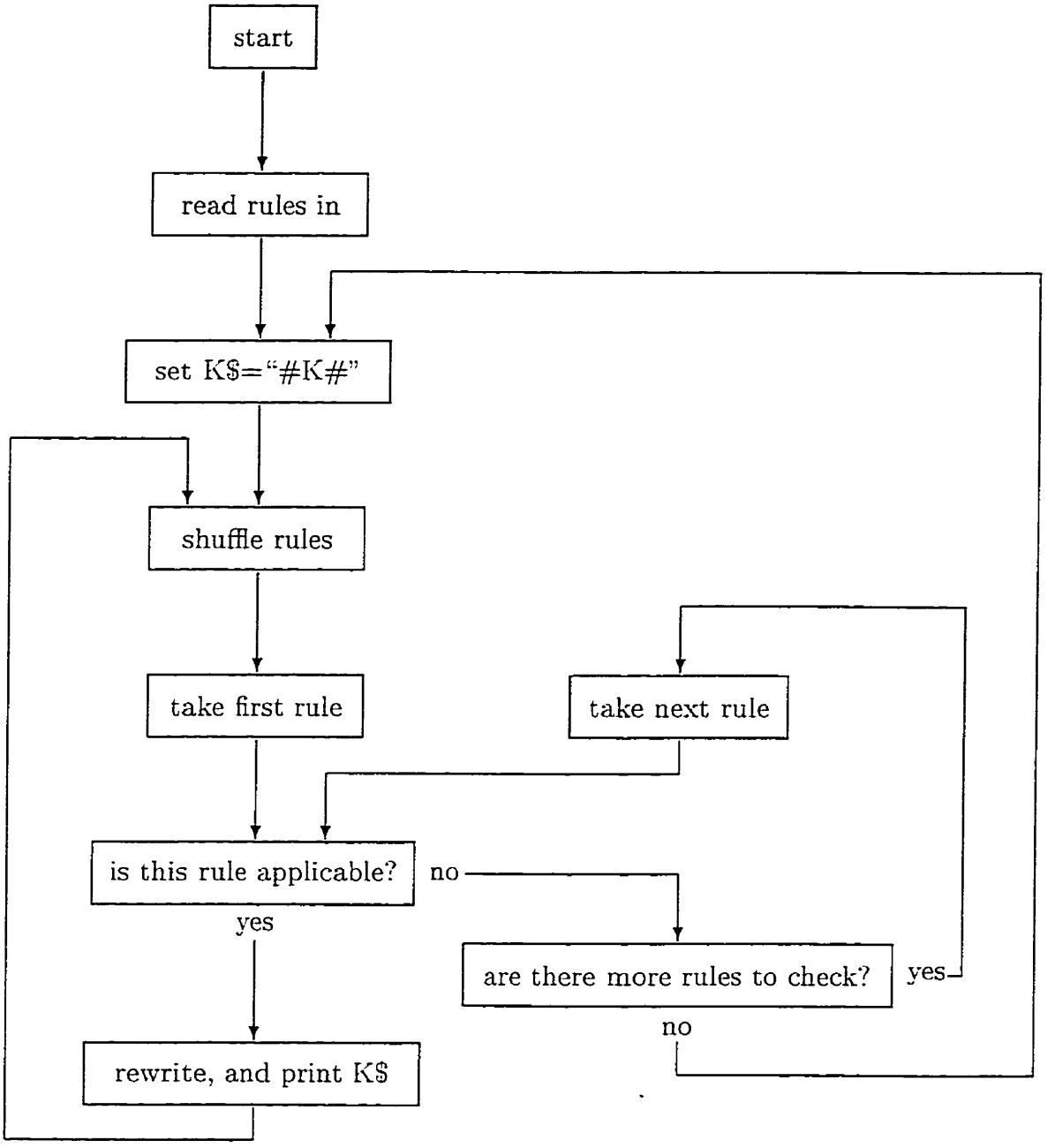

Figure A.1: Flow Chart for BASIC Program

```
175 IF D = 50 THEN 900
180 L = 0
185 REM L COUNTS HOW MANY STEPS IN A PRODUCTION
190 PRINT #1, " "
210 PRINT #1, K$;
215 REM SHUFFLE RULES
220 GOTO 500
230 FOR Q = 1 TO N
240 F = 1
245 REM CHECK RULE APPLICABILITY
250 GOTO 700
260 IF F = 1 THEN 300
270 NEXT Q
280 GOTO 160

300 REM REWRITE K AND PRINT
305 M$ = MID$(K$, I + LEN(R$(Q, 1)))
310 MID$(K$, I) = R$(Q, 2)
315 MID$(K$, I + LEN(R$(Q, 2))) = M$
320 PRINT #1, " ⟶ ("; R$(Q, 0); ") ⟶"; K$;
330 L = L + 1
335 IF L = 15 THEN 160
340 GOTO 220

500 REM RULE SHUFFLE ROUTINE
510 FOR E = 1 TO N
520 S = 1 + INT(N * RND)
530 FOR J = 0 TO 4
540 T$(J) = R$(S, J)
550 R$(S, J) = R$(E, J)
560 R$(E, J) = T$(J)
570 NEXT J
580 NEXT E
590 GOTO 230

700 REM CHECK RULE APPLICABILITY ROUTINE
710 IF LEN(R$(Q, 1) + R$(Q, 3) + R$(Q, 4)) > LEN(K$) THEN F = 0
715 IF F = 0 THEN 800
720 FOR I = 1 TO (LEN(K$) - LEN(R$(Q, 1))) + 1
730 IF MID$(K$, I, LEN(R$(Q, 1))) = R$(Q, 1) AND I - LEN(R$(Q, 3)) > 0 AND
I + LEN(R$(Q, 1)) + LEN(R$(Q, 4)) <= LEN(K$) + 1 THEN 760
740 NEXT I
750 F = 0
755 IF F = 0 THEN 800
760 IF R$(Q, 3) = "" THEN 780
```

```
770 IF MID$(K$, I - LEN(R$(Q, 3)), LEN(R$(Q, 3))) <> R$(Q, 3) THEN F = 0
775 IF F = 0 THEN 800
780 IF R$(Q, 4) = "" THEN 800
790 IF MID$(K$, I + LEN(R$(Q, 1)), LEN(R$(Q, 4))) <> R$(Q, 4) THEN F = 0
800 GOTO 260
900 END
```

The program begins by reading in all the data; ie, the production rules for the grammar being tested. We start with the string #R#, then the rules are shuffled, with the Rule Shuffle Routine in lines 500 to 590. One by one we check to see if the rules are applicable to the current string, using the Check Rule Applicability Routine, lines 700 to 800. This is done using the counter F, which is set to 0 initially but changed to 1 if we find an applicable rule. The Check Applicability Routine works by searching the string for the left side of the rule being checked. If it is found, the left context and right context are then checked. If all matches, F is set to 1. If not, F remains 0, and we take the next rule and check it. When it occurs that F is set to 1, we go to line 300, where we rewrite our string according to the rule which matched, and print out the new string along with the rule number of the rule used. At that point, we reshuffle the rules, and again begin checking for an applicable rule. When it happens that we have tried every rule and none are applicable, that means our derivation is complete. We start again with the initial string #R#. We also have counters to regulate the number of derivations required by a particular usage of the program, and the maximum number of steps in a single derivation; it is possible to go in circles, so we can end the derivation after a certain number of steps if we so desire.

Instead of the program randomly choosing rules to try, the rules are shuffled first to randomize the order, then the program tries them in that new order. This simulates randomly trying the rules.

Substitute symbols were used for some of the symbols in the grammars, specifically, ones which could not be produced on the computer (such as accents) and ones which were a combination of symbols (for example <S). These substitute symbols were replaced with the original ones in the sample productions given earlier.

Appendix B

List Of Informants

Indonesian

- Sinta Ratna Dewi

  Age: 26

  Occupation: Youth Program Coordinator

  Languages spoken: Javanese, Indonesian, English

Javanese

- Sinta Ratna Dewi

  Age: 26

  Occupation: Youth Program Coordinator

  Languages spoken: Javanese, Indonesian, English

- Wijono

  Age: 35

  Occupation: University lecturer

  Languages Spoken: Javanese, Indonesian

Madurese

- Mohammed Djauhari

  Age: 31

  Occupation: restaurant worker

  Languages spoken: Madurese, Balinese, Javanese, Indonesian

Sundanese

- Ade Sutrajat

  Age: 30

  Occupation: merchant

  Languages spoken: Sundanese, Indonesian

- Yance Manu

  Age: 25

  Occupation: merchant

  Languages spoken: Sundanese, Indonesian

- R. Denny Suwardani

  Age: 20

  Occupation: merchant

  Languages spoken: Sundanese, Indonesian

- Hery Haerudin

  Languages spoken: Sundanese, Indonesian

- Sulikanti Agusni

  Occupation: Ph.D. student

  Languages spoken: Sundanese, Indonesian, English

Balinese

- Mohammed Djauhari

  Age: 31

  Occupation: restaurant worker

  Languages spoken: Madurese, Balinese, Javanese, Indonesian

- Komang Etika Yasa

  Age: 21

  Occupation: student

  Languages spoken: Balinese, Indonesian

Banjarese

- Maulana

  Age: 28

  Occupation: merchant

  Languages spoken: Banjar, Indonesian

Acehnese

- M. Yasir Putra Utama

  Age: 25

  Occupation: Student

  Languages spoken: Acehnese, Indonesian

Toba Batak

- Mercy Aritonang

  Age: 23

  Occupation: Student

  Languages spoken: Toba Batak, Indonesian

Appendix C

Kinship Data for Other Languages

Data was collected for numerous other languages spoken in Indonesia. For many of the languages, a complete set of kinship terms was not collected. Below are presented incomplete tables of kinship terms for four languages: Balinese, Banjarese, Achinese, and Toba Batak.

Balinese is spoken by approximately three million people, on the island of Bali as well as in other parts of Indonesia due to migration.

Banjarese is spoken primarily in south Borneo. There are two primary variants: Hulu and Kuala. We present terms from Hulu Banjarese.

Achinese is spoken in northern Sumatra. Data shown below is from Aceh Utara. Terms from Aceh Besar differ noticeably from these. The term ayah tuha refers to the parent's oldest brother; ayah teungoh refers to the next oldest; and ayah cut to the youngest. The same hierarchy of terms applies for aunts. One assumes that families did not often have more than three male and three female children. We introduce three new symbols; Se for eldest sibling, Sm for middle sibling, and Sy for youngest sibling.

Toba Batak has terms for eldest, middle, and youngest sibling, similar to Achinese. Thus we use the same symbols (Se, Sm, Sy respectively). The Batak Toba terms pariban and parumaen have special significance. One can wed one's pariban, and is often encouraged to. In terms of the term parumaen, a woman's son can marry her parumaen, and a man's daughter can marry his parumaen. Indeed the

term for child-in-law is parumaen, whether or not the child actually married his/her parumaen. Toba Batak often distinguishes based on sex of intermediate relative.

4	PPPP(S)		kelab	
3	PPP(S)		kumpi	
2	PP(S)M	kaki	PP(S)F	nini
1	PM	bapa	PF	meme
	PSM	nanang	PSF	meme
	P<SM	rerama	P<SF	bibi
0	>SM	bli	>SF	embok
	<S		adi	
	PPSCC		misanan	
	PPPSCCC		mindon	
-1	C		pianak	
	SC, PSCC, PPSCCC		keponakan	
-2	(S)CC		cucu	
3	(S)CCC		kumpi	
4	(S)CCCC		kelab	

Table C.1: Balinese Primarily Consanguineous Kinship Terms

1	P′M	bapa tumin	P′F	meme tumin
0	>S′M	bli kualon	>S′F	embok kualon
	<S′		adi kualon	
-1	C′		pianak kualon	

Table C.2: Balinese Steprelation Terms

1	ΣPM	bapa matua	ΣPF	meme matua
0	Σ		kurenan	
	SΣ, ΣS		ipah	
	CΣP		warang	
-1	CΣ		mantu	

Table C.3: Balinese Affinal Kinship Terms

4	PPPP(S)		wareng, waring	
3	PPPM	datu laki	PPPF	datu bini
	PPPS		dangsanak datu	
2	PPM	ka'i	PPF	nini
	PPMS		dangsanak ka'i	
	PPFS		dangsanak nini	
1	PM	abah	PF	uma
	PMS		dangsanak abah	
	PFS		dangsanak uma	
	P<SM	pakecil	P<SF	makecil
0	>S		kaka	
	<S		ading	
	PSC		sapupu sekali, mamarina	
	PPSCC		sapupu dua kali	
-1	C		anak	
	SC		kemanakan	
-2	(S)CC		cucu	
3	(S)CCC		buyut	
4	(S)CCCC		intah	
5	(S)CCCCC		cicit	

Table C.4: Banjarese Primarily Consanguineous Kinship Terms

1	P′M	abah tiri	P′F	uma tiri
0	$^{>}$S′		kaka tiri	
	$^{<}$S′		ading tiri	
-1	C′		anak tiri	

Table C.5: Banjarese Steprelation Terms

1	MΣP		mintuha lalakian	
	FΣP		mintuha bibinian	
	ΣPS, PSΣ		mintuha lambung, bintuha lambung	
0	ΣM	laki	ΣF	bini
	$^{>}$SΣ, Σ$^{>}$S		kaka ipar	
	$^{<}$SΣ, Σ$^{<}$S		ading ipar	
	CΣP		pawarangan	
-1	CΣ		minantu	

Table C.6: Banjarese Affinal Kinship Terms

7	$P^7(S)$		injhe	
6	$P^6(S)$		intu nini	
5	$P^5(S)$		indatu	
4	PPPP(S)		intu	
3	PPP(S)		syi'tu, kuha	
2	PPM	abusyi' , abuchik	PPF	
	PPSM		PPSF	mucut
1	PM	ayah	PF	bunda
	P>SM	ayah tuha, ayah teungoh	P>SF	nya'tuha, nya'teungoh
	P<SM	ayah cut	P<SF	nya'cut
0	>SM	po lem	>SF	poda
	<SM	adun	<SF	adoe
-1	CM	aneuk agam	CF	aneuk inong
	SCM	aneuk keumuen agam	SCF	anek keumuen inong
-2	CCM	cucoe agam	CCF	cucoe inong
-3	(S)CCC		ceut	
-4	(S)CCCC		cah	
-5	$(S)C^5$		con	
-6	$(S)C^6$		ciet	
-7	$(S)C^7$		ceh pureung	

Table C.7: Achinese Primarily Consanguineous Kinship Terms

1	ΣPM	ayah tuan	ΣPF	bunda tuan
0	ΣM	lakoe	ΣF	peuromoh
	SΣ, ΣS		ipah	
	>SΣM	po lem	>SΣF	teumuda
	<SΣM	lakoe adun	<SΣF	peuromoh adoe
	MΣSM, FΣSF		parui	
	CΣP		bisan	

Table C.8: Achinese Affinal Kinship Terms

2	(Σ)PP(S)M	opung bawa	(Σ)PP(S)F	opung boru
	(Σ)PMPM	ompung doli	(Σ)PMPF	ompung boru
	(Σ)PFPM	ompung suhut	(Σ)PFPF	ompung bao
1	PM	among	PF	inang
	(Σ)PFSM	tulang	(Σ)PMSF	namboru
	(Σ)PM>SM	among tua	PM>SF	damang sihahaan
			(Σ)PF>SF	inangtua
	(Σ)PM<SM	amonguda	(Σ)PF<SF	inangbaju, inanguda
0	>SM, P>SMCM	akang bawa	>SF, P>SFCF	akang boru
	MPM>SFCM	akang bawa	FPF>SMCF	akang boru
	PF>SFCM	akang bawa	PM>SMCF	akang boru
	<S, P<SMCM, P<SFCF		anggi	
	FPF<SMCF, MPM<SFCM		anggi	
	PF<SFCM, PM<SMCF		anggi	
	FPMSFCM	pariban	MPFSMCF	pariban
-1	CM	anak	CF	boru
	FSFCM, SMCM	anak	MSMCF, SFCF	boru
	Ce		siahaan	
	Cm		silitanga	
	Cy		siampudan	
	MSFCM	parumaen	FSMCF	parumaen
	<SMC		maramatu	
-2	(S)CC		pahompu	

Table C.9: Toba Batak Primarily Consanguineous Kinship Terms

1	ΣPM	simatua doli	ΣPF	simatua
			PFSMΣF	nantulang
	PSΣM	amang boru		
			PM>S Σ	inangtua
			PM<S Σ	inanguda
	ΣP>SM	simatua siangkangan		
	ΣP<SM	simatua sianggian		
0	ΣM		ΣF	oroan
	MSΣM, MΣSM	lae	FSΣF, FΣSF	eda
	MSΣSM, MΣSΣM	lae	FSΣSF, FΣSΣF	eda
	F>SΣM, FΣ>SM	akang bawa	M>SΣF, MΣ>SF	akang boru
	F>SΣSM	akang bawa	M>SΣSF	akang boru
	F<SΣM, FΣ<SM	anggi	M<SΣF, MΣ<SF	anggi
	F<SΣSM	anggi	M<SΣSF	anggi
	FΣSΣM, MΣSΣF		bao	
-1	CΣ		parumaen	
	ΣFSCM	tulang naposo	ΣFSCF	maen

Table C.10: Toba Batak Affinal Kinship Terms

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IMAGE EVALUATION
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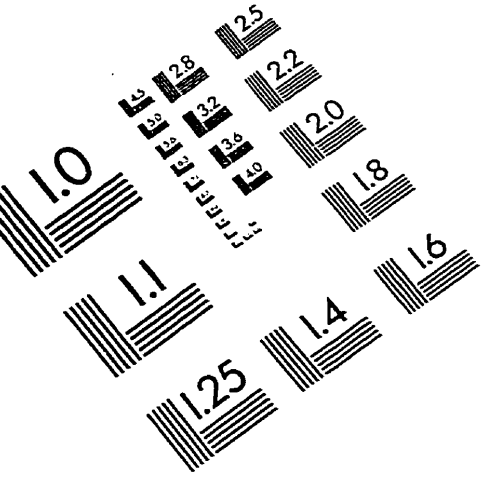

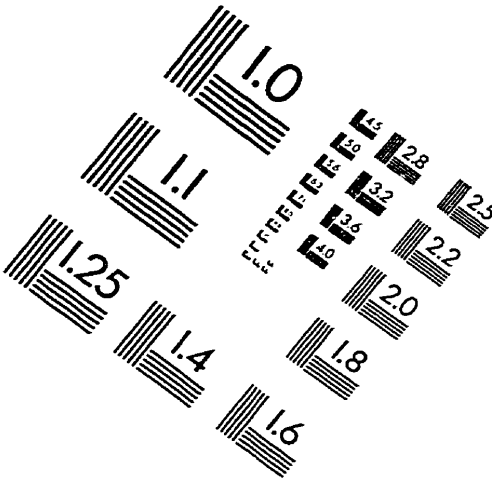

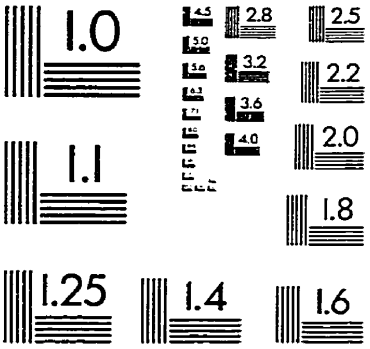

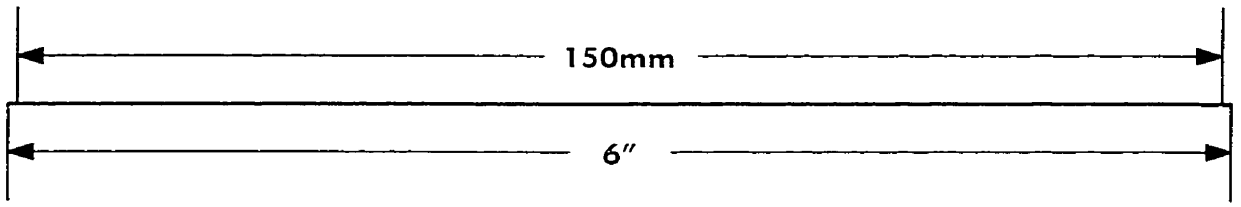

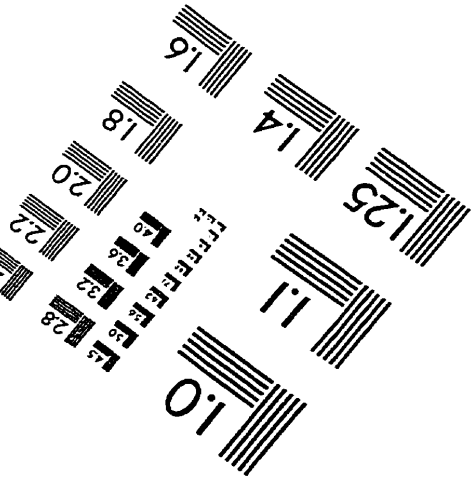

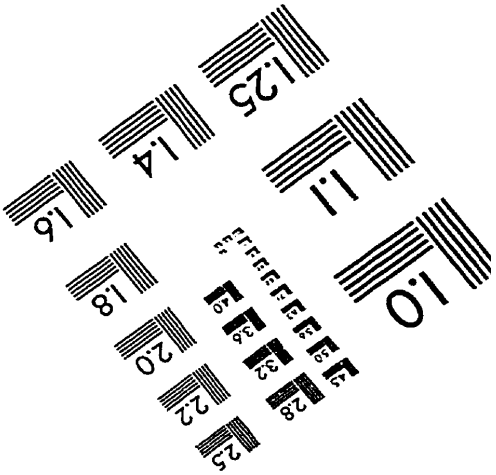

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