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The Acquisition of Complex Morphology

Insights from Murrinhpatha

William Forshaw

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The Acquisition of Complex Morphology. Insights from Murrinhpatha
by William Forshaw

The Acquisition of Complex Morphology

Insights from Murrinhpatha

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Abbreviations

ADV	adverbial
APPL	applicative
AT	adult target
B.SBJ	supra-inflection class, singular subject, b-
Br	brother
CLF:ANIM	noun classifier, animate
CLF:HUMAN	noun classifier, human
CLF:LANG	noun classifier, language
CLF:PLACE	noun classifier, place and time
CLF:THING	noun classifier, neuter/residue class
CLF:TREE	noun classifier, tree
CLF:VEG	noun classifier, non-meat food
CLF:WATER	noun classifier, water
CLF:WEAPON	noun classifier, weapon
CSP	classifier stem paradigm
DM	discourse marker
DO	direct object
DU	dual
EMPH	emphasis
EXCL	exclusive
F	female
Fa	father
FOC	focus
FUT	future
FUTIRR	future irrealis
HITH	hither
IBP	incorporated body part
INCL	inclusive
INTS	intensifier
IO	indirect object
LOC	locative
LVC	light verb construction
M	male
M.NFUT	supra-inflection class, non-future tense, -m
M.SBJ	supra-inflection class, singular subject, m-
MSP	mean size of paradigm

Mo	mother
NEG	negative
NFUT	non-future
NGAM.NFUT	supra-inflection class, non-future tense, -ngam
NGAN.NFUT	supra-inflection class, non-future tense, -ngan
NG.SBJ	supra-inflection class, singular subject, ng-
N.NFUT	supra-inflection class, non-future tense, -n
NUM	number
PC	paucal
PERL	perlative
PIMP	past imperfective
PL	plural
POSS	possessive
PPhrase	prosodic phrase
PSTIRR	past irrealis
PRSL	presentational
PWord	prosodic word
RDP	reduplicated
RR	reflexive/reciprocal
S	subject
S.CS	serialised classifier stem
SG	singular
TAM	tense/aspect/mood
Zi	sister

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CHAPTER 1

Setting the scene

In order to best understand language acquisition we need to consider as typologically diverse a range of languages as possible (Bowerman, 2011; Evans & Levinson, 2009; Stoll & Lieven, 2013). However, much of what is known about language acquisition is based on the study of approximately 1–2% of the world's languages (Lieven & Stoll, 2010). Different linguistic structures pose different problems for children acquiring language, and how children manage to solve these problems provides us further insight into how children acquire language more generally. Australian languages and polysynthetic languages remain greatly under researched in the field of language acquisition (Kelly et al., 2014).

Crosslinguistic research has shown that particular typological characteristics impact acquisition in similar ways (Bowerman, 2011). For example, agglutinative morphology tends to be acquired more easily than synthetic morphology (e.g. Slobin, 1982). Furthermore, children acquiring languages with rich morphological systems become aware of the importance of morphology at a younger age (e.g. Laaha & Gillis, 2007). This monograph contributes to this typological approach by considering the acquisition of polysynthetic verb structures and complex morphological systems in Murrinhpatha, a polysynthetic language of Northern Australia.

Murrinhpatha verbs exhibit a number of properties that pose interesting challenges to both the language learner and current theories of acquisition; thus its study allows us to better understand the acquisition of rich and complex morphological systems. The majority of Murrinhpatha verbs have a bipartite stem structure, where one of a closed class of 38 classifier stems combines with one of a larger class of lexical stems (Street, 1987; M. Walsh, 2011). Together these encode the semantics and argument structure of the verb (Nordlinger & Caudal, 2012). These elements, which may be discontinuous, co-vary to encode different verbal meanings. The following examples are verbs with the same lexical stem -*kurrk* 'scratch', in combination with different classifier stems (the lexical stem is in bold).[1]

(1) a. *mam-**kurrk***
1sgS.hands(8).nfut-**scratch**
'I scratched something (with hand or stick).'

---

1. Classifier stems are traditionally glossed with numbers as a full semantic analysis of this system is yet to be achieved as discussed in § 2.2.3.

b. *thunungam-**kurrk***
2sgS.feet(7).nfut-**scratch**
'You scratched something (with your foot).'

c. *pan-**kurrk***
3sgS.slash(23).nfut-**scratch**
'They (sg) dug in the ground with a stick (e.g. for crabs).'
(Adapted from Nordlinger, 2015, p. 492)

Classifier stems are portmanteau morphs encoding subject, person and number, as well as tense/aspect/mood, as indicated in the glosses of the previous examples. Classifier stems form paradigms that encode 42 morphological property sets. The inflectional patterns of these paradigms, although displaying a number of inter- and intra-paradigmatic 'semi-regularities', have a great amount of homophony, suppletion and irregularity, which means that forms cannot easily be generated from general patterns (Nordlinger, 2015). In addition to stem morphs, Murrinhpatha verbs have a range of affixal morphs, including object markers, incorporated body parts, and additional number and tense/aspect/mood marking. This means that verbs may be large polymorphemic constructions, as shown in (2). Verbs are capable of encoding all core arguments, such that arguments need not be realised as overt nominals in order to compose a full grammatical clause.

(2) *mam-ngi-ngkarlay-warda=dim*
3sgS.hands(8).nfut-1sg.do-wave-now=3sgS.sit(1).nfut
'He's waving at me.' (LAMP_20131206_WF_01_V1 00:09:59)

It has been found crosslinguistically that children's early word productions often differ from target forms, primarily through the omission of segments and syllables (e.g. Demuth, 1996b). Given that Murrinhpatha verbs may be long words, they are likely to be truncated by children. Accounts of the truncation of early word forms typically fall into two categories, those which highlight the importance of prosodic/phonological factors (e.g. Demuth, 1996b; Slobin, 1985a) and those which highlight the influence of morphosyntactic factors (e.g. Rizzi, 1993; Wexler, 1998).

Murrinhpatha poses potential problems to a morphosyntactic account as it requires the child to be aware of the underlying morphological structure of complex verbs. Given the complexity of Murrinhpatha verb forms it seems unlikely that a child would have deciphered the underlying morphological structure at a time that they were still truncating word forms. Despite this, it has been observed for a number of morphologically complex languages that children omit all non-stem morphology resulting in the production of bare stems (e.g. Courtney & Saville-Troike, 2002; Deen, 2009). Murrinhpatha consequently provides an interesting opportunity for considering this issue.

Murrinhpatha's complex and often irregular verbal paradigms also pose an interesting problem for theories of morphological acquisition. Dual-route theories claim that children acquire inflectional morphology through the identification and application of abstract morphological rules (e.g. Clahsen, 2006b; Dressler & Karpf, 1995; Pinker, 1984). While such accounts are well-placed to describe regular systems such as the English past tense, they are not able to account for the acquisition of more complex morphological systems (Stoll & Bickel, 2013). Since the task of generating rules for Murrinhpatha's verbal paradigms is not straightforward (M. Walsh, 2011, p. 224), it seems unlikely that dual-route theories will be able to account for their acquisition. However, without the existence of productive morphological rules it seems unlikely that children would be able to acquire the complex paradigms of polysynthetic languages (Mithun, 2010). Conversely, single-route usage-based theories of morphological acquisition argue that powerful general learning mechanisms help children to identify regular and semi-regular patterns across word forms, which result in the creation of general schemas (e.g. Bybee, 1995). These schemas facilitate the acquisition of new word forms. This means that children would need to learn large numbers of minimally different verbal forms relying on low scale analogy and schematization (Stoll, 2015). Given that little is known about how children acquire the complex paradigms of polysynthetic languages (Stoll, 2015), observing the acquisition of Murrinhpatha's complex verbal paradigms allows us to develop a more typologically well-rounded understanding of how morphological systems are acquired and how the structure and complexity of morphological systems influences their acquisition.

There has been little study into the acquisition of structures similar to Murrinhpatha bipartite stem verbs. It is therefore relatively unknown how children acquire such structures. Murrinhpatha bipartite stem combinations may be semantically compositional, raising questions as to when children acquire these compositional principles and whether children acquire verbs as lexicalised units or learn to produce them 'on-line'. Acquisition studies of bipartite structures in other languages, such as light verb phrases in Persian (Family, 2009) and preverbs in Georgian (Imedadze & Tuite, 1992), find that children do acquire such compositional principles, as evidenced by the production of novel combinations, based on grounds of semantics and frequency. The acquisition of such structures is dependent on factors such as frequency of the combinatorial elements as well as the entire construction, morphosemantic transparency and productivity (e.g. Berman, 2011; Dressler et al., 2019). Although similar in some respects to these structures, the acquisition of bipartite stem verbs like those found in Murrinhpatha has not yet been explored.

This monograph examines these issues based on the language development of five monolingual Murrinhpatha speaking children aged between 1;9 and 6;1 from Wadeye, in Australia's Northern Territory. These children were recorded at semi-regular intervals over a two-year period, while they were interacting with other children and caregivers in semi-naturalistic contexts. These recordings represent the first detailed documentation of Murrinhpatha child language and form part of the larger Language Acquisition of Murrinhpatha (LAMP) project based at the University of Melbourne.[2] The findings presented here provide a unique and new perspective into the acquisition of complex morphology and language in general.

1.1 Historical and sociolinguistic context

This study is based in the town of Wadeye (Port Keats). Wadeye lies on the edge of coastal mangroves at the end of the Port Keats road, near the western coast of Australia's Northern Territory (see Figure 1). Wadeye is one of Australia's largest Indigenous towns, with approximately 3000 residents (*Wadeye – Thamarrurr Development Corporation*, n.d.). The majority of these residents are Indigenous Australians from the traditional clans of the surrounding Thamarrurr region (Taylor, 2010). Today these people typically speak Murrinhpatha as a first language. The remainder of the Wadeye population includes people who have married into families from the area and a predominantly non-Indigenous population of 'service providers', including health workers, educators, contractors, council workers, shop staff and police. The non-Indigenous population tend not to speak or understand much Murrinhpatha and are typically speakers of Australian English.

The township of Wadeye has a relatively short history. In 1935, a Catholic Mission was established by the Missionaries of the Sacred Heart at nearby Werntek Nganayi, now also known as 'Old Mission'. In 1939, due to the need for a more reliable water supply, the mission was moved to its current location at Wadeye on the Kardu Diminin clan estate. The town was known as Port Keats until the 1970s, after which it officially became known as Wadeye. The founding of the mission attracted clans from the surrounding region, who relocated to Wadeye. By the 1950's some twenty clans resided in Wadeye (Bro. J. Pye, 1972), representing around 6 different language groups. Today up to 27 different clan groups reside in Wadeye, with the number varying slightly depending on different sources (e.g. Nganbe & McCormack, 2009; Taylor & Ivory, 2013).

2. https://arts.unimelb.edu.au/school-of-languages-and-linguistics/research/past-research-projects/lamp

Figure 1. Language map for the Wadeye and Fitzmaurice river regions[3]

3. Original map (1999) Mark Crocombe with community elders from each language family living at Wadeye. Updated map (2016) Mark Crocombe and Maree Klesch with community elders.

Murrinhpatha is the language of the Kardu Diminin clan,[4] on whose land Wadeye is located (Ward, 2018). This makes Murrinhpatha the appropriate or proper language of Wadeye.[5] Today Murrinhpatha is spoken by approximately 2500 people, who predominantly reside in and around Wadeye. While Murrinhpatha remains the 'dominant' language of the town and is used between speakers in all social environments where possible, other traditional Indigenous languages of the area have very few fluent speakers remaining and are not being completely acquired by children. Today many people who speak Murrinhpatha as a first language identify as belonging to a different heritage language.[6] The vitality of Murrinhpatha in comparison to other languages of the area may be due to the fact that Wadeye is located on Murrinhpatha land.

In addition to Murrinhpatha, Indigenous people in Wadeye use English to communicate with 'service providers'. There is a wide range of competency in English in the Wadeye Indigenous population. Typically, those over the age of around 40 were likely to have been schooled in the dormitory system, which had an oppressive approach to Aboriginal languages (D. X. Bunduck, 2018). Consequently, they have a greater command of English, whereas younger generations who did not attend dormitory schools tend to be less competent. Outside of the 'service provider' context, other languages such as Kriol[7] and varieties of Aboriginal English are used for communication with people who do not speak Murrinhpatha. These may be people who have married into Murrinhpatha-speaking families or are visiting relatives. There is substantial mobility between Wadeye and a number of inland communities including Peppimenarti, Nganambala (Emu Point) and Nauiyu (Daly River), where people typically speak Kriol as a first language (Mansfield, 2014; Reid, 2011; Rhydwen, 2003).[8] When people visit or emigrate from Kriol-speaking areas they likely use a mixture of Kriol, varieties of English and Murrinhpatha to

4. Murrinhpatha is also the language of various other clan groups; see Ward (2018).

5. See Rumsey (1993) for a description of the relationship between people, language and land in a broader Australian Aboriginal context.

6. Further information about the peoples gathered together at Wadeye can be found here (Ward, 2018).

7. Kriol refers to an English lexifier creole language spoken as a first language by up to 30,000 people across regions of the top end of Australia from Cape York to Broome and south to Tennant Creek (Meakins, 2014). Murrinhpatha speakers may use the term *Murrinh Pidthin* (Pidgin Language) to refer to Kriol.

8. It should be noted that many Kriol speakers in places such as Daly River may not identify as speaking 'Kriol' and instead use other labels to refer to this language such as 'Pidgin English' or 'Ngan'giwatyfala' (Rhydwen, 2003).

communicate, depending on the abilities of the relevant interlocutors. People in Wadeye also have connections with populations in Kununurra & Wyndham in Western Australia, as well as populations in Darwin and the Tiwi Islands north of Darwin (Taylor, 2010). It is unclear what impact these links have on the linguistic ecology of Wadeye.

The majority of Indigenous children in Wadeye today grow up with Murrinhpatha as their first language. They typically have only limited exposure to English before they commence education at the local school, 'Our Lady of the Sacred Heart Thamarrurr Catholic College'. The school provides a bilingual program with biliteracy instruction in Murrinhpatha and English, based to some extent on a step transition model (D. F. Bunduck & Ward, 2017; Devlin, 2005). Before attending school, children have little to no receptive or productive skills in English. They may overhear and be addressed in English sporadically at places like the shop and health clinic. They also watch English language television and media on mobile devices. Exposure in these environments tends to result in the borrowing of the odd word or phrase into Murrinhpatha.

Child-rearing practices in Wadeye are not a central focus of this monograph. It is worthwhile, however, to provide some observations of day-to-day life based on my own time spent with a small number of families and through my work at the local school. These observations have contributed to the methods used in this study, in particular the structure of recording environments. For an overview of the literature concerning Indigenous children and youth in Australia, see Eickelcamp (2010).

Children born in Wadeye are typically cared for by their mothers. They are mostly carried until they are able to walk or a younger sibling is born. In addition, young children may be cared for by fathers, grandparents, the mother's female siblings (also referred to as *kale* 'mother') and sisters-in-law, and elder siblings. This distribution of caregiving responsibility is evidenced by the fact that some children may regularly sleep at different houses under the care of various kin.

Children are spoken to from a young age and are treated as autonomous beings capable of making their own decisions. For example, when going fishing a two-year-old may be given the option to come or stay and their decision is likely to be accepted. There is a noticeable child-directed speech register used by some speakers when talking to young children, in particular pre-verbal infants. This register is characterised by higher overall pitch, exaggerated intonation patterns and potentially palatalisation. Children are also often prompted to speak by more experienced interlocutors. Prompting takes a specific structure to which children are highly attuned. The prompter says what is to be said by the child followed by either *thama* 'you say it' or *na-na/-nge* 'say it to him/her'. Initially, I considered that prompting may be a result of parents wanting their children to 'perform' during recordings; however, given observations in a variety of other contexts where the child's speech was not a primary focus I do not believe this to be the case. Instead, this appears to be a typical explicit method of instruction used by more experienced speakers to guide less competent speakers in their behaviour and language use.[9] It is clear, however, that some caregivers tend to provide more prompts than others (Kelly & Davidson, 2015).

Children in Wadeye grow up surrounded by family and are in regular contact with speakers of various generations. This is due both to the strength and importance of family as well as the dramatic overcrowding of housing throughout the town (AAP, 2020). Children also spend a large amount of time playing in their own peer group with siblings and cousins. The significance of the peer group in the child's social world has also been highlighted in a number of other Indigenous Australian contexts, including Maningrida (Hamilton, 1981), Aurukun (Martin, 1993) and Docker River (Fietz, 2008). The importance of these peer groups likely increases as children grow older and become more independent from older caregivers. Indeed, the peer groups of young men in Wadeye have been shown to be a major factor in their social organisation (Mansfield, 2014). For recent insights into child rearing practices elsewhere in Australia's Northern Territory, see Fasoli et al. (2018), *Growing up Yolngu* (n.d.) and Wadrill et al. (2019).

1.2 Research questions and monograph outline

This monograph considers three major research questions:

1. What are the characteristics of children's early Murrinhpatha verbs and what factors account for these characteristics?
2. What insights can be gained from children's acquisition of the complex morphological patterns of Murrinhpatha classifier stem paradigms?
3. What insights can be gained from children's acquisition of the Murrinhpatha bipartite stem verb system?

I examine each question with regard to current debates and research in language acquisition and explore how the findings from Murrinhpatha acquisition inform our understanding of the acquisition of morphology and language in general.

The remainder of the monograph is structured as follows. Chapter 2 provides a general overview of the Murrinhpatha language and previous linguistic work on Murrinhpatha. It also includes a detailed description of the verb structures central

9. In my own learning of Murrinhpatha, I have also been prompted in the same way as young children.

to this study, including bipartite stem morphology, classifier stem paradigms and the prosodic structure of verbs. Chapter 3 provides relevant background of empirical studies and theoretical proposals regarding the acquisition of verbs and verb morphology. Throughout this chapter, the importance of a crosslinguistic approach to language acquisition is highlighted. I also focus on findings from acquisition studies of other complex morphological systems and the issues they raise for theories of acquisition. The methods of this study are outlined in Chapter 4.

Chapter 5, the first of three analysis chapters, focuses on children's verb use before age 3 in relation to Research Question 1. It examines children's early verb productions and considers what factors drive these productions. The first half of this chapter focuses on the structure of children's early verbs given findings in other languages that children often truncate their early words and omit inflectional morphology (e.g. Deen, 2009; Demuth, 1996b). It shows that the truncation of Murrinhpatha verb forms is sensitive to prosodic factors found in the adult target language. The second part of this chapter considers whether children's early verbs are restricted in terms of semantics and pragmatics similar to findings for English-acquiring children (e.g. Clark, 1993; Huttenlocher et al., 1983; Ninio, 1999b), and what impact this may have on the acquisition of verb morphology.

Chapter 6 addresses Research Question 2, analysing the development of Murrinhpatha classifier stem paradigms across the corpus. Using a 'matched sample', it examines the development of classifier stem paradigm cell diversity using a measure of mean size of paradigm (Xanthos & Gillis, 2010). I then provide qualitative analysis to further illustrate the findings of the quantitative analysis. Through this analysis, potential pathways of development in acquiring complex verbal paradigms are examined. The final analysis chapter (Chapter 7) focuses on Research Question 3, exploring the acquisition of the bipartite stem verb system. It examines the extent to which children are aware of the semantics associated with individual stem elements and the impacts of the structure of this system on acquisition. In particular, it focuses on the contrastive use of several classifier stem paradigms and children's errors of commission. Chapter 8 revisits the findings from the previous three analysis chapters and provides discussion in relation to broader empirical findings and theoretical approaches in the field of first language acquisition as well as proposing avenues for future research. It highlights how the study of languages like Murrinhpatha can further our understanding of acquisition and the importance of crosslinguistic and typological diversity to the field. Morphological complexity is an important variable. A greater knowledge of the impacts of complexity on language acquisition can help the field better understand the processes of morphological acquisition and become less reliant on findings from a small number of the world's languages which tend to be typologically similar.

CHAPTER 2

Grammatical background

Murrinhpatha[10] is a polysynthetic non-Pama-Nyungan language spoken in the Thamarrurr region of Australia's Northern Territory. It is one of only 12 traditional Australian Indigenous languages where intergenerational transmission remains unbroken (*National Indigenous Languages Report*, 2020, p. 49).[11] Together with the neighbouring language Ngan'gityemerri, Murrinhpatha forms the Southern Daly language subgroup (Green, 2003). For an overview of languages of the Daly River region, see Nordlinger (2017).

Murrinhpatha has been the focus of a growing amount of linguistic research. This has included introductory and foundational grammatical descriptions (Street, 1987; M. Walsh, 2011), as well as more focused research on a variety of areas including nominal classification (M. Walsh, 1997), person reference (Blythe, 2009, 2013), description of aspects of Murrinhpatha's complex verb morphology (Blythe, 2010; Forshaw, 2011; Mansfield, 2014, 2019a; Mansfield & Nordlinger, 2020; Nordlinger, 2010, 2015; Nordlinger & Caudal, 2012; Seiss, 2012; M. Walsh, 1995), sociolinguistics (Mansfield, 2013, 2014), language change (Mansfield, 2015, 2016a; Mansfield & Nordlinger, 2020), and language and education (Wood et al., 2020). The field of Murrinhpatha linguistics has also recently expanded to include studies of language acquisition (Davidson, 2018, 2018; Forshaw, 2016; Forshaw et al., 2017; Kelly et al., 2015, 2009), led by the LAMP project.

2.1 Phonology and orthography

The tables below, derived from Nordlinger (2015, p. 497) and Mansfield (2019a, p. 75), illustrate the Murrinhpatha phoneme inventory using the current orthography. This orthography is used throughout the monograph when presenting language examples. It should be noted, however, that the word boundaries in examples

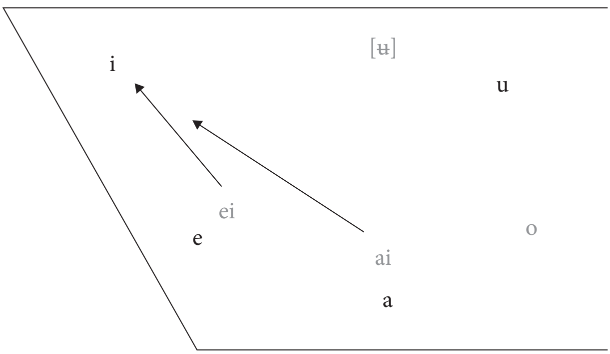
10. Murrinhpatha is the current preferred spelling of the language name, however it is also found in the literature in the following forms: *Murrinh-Patha, Murriny Patha, Murinypata* and *Murinbata*.

11. By contrast, prior to the invasion of Australia in 1788 there were 250–300 distinct languages (Koch & Nordlinger, 2014).

do not always align with the orthography as it is not always clear what parts of the verbal complex are contained in a single word. See Mansfield (2019a) for discussion of word status in Murrinhpatha. Laminals in Murrinhpatha typically vary allophonically between a lamino-dental realisation before back vowels (/u/ and /a/) and a lamino-palatal realisation elsewhere. There are, however, a number of exceptions to this rule, such as in the lexeme for 'boat' *tharntu* [carntu].[12] The shaded fricative series has been recently introduced and is a result of the recent borrowing of loanwords from Standard Australian English and Kriol (Sandefur, 1986).[13]

Table 1. Murrinhpatha phoneme inventory

Consonants	Bilabial	Alveolar	Retroflex	Laminal	Velar
voiceless stop	p	t	rt	th	k
voiced stop	b	d	rd	dh	g
fricative	f	th	sh	s	
nasal	m	n	rn	nh	ng
lateral		l	rl		
flap/trill		rr			
glide	w	r		y	



*Greyed vowels have recently been added into contemporary Murrinhpatha through loanwords

12. The work of Blythe (e.g. 2009) uses a slightly different orthography which formally differentiates between lamino-palatal (e.g. *tj-*) and lamino-dental (e.g. *th-*) consonants. Where examples from other sources do not conform to the above orthography they are changed so as to be consistent.

13. There is no definitive approach to how English and Kriol loanwords are treated in Murrinhpatha orthography. In some cases words may be assimilated to the more traditional orthography such as *waya* for 'wire' whereas in other cases words may be written in the orthography of the source language.

The remainder of this chapter focuses on the description of verbs and verb morphology, with a particular focus on the bipartite stem verb system and characteristics of classifier stem paradigms. For a more general language overview see Blythe (2009 Chapter 6), and for a greater description of Murrinhpatha phonology see Mansfield (2019a Chapter 3).

2.2 Verbs

Similar to many languages of northern Australia, the majority of verbs in Murrinhpatha have a bipartite structure (e.g. McGregor, 2002; Schultze-Berndt, 2000). In most other northern Australian languages with this type of verbal system, the two predicative elements are distinct parts of speech and are combined syntactically to form a complex predicate. By contrast, in Murrinhpatha and Western and Southern Daly languages these two elements are contained in a single verbal word (Nordlinger, 2017). These bipartite stem verbs are constructed of two distinct stem morphs, a classifier stem (also referred to as 'auxiliaries' (M. Walsh, 2011), 'classifier-subject pronominals' (Nordlinger, 2011) and 'finite verbs' (Mansfield, 2019a)) and a lexical stem (also referred to as 'coverbs' (Blythe, 2009; Mansfield, 2019a) and 'verb roots' (M. Walsh, 2011) which can occur in continuous or discontinuous positions in the verb as shown in Table 2.

Together the classifier stem and lexical stem account for the verbal semantics, argument structure and event denotation of the verb (Nordlinger & Caudal, 2012). These two elements combine in a variety of ways to encode different verbal meanings, as explained in further detail in § 2.2.3. In the example in (3), the two stem elements have been bolded with the classifier stem always occurring word initially.

(3) ***ngam***-*mpa*-***mut***
1sgS.poke(19).nfut-2sg.io-**give**
'I gave it to you' (LAMP_20131206_WF_02_V1 00:05:25)

In addition to predicate semantics, classifier stems encode subject person/number and tense/aspect/mood. There are approximately 38 classifier stems, which are inflected to encode 42 morphological property sets resulting in complex classifier stem paradigms (CSPs). This results in 1596 inflected classifier stem forms (Mansfield & Nordlinger, 2020).[14] CSPs have been argued to categorise the event type of the verb according to a number of semantic parameters (e.g. Barone-Nugent, 2008);

14. Mansfield and Nordlinger actually argue for 39 classifier stems resulting in 1638 stem forms but this appears to include treating CSP(19) as two homophonous yet semantically distinct paradigms. I choose to treat this as a single CSP poke(19).

however, the analysis of this system poses a range of problems and a comprehensive analysis cannot be achieved on purely semantic grounds (Nordlinger, 2012a). Where possible these event categories are given in the glosses of classifier stems, yet given processes of metaphorical extension and lexicalisation, these should not be read literally but as labels. The labels used here largely follow those used in various works of Nordlinger (2010, 2012a, 2015). In addition, classifier stems are glossed with numbers following the tradition of previous descriptions (Blythe, 2009; Blythe et al., 2007; Street, 1987; M. Walsh, 2011). In this monograph I largely follow the numbering system illustrated by Blythe et al. (2007).

Classifier stems are obligatory in all verbs. Eleven CSPs can occur as simple verbs without a lexical stem, as shown in (4). Five of these 11 CSPs[15] typically maintain their meaning in bipartite stem verbs, whereas the remaining six CSPs[16] are less semantically transparent when used in bipartite stem verbs (Mansfield, 2019a, pp. 196–197).

(4) *Acacia* ***kanthin***=*pirrim*
name **3SGS.HAVE(22).NFUT**=3SGS.STAND(3).NFUT
'Acacia has a guitar' (LAMP_20131206_WF_02_V1 00:02:02)

A number of simple verbs may also be used to construct phrasal verbs. In this construction type, the simple verb is typically immediately preceded by a 'preverb' that encodes the main lexical content of the phrasal verb (Mansfield, 2016a),[17] as in (5). These differ from bipartite stem verbs as the preverb and simple verb are not morphologically bound. This construction is readily used to borrow verbs from both English and Kriol and is a growing verbal structure in Murrinhpatha (Mansfield, 2016a).

(5) *walalanhka* ***pirrim***
wave **3SGS.STAND(3).NFUT**
'He's waving' (LAMP_20131206_WF_02_V1 00:07:46)

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15. Mansfield (2019a, p. 197) confusingly terms these lexical verb stems in light of previous Murrinhpatha literature. These are LIE(2), STAND(3), ALOFT(5), GO(6) and HAVE(22).

16. Mansfield (2019a, p. 197) terms these light verb stems. They are SIT(1), BE(4), FEET(7), HANDS(8), HANDS:RR(10) and SAY/DO(34).

17. Phrasal verbs are referred to by Mansfield (2016a) as light verb phrases. In the description of these constructions he refers to simple verbs as light verbs and preverbs as coverbs. I deliberately avoid the use of the term coverb to avoid confusion with the lexical stem which has been described as a coverb in previous descriptions of Murrinhpatha (e.g. Blythe, 2009).

In addition to stem morphology, Murrinhpatha verbs may include direct and indirect object marking, reflexive/reciprocal markers, incorporated body parts, additional tense/aspect/mood and number marking, various adverbial markers, and a serialised verb element. This can result in long and complex polymorphemic verbs, as shown in (6). Murrinhpatha verbs may constitute full clauses encoding all core arguments, meaning that overt nominal arguments are not required to make a clause grammatical.

(6) *nanhthi* *hat* ***ngungan-ngintha-we-wurl=ngem***
CLF:THING hat **1SGS.REMOVE(32).NFUT-DU.F-head-undress=1SGS.SIT(1).NFUT**
'We (dual exclusive non-siblings) are taking hats off our heads.'
(LAMP_20131206_WF_01_V1 00:22:33)

The verb has a templatic structure in which affix ordering is governed by morphotactic constraints and not by semantic compositionality and/or syntactic structure (Nordlinger, 2010).[18] The structure of this template, adapted from Nordlinger (2010), is given below. I divide the verb template in two sections, similar to Mansfield (2015). The first section, the verbal Prosodic Word (PWord), begins with the classifier stem and concludes with the lexical stem. The verbal PWord has a bimoraic minimum and predictable penultimate stress when greater than a single syllable (Mansfield, 2019a). The second section is a sequence of morphs which are external to the internal PWord. When slots 2, 3 or 4 are overtly expressed in bipartite stem verbs, this causes stem morphology to be discontinuous.

Table 2. Murrinhpatha verb template

1	**2**	**3**	**4**	**5**	**6**	**8**	**9**		**10**
Classifier Stem	S.NUM/ DO/IO	RR	IBP/ APPL	Lexical Stem	TAM	S.NUM/ O.NUM	ADV	=	SCS
Verbal PWord					Suffix Sequence				

Key:

S.NUM:	Subject number marker	APPL:	Applicative
DO:	Direct object marker	TAM:	Tense/aspect/mood marker
IO:	Indirect object marker	ADV:	Adverbial
RR:	Reflexive/reciprocal marker	O.NUM:	Object number marker
IBP:	Incorporated body part	SCS:	Serial classifier stem

18. Mansfield (2017) proposes an alternative description, which argues that the position of the lexical stem is determined by prosodic criteria. This description reduces the need for the competition of morphology in certain slots; however, it also relies on the existence of templatic verb structures.

There is considerable inter- and intra-speaker variability in the sequencing of suffixes external to the verbal PWord (Mansfield, 2019a); however, this does not impact the scope of these morphs, consistent with a templatic account.[19]

There are a number of morphophonemic processes which occur in verbal PWords. These are typically the result of a final nasal of a classifier stem or object marker being followed by an initial consonant of a lexical stem or incorporated body part. This is often found in verbs with non-future classifier stems, as these have final nasals in most forms (see § 2.2.4). These processes are discussed at length in Mansfield (2019a). In this monograph, where relevant to discussion, the first line of examples shows the surface form of the verb and the second line shows the underlying morphological representation, as in (7). In cases where the surface form is not relevant to discussion it may be omitted.

(7) *bangarnurt*
bangam-rdurt
1sgS.bash(14).nfut-find
'I found it.' (LAMP_20131105_WF_01_V1 00:29:17)

2.2.1 Complexity in use

The above preliminary presentation of Murrinhpatha verbs highlights the potential complexity of Murrinhpatha verbs and suggests that they are constructed of many morphs. While examples such as (6) capture the potential complexity of Murrinhpatha verbs, they do not represent the typical complexity of verbs in everyday use or the typical complexity of verbs used in child-directed speech. Understanding the typical structure of verbs is important given that frequency and word position is argued by many accounts to be a major factor in the acquisition of morphology (e.g. Ambridge et al., 2015; Lieven, 2010; C. Pye et al., 2007).

A study of the typical structure of verbs based on a corpus of 4 adult-to-adult small group conversations and 3 short narratives was undertaken by Forshaw et al. (2012). It examined the morphological structure of 1359 verb tokens. It found that, on average, in addition to stem morphs, verbs contained 1.21 overt affixal morphs with the most frequent slots filled being slot 2 (object markers and subject number) and slot 6 (TAM) occurring in 36% and 37% of verb tokens respectively. The study also found that lexical stems also occur word finally in 41% of all verb tokens despite their position in the middle of the verbal template. This means that, in addition to occurring at the end of the verbal PWord, they are also regularly located at the end

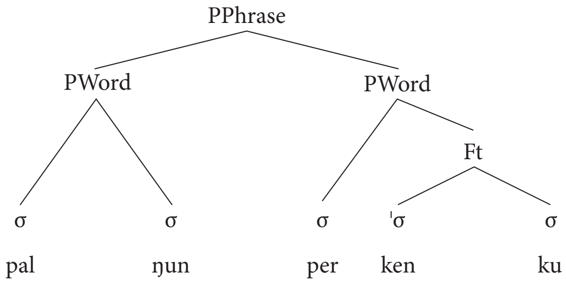
19. The suffix sequence shown in the above table is consistent with sequences of most previous descriptions (e.g. Blythe, 2009; Nordlinger, 2015; M. Walsh, 2011) but does not represent any argument as to a default sequence.

of the verbal complex. This is important given that the ends of words are salient for children (e.g. Peters, 1985; C. Pye et al., 2007). The small nature of this study means that it is only indicative of adult verb use and a more comprehensive study may produce different results. While it would be preferable to draw on the findings from a corpus of child-directed speech this research is yet to be undertaken. What is utilised is the best available representation of the typical structure of adult verbs.

2.2.2 Prosodic structure of verbs

The PWord in Murrinhpatha is a minimally bimoraic accent anchoring unit of speech (Mansfield, 2019a).[20] One or more PWords, and their dependent adjuncts, form prosodic phrases (PPhrase). There is a single stressed syllable in each PPhrase, which is realised on the penultimate syllable of the final PWord within a particular PPhrase as a pitch accent as shown below. I treat this pitch accent as heading a trochaic foot at the edge of the PWord.[21] The pitch accent involves a high tone immediately followed by a low tone (Mansfield, 2019a, p. 89). Given findings of no secondary stress patterns (Mansfield, 2019a), I treat other syllables as being prosodified at the PWord level. Where a PWord is monosyllabic, the stress occurs on the single syllable. As noted previously, the bipartite verbal PWord begins with the classifier stem and concludes at the lexical stem.

(8)



(Mansfield, 2017, p. 5)

20. The most complete description of the prosodic structure of Murrinhpatha verbs comes from Mansfield (2019a, pp. 85–98). There have previously been a number of impressionistic descriptions of the prosodic structure of Murrinhpatha verbs (Clemens, 2013; Mansfield, 2014; Street & Mollinjin, 1981; M. Walsh, 2011).

21. Mansfield (2019a), however, argues against the existence of any metrical structure in Murrinhpatha PWords. I maintain the existence of a trochaic foot at the right word edge given similarity to word structure in other languages as well as the usefulness of this structure in explaining children's early verb use.

Importantly, although stress is predictable in relation to the end of the verbal PWord, it does not coincide with a specific morphological slot. In the following simple verb examples stress falls on the initial syllable of the classifier stem (9) and on the first syllable of the indirect object marker (10).

(9) *'na-nga*
2sgS.say/do(34).fut-1sg.io
'Tell me.' (Mansfield, 2019a, p. 139)

(10) *mam-'pirra*
3sgS.say/do(34).nfut-3pl.io
'He told them.' (Mansfield, 2019a, p. 139)

This is also the case in bipartite stem verbs. When lexical stems are monosyllabic, the preceding morph is stressed (11). When the lexical stem is at least two syllables long ((12), (13)), the penultimate syllable of the lexical stem will be stressed. This means that, while the end of the lexical stem is predictable on the basis of stress, the initial boundary of the lexical stem is not predictable in this way. The lexical stems in these examples are bolded.

(11) *ngunu'ngam-**ku***
1sgS.feet(7).nfut-**throw**
'I threw it away.' (Mansfield, 2019a, p. 77)

(12) *puma-'**patha**-nu-ngime*
3plS.hands(8).fut-**make**- fut- pc.nsib
'They will make it.' (Mansfield, 2019a, p. 77)

(13) *kardu bangam-**dha'wibu**=dim*
clf:human 3sgS.bash(14).nfut-**light.cigarette**=3sgS.sit(1).nfut
'He's lighting up (a cigarette).' (Mansfield, 2019a, p. 95)

2.2.3 Bipartite stem verbs

Bipartite stem verbs are minimally composed of a classifier stem and a lexical stem. These stems co-vary to encode different verbal meanings, with many classifier stems occurring with a variety of lexical stems and vice versa (Nordlinger & Caudal, 2012). In the most transparent constructions, the verbal meaning can be understood as being composed of meanings of both the classifier and lexical stem. These individual stem morphs can have clear associated meanings spread across a wide variety of constructions. There is, however, great diversity across the verbal system, both in terms of flexibility and semantic transparency of individual stems. Flexibility refers to the number of combinations in which a classifier or lexical stem can occur, whereas semantic transparency refers to the ease with which a core semantic meaning can be attributed to a stem based on its use in a variety of combinations. The characteristics presented in this section have been explored in detail in other languages of the Daly region Marrithiyel (Green, 1989) and Ngan'gityemerri (Reid, 2011), which have similar bipartite verb systems.

At the most productive end of the verbal system, combinations of classifier and lexical stems are semantically transparent and the individual stems typically have relatively high flexibility. The interaction of the stem elements in terms of semantic transparency is highlighted by the following examples from Nordlinger (2015, p. 494). The verbs in (14a–d) all contain the CSP BASH(14) in combination with a variety of lexical stems. These verbs all encode events of 'bashing' or 'sticking' using some type of instrument. These semantics are associated with the CSP and additional meaning is contributed by the lexical stem.

(14) a. *bangam-rtal*
3SGS.BASH(14).NFUT-chop
'He chopped it (with an axe).'
b. *bangam-melmel*
3SGS.BASH(14).NFUT-flatten
'He flattened it (with a hammer).'
c. *bangam-warnta*
3SGS.BASH(14).NFUT-split.open
'He smashed it open (with a hammer).'
d. *bangam-let*
3SGS.BASH(14).NFUT-stick
'He stuck it together (with something).' (Nordlinger, 2015, p. 494)

By contrast, the verbs in (15a–d) all contain the same lexical stem *-rtal* in combination with a variety of CSPs. These verbs all encode events of 'breaking something into pieces.' This meaning of 'breaking' is associated with the lexical stem. The CSP in each of these instances further specifies the method by which the thing has been broken. For example CSP POKE(19), which often encodes actions done with or related to the mouth (e.g. Barone-Nugent, 2008), specifies that the thing is broken by the mouth (15d).

(15) a. *bangam-rtal*
3SGS.BASH(14).NFUT-chop
'He chopped it (with an axe).'
b. *pan-rtal*
3SGS.SLASH(23).NFUT-chop
'He sliced it (with a knife).'

c. *mungam-rtal*
3sgS.break(11).nfut-chop
'He broke it with his hands.'

d. *dam-rtal*
3sgS.poke(19).nfut-chop
'He broke it off with his mouth.' (Nordlinger, 2015, p. 494)

The individual stems in the above examples also tend to have relatively high flexibility. According to a shared Toolbox database of various Murrinhpatha linguists (Blythe et al., n.d.),[22] the CSPs used in (15a–d) combine with 77, 113, 12 and 160 lexical stems respectively. By comparison, one of the least flexible CSPs is look(12), which has only been attested with a single lexical stem *-yerr* 'look out' and its reduplicated form *-yelerr*. With regard to lexical stems, *-rtal* 'chop', which is used in (15a–d), has relatively high flexibility combining with 6 different CSPs. By comparison the lexical stem *-dharryit* 'to be cautious' is only attested in combination with a single CSP poke(19).

The flexibility of stems may, to some extent, be related to their semantic transparency, in that the semantics associated with a stem element will be distinguished more easily, both from the point of linguistic analysis and acquisition, if it is used in a wide variety of combinations, given of course that the semantics of these combinations are similar in some way. There are, however, examples where determining the semantics of a flexible stem element is not possible. For example, the lexical stem *-bath* has been attested with six CSPs but has no easily discernible semantic core (Blythe et al., n.d.). Since the majority of classifier and lexical stems do not occur on their own, determining their semantics must be achieved through the comparison of various combinations. Furthermore, when CSPs do occur as simple verbs their semantics are not necessarily maintained in bipartite stem verbs (e.g. Mansfield, 2019a, p. 196; M. Walsh, 2011).

Lexical stems, in comparison to CSPs, generally occur in fewer combinations and are semantically less general. This can be attributed to the relative size of each stem category, with the class of lexical stems being quite large in comparison to 38

22. Throughout this monograph I often refer to entries from this database which contains entries of lexemes and morphs as well as many language examples. The current database is the amalgamation of the previous Toolbox databases of Joe Blythe and Rachel Nordlinger. It includes many entries taken from the various works of Chester Street (e.g. 2012). More recently, contributions to the database have been made by myself and John Mansfield. This database should never be considered comprehensive and will always be a 'work-in-progress'. It does, however, contain a wealth of information and is quite detailed and extensive. Toolbox is an analysis tool for linguists and is primarily designed to parse and interlinearise text. It is developed by the SIL (Summer Institute of Linguistics) http://www-01.sil.org/computing/toolbox/.

CSPs. By contrast, CSPs tend to have more general semantics, allowing them to potentially occur in a wider variety of combinations. These include general meanings such as 'do with hands' for HANDS(8) and 'do with heat' for HEAT(27). Some CSPs have more specific semantics and consequently tend to have less flexibility, such as WATCH(28), which encodes events of 'watching'. The use of these CSPs is illustrated by the below examples. The classifier stems appear in bold.

(16) HANDS(8)
a. ***mam**-mel*
1SGS.HANDS(8).NFUT-flatten
'I flattened it out by hand.' (Street, 2012, p. 27)
b. ***mam**-ngintha-yit=ngem*
1SGS.HANDS(8).NFUT-DU.F-hold=1SGS.SIT(1).NFUT
'We (excl.) are holding him.' (LAMP_20131120_WF_01_V1 00:02:27)
c. ***mam**-kuruk*
1SGS.HANDS(8).NFUT-fold
'I folded it.' (Street, 2012, p. 9)

(17) HEAT(27)
a. ***thina**-nge-thi*
2SGS.HEAT(27).FUT-3SG.F.IO-cook
'You cook it for her.' (LAMP_20131105_WF_01_V1 01:14:35)
b. *kura* ***ngina**-yirryirr-nu*
CLF:WATER **1SGS.HEAT(27).FUT**-boil-FUT
'I will boil the water.' (Street, 2012, p. 83)
c. *ku* *yagurr* ***ningam**-rdath=dim*
CLF:ANIM goanna **3SGS.HEAT(27).NFUT**-singe=3SGS.SIT(1).NFUT
'He's singeing the goanna.' (Street, 2012, p. 53)

(18) WATCH(28)
a. ***ngirra**-ngka-nu*
1SGS.WATCH(28).FUT-watch.over-FUT
'I'll watch over it.' (Street, 2012, p. 36)
b. ***thirra**-ngi-marit*
2SGS.WATCH(28).FUT-1SG.DO-learn
'You learn from me by observation.' (Street, 2012, p. 25)
c. ***ngirra**-nhi-bath-nu*
1SGS.WATCH(28).FUT-2SG.DO-watch-FUT
'I will watch you.' (Street, 2012, p. 2)

Another transparent and flexible aspect of the bipartite verb system is the systematic relationship that exists between some CSPs. There are a number of clear patterns where a change in CSP results in a predictable change in meaning of the verb across a wide range of lexical stems. I refer to these as CSP alternations. The acquisition of some of these alternations is explored in § 7.2.2. One of the most flexible of these CSP alternations is the reflexive/reciprocal alternation. In Murrinhpatha there is a systematic relationship between pairs of CSPs where a reflexive/reciprocal verb is formed by a predictable change in CSP (Nordlinger, 2011). For example, verbs formed with HANDS(8) will form their reflexive/reciprocal equivalents with the CSP HANDS:RR(10), as shown below. The classifier stems appear in bold.

(19) a. *mi* ***mam**-yeth*
CLF:VEG **3SGS.HANDS(8).NFUT**-slice.into
'He cut the food.'
b. *mange* ***mem**-ma-yeth*
hand **3SGS.HANDS:RR(10).NFUT**-hand-slice.into
'He cut his hand.' (Adapted from Nordlinger, 2011, p. 722)

In addition to reflexive/reciprocal CSP alternations, there are a number of transitive/intransitive alternations where the CSP also impacts the argument structure of the verb. One example of this relationship is found between the CSPs TURN(29) and TURN:INTR(30). For example, in combination with the lexical stem *-wurl*, these combinations mean to 'return (an object)' and 'to return' respectively (Street, 2012). These reflexive/reciprocal and transitive/intransitive CSP alternations are listed in the table below.

Table 3. Reflexive/reciprocal and transitive/intransitive CSP alternations*

Transitive CSP	RR/INTR equivalent
FEET(7)	FEET:RR(38)
HANDS(8), GRAB(9) & SAY/DO(34)	HANDS:RR(10)
LOOK(13) & BASH(14)	BASH:RR(15)
LOWER(17)	LOWER:INTR(18)
POKE(19) & HEAT(27)	POKE:RR(21)
SLASH(23)	SLASH:RR(24)
WIPE(26)	WIPE:RR(37)
WATCH(28)	WATCH:RR(36)
TURN(29)	TURN:INTR(30)
REMOVE(32)	REMOVE:RR(33)

* These relationships have been identified and inferred from characterisations of CSPs by Mansfield (2019a, p. 115), Blythe et al. (2007), Nordlinger (2011, p. 722) and lexical entries by Street (2012). Mansfield's analysis in particular differs from that presented here due to his further segmentation of CSP forms.

At the less transparent end of the bipartite verbal system, combinations of stems are difficult to analyse compositionally. In many instances the combinations may be idiosyncratic. Consider, for example, the set of lexical stems in (20). These have only been attested as combining with the CSP SEE(13) and, where logically possible, with its reflexive/reciprocal equivalent BASH:RR(15). Given the lack of contrastive examples this makes attributing partial semantics to the lexical stem difficult. Instead, lexical stem glosses reflect the meaning of the stem combination.

(20) Lexical stems which combine with SEE(13)
(a) *-ndarlarl* 'be a big rain'
(b) *-ngkardu* 'look'
(c) *-ngkathap* 'serve one right'
(d) *-yilil* 'be in the middle' (Blythe et al., n.d.)

Determining the core semantic association for CSPs can also prove difficult. If we further consider the verbs which contain CSP SEE(13), a core semantic meaning is not clear. In addition to the above lexical stems, SEE(13) is attested with 10 other lexical stems, including those meaning 'to drink', 'to drop' and 'to trip'. If there is indeed a semantic core it is likely to be so oblique that it will not be apparent to adult speakers or children acquiring the language.[23]

Deciphering the relationship between bipartite stem combinations with a shared stem element and distinguishing the prototypical semantics of a particular stem can be problematic. It is often difficult to decide whether individual stems in different environments should be treated as polysemous or whether these are better treated synchronically as distinct homophonous morphs (Nordlinger, 2012a). Firstly, with regard to CSPs, it is possible for an individual CSP to be associated with more than one semantic core. For example, the CSP POKE(19) is used both in contexts where the action is done with a long-pointed instrument as in (21) and also in contexts where the action is done with the mouth as in (22). In the related language Ngan'gityemerri, these meanings would be encoded by two different classifiers (Nordlinger, 2012a). In one analysis it is proposed that the 'mouth' use emerges through various bridging contexts (Barone-Nugent, 2008). CSPs with multiple semantic cores are likely not transparent to speakers.

(21) *berengunh ngam-rilil*
already 1SGS.POKE(19).NFUT-write
'I've already written it down.' (Nordlinger, 2012a, p. 6)

(22) *nga-thap-nu mani*
1SGS.POKE(19).FUT-taste-FUT be.able
'I'll taste it.' (Nordlinger, 2012a, p. 6)

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23. This CSP is glossed as SEE(13) in all combinations to provide consistency across CSP glosses. It does not however imply a semantic analysis but is glossed after the meaning of one of the most frequent bipartite stem verbs which contains this CSP.

This issue is also sometimes found in relation to lexical stems where the same stem is used in different verbs. Consider the pairs of examples below in (23) and (24). In (23), the verbs with a shared lexical stem mean 'to wake someone (by shaking)' and 'to find'. In (24), the verbs with a shared lexical stem mean 'to bite' and 'to quieten a child'.

(23) a. *na-ngi-rdurt*
2sgS.hands(8).fut-1sg.do-wake
'You wake me (by shaking).'
b. *da-ngi-rdurt*
2sgS.bash(14).fut-1sg.do-find
'You find me.' (Constructed)

(24) a. *ku were kanhi-ka ba-nhi-lele-nukun*
clf:anim dog this-foc 3sgS.bash(14).fut-2sg.do-bite-fut.irr
'This dog might bite you.'
b. *kardu wakal ma-lele-nu*
clf:human small 1sgS.hands(8).fut-quieten.child-fut
'I will quieten the child.' (Street, 2012, p. 18)

In both these cases it is difficult to determine what the core meaning of the lexical stem might be. From an acquisition perspective it is best to treat these stems as different but homophonous stems rather than the same stem combining with different CSPs given the lack of semantic transparency. However, it is clear that many other combinations may still be understood as semantically compositional, at least from the point of view of a linguistic analysis.

It is also important to note that bipartite stem verbs have no or very limited productivity in terms of allowing the creation of new verbs. This is most noticeable with regard to the borrowing of verbs from English and Kriol (Mansfield, 2016a). Borrowed verbs are incorporated in Murrinhpatha through the phrasal verb structure and not as bipartite stem verbs, as shown below. This lack of productivity suggests a lack of transparency of the bipartite system and that stem combinations may be fused rather than compositional in the minds of speakers.

(25) *meikit mam ngamimarda=thu*
make.it 3sgS.say/do(34).nfut other.side=hith
'He made it all the way across.' (Mansfield, 2016a, p. 409)

The bipartite stem verb system of Murrinhpatha is composed of verbs which exist on a continuum of flexibility and semantic transparency. At the most systematic end of this system, classifier and lexical stem combinations can be understood as semantically compositional and associating core semantic meaning with individual elements is relatively straightforward. In such cases we might anticipate children acquiring this compositional structure. However, many stem combinations are not transparent and determining the semantic contribution of the individual stem elements is not possible and consequently is not accessible to the learner. In Chapter 7 I explore the impact of the differences in semantic transparency, flexibility and productivity across the system on acquisition.

2.2.4 Inflectional patterns of classifier stem paradigms

Classifier stems are a closed class of 38 members. Classifier stems form paradigms each with 42 forms resulting in 1596 potential classifier stem forms. They encode four subject person categories – 1st person exclusive, 1st person inclusive, 2nd person and 3rd person – three number categories[24] – singular, dual and plural – as well as four tense/aspect/mood (TAM) categories non-future, irrealis, past and past irrealis (Mansfield, 2019a, p. 116). There are also additional distinctions made in 3rd person forms between non-future vs presentational (Mansfield, 2019b) and irrealis vs future indicative. The classifier stem paradigm (CSP) for SIT(1) adapted from Nordlinger & Caudal (2012, p. 82) and Mansfield (2019a, p. 237) is shown below.[25]

Table 4. CSP SIT(1)

		NFUT (/PRSL)		PAST	PSTIRR	IRR (/FUT)
SG	1	*ngem*		*ngini*	*ngini*	*ngi*
	2	*thim*		*thini*	*thini*	*thi*
	3	*dim / kem*		*dini*	*dini*	*pi*
1 INCL		*thim*		*thini*	*thini*	*ki / pi*
PL/DU	1	*ngarrim*	PL	*ngarrini*	*ngarrini*	*nguyu*
	2	*nirrim*		*nirrini*	*nirrini*	*nuyu*
	3	*pirrim / karrim*		*pirrini*	*pirrini*	*kuyu / puyu*
	1		DU	*ngarrine*	*ngarrine*	*nge*
	2			*nirrine*	*nirrine*	*ne*
	3			*pirrine*	*pirrine*	*ke / pe*

24. Murrinhpatha also has additional affixal number marking which encodes a distinction between sibling and non-sibling groups and encodes a fourth number category paucal (Nordlinger, 2012b).

25. All 38 classifier paradigms are listed as an appendix.

Descriptions of the patterns of CSPs have noted that there is a significant degree of suppletion, homophony and irregularity across and within paradigms that cannot be easily accounted for through a set of rules (Nordlinger, 2015; M. Walsh, 2011, p. 224). The sheer size of these paradigms as well as the lack of straightforward inflectional rules creates great challenges both for the learner as well as for theories of morphological acquisition. There are, however, many semi-regular patterns of inflection that can be identified. In order to examine these patterns classifier stem forms can be divided into a prefix, inner stem and suffix (Green, 2003, p. 131; Mansfield, 2019a).

The patterns of inflectional exponence of CSPs are not generally shared across CSPs. Of the 38 classifier stems, the exponence pattern of 30 paradigms are not shared by any other classifier stem (Mansfield 2019a, p. 117). There is, however, a degree of semi-regular inflection both within and across paradigms. Mansfield (2019a, p. 118) refers to this as 'inflection by intersecting formatives.'[26] This means that a lexeme may be inflected according to a number of intersecting paradigmatic patterns. Mansfield identifies six semi-regular formatives. These are labelled Prefix Consonant (PrefC), Prefix Vowel (PrefV), Inner Stem Consonant (InnerC), Inner Vowel Height (InnerVH), Inner Vowel Frontness (InnerVF) and Suffix. The formatives of greatest interest to this study are PrefC and Suffix.

Table 5. Allomorphy of PrefC for classifier stems

<table>
<tr><th></th><th></th><th>NFUT (/PRSL)</th><th>PAST</th><th>PSTIRR</th><th>IRR (/FUT)</th></tr>
<tr><td>SG</td><td>1</td><td colspan="4">ng, ø</td></tr>
<tr><td></td><td>2</td><td colspan="4">th, ø</td></tr>
<tr><td></td><td>3</td><td colspan="3">p, w, d, n, y, k, ø</td><td>k, ø / p, ø</td></tr>
<tr><td>1 INCL</td><td></td><td colspan="2">th</td><td colspan="2">p</td></tr>
<tr><td>PL/DU</td><td>1</td><td colspan="4">ng</td></tr>
<tr><td></td><td>2</td><td colspan="4">n</td></tr>
<tr><td></td><td>3</td><td>p / k</td><td colspan="2">p</td><td>k / p</td></tr>
</table>

The PrefC formative is associated with subject person and number categories. The allomorphy of this formative is shown in the table above adapted from Mansfield (2019b, p. 122). In examining the PrefC of CSPs, some patterns of interest emerge. Notably, in 26 paradigms 1st person singular forms have an initial *ng*- and 2nd person singular forms have an initial *th*-, with greater allomorphy in third person forms. This pattern of inflection, which I label NG.SBJ, is shown below for POKE(19).

26. I have previously described these patterns of inflection as supra-inflection classes (Forshaw, 2016).

Another pattern of interest related to subject person and number is found when the PrefC formative is zero. In these instances, there is a morphomic pattern where 1st singular and 3rd singular forms are homophonous. There are two patterns of this type which I label M.SBJ and B.SBJ. In the M.SBJ class, 1st and 3rd singular forms have an initial *m*- and 2nd singular forms have an initial *n*-. In the B.SBJ class, 1st and 3rd singular forms have an initial *b*- and 2nd singular forms have an initial *d*-. These patterns of inflection are shown below. It is possible that such patterns may be useful for children in learning paradigms.

Table 6. Partial CSPs belonging to various singular subject supra-inflection classes

NG.SBJ – POKE(19)

	NFUT	PAST	IRR
1SG	ngam	ngani	nga
2SG	tham	thani	tha
3SG	dam	dani	da

M.SBJ – HANDS(8)

	NFUT	PAST	IRR
1SG	mam	me	ma
2SG	nam	ne	na
3SG	mam	me	ma

B.SBJ – SEE(13)

	NFUT	PAST	IRR
1SG	bam	be	ba
2SG	dam	de	da
3SG	bam	be	ba

The other inflectional pattern of interest to this study is the suffix formative, which is linked to tense. The suffix allomorphy for classifier stems is shown in the table below. Classifier stems typically use one allomorph throughout a paradigm. Irrealis forms are always zero in all classifier stem forms. Of particular interest are the inflectional patterns of non-future forms and the relationship of these forms to other forms within a paradigm. Consider the following partial CSPs as well as those above in Table 6.

Table 7. Suffix allomorphy for classifier stems

NFUT	/ngam. ngan, m, n/
PST	/ni, ne, nhi, nhe, rne, rni/
PSTIRR	/ni, ne, ngi, nge, y/
IRR	/ø/

Table 8. Partial CSPs belonging to various non-future supra-inflection classes

M.NFUT – SEE(13)

	NFUT	PST	IRR
1SG	bam	be	ba
2SG	dam	de	da
3SG	bam	be	ba

N.NFUT – TURN(29)

	NFUT	PST	IRR
1SG	ngurdan	ngurdini	ngurdu
2SG	thurdan	thurdini	thurdu
3SG	wurdan	wurdini	purdu

NGAM.NFUT – BASH(14)

	NFUT	PST	IRR
1SG	bangam	be	ba
2SG	dangam	de	da
3SG	bangam	be	ba

NGAN.NFUT – SNATCH(9)

	NFUT	PST	IRR
1SG	mangan	me	ma
2SG	nangan	ne	na
3SG	mangan	me	ma

It is apparent that for many paradigms the irrealis and non-future forms are only distinguished by the addition of the non-future marker. This is seen most clearly above for the partial CSPs POKE(19), HANDS(8), SEE(13), BASH(14) and SNATCH(9). Another characteristic is that some CSPs are only differentiated by their non-future forms. This can be seen above for the CSPs SEE(13) and BASH(14) and is true of the complete paradigms as well, as listed in an appendix. Again these patterns within and across CSPs may be utilised by children during the process of language acquisition.[27] Despite these identifiable patterns, it has been shown that Murrinhpatha CSP cell predictability is comparatively very low crosslinguistically (Mansfield & Nordlinger, 2020). This means that, given knowledge of a particular form, there is a relatively low predictability of predicting another form compared with many other languages. This raises the question as to how complex and unpredictable a morphological system can become before its patterns of exponence are no longer an aid to acquisition. I return to this issue in § 3.4.4 and Chapter 6. For further description of the patterns of CSPs the reader is directed to Mansfield (2019a, Chapter 5).

27. Despite some description of the internal structure of classifier stem forms throughout this monograph they are glossed as protmanteau morphs.

CHAPTER 3

Acquisition of verbs and verb morphology

This chapter provides an overview of previous research into the acquisition of verbs and morphology. It presents findings from the study of a wide variety of languages with a particular focus on the acquisition of complex morphological systems. It also surveys prominent theories drawn from a range of theoretical standpoints. This discussion raises questions and provides insights into how Murrinhpatha bipartite stem verbs are potentially acquired and builds the theoretical background for the analysis and discussion of the acquisition of Murrinhpatha verbs in Chapters 5, 6, 7 and 8. In these chapters, I explore the extent to which various theories of acquisition are able to account for how Murrinhpatha bipartite stem verbs are acquired.

The chapter is divided into five main sections. § 3.1 highlights the importance of typological diversity and the study of smaller and less studied languages in improving our understanding of language acquisition. § 3.2 focuses on the issue of early segmentation and children's early verb productions. § 3.3 surveys studies focused on verb acquisition and theories of word learning, with a particular focus on their semantics and pragmatics. § 3.4 evaluates theoretical approaches concerning the acquisition of inflectional morphology, and § 3.5 considers studies of the acquisition of constructions similar to Murrinhpatha bipartite stem verbs.

3.1 Crosslinguistic study of language acquisition

A fundamental question in language acquisition research is how children negotiate the immense amount of variation in the structure of the world's languages (Bowerman, 2011; Evans & Levinson, 2009; Slobin, 1985b; Stoll & Lieven, 2013). Despite this variation, typically developing children are able to acquire any of the world's languages, which form a central part of their own unique social world, using the same biological apparatus. A key finding of crosslinguistic acquisition research has been to show that different languages pose different types of problems for the learner (e.g. Bowerman, 2011; Slobin, 1985b). A crosslinguistic approach to acquisition is essential if we are to have a comprehensive understanding of language acquisition in general.

Despite various cross-linguistic research programs (e.g. Dressler, 2007a; Slobin, 1985b, 1985c, 1992, 1997a, 1997b; Stoll & Bickel, 2013) and a growing number of researchers analysing the acquisition of morphologically complex languages (e.g. Allen, 2017; Bittner et al., 2003a; Chee, 2017; Deen, 2005; Engelmann et al., 2019; Granlund et al., 2019; Krajewski et al., 2012; Rose & Brittain, 2011; Savičiūtė et al., 2018; Stoll et al., 2012), the study of language acquisition generally and the acquisition of verbs and verb morphology continues to be dominated by findings from a small number of typically isolating languages (Kelly et al., 2015). With regard to the acquisition of verbs, there is a clear lack of typological diversity. In two volumes dedicated to the lexical acquisition of verbs (Hirsh-Pasek & Golinkoff, 2006; Tomasello & Merriman, 1995), chapters are dominated by studies of English-acquiring children, with only a few chapters that consider the acquisition of languages such as Japanese and Chinese (Imai et al., 2006), and a small number that take a broader crosslinguistic perspective (e.g. Gentner, 2006). The lack of diversity is also prevalent in studies of the acquisition of verbal morphology. Stoll (2015, p. 357) notes the following in her discussion of the acquisition of inflectional morphology:

> There is only a severely limited sample of languages for which we have longitudinal data available and this small sample is very much biased towards the Indo-European languages of Western Europe

As a result, a great deal of information is being ignored when developing theories of acquisition.

3.2 Early verb production

It is well established that children's early word productions regularly differ from those of adults, including the omission of segments and syllables (e.g. Demuth, 1996b). This is also the case for children's early verb productions; in particular, it has been noted that children omit inflectional morphology (e.g. R. Brown, 1973; Freudenthal et al., 2015; Wexler, 1994). In polysynthetic languages verbs can be long and complex, constructed of multiple morphs capable of encoding what in languages such as English would be an entire sentence (Evans & Sasse, 2002). Consequently, it is likely that many children's early verbs in polysynthetic languages will be truncated in some way.

Theories which attempt to account for children's early verb productions tend to fall into two broad approaches. The first focuses on phonological and prosodic features of the adult target language (e.g. Demuth, 1996b, 2006; Peters, 1985), while the second argues that children's early verb productions are impacted primarily by morphosyntactic development (e.g. Courtney & Saville-Troike, 2002; Schütze & Wexler, 1996). I detail these various approaches below.

3.2.1 Phonological and prosodic accounts

3.2.1.1 *Perceptual salience*

Perceptual salience, defined as the elements of speech which are more prominent for children in language input, has been used by several researchers to explain children's early verb productions in a variety of languages (Kelly et al., 2014). Proponents of perceptual salience argue that elements of speech which are salient are more likely to be produced earlier in development and less salient elements are more likely to be omitted (e.g. Mithun, 1989; C. Pye, 1983; C. Pye et al., 2007).

There is some variation with regards to the types of cues researchers consider to be perceptually salient. Studies which appeal to perceptual salience usually consider stressed syllables and the beginning and end of words and phrases to be perceptually salient to children (e.g. Mithun, 1989; C. Pye, 1983; C. Pye et al., 2007), drawing on the crosslinguistic work of Peters (1985) and Slobin (1985a). Additionally, other researchers have included morphosemantic transparency and factors of frequency under a banner of perceptual salience (e.g. Courtney & Saville-Troike, 2002).

Across a number of languages with complex verb morphology, it has been found that children tend to preserve stressed syllables as well as the ends of words. Early verbs of children acquiring the polysynthetic language Mohawk were found to be one syllable in length (Mithun, 1989). This was always the stressed syllable in the adult target form, despite the fact that this was not always part of the verb stem. Pye (1980, 1983) found that, for children acquiring Quiché, initial verbs tended to be the final syllable of the adult target form, which was also stressed. In both languages, verb morphology is described as developing leftwards, from an initially truncated form with no evidence of morphological analysis to more increasingly abstract and longer forms. Similar findings have also been observed in the acquisition of North East Cree (Terry, 2010), a polysynthetic language of North America, Chintang (Stoll et al., 2012), a polysynthetic Sino-Tibetan language, and Q'anjob'al (Mateo Pedro, 2015), an agglutinative Mayan language with complex verb morphology.

In a number of other languages with complex verb morphology, children are found to produce bare verb stems stripped of all affixes (P. Brown, 1997; Courtney & Saville-Troike, 2002; Crago et al., 1998; Crago & Allen, 2001; C. Pye et al., 2007). A number of studies have argued that the early production of bare stems is in some part due to perceptual salience, with bare stems more likely to be produced by children when they occur at a word edge and when syllabic and morphological boundaries coincide (e.g. Courtney & Saville-Troike, 2002; C. Pye et al., 2007). The salience of word edges is also highlighted by the MOSAIC computational model (Freudenthal et al., 2015), which simulates the production of optional infinitives in declaratives and Wh- questions in a number of languages, largely by having a built-in bias to attend to the end of utterances. Alternatively, it has been argued that the production of bare stems may be due to morphosyntactic factors and evidence of an innate category of ROOT, following Pinker (1984). This approach is considered further in § 3.2.2.

3.2.1.2 *Prosodic licensing model*

Another approach that aims to explain the productions of children's early words is the Prosodic Licensing Model, also referred to as the Metrical Omission Model (Deen, 2005; Demuth, 1996b, 2006, 2014; Demuth & Fee, 1995; Gerken, 1987a, 1987b, 1991, 1996; Gerken et al., 1990; Gerken & McIntosh, 1993; Lleó, 2006; Lleó & Demuth, 1999). This approach argues that children's early productions are sensitive to the prosodic structure of the language they are acquiring. As children develop, they gradually incorporate more structure into their lexical representations and crosslinguistic differences in children's early productions are accounted for by differences in the prosodic structures of languages (e.g. Demuth, 1996b).

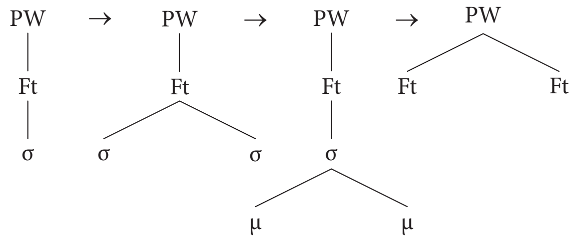
This approach builds on research in metrical phonology regarding the prosodic structure of language (Nespor & Vogel, 1986; Selkirk, 1984, 1986). Researchers appeal to the prosodic hierarchy, where phonological or prosodic words (PWords) are constructed of feet, which are in turn constructed of syllables and finally moras, as shown by the following hierarchy (adapted from Demuth, 2001, p. 5).

(26) Prosodic Hierarchy

Utt	Utterance	*I think Sue likes bananas*
IP	Intonational Phrase	*Sue likes bananas*
PP	Phonological Phrase	*likes bananas*
PW	Prosodic Word	*bananas*
Ft	Foot	*nanas*
σ	Syllable	*nas*
μ	Mora	*na*

Children gradually learn to exploit the different levels of the prosodic hierarchy, initially focussing on the levels of the PWord and below (Demuth, 2001). Demuth and Fee (1995) identify four stages in the acquisition of prosodic words in English. Firstly, children produce CV syllables, then disyllabic feet, then monosyllabic bimoraic feet, then words composed of multiple feet that form part of a phonological phrase, as shown below.

(27) Stages in the Development of English PWords (Demuth, 2001, p. 8)



/bæ/	/ˈbænə/	/bæm/	/bəbəˈnænə/	‘banana’
/fa/	/ˈɛfə/	/fan/	/ˈɛfəfənt/	‘elephant’

Demuth (2001) argued that children remain at stage two, the Minimal Word Stage, for several months. At this stage, children are sensitive to a minimal word constraint, which requires that a PWord must be minimally and maximally a binary foot. In English this may be either a monosyllabic bimoraic foot or a disyllabic trochaic foot. The construction of feet differs crosslinguistically. For instance, whereas Dutch and English allow disyllabic trochaic feet and bimoraic feet, Sesotho, a Bantu language, only permits trochaic feet, and Quiché Mayan has iambic feet. These differences in foot structure result in different minimal word effects in children's early word production (e.g. Demuth, 1996b). For example, children's early words in Sesotho are typically disyllabic trochees. By contrast, early words in Quiché may be monosyllabic stressed syllables, where the final stressed syllable of the adult target word is preserved.

Children's word productions are argued to be sensitive to the PWord structures they have acquired. If a child has not yet acquired the structure of the target word, then they will alter the production of that word to match a structure which they have already acquired (e.g. Demuth, 2001). This can be understood as the target word not being prosodically licensed by the child's current understanding of prosodic structure. As children learn more about their language, they will acquire the various different prosodic structures permissible in their language. However, these stages of development are not discrete. This explanation is used to account for the truncation of trisyllabic word forms in Spanish through the omission of the initial unfooted weak syllable similar to findings for English (e.g. Gerken, 1996) and Dutch (Fikkert, 1994).

Further potential evidence of children's awareness of prosodic structure is the production of ‘filler syllables’[28] (Peters, 2001; Veneziano & Sinclair, 2000). Filler

28. ‘Filler syllables are also referred to as ‘shadow vowels’ (Demuth, 1992), ‘monosyllabic place holders’ (Bottari et al., 1993) and ‘additional elements’ (Veneziano & Sinclair, 2000).

syllables typically have a V or CV structure and are unglossable. There are a number of cases crosslinguistically in which, developmentally, a child first tends to omit a syllable before later producing a filler syllable and finally producing a well-formed syllable (Demuth, 2018). The production of the filler syllable may indicate a child's knowledge of the prosodic structure of the target word despite not being able to produce all syllables correctly.

3.2.2 Morphosyntactic accounts

In contrast to the previous accounts, many researchers have argued that children's early verb productions are sensitive to morphosyntactic factors. These approaches tend to focus on findings that inflectional morphology is omitted in early stages of verb development, and that children initially produce particular types of verb structures with little or no inflectional morphology, including bare stems (e.g. Courtney & Saville-Troike, 2002), root infinitives (e.g. Rizzi, 1993; Wexler, 1998) and imperatives (e.g. Salustri & Hyams, 2003). Morphosyntactic accounts of children's early verb productions are particularly attractive to researchers working within the syntactically-focused generative framework. Many of these approaches argue that children's errors are due to children's syntactic representations being underspecified or truncated in some way (e.g. Rizzi, 1993; Schütze & Wexler, 1996).

3.2.2.1 *Perceptual salience and grammar*

The production of bare verbs has already been noted in § 3.2.1 for a number of languages (e.g. Courtney & Saville-Troike, 2002; Crago & Allen, 2001). Accounts of this phenomenon relying on perceptual salience have been criticised for only describing what children do, but not why these patterns come about (e.g. Pinker, 1989). What is missing from such accounts, from a nativist perspective, is some theory of grammar with guiding syntactic principles at a deep-structure level.

The incorporation of 'grammar' into a salience account is essentially the approach taken by Courtney and Saville-Troike (2002) in their analysis of early verb production in both Navajo and Quechua. Children in both languages produce bare verb stems. The extraction of these elements is aided by perceptual salience as the stems occur at word edges. The stems are also morphologically transparent, as syllable and morphological boundaries coincide. It is argued, however, that if perceptual salience were the sole driving force behind production, this would also lead to the production of bare affixes by children, which were not attested in their data. The absence of bare affixes is claimed to be due to the existence of an innate grammatical notion of ROOT/STEM, following Pinker (1984).

3.2.2.2 *Root infinitives and analogue hypotheses*

A number of syntactic-based approaches developed in response to findings that children acquiring a number of predominantly Western European languages produce root infinitives (e.g. Rizzi, 1993; Wexler, 1998). Root infinitives are verbs with infinitival morphology used in a matrix clause, resulting in the use of infinitival morphology where finite morphology is anticipated (Hoekstra & Hyams, 1998), as shown by the examples below. This stage of development is often referred to as the *optional infinitive stage*, where children produce both finite and infinitival verb forms (Wexler, 1994).

(28) German
Thorstn das haben
name that have-INF (Poeppel & Wexler, 1993)

(29) Dutch
Papa schoen wassen
daddy shoes wash-INF (Weverink, 1989)

Perhaps the most influential of these proposals has been the Agreement/Tense Omission Model (ATOM) (Schütze & Wexler, 1996; Wexler, 1998). This model argues that, while all parameters are correctly set by the optional infinitive stage, the abstract features of agreement and tense may be underspecified in the underlying representation. This leads children to sometimes omit agreement marking and/or tense in finite contexts. In addition to accounting for the optional infinitive stage it also accounts for the fact that subjects tend to be omitted in root infinitive contexts. See Ambridge & Lieven (2011, pp. 145–150) for further discussion of the strengths and weaknesses of this model.

In languages without an infinitive form it has been argued that children may produce other analogous constructions. Salustri and Hyams (2006, 2003) propose that, in null subject languages such as Italian, Spanish, Catalan, Slovenian and Hungarian, the imperative is analogous to the infinitive given the early predominance of imperative forms. They argue that the imperative is similar to infinitives in other languages as both are irrealis with directive illocutionary force and are tenseless. It is suggested that infinitives are used ahead of imperatives in languages such as German, as "the derivation of a root infinitive is more economical than an imperative derivation in that imperatives involve verb movement (to Mood and Force) while the root infinitive does not" (Salustri & Hyams, 2006, p. 177). The *Imperative Analogue Hypothesis* makes two major predictions that could potentially apply to Murrinhpatha. The first is that imperatives will occur significantly more often in child language than in adult language. The second is that imperatives will be used significantly more frequently in null subject languages than in languages that allow infinitive forms as both fulfil a similar function. The structure of children's early Murrinhpatha verbs is examined in § 5.1 in relation to the various theories discussed here.

3.3 Verb lexicon in acquisition

3.3.1 Semantics of early verbs

Discussions of the semantics of children's early verbs have largely focused on claims that children's early verbs are predominantly 'general-purpose'; for example, verbs such as *do, make, get* and *go* (Bloom, 1991; Clark, 1993, 1978). These general-purpose verbs, often referred to as 'light verbs', are argued to be acquired earlier due to their semantic generality and may act as syntactic pathbreakers aiding the acquisition of new syntactic rules (e.g. Ninio, 1999b). They can be used in a wide variety of contexts and can be used in place of semantically more specific verbs (Bloom, 1991; Clark, 1993, 1978). There is no consensus as to the definition of what does and does not constitute a light verb (Theakston et al., 2004). However, they typically have a high token frequency and are dependent on context for their interpretation. Despite reference to this claim by many researchers it does not appear to be well investigated empirically. P. Brown (1998) argues that this claim, based initially on studies of English, is crosslinguistically invalid, showing that many Tzeltal-acquiring children's first verbs are semantically specific. Furthermore, Theakston et al. (2004) argue that since 'light verbs' tend to be highly frequent, it is unclear whether they are acquired earlier due to their semantic generality or their high frequency. Investigating this issue is of interest in this monograph, as certain types of verbs may help children to uncover the underlying morphological structure of Murrinhpatha verbs.

3.3.2 Verbs and pragmatic development

There has been little research into the relationship between children's pragmatic development and verb acquisition (Cameron-Faulkner, 2014). It is regularly claimed, however, that children's early verbs have a 'self-action' bias (e.g. Huttenlocher et al., 1983). The claim that children's early verbs have a 'self-action' bias is regularly attributed to a foundational study by Huttenlocher et al. (1983). This study considered the production and comprehension of verbs in experimental and naturalistic settings. It found that English-speaking children aged 1;11–2;4 "rarely used verbs to encode observed behaviour" (Huttenlocher et al., 1983, p. 84). Instead children's early action verb productions tended to encode events where the child was the agent and events where the child was requesting a caregiver to act. These findings are characterised well by Edwards and Goodwin (1986), who argue that the nature of children's verb use is rooted in the child's communicative needs. Children's attention is typically centred on their own actions in the immediate environment, which will involve the assistance of others to do things they cannot do and gain permission for their own actions. Consequently, children's verb use is better understood as having a 'self-interest' bias rather than a 'self-action' bias.

3.3.2.1 *Speech act development*

Interest in researching children's pragmatic development in general has continued to grow (Matthews, 2014). Much of this research has focussed on the development of particular types of Speech Acts, such as directives (Aronsson & Thorell, 1999; Ciesielski, 2015; Georgalidou, 2008; Hollos & Beeman, 1978; Nakamura, 1999; Ryckebusch & Marcos, 2004), requests (e.g. Ervin-Tripp, 1986), apologies (e.g. Ely & Gleason, 2006; Long, 2010), greetings (e.g. Greif & Gleason, 1980) and promises (Astington, 1988; Bernicot & Laval, 2004).

Speech Act theory developed from an understanding that language can be used to perform actions, highlighted by Austin's distinction between constative and performative utterances (for a brief introduction see Cummings, (2013)). Austin (1962) argued that three acts or 'forces' are simultaneously present in any utterance. These are the 'locutionary act', equivalent to the linguistic form, the 'illocutionary act', the speaker's intent or purpose in producing the utterance, and the 'perlocutionary act', the impact of the utterance on the hearer. Searle (1969) built on the work of Austin, focussing primarily on the 'illocutionary act' and developing a taxonomy of illocutionary acts (Searle, 1976). This taxonomy, often referred to as a taxonomy of speech acts, is regularly used as a theoretical starting point in current child language studies of pragmatic development (Cameron-Faulkner, 2014). This taxonomy consists of five speech act categories which are shown below, as given in Cameron-Faulkner (2014, pp. 39–40).

i. **Representatives (e.g. assertions, claims, statements)**
   These types of utterances reflect a word to world relationship in which the speaker indicates their belief of how they perceive the world to be.
   e.g. *This is a very interesting point*.
ii. **Directives (e.g. commands, requests, orders)**
   Speakers employ these types of speech acts in order to change a state of affairs via the hearer. Consequently, directives are instances of the speaker attempting to make the world fit the word with the hearer responsible for the shift.
   e.g. *Please come and see me as soon as possible*.

iii. **Commissives (e.g. promises, offers, threats)**
Commissives are used by speakers in order to communicate their intention to act. These speech acts are used to make the world fit the word, but in contrast to directives it is the speaker that is responsible for the shift.
e.g. *I'll pick up the papers this afternoon.*

iv. **Expressives (e.g. thanking, praising, blaming)**
Expressives are used in reference to psychological states and as such cannot be categorised according to the world/word distinction. Therefore expressives are claimed to display a null/empty direction of fit.
e.g. *Many thanks for your positive comments.*

v. **Declaratives (e.g. official conventional acts such as nomination, hiring and firing, openings of institutions)**
The final category of speech acts contains those typically used in formal settings to bring about changes in the current state of affairs. In the case of declaratives the direction of fit is both words to world and world to words.
e.g. I declare this store open.

Studies focused on the acquisition of speech acts generally have found that children produce directives from an early age in a variety of languages (e.g. Aronsson & Thorell, 1999; Ciesielski, 2015; Georgalidou, 2008; Hollos & Beeman, 1978; Küntay et al., 2014; Nakamura, 1999; Ryckebusch & Marcos, 2004). Directives also appear to be a function of children's early verbs. In studies of English, early verbs may be used as 'requests' (Huttenlocher et al., 1983) or as 'commands' (Naigles et al., 2009), fitting neatly in the directives category. Early verbs are also used by children to describe their own impending action (Smiley & Huttenlocher, 1995), showing that early verbs may be used as commissives. Additionally, Naigles et al. (2009) found that children's early verbs may be used to describe the action of third persons, suggesting early verbs can be used in representative utterances. It is unclear from these few studies whether verbs tend to be used for specific types of speech acts before others but is a question worth exploring.

This question is of particular interest in this monograph given the well-established link between speech acts and sentence types crosslinguistically (e.g. König & Siemund, 2007; Levinson, 1983; Sadock & Zwicky, 1985). In particular, three basic sentence types that are differentiated in most if not all of the world's languages are strongly associated with types of speech acts, as shown below (König & Siemund, 2007).[29] These sentence types are distinguished in languages by different formal means, including word order, inflectional affixes, particles, and intonation.

29. The speech act category of 'questions' is not included in the taxonomy of five categories utilised in this study. I adopt the taxonomy of Searle (1976), as presented by Cameron-Faulkner (2014). I treat the category of questions as being subsumed by these five categories. Questions are categorised according to these five categories depending on their illocutionary force.

Table 9. Sentence types and associated speech acts

Sentence type	Speech act
Declarative	Representatives
Interrogative	Questions
Imperative	Directives

These insights regarding adult speech raise the question as to whether this link is also found in children's speech and whether the early development of a certain speech act category may in some way lead to the earlier development of a particular sentence type or morphological structure than might otherwise be expected on formal grounds. Although not tied to the development of speech acts, there are a number of pertinent examples in the literature where a linguistic structure is acquired earlier or later than might be expected due to its associated function. For example, in Sesotho children have been shown to acquire passive constructions relatively early compared with English and Hebrew due to their important functional role to question subjects/answer subject questions as well as their frequency (Demuth, 1989). Conversely, Ochs (1988) argued that the ergative marker in Samoan is acquired later than expected on formal grounds due to its sociolinguistic status and relatively low frequency in CDS. Based on these findings it is possible that if a child tends to produce early verbs for a particular speech act this may lead to the early acquisition of constructions associated with this function.

3.4 Acquisition of inflectional morphology

The study of the acquisition of inflectional morphology has often focused on the English past tense (e.g. McClelland & Patterson, 2002; Pinker, 2006; Pinker & Ullman, 2002). This has led to some theoretical approaches initially being developed to account for empirical facts associated with the acquisition of a specific morph in a single language and then being applied to findings from other languages. Given the diversity of the world's languages, such approaches are not easily generalisable (Stoll & Bickel, 2013). Although there is a growing body of research regarding highly inflected languages (e.g. Engelmann et al., 2019; Granlund et al., 2019; Krajewski et al., 2012; Laaha & Gillis, 2007; Mateo Pedro, 2015; Savičiūtė et al., 2018; Stoll et al., 2017; Xanthos et al., 2011), much remains to be understood about the acquisition of complex morphological systems such as the large and complex verbal paradigms in polysynthetic languages such as Murrinhpatha (Stoll, 2015).

As with other debates in linguistics, research concerning the acquisition of inflection is largely divided between Nativist/Generativist and Usage-Based/Emergentist accounts (Ambridge & Lieven, 2011). The former assumes that core linguistic knowledge is innate. By contrast, the latter assumes that linguistic knowledge is not innate, and that grammar must be learned, driven by input from the specific language being acquired and emerging from the child's usage. I now provide a brief overview of these approaches as well as presenting other relevant research regarding the acquisition of inflectional morphology.

3.4.1 Nativist/generativist approaches

Central to many Nativist approaches is the notion that the formation of inflected word forms is rule-based. These approaches rely on a clear psychological distinction between regular and irregular morphology, where irregular forms are retrieved directly from the lexicon rather than being formed 'on-line' (Clahsen, 1999; Pinker & Prince, 1991; Prasada & Pinker, 1993). For example, in English regularly inflected past tense forms (e.g., *walk-walked*) are governed by a symbolic rule that attaches a suffix *–ed* to an uninflected base form. Conversely, irregular past forms (e.g., *sing-sang*) are stored in the lexicon. When a base form has an irregular counterpart, the retrieval of an irregular form blocks the regular morphological process from occurring. This has led to such approaches being referred to as dual-route models (Clahsen, 2006a). Key support for the existence of this abstract rule is the ability of children to inflect nonce verb forms (e.g., *rick-ricked*) (Berko, 1958) and that children may overextend the regular rule to irregular verbs (e.g. Cazden, 1968; Marcus, 2000).

Dual-route, rule-based models face a clear problem in accounting for how children can acquire large inflectional paradigms with complex patterns of allomorphy and syncretism, where there are no clear default rules and no clear distinction between regular and irregular morphology (e.g. Dąbrowska, 2001, 2004; Krajewski et al., 2012; Mirković et al., 2011). In many instances it is simply a challenge for a rule-based approach to describe such systems. If children are unable to generate abstract rules, then a great deal of 'irregular' forms would need to be stored in the lexicon. The question of how adult speakers store and produce such complex inflectional paradigms has been explored by Mithun (2010) for speakers of two unrelated polysynthetic languages, Central Alaskan Yup'ik and Mohawk. Mithun argues that if inflection is rule-based then inflected word paradigms should not be defective, that is, all cells should be able to be produced by a speaker through the application of the relevant rules. However, through elicitation of complex paradigms from adult speakers, 'gaps' were found to exist where a speaker could not produce a relevant form or was unsure of the form they produced. This suggests that speakers store whole inflected forms, and that they are not generated by rules. If they were generated by rules an adult speaker would have the relevant building blocks to produce any potential form. Speakers instead 'search their memories for echoes of existing forms' (Mithun, 2010, pp. 134–135).

Another issue for a dual-route approach is that in drawing a clear distinction between regular and irregular morphology it does not allow for children to utilise 'semi-regular' patterns in acquiring 'irregular' forms. For example, a number of 'irregular' past tense forms in English display an amount of 'semi-regularity' with phonologically similar base forms undergoing similar changes (e.g. *feel-felt, kneel-knelt; drink-drank, shrink-shrank*). It has been shown that adult speakers can extend sub-regular patterns to nonce stems (e.g. *spling-splung*) (Bybee & Moder, 1983; Kim et al., 1991; Prasada & Pinker, 1993). This has led to acceptance that irregular forms are not stored in isolation and that word forms have associative links similar to connectionist models (Pinker, 2006; Pinker & Prince, 1991). Multiple rule approaches have also been proposed to account for these 'semi-regularities' (e.g. Albright & Hayes, 2003). This approach proposes the existence of a number of rules sensitive to the type frequency of the pattern.

A dual-route account must additionally account for how abstract rules are acquired by children. A prominent 'top-down' proposal of this process has centred around the notion of 'miniparadigms', first proposed by Pinker (1984, p. 180) within the framework of Lexical Functional Grammar and later adopted to some extent by studies grounded in a theory of Protomorphology (Bittner et al., 2003a; Dressler & Karpf, 1995). According to this process, children first learn inflected word forms as chunks (MacWhinney, 1978). These are then organised into lexically-specific miniparadigms and only later, after children have constructed a critical mass of miniparadigms and successfully analysed these into their morphological elements, do they begin to abstract symbolic morphological rules.

Miniparadigms are collections of phonologically and semantically similar words. Children are argued to append feature equations to whole word forms. The organisation of these paradigms is driven by linguistically relevant features such as case. Miniparadigms must be expandable so that children can incorporate additional inflected word forms. This process relies on the *Unique Entry Principle* (Pinker, 1984, p. 177), which states that each cell of an adult paradigm may only be filled by a single form. According to this principle, if a child attempts to enter a word form into a cell and that cell is already filled, the child should: (i) replace the existing form if the new form has a greater strength, (ii) maintain two forms in the cell for the time being if both forms are of similar strength, or (iii) hypothesise a new feature equation for this form based on inferences of meaning. If a new feature equation is hypothesised these new features should be included as dimensions in the miniparadigm.

On the basis of growing miniparadigms children then begin to abstract general paradigms, which can be used to fill out other incomplete miniparadigms and form the basis for symbolic rules (Pinker, 1984, Ch.5). Initially children find the 'phonetic material in common'[30] across all cells in a word specific paradigm and store this element in the lexicon with the appended feature STEM or ROOT. The child then also extracts similar phonetic material based on the features encoded by the various paradigm dimensions (e.g. SBJ). Where this is unsuccessful, for example, in cases of fusional morphology, similar phonetic material can be extracted based on more than one feature dimension at a time (e.g. SBJ+MOOD). The extracted material is stored in general paradigms. The child then constructs word structure templates which encode how STEMS and AFFIXES are to be combined (Pinker, 1984, p. 190). These are the basis of abstract inflectional rules.

3.4.2 Usage-based approaches

In contrast to nativist dual-mechanism approaches (e.g. Pinker & Prince, 1991), single mechanism usage-based approaches do not require symbolic rules and argue that all morphology is learned through powerful 'general learning mechanisms' (Bybee, 1995). Such approaches do not appeal to the existence of innate grammatical features or morphological modules. Instead, on this view grammar emerges from language input and use. For an introduction to such approaches in the broader field of language acquisition, see Behrens (2009).

The Network Model (Bybee, 1985, 1995; also Köpcke, 1998), which aims to account for the acquisition of inflectional morphology, proposes that schemas emerge from associations made among related inflected word forms. Word forms have varying degrees of lexical strength largely linked to their token frequency. The more frequent a word form, the more easily it will be retrieved and the weaker its connections with other word forms. This predicts that, all things being equal, irregular forms should be frequent otherwise they may be regularised (Bybee, 1995). Word forms with similar phonological and semantic features will develop lexical connections. The strength of these connections varies depending on the type and number of features shared. Word forms are not decomposed into stems and affixes as with rule-based approaches, but instead schemas emerge where what is common remains specified and in the place of varying material an abstract slot emerges (Bybee, 1995).

There are both source-oriented and product-oriented schemas. Source-oriented schemas are generalisations across different forms of a lexeme (e.g. *dance-danced*), whereas product-oriented schemas are generalisations of sets of derived word forms (e.g. *strung, stung, flung, clung, hung etc*.). The relative strength of these schemas is

30. Note Pinker uses this term "as a placeholder for more precise notions to be taken from a theory of phonology" (1984, p. 188).

dependent on type frequency. If a schema has more members it is argued to have greater strength and is consequently more likely to be applied to new word forms (Bybee, 1995). This strength is also dependent on the variability of items within a schema. If the word forms contained in the schema are all very similar, this makes it less likely that it will be extended to new items (Bybee, 1995).

This approach is consequently able to account for perceived differences in the acquisition of regular and irregular morphology in languages such as English. 'Regular' morphs, such as the past tense suffix *-ed*, have a much higher type frequency and thus are anticipated to be overextended to 'irregular' word forms. This approach also neatly captures 'sub-' and 'semi-regularities', which are typically treated as a more peripheral issue in a dual-mechanism approach, and suggests that children are able to harness these semi-regular patterns in the acquisition of morphology (Bybee, 1995). Regularity is not treated as a dichotomy of regular and irregular patterns, but all morphology is placed on a continuum of regularity governed largely by factors of type and token frequency.

A number of recent studies of highly inflected languages have provided some support for usage-based accounts (e.g. Granlund et al., 2019; Savičiūtė et al., 2018). For example, in a crosslinguistic study of nominal inflection in Polish, Finnish and Estonian, Granlund et al. (2019) hypothesised the following. With regards to token frequency, the greater the frequency of a specific word form in a given context, the quicker this word form will be acquired. With regards to type frequency, the more lexemes inflected according to the same pattern, the quicker and more accurate the relevant word forms will be acquired. With regard to the interaction of these factors, the lower a word form's token frequency the more likely it is to be impacted by type frequency, as it is less likely to be retrieved straight from memory as an acquired chunk. Granlund et al. (2019) found effects of token frequency and type frequency in all languages, while only Polish showed evidence of a predicted interaction between token and type frequency. These findings lend support to usage-base accounts for which type and token frequencies are fundamental to explaining the acquisition of morphological systems.

3.4.3 Protomorphology

Protomorphology is a theoretical approach to the acquisition of morphology, which argues for the existence of an emergent autonomous morphological module (Bittner et al., 2003a; Dressler, 2012; Dressler & Karpf, 1995). This approach differs from nativist accounts (e.g. Pinker, 1984) in arguing that a morphological module is emergent rather than innate, but also differs from a network model (e.g. Bybee, 1995), which does not propose modularity of linguistic subsystems. This approach has been used as the theoretical basis for a wide ranging crosslinguistic research project led by Wolfgang Dressler concerning the acquisition of inflectional morphology by children aged 1;2–3;0 (Bittner et al., 2003b; Dressler, 1997).

Early morphological development is divided into three phases: (i) Premorphology, (ii) Protomorphology, and (iii) Morphology Proper (Dressler, 1997). The first phase of Premorphology is a rote-learning phase, where children show no evidence of knowledge of the morphological system. During this phase children produce both uninflected and inflected forms as unanalysed chunks (MacWhinney, 1978) and typically have only one rote-learned form per lemma. The second phase of development, Protomorphology, is when children begin to make generalisations across rote-learned forms and the morphological module starts to emerge. Children start to construct creative morphological patterns which may be overgeneralised (Dressler, 1997). The onset of Protomorphology often coincides with the emergence of 'true miniparadigms' (e.g. Aguirre, 2003; Bittner, 2003; Katičić, 2003; Kilani-Schoch, 2003; Pfeiler, 2003) defined as "…non-isolated set[s] of minimally three phonologically unambiguous and distinct inflectional [word]forms of the same lemma produced spontaneously in contrasting syntactic or situative contexts in the same month of recordings (Bittner et al., 2003b, p. xvi)." The final phase of development in this approach is 'Morphology Proper'. This is essentially the acquisition of adult-like morphology and is a placeholder for a logical endpoint in development. At this stage the morphological module and its submodules are fully formed and autonomous.

The key strength of the Protomorphology approach has been in comparing how different typological variables impact the acquisition of systems. It has shown, for example, that children learning morphologically rich languages tend to become aware of morphology earlier than children acquiring languages with little morphology, and acquire these systems at a faster rate (Laaha & Gillis, 2007; Xanthos et al., 2011).[31] This means that children will tend to reach a protomorphological stage earlier when acquiring agglutinating and inflecting languages compared to more isolating languages. It has also solidified previous findings that more agglutinative morphological systems are acquired more easily than those systems which are more inflecting-fusional (e.g. Aksu-Koç & Ketrez, 2003; Aksu-Koç & Slobin, 1985). Agglutinating languages tend to have greater morphological transparency as well as a preference for one-to-one mappings between form and function (biuniqueness), which results in earlier mastery of morphosyntax. Protomorphology importantly seeks to link such observations to larger typological variables.

31. This does not entail, however, that systems will be mastered earlier given that rich morphological systems are much larger.

3.4.4 Morphological complexity

The complexity of a morphological system will impact its acquisition. Morphological complexity as a variable can be understood as seeking to quantify the predictability or regularity of specific morphological systems in comparison to others. The complexity of morphological paradigms has been of growing interest in morphological theory through the investigation of the 'Paradigm Cell Filling Problem' (Ackerman et al., 2009; Stump & Finkel, 2013). That is, given the knowledge of a number of cells in a paradigm, what is the likelihood of predicting an unknown form? Researchers have quantified the predictability or unpredictability of inflectional systems utilising a measure of entropy (Shannon, 1948). Entropy is measured in 'bits', where one bit is the amount of information needed to select between two equally possible outcomes such as [a, b] or [a, a, b, b]. The distribution [a, a, a] would have an entropy of zero (i.e., it is completely predictable). Using a measure of 'Complete Paradigm Predictability', Mansfield (2019a, p. 132) showed that Murrinhpatha classifier stems have a high rate of inflectional unpredictability crosslinguistically. This raises the question of how complex and unpredictable an inflectional system can become before analogy across word forms is no longer an aid to acquisition. It also suggests that rule-based approaches will have great difficulty in accounting for a language as morphologically complex as Murrinhpatha.

Table 10. Complete paradigm prediction scores for crosslinguistic sample (Mansfield, 2019a, p. 132)

Language	Paradigmatic cells	Complete paradigm predictability (bits)
Amele	3	8.65
Arapesh	2	8.14
Burmeso	12	12.00
Fur	12	28.47
Greek	8	12.97
Kwerba	12	10.37
Mazatec	6	29.52
Murrinhpatha	42	156.37
Ngiti	16	30.99
Nuer	6	4.67
Russian	12	10.93

Despite this complexity Mansfield (2016b) argues that a learner may still be aided in the acquisition of classifier stem forms through the semi-regular patterns that exist even in such complex inflectional systems. Furthermore, Mansfield and Nordlinger (2020) have shown that observed changes in Murrinhpatha classifier stem paradigms can be explained through knowledge of semi-regular patterns. This suggests that children may be able to utilise these patterns when acquiring new word forms.

3.4.5 Quantifying morphological development

In my analysis of the development of inflectional diversity in Murrinhpatha classifier stem paradigms I adopt a modified measure of *Normalised Mean Size of Paradigm* presented below. For discussion of the development and need for this measure the reader is referred to (Xanthos & Gillis, 2010).

Traditionally a common and straightforward measure of inflectional diversity/flexibility has been to calculate the number of inflected word forms per lemma (e.g. Küntay & Slobin, 1996; Ogura et al., 2006). Xanthos & Gillis (2010) refer to this metric, which is a type of type-token ratio, as the *Mean Size of Paradigm* (MSP). It is defined by the following ratio where $|F|$ represents the number of word forms (types) and $|L|$ represents the number of lemmas (types) contained in a given sample.

(30) *Mean Size of Paradigm*

$$\text{MSP:} = \frac{|F|}{|L|}$$

It is well established, however, that type-token measures such as MSP are dependent on sample size (Malvern et al., 2004; Tomasello & Stahl, 2004; Tweedie & Baayen, 1998). Xanthos and Gillis (2010) address this by proposing a measure of 'Normalised MSP'. This measure uses a method of statistical 'bootstrapping' (Baayen, 2008), in which a number of subsamples are taken from a given sample *without replacement*, for which MSP is to be calculated. MSP is calculated for each of these subsamples. The mean value of MSP for this group of subsamples is then reported.

Criteria for determining the optimal size of the subsample S are not given by Xanthos and Gillis (2010), although they do provide some discussion of impacts to be considered when setting the value of S. Firstly, S must be equal to or lower than the sample size of the smallest sample to be measured. If S is set to a larger number, it will produce a value closer to the MSP of the entire sample. If S is set lower it will provide a better estimate of the variance of the sample. There is consequently a trade off in setting the value of S in terms of capturing variance of a sample and the diversity of the entire sample.

Xanthos and Gillis (2010) propose that the number of subsamples B to be calculated should be a function of the size of the sample N and the size of the subsample

S. The number of subsamples to be constructed is calculated as *B: = N/S* rounded to the closest integer. This is so that, on average, each token is only sampled once in the whole set of subsamples. However, this method is too unstable for the current study as shown in § 6.1. Instead, a decision was made to set the number of subsamples to 100. This follows the approach of Malvern et al. (2004), who calculate inflectional diversity over 100 subsamples using their own measure. In terms of MSP this will have the effect of producing a more stable value of MSP, particularly when the value of *B* is quite low as is the case in some instances. I adopt this adapted measure of *Normalised MSP* in order to quantify the development of inflectional diversity in classifier stem paradigms across the corpus.

3.5 Acquisition of bipartite constructions

There has been no previous account of the acquisition of a bipartite verb system in the literature. However, work on the acquisition of other bipartite construction types that share similarities with bipartite stem verbs provide some insight into how bipartite stem verbs in Murrinhpatha are acquired. This includes the acquisition of compound words in a variety of languages (e.g. Argus & Kazakovskaya, 2013; Berman, 2011; Clark et al., 1985, 1986; Dressler et al., 2010, 2017, 2019; Nicoladis, 2002, 2007), Persian light verb constructions (Family, 2009), Georgian preverbs (Imedadze & Tuite, 1992), and separable verbs in Germanic languages (Behrens, 1998). These constructions are all constructed from at least two elements, both of which contribute to the core semantics of the final word or phrase.

A key question when investigating the acquisition of such structures has been to ascertain when children acquire the 'general combinatoric principles' of these structures in their language. Evidence of children's understanding is often considered to be illustrated by the production of novel combinations not found in adult language as well as children's ability to understand novel combinations. Studies have also sought to determine the relevant factors which impact the acquisition of bipartite structures. The factors typically identified are the frequency of the construction type in a language, the combinatorial type frequency of individual elements in the relevant construction, and morphosemantic transparency.

It is generally found that children acquire the general combinatoric principles of a construction type earlier if that construction is frequent in the language or more importantly frequent in child directed speech. For example, children begin to acquire the guiding principles of noun-noun compounds by age 2 in English (Clark, 1981) and Swedish (Mellenius, 1997) where these constructions are frequent. By contrast, when these compounds are less frequent, as in Hebrew, children do not produce novel compounds until around age 5 (Clark & Berman, 1987). An even greater predictor of the acquisition of combinatoric principles of a construction type in a specific language is the richness and productivity of that construction type (e.g. Dressler et al., 2019; Krott & Nicoladis, 2005; Nicoladis & Krott, 2007). This refers to the combinatorial type frequency of individual elements as well as the ability to create new novel constructions. For a child to uncover underlying combinatoric principles the construction type must be sufficiently productive to allow constructions to be decomposed, otherwise they will simply be learned as rote. The more productive a construction type, the earlier the underlying principles will be acquired (Dressler et al., 2019). These findings are consistent with Bybee's Network Model of inflectional acquisition (1985, 1995) (see § 3.4.2), which states that patterns with high type frequency are more salient for children. This suggests that the acquisition of the underlying principles of such constructions are acquired in a piecemeal fashion with more productive patterns being acquired earlier.

Finally, the more morphosemantically transparent a construction, the more likely a child will be able to acquire the underlying combinatoric principle (e.g. Argus & Kazakovskaya, 2013; Dressler et al., 2010). Constructions are transparent when their meaning is compositional, that is, it is clear what part of the whole meaning each element encodes. If the meaning of the construction is only semi-transparent or opaque, it follows that children may not be able to or need to acquire the underlying combinatoric principle. All these factors illustrate the importance of the characteristics of a specific construction in a language, such as productivity and complexity, to their acquisition rather than simply considering language typology classifications (Dressler et al., 2019). I consider these factors with regard to the acquisition of Murrinhpatha bipartite stem verbs in Ch.7.

CHAPTER 4

Methodology

This monograph focuses on the acquisition of Murrinhpatha in Wadeye in Australia's Northern Territory by five focus children over a two-year period (for more details of the historical and sociolinguistic context see § 1.1). At the beginning of data collection the children were aged between 1;9 and 4;3. The children were recorded interacting in semi-naturalistic contexts with other children and caregivers. For discussion of the methodological challenges associated with acquisition research in such a context, see Kelly et al. (2015) and Forshaw (2016, pp. 121–148).

4.1 Relationships

Acquisition research, particularly in small remote communities, requires the involvement and co-operation of participants, their families, and the broader community. This means that the methods utilised must be respectful and sensitive to the environment in which the study is being undertaken. Central to this is that researchers are also aware of their own identities and their relationship with the community and research participants. This type of research is not possible without the building and maintenance of positive relationships and the recognition of linguistic and cultural differences between 'outsiders' and 'community members.' It is also important to be mindful that the purpose of the research questions being investigated may not be easily recognised by participants and that ongoing conversations need to be had with participants to help grow a shared understanding of the purpose of the research. Better still is for community members to be engaged in the development of research aims. The potential conflict between the aims of non-Indigneous researchers and Indigenous communities is a growing issue within language acquisition and linguistics more generally (e.g. Roche, 2020; Singer, 2020), and there is a need to move towards more decolonizing methodologies (e.g. Leonard, 2018), such that Indigenous peoples and communities have greater power, authority and influence in the research process.

I am an Anglo-Australian male who has lived most of his life in Melbourne, Australia's second largest city in the country's south-east. Before beginning my data collection in Wadeye I had neither visited the Northern Territory nor an Indigenous community. Furthermore, my contact with Indigenous Australians had been minimal. The fact that I do not identify linguistically or culturally with the focus children is a clear limitation of this study. Studies with stronger collaborative links between researchers and community members (e.g. Fasoli et al., 2018), as well as research done by community members (e.g. Chee, 2017), should be encouraged by the field of acquisition.

In preparation for my first fieldtrip, I benefitted from extensive advice given by linguists who had long-standing relationships with the community (e.g., Rachel Nordlinger, Joe Blythe). For my first fieldtrip I was initially accompanied by Joe Blythe, who introduced me to many people and showed me around Wadeye. At this time we engaged a primary Murrinhpatha research assistant (RA), 'Carla' (a pseudonym), who had worked with several members of the LAMP research team over a number of years. Carla helped to facilitate discussions with various community stakeholders about the aims of the broader LAMP project and to gain 'community approval' from relevant representatives. Carla also facilitated the recruitment of focus children and their families, explained the project in Murrinhpatha and helped to gain informed consent from participants. She also helped to run recording sessions and assisted in transcription. Carla was a truly integral person to this study.

The nature of acquisition research meant that I was required to have working relationships with the mothers of the various focus children. These were young women of a similar age to me. It was culturally inappropriate for me to spend time alone with these women. Consequently, initially all my contact with these women was through Carla, who was a mother or mother-in-law of these women. Over the course of data collection these women became more comfortable in interacting with me; however, during transcription and recording sessions it was always important that there be another adult present. I also sought to strengthen relationships with families through spending time with them outside of 'work'. This mostly involved trips to country for fishing, hunting or gathering bush foods.

Since July 2015 I have been living in Wadeye on Kardu Diminin land with my partner Megan Wood and our son Leroy Jim (Mawurt), who was born in late 2017. I have been working as a linguist at Our Lady of the Sacred Heart Thamarrurr Catholic College since the middle of 2016 supporting the school's Murrinhpatha/English bilingual program. I have come to know many more people in the community over this time who have helped to expand my understanding of life and language in Wadeye.

4.2 Focus children

This monograph is based on the language of five focus children over a two-year period between July 2012 to June 2014. These children were aged between 1;9 and 4;3 at the beginning of data collection, as shown below. The decision for children to be recruited across this age range was made to ensure that the resulting corpus captured a broader picture of language development than if all children were the same age. The total age breadth contained in the final corpus ranges from 1;9 to 6;1. Similar staggered longitudinal approaches have been adopted by other studies for similar reasons (Allen & Crago, 1996; Rose & Brittain, 2011). There was initially a sixth focus child, Adam, who was 2;0 at the commencement of data collection. His data was later excluded as it became clear that his language development was delayed compared with his peers.

Table 11. Age of focus children on July 10th, 2012

Focus child*	Age on July 10th 2012	Gender
Acacia	1;9	F
Emily	2;3	F
Nathan	3;2	M
Mavis	3;7	F
Molly	4;3	F

* All participant names are pseudonyms.

The five focus children were recruited through the primary research assistant Carla and were all her grandchildren. This meant that all focus children knew each other and each other's families, allowing for them all to participate easily in recordings with one another. The decision to choose these children also meant that RAs involved with transcription of recordings, typically mothers and grandmothers, were familiar with the idiosyncrasies of each child's speech. A potential limitation of this strategy is that findings may not be easily generalisable beyond this family.

Another consideration in the recruitment of focus children was hearing health. There are high rates of otitis media in populations of Aboriginal and Torres Strait Islander children, especially those from remote communities (Australian Institute of Health and Welfare, 2011). Otitis media, also known as 'glue ear', is an infection of the middle ear common in early childhood. Concurrent episodes of otitis media result in periods of mild-to-moderate hearing loss, which can be present for a few weeks to a few months (Williams & Jacobs, 2009). In children with recurrent otitis media this may impact their language development, as it impacts the way in which they perceive linguistic input.[32]

32. Findings as to whether otitis media impacts Indigenous children's language development have been mixed (Williams & Jacobs, 2009). This may in part be due to the fact that these studies tend to assess children's development in Standard Australian English (SAE) which is often not the first language of these children.

Given the potential impact of otitis media on language development, it might be assumed that children with a history of infection be screened out of this study. This was not done as the rates are so high that recruiting focus children with 'normal hearing' would have been difficult and this cohort would have not been representative of the wider population. In a survey of Indigenous children aged between 6 to 30 months from four health regions in the Northern Territory, it was found that only 20% were likely to have 'normal hearing' and to not require medical or audiological treatment (Morris et al., 2005). It is estimated that between the age of 2 and 20 Australian Indigenous populations will experience otitis media for an average of 32 months compared with 3 months for the non-indigenous population (Couzos et al., 2001). This means that for children acquiring Murrinhpatha it is more likely for a child to have a history of otitis media than to have 'normal hearing'. Consequently, the focus children's history of ear infection was not considered in this study, although children who were suspected of having other problems leading to language delay were not included.

4.3 Recording

Data collection was undertaken across four fieldtrips to Wadeye over a two-year period, from July 2012 to June 2014. Each focus child was recorded on at least two occasions during each data collection fieldtrip. The one exception was Emily, who was only recorded once during fieldtrip two. These recordings were typically between half an hour to an hour in duration. In total there were 33 recordings involving focus children. These 33 recordings resulted in 2064 minutes of recorded interaction, of which approximately 732 minutes has been transcribed.

Table 12. Fieldtrip schedule

Trip	Period	Tasks
1	July-September 2012	Recruitment, Data Collection, Transcription
2	April-June 2013	Data Collection, Transcription
3	October-December 2013	Data Collection, Transcription
4	April-June 2014	Data Collection, Transcription
5	July- September 2015	Transcription, Clarifications

In terms of a recording schedule, studies typically space recordings at regular intervals (e.g., weekly or monthly (Kelly et al., 2015). In this context, however, recordings were largely spontaneous and a strict schedule was not adhered to.[33] I found that it

33. It should be noted that O'Shannessy (2006) has had success in making weekly spontaneous recordings in a similar context.

was largely ineffective to pre-schedule recordings with most participants. When I attempted to pre-schedule recordings, one or more of the participants would often be unavailable when it came time to record. Consequently, the recording schedule had to be highly flexible. If I had tried to enforce a more rigid schedule, this would have resulted in less data being collected and frustration for both me and the study participants.

The recordings involved two focus children interacting with each other, at least one caregiver, and sometimes other children. The majority of recordings were made in a variety of bush locations around Wadeye. The bush-based recording environment was chosen for a number of reasons. Firstly, families often go on bush trips on weekends and holidays to camp, fish, swim, collect bush foods, or have a picnic. This meant that participants were familiar with the recording environment and data collection involved enjoyable activities that are commonly experienced in groups. It also provided a relatively quiet location for recording away from the noise of town and restricted the number of participants to the number of people that could fit in the project vehicle. This made recording and transcription easier.

All sessions were recorded using two video cameras fixed to tripods. During trip one I used two Sony HDR-CX550V cameras. For trip two I used one Sony HDR-CX550V and one Sony HXR-NX30P. The Sony HXR-NX30P had greatly superior audio control with dual XLR inputs and manual wheels to adjust microphone levels. The HDR-CX550V only had a built-in microphone and a 3.5mm stereo jack, and audio level control was restricted to normal or low settings.[34] For trips three and four I used two Sony HXR-NX30P cameras. Multiple audio tracks were recorded for each session by each of the video cameras. The primary audio track was captured with two Sennheiser ew 112-p G3 wireless lavalier lapel microphone sets. The signal from these microphones was recorded in 16bit 48kHz stereo by the primary camera. This was the highest standard available on these devices. The wireless transmitters and lapel microphones were fitted in custom-made adjustable backpacks designed and constructed by my sister Rose Forshaw. These backpacks were worn by the two focus children in each recording similar to a method pioneered by Wells and French (1980). The surrounding speech of adults and other children was also captured through the backpack microphones. This proved to be adequate in most scenarios.[35]

34. I was able to record two wireless lavalier microphones using the HDR-CX550V by using a 3.5mm stereo to RCA adapter. I then converted each RCA input to 3.5mm stereo and then finally to 3.5mm female mono plugs. This somewhat convoluted string of adapters allowed for one microphone to be recorded on the left stereo track and the other on the right.

35. I also recorded an additional audio track through the secondary camera which could be utilised when the backpack microphones did not adequately pick up surrounding speech.

Bush-based recordings were participant-led in that participants selected the location for recording. The only restrictions on locations were that there was good shade available, Traditional Owners were happy for us to work in that location and that it was relatively close to Wadeye. Once in a location, participants were provided with ingredients to make tea and damper. If the recording took place by a river, participants were also able to fish. Bush-based recordings proved to be very successful in providing an environment which simultaneously made participants feel relaxed and in-control while enabling the making of interesting and relatively high-quality recordings for transcription and analysis.

Initially a small number of recordings were made in a 'portable baby lab'. This was a large tent that was set up in a room and lined with carpet to reduce noise. These recordings involved two focus children and two to three caregivers. The caregivers were provided with toys that they and their children could play with. This approach was somewhat modelled on the Aboriginal Child Language Acquisition project, which recorded child language in other remote Australian Indigenous contexts (Disbray, 2008; Meakins, 2011; Moses, 2009; O'Shannessy, 2006; Simpson & Wigglesworth, 2008). This approach to recording was abandoned relatively quickly as the interactions recorded did not seem particularly 'natural' and participants did not seem very relaxed.

4.4 Transcription and coding

Transcription of recordings is one of the most time-consuming aspects of creating a longitudinal corpus (Demuth, 1996a). Ideally, researchers will have a good familiarity with or be a native speaker of the target language (e.g. Mateo Pedro, 2015), and if this is not the case, have access to a team of literate native speaker RAs who can undertake independent transcription and translation of recordings (Rose & Brittain, 2011; Stoll et al., 2012). Neither of these options were possible in this study. Firstly, before beginning data collection, I had limited familiarity with Murrinhpatha, meaning that I could not undertake transcription and translation into English independently. Secondly, there was a lack of available literate native speakers, meaning that relying on a team of native speaker RAs was not feasible. Consequently, all transcriptions and translations of recordings for this study were done through 'team transcription', which involved working with the assistance of a team of Murrinhpatha speaker RAs. The majority of RAs were related to the children, predominantly mothers and grandmothers. They varied in ability in terms of their English oral language competency and English and Murrinhpatha literacy.

Approximately 732 minutes of interaction was transcribed. Transcription was done using ELAN multimedia annotation software (Sloetjes & Wittenberg, 2008).[36] All child utterances containing verbs were tagged. I re-listened to each of these utterances and checked the reliability of the initial transcription. Transcriptions which I considered unreliable were checked again by myself and an additional native speaker. Based on this assessment, utterances were either confirmed or excluded from the final verb database.

After transcription, children's verb productions were coded to allow for easy exploration of the corpus and statistical analysis. A verb was defined as any word that contained a classifier stem, including bipartite stem verbs, simple verbs and phrasal verbs (§ 2.2). All utterances containing verbs were then exported to an SPSS database (*IBM SPSS Statistics for Windows*, 2011) with relevant metadata. Each row in the database represented the production of a verb by a focus child. These verb productions were then manually coded according to their morphological structure, including the presence and absence of morphs, the features encoded by classifier stems, the length of verb productions (syllables and morphs), and the nature of any non-standard productions. This database was then exported and adapted for use in Minitab (*Minitab 17 Statistical Software*, 2010), in which all relevant counts and analyses reported in this monograph were undertaken. This method resulted in a final corpus of 2036 verb tokens produced by focus children. The distribution of these productions is shown in the table below.

Table 13. Verb tokens and age by child and fieldtrip

Focus child	**Fieldtrips**				**Total**	**Transcribed interaction (min)**
	1	**2**	**3**	**4**		
Acacia	3 (1;9–1;10)	52 (2;6–2;7)	102 (3;0–3;2)	120 (3;6–3;7)	**277**	312
Emily	15 (2;4–2;6)	79 (3;1)	15 (3;7–3;9)	45 (4;1–4;3)	**154**	233
Nathan	92 (3;6–3;7)	143 (4;4)	82 (4;10–4;11)	113 (5;3–5;4)	**430**	186
Mavis	35 (3;7–3;9)	82 (4;5–4;6)	198 (4;11–5;1)	174 (5;4–5;6)	**489**	240
Molly	266 (4;3–4;5)	121 (5;0–5;2)	117 (5;7–5;8)	182 (6;0–6;1)	**686**	225
					2036	**732***

* This is not the sum of the individual values in this column as individual recordings typically involved more than one focus child.

36. ELAN is developed by the Max Planck Institute for Psycholinguistics, Language Archive, Nijmegen. http://tla.mpi.nl/tools/tla-tools/elan/

As expected, the distribution of verb tokens across children and fieldtrips is not uniform. Fewer verb tokens were identified at earlier stages of language development and more were identified at later stages. This was the result of a number of factors. Firstly, the younger focus children tended to produce less speech during recording sessions relative to older children. Secondly, the proportion of verbs to overall words tended to be lower at earlier stages of development. Variation in the numbers of verb tokens recorded, transcribed and coded for each child during each fieldtrip was also related to the number of recordings the child participated in as well as how much of these sessions were transcribed.

CHAPTER 5

Early verbs

This chapter tests the predictions of theories of children's early verb productions using the Murrinhpatha corpus data. The beginning of the chapter examines the structure of children's early verbs and the extent to which these productions are influenced by phonological/prosodic (e.g. Demuth, 1996b; Peters, 1985; Slobin, 1985a) and/or morphosyntactic (e.g. Courtney & Saville-Troike, 2002; Schütze & Wexler, 1996) factors. The latter part of this chapter considers whether the semantics and pragmatics of early verbs are restricted in a similar way to what has been shown for English-speaking children (e.g. Clark, 1993; Huttenlocher et al., 1983), and what potential impacts this may have on the acquisition of verb morphology.

This analysis focuses primarily on the verb use of Acacia and Emily before age 3, and considers verb use throughout the corpus where appropriate. Verb use at this age is relatively infrequent, meaning that only a small set of data were considered (see § 4.4). This sample does, however, provide a useful picture of the structure of early verbs and how they are used.

5.1 Structure of bipartite stem verbs

A key characteristic of early word productions are errors of omission (e.g. Demuth, 1996b). The omission of syllables and segments is also characteristic of children's early verb productions in Murrinhpatha. Accounts of early verb productions tend to either focus on phonological/prosodic factors (e.g. Demuth, 1996a; Peters, 1985; C. Pye et al., 2007) or morphosyntactic factors (e.g. Rizzi, 1993; Wexler, 1994) as detailed in § 3.2.1 and § 3.2.2 respectively, although others acknowledge the influence of various factors (e.g. Courtney & Saville-Troike, 2002).

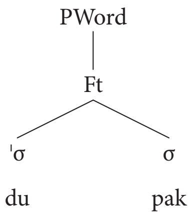
In the following analysis of Murrinhpatha early verb productions I argue in favour of the prosodic licensing account (e.g. Demuth, 1996b, 2001) outlined in § 3.2.1.2, where children's productions are sensitive to the prosodic structures of the adult target language. I also argue that children's early verb productions are influenced by factors of perceptual salience (Peters, 1985; Slobin, 1985a).

5.1.1 Prosodic licensing account

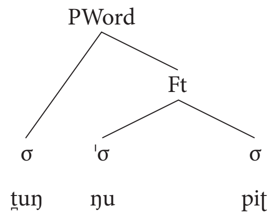
A prosodic licensing account argues that children's early productions are sensitive to the prosodic structures of the adult language and that crosslinguistic differences in early lexical productions can, in part, be attributed to differences in prosodic structures (Demuth, 1996b, 2001, 2006; Gerken, 1991, 1996). Initially children are argued to adhere to a minimal word constraint, which requires that a PWord is equivalent to a foot (Demuth & Fee, 1995). As children develop, they incorporate more structure into their lexical representations and exploit levels of the prosodic hierarchy above the PWord level.

PWords in Murrinhpatha have a bimoraic minimum. As discussed in § 2.2.2, I treat verbal PWords greater than a syllable as having a penultimate pitch peak (stress) that heads a trochaic foot at the right edge of the PWord. Although stress is predictable in relation to the end of the verbal PWord, it is not associated with a specific morphological slot. Where a PWord is monosyllabic, the stress occurs on the single syllable. As there is no clear evidence of secondary stress (Mansfield, 2019a), I treat syllables preceding the head foot as being prosodified at the PWord level. Verbal PWords begin with the classifier stem and conclude with the lexical stem. The prosodic structures for di-, tri- and tetrasyllabic verbal PWords are given below.

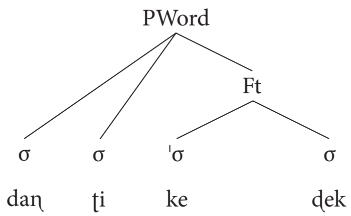
(31) a. Disyllabic verbal PWord
dupak 'you put it down'



b. Trisyllabic verbal PWord
thungupirt 'you take it off'



c. Tetrasyllabic verbal PWord
darntikerdek 'he finished it'



I present children's early verb productions in terms of the syllabic length of the adult target. Where children omit elements of a verb, the target verb has been documented in transcription sessions. Stress is assigned based on pitch peaks where recordings allow, otherwise stress is attributed based on my own impressions where audio quality is not of a sufficient standard.

5.1.1.1 *Monosyllabic verbal PWord targets*

Monosyllabic verbal PWords with a bipartite stem structure are extremely rare in Murrinhpatha; I have only been able to identify a single verb of this type. This is the verb 'get' constructed of the lexical stem *-art* and the CSP GRAB(9). This is a monosyllabic PWord when the classifier stem is not in the non-future. There are no examples in the corpus of omission errors which impact monosyllabic verbal PWords. These, however, would be particularly difficult to identify as the child would only be producing morphology not contained within the PWord, making the identification of such a verb unlikely.

5.1.1.2 *Disyllabic verbal PWord targets (ˈσ σ)*

There are a number of productions of disyllabic verbal PWords in the early verbs of both Acacia and Emily. In each of these productions the verbal PWord has penultimate stress, as with the adult target form. This can be seen in the following examples. The verbal PWord is bolded in examples for the remainder of the discussion of verb structure. The first line of child examples provides a phonemic representation of the child's utterance. The 'AT' line, when present, provides the adult target form as given by a native speaker research assistant.

(32) Acacia 1;10
mama ***ˈdebil***
AT: mama **ˈne-birl**
Mo **2SGS.HANDS:RR(10).FUT-turn.to.look**
'mum you look' (LAMP_20120822_WF_01_V1 00:13:37)

(33) Acacia 1;10
ˈunga
AT: **ˈnangart**
na-nga-art
2SGS.HANDS(8).FUT-1SG.IO-get
'you get it for me' (LAMP_20120831_WF_01_V1 00:03:25)

(34) Acacia 2;7
ˈbuy-bat*-nu* *Mavis*
3SGS.LOWER:INTR(18).FUT-fall-FUT name
'Mavis is going to fall' (LAMP_20130524_WF_01_V1 00:15:15)

(35) Acacia 3;2
*ˈ**udhuth**nu*
AT: ˈ**ngi-dhuth**-nu
1sgS.sit(1).fut-swim-fut
'I will swim' (LAMP_20131202_WF_01_V1 00:48:59)

(36) Emily 2;6
ˈkepa
AT: ˈ**du-pak**
2sgS.lower(17).fut-put
'you put it down' (LAMP_20120910_WF_01_V1 00:31:06)

As predicted by a prosodic licensing model, these verbal PWords are not reduced in terms of their lexical structure, as the PWord is a minimal PWord (Demuth & Fee, 1995). These examples show that both Emily and Acacia are able to produce verbal PWords of the type shown in (31a) at the initial stages of data collection, 2;6 and 1;10 respectively. These verbs, however, are not all well-formed. In particular, the initial syllable in Acacia's productions in (33) and (35) are filler syllables (Peters, 2001). In contrast, the final syllable of the verbal PWords in these examples closely resembles the adult target. This suggests that the end of the verbal PWord is particularly salient for Acacia, as has been found for many other languages (e.g. Peters, 1985; Slobin, 1985a). However, it is possible that such forms would be truncated at an earlier stage of development when utterances are more likely to be monosyllabic.

5.1.1.3 *Trisyllabic verbal PWord targets (σ ˈσ σ)*

Trisyllabic verbal PWords in the adult language have penultimate stress, as represented in (31b). Verbs of this type are found relatively frequently in Acacia and Emily's early verbs as well as throughout the corpus. Children's early verbs include both well-formed and truncated trisyllabic verbal PWords. Words with this structure are prone to truncation in a number of languages where the adult target is reduced to a single trochee (e.g. Gerken, 1996; Lleó & Demuth, 1999). This is also the case for early verbs in Murrinhpatha. In a number of verbs the initial syllable is either omitted or realised as a filler syllable, suggesting that it may have been omitted at an earlier stage of development.

The omission of the initial unstressed syllable is illustrated by the following productions in (37)–(40). In (37)–(39) the lexical stem is produced and the preceding classifier stem, which coincides with the initial syllable, is omitted. In (40), however, the second syllable of the classifier stem is maintained, suggesting that omission is structural rather than morphological.

(37) Emily 2;6
ˈnimi-ne ***ˈmatha***
AT: ˈnimi-de **na-ˈwatha**
other-again **2sgS.HANDS(8).FUT-make**
'you make it again' (LAMP_20120910_WF_01_V1 00:30:26)

(38) Nathan 3;7
ˈkardu
AT: **damˈkardu?**
dam-ngkardu
2sgS.SEE(13).NFUT-see
'did you see it?' (LAMP_20120830_WF_01_V1 00:14:22)

(39) Acacia 2;7
ˈlale*-nu* *Mavis*
AT: **ba**-ˈ**lele**-nu Mavis
3sgS.BASH(14).FUT-bite-FUT name
'it will bite Mavis' (LAMP_20130502_WF_01_V1 00:27:14)

(40) Acacia 2;7
ˈnuku*warda*
AT: **nguˈnu-ku**-warda
1sgS.FEET(7).FUT-throw-INTS
'I will throw it'
[Acacia throws an object after her utterance]
(LAMP_20130524_WF_01_V1 00:29:06)

Children's productions of trisyllabic verbal PWord targets also show evidence that the end of the verbal PWord is particularly salient. For example, in (41) Acacia aged 3;7 omits the initial syllable of a trisyllabic verbal PWord and produces the initial syllable of the disyllabic lexical stem *-yiparl* as a filler syllable.

(41) Acacia 3;7
*ˈ**aparl**lu-nga* *Tharran*
AT: **baˈyiparl**lu-nga Tharran
ba-yiparl-nu=nga Tharran
1sgS.BASH(14).FUT-hit-FUT=DM name
'I will hit Tharran' (LAMP_20140531_WF_01_V1 00:24:34)

Acacia and Emily do not truncate all early trisyllabic verbal PWords. Both children produce well-formed structures where the initial unstressed syllable is maintained. These well-formed verbs are produced at the same age as truncated verbs. For example, in response to a prompt by her mother Tania, Emily produces a verb construction meaning 'you wash your face first', as shown in (42). In this instance the initial unstressed syllable *ne* is well-formed. Other well-formed examples of this type are given in (43), (44) and (45).

(42) Emily 3;1
1 *Tania:* ***ne-ng'ka-purl****-warra=nga*
2sgS.HANDS:RR(10).FUT-face-wash-FIRST=DM
thama
2sgS.SAY/DO(34).FUT
'say wash your face first'
2 *Emily:* ***ne-ng'ka-purl****-warra*
2sgS.HANDS:RR(10).FUT-face-wash-FIRST
'wash your face first' (LAMP_20130502_WF_01_V1 00:17:23)

(43) Emily 3;1
ba'garduk*nu*
AT: **ba-'gurduk**-nu
1sgS.SEE(13).FUT-drink-FUT
'I will drink it' (LAMP_20130502_WF_01_V1 00:21:47)

(44) Emily 3;1
tha'ni-wup
2**sgS.BE**(4).**FUT-sit.down**
'you sit down' (LAMP_20130502_WF_01_V1 00:02:22)

(45) Acacia 2;7
Bill ***ma'nithu****-kanam*
AT: Bill **marn'tithuk**-kanam
mam-rithuk=kanam
name **3sgS.HANDS(8).NFUT-be.a.nuisance**=3sgS.BE(4).NFUT
'Bill she's being a nuisance'
(LAMP_20130524_WF_01_V1 00:26:55)

The variation in the production of verbs of this structure highlights that the development of verbal prosodic structure is not divided into discrete stages. As observed in other languages, children produce a variety of different forms of a particular target prosodic structure at a single age (e.g. Deen, 2005; Swift & Allen, 2002). This variation can also occur when attempting to produce the same target utterance (Deen, 2005, p. 20). Variation in the production of a single target is also found in the production of Murrinhpatha verbs. In the following example Acacia produces both well-formed instances of the verb 'you gather it for me' (lines 2 and 4) as well as omitting the unstressed initial syllable (lines 1 and 3).

(46) Acacia 2;7

1 *Mavis* *xxx* *'**ngakut**nu-nga*
AT: **na-'nga-kut**nu=nga
name xxx **2SGS.GRAB(9).FUT-1SG.IO-gather**-FUT=DM
'Mavis you gather it for me'

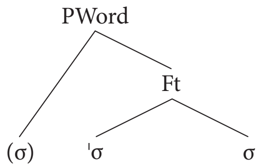
2 ***na-'nga-kut**-nu*
2SGS.GRAB(9).FUT-1SG.IO-gather-FUT
'you gather it for me'

3 *'**ngakut**nu*
AT: **na-'nga-kut**-nu
2SGS.GRAB(9).FUT-1SG.IO-gather-FUT
'you gather it for me'

4 ***na-'nga-kut**-nu*
2SGS.GRAB(9).FUT-1SG.IO-gather-FUT
'you gather it for me' (LAMP_20130524_WF_01_V1 00:40:29)

This variation in the production of trisyllabic verbal PWords is reminiscent of what has been described for the acquisition of trisyllabic words in Spanish (Demuth, 2001), where children produce both well-formed and truncated trisyllabic word targets at the same age. This pattern of production is illustrated by the structure in (47), which shows a tendency to omit the initial unstressed unfooted syllables of such structures. This tendency is argued to be due to the minimal word constraint, where a prosodic word should be no bigger or smaller than a foot (Demuth & Fee, 1995). As children are exposed to more trisyllabic words of this structure, the constraint is overcome (Demuth, 2001). This also seems to be the case for the acquisition of Murrinhpatha trisyllabic verbal PWords.

(47)



This developmental pathway can also be illustrated by the productions of a single frequent verb across the corpus in the speech of all focus children, providing insight into the developmental process over time. The verb 'to take off' is the most frequent trisyllabic verbal PWord in the corpus. It is constructed of the CSP REMOVE(32), which is disyllabic in future indicative and imperative constructions, and the monosyllabic lexical stem *-pirt* 'take off'. The verbal PWord is trisyllabic when no inter-stem morphology is present and the classifier stem encodes future tense. It is used on 10 occasions by 4 children between the ages of 2;7 and 5;8. These are arranged according to age in the table below.

Table 14. Production of 'take off' by focus children in imperative & future indicative constructions

Stage		Child production		Adult target	Age	Child
		Verbal PWord	Suffix			
I-A	a.	*'ipirt*	*nga*	(ngu'ngupirtnu-nga)	2;7	Acacia
	b.	*'ipirt*		(ngungu'wepirtnu)	2;8	Mavis*
	c.	*'ipirt*	*nu*	(ngungu'wepirtnu)	2;8	Mavis*
	d.	*'ipirt*	*nukun*	(ngungu'wepirtnu)	2;8	Mavis*
I-B	e.	*'ngupirt*		(ngu'ngupirt)	3;6	Acacia
	f.	*ngu'ngupirt*		(ngu'ngupirt)	3;6	Acacia
	g.	*'ngupirt*		(ngu'ngupirt)	3;6	Acacia
II	h.	*ngu'ngupirt*		(ngu'ngupirt)	4;4	Nathan
	i.	*thu'ngupirt*		(thu'ngupirt)	4;5	Mavis
	j.	*ngu'ngupirt*	*nu*	(ngu'ngupirtnu)	4;11	Nathan
	k.	*thu'ngupirt*		(thu'ngupirt)	5;8	Molly

* These tokens are actually based on the production of a verb with a tetrasyllabic core but are included here as they are closely related verb forms whose truncated forms align with truncated forms of trisyllabic core verbs at this stage.

A clear developmental pathway can be observed for this particular verb, showing three non-discrete stages. During the first two stages I-A and I-B, the trisyllabic verbal PWord tends to be reduced to a single trochaic foot. At stage I-A (2;7–2;8) the verbal PWord is disyllabic and consists of a well-formed lexical stem and a preceding filler syllable *i*. The initial unfooted syllable of the target form is omitted. At stage I-B (3;6) there are well-formed verbs (f) as well as the continued production of truncated verb forms (e) and (g). These truncated verb forms, however, differ from those at stage I-A as both syllables produced in the verbal PWord are well-formed.[37] At stage II (4;4 and older) only well-formed trisyllabic PWords are observed. The development of this verb is largely representative of the development of trisyllabic verbal PWords more generally. This developmental pathway is consistent with the prosodic licensing model (e.g. Demuth, 1996b, 2001).

5.1.1.4 *Tetrasyllabic verbal PWord targets (σ σ 'σ σ)*

Tetrasyllabic verbal PWords have a trochaic foot at their right edge. This prosodic structure is shown in (31c). In contrast to trisyllabic verbal PWords, tetrasyllabic verbal PWords are scarce in Acacia and Emily's early productions. The earliest

37. It is however unclear whether this is actually the second syllable of the target verb or the initial syllable as these are identical in these target forms.

example of a well-formed verb of this type is produced by Acacia at age 2;7 in line 3 of (48). Her production is likely modelled on the production of the same word by her elder sister Mavis in line 1.

(48) Acacia 2;7, Mavis 4;6

1	*Mavis:*	*ya*	*ngarra*	***kana'lili?***
		ya	ngarra	**kanam-lili**
		HES	LOC	**3SGS.BE(4).NFUT-walk**
		'hey where's he walking'		
2	*Valerie:*	*ngarra*	*lektrik*	*xxx*
		LOC	electricity	xxx
		'by the electricity (place)'		
3	*Acacia:*	***kana'lili***		
		kanam-lili		
		3SGS.BE(4).NFUT-walk		
		'he's walking'		(LAMP_20130524_WF_01_V1 00:27:40)

Unsurprisingly, tetrasyllabic verbal PWords are also truncated in children's speech. There are two patterns of omission observed for verbs of this type, both of which maintain the structure of the trochaic foot at the right edge of the verbal PWord. The first pattern of omission is for the first two syllables to be omitted, resulting in a single trochaic foot. This was also the outcome when trisyllabic verbal PWords were truncated. This pattern of omission is shown in (49), with Mavis (2;8) imitating the production of Carla.[38]

(49) Mavis 2;8

1	*Carla:*	***ngungu-'we-pirt****-nu*
		1SGS.REMOVE(32).FUT-head-take.off-FUT
		'I will take its head off'
2	*Rachel:*	***ngungu-'we-pirt****-nu*
		1SGS.REMOVE(32).FUT-**head-take.off**-FUT
		'I will take its head off'
3	*Carla:*	*pelpith*
		head
		'head'
4	*Mavis:*	***'ipirt***
	AT:	**ngungu**-'**we-pirt**-nu
		1SGS.REMOVE(32).FUT-head-take.off-FUT
		'I will take its head off'

38. This example comes from an elicitation session being undertaken by Rachel Nordlinger investigating verbal body part incorporation.

5 *Carla:* *'ipirtnu mam*
ipirtnu 3sgS.say/do(34).nfut
'she said "ipirtnu"'
6 *Carla:* *instead of ngungu'wepirt*
7 *Carla:* *but she was saying 'ipirtnu'* (RN 20110805)

Another example of this pattern of omission is produced by Acacia in response to a prompt by Emily's mother, Tania. The verb included in the prompt in line 1 *thanam'kaykay* is realised by Acacia as *nakay*. As was seen in early productions of both disyllabic and trisyllabic verbal PWords, the final syllable of the PWord appears to be the most salient as it resembles the adult target, whereas the preceding syllable produced by Acacia *na* differs from the adult target *kay*.[39]

(50) Acacia 2;7
1 *Tania:* *thangku* ***thanam-'kaykay***
what **2sgS.be(4).nfut-call.out(rdp)**
na-nge
2sgS.hands(8).fut-3sg.f.io
'say to her "why are you calling out?"'
2 *Acacia:* ***'nakay***
thanam-'kaykay
2sgS.be(4).nfut-call.out(rdp)
'you are calling out' (LAMP_20130502_WF_01_V1 00:33:54)

This pattern of omission is consistent with the pattern of omission identified for trisyllabic verbal PWords. The few examples of this type identified for tetrasyllabic verbal PWords are also produced at a similar age of development to truncated trisyllabic verbal PWords, before age 3;6.

The second pattern of omission impacting tetrasyllabic verbal PWords is for the PWord to be reduced to a trisyllabic PWord with the same lexical structure as adult trisyllabic verbal PWords; that is, with an initial unstressed syllable followed by a trochaic foot. Errors of omission of this type are identified in the corpus between age 3;6 and 4;5. This pattern of omission is neatly illustrated by Emily at age 3;7 when attempting to produce the verb *kewi'nhipaknu/kewi'nhipaknukun* 'it will/might spill'. She truncates the verb so that it is a trisyllabic PWord with penultimate stress. This verb is then reformulated by Mavis aged 4;11, who produces a tetrasyllabic PWord with the same lexical structure as the adult target form. Her production, however, is still not entirely adult-like in terms of the segments produced.

39. It is also possible that Acacia is producing the 2nd and 3rd syllables of the adult target verb [nam kaj] as [na kaj]. However findings throughout the rest of the chapter suggest that this is unlikely to be the case.

The target form is then modelled for both Emily and Mavis by Emily's mother Tania, who is also seeking clarification as to what the girls are talking about. This example provides a compact snapshot of the production of a specific verb across three age groups.

(51) Emily 3;7, Mavis 4;11

1 *Emily:* ***ka'yipak**nu*
AT: **ke-wi'nhipak**-nu
3sgS.poke:rr(21)-spill-fut
'it will spill'

2 *Mavis:* ***kawi'yipak**nu*
AT: **ke-wi'nhipak**-nu
3sgS.poke:rr(21)-spill-fut
'it will spill'

3 *Tania:* *ke-**wi'nhipak**-nukun* *ngarra?*
3sgS.poke:rr(21)-spill-futirr what
'what might spill?'

(LAMP_20131105_WF_01_V1 00:16:14)

In the above production by Emily it is the initial syllable of the adult target form *ke-*, realised as *ka-*, which is maintained and not the second syllable *-wi*. Another omission error of this type is shown in (52) below produced by Mavis at 3;9.

(52) Mavis 3;9
thang'kala
AT: **thani-ng'kala**
2sgS.be(4).fut-climb.up
'you climb up' (LAMP_20120831_WF_01_V1 00:28:23)

However, it is not always the initial syllable of the adult target that is maintained. In other instances, children maintain the second syllable of the adult target form. This is shown in (53), where Molly at age 4;5 is attempting to produce the tetrasyllabic verbal PWord 'I will climb up' *nganing'kalanu*. Molly omits the initial syllable *nga-* and maintains the second syllable *-ni-* of the adult target in her production. This variation shows that it is the more abstract prosodic structure that children are sensitive to rather than the fully realised syllables of the adult target forms.

(53) Molly 4;5
ngay-ka ***ning'kala**nu*
AT: ngay=ka **ngani-ng'kala**-nu
1sg=foc **1sgS.be(4).fut-climb.up**-fut
'I'll climb up' (LAMP_20120830_WF_01_V1 00:10:31)

It is also possible that neither the initial nor the second syllable will be maintained when a verb of this type is reduced to a trisyllabic verbal PWord. In this case the initial unstressed syllable of the child's truncated verb production may also be produced as a filler syllable. This is shown in (54), where Nathan, aged 4;4, omits the initial syllables of the verb *ngunu'nhiku* and produces a verb which begins with a filler syllable *a*.

(54) Nathan 4;4

1 *awu* *riliwan* *ma*
AT: awu riliwan matha
no true INTS
'no it's true'

2 ***a'nhuku****-ya* *ngarra* *kanarnturturt*
AT: **ngunu-'nhi-ku**=ya ngarra kanarnturturt
1SGS.FEET(7).FUT-2SG.DO-throw=DM LOC salt.water.crocodile
'I'll throw you where the crocodile is'

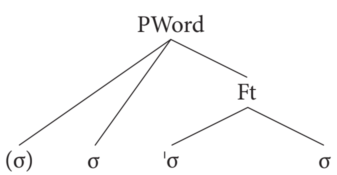
(LAMP_20130521_WF_01_V1 00:39:19)

As with trisyllabic verbal PWords, children also produce well-formed tetrasyllabic PWords at the same age as producing truncated forms of the same verb type. It has already been shown in (48) that children can produce verbs of this type as young as 2;7 when they are modelled in a previous utterance. Another example of a well-formed tetrasyllabic verbal PWord is given in (55) below, produced by Nathan aged 3;7.

(55) Nathan 3;7
dam-nhi-'riwak=*kanam*
3SGS.POKE(19).NFUT-1INCL.DO-follow=3SGS.BE(4).NFUT
'he keeps following us two' (LAMP_20120830_WF_01_V1 00:07:01)

Broader consideration of the data shows that children tend to produce both well-formed tetrasyllabic verbal PWords as well as producing forms where the initial syllable is omitted between 3;6 and 4;5. At this stage children's productions are constrained by the structure shown below, which shows that children allow tetrasyllabic verbal PWords but that the initial abstract syllable is prone to omission.

(56)



As with the previous discussion of trisyllabic verbal PWords, the corpus allows us to look at the production of a frequent tetrasyllabic verbal PWord across a broad age range. The most frequent verb of this type in the corpus is 'to climb up', which is constructed of the lexical stem *-ngkala* 'climb up' and CSP BE(4), and is disyllabic in all but its dual non-future and presentational forms. The table below shows all the future indicative and imperative productions of this verb by focus children across the corpus.[40]

Table 15. Production of 'climb up' by focus children in imperative & future indicative constructions

Stage		Child production			Adult target	Age	Child
		Verbal PWord	?	Suffix			
I-A	a.	*'ala**			(thaning'kala)	–	–
I-B	b.	*'kala**			(thaning'kala)	–	–
II-A	c.	*ang'ala*			(nganing'kalanu)	3;10**	Adam
II-B	d.	*pang'kala*			(paning'kala)	3;6	Acacia
	e.	*nganing'kala*	*p*		(nganing'kala)	3;6	Acacia
	f.	*kaning'kala*		*kathu*	(kaning'kalakathu)	3;7	Nathan
	g.	*thang'kala*			(thaning'kala)	3;9	Mavis
	h.	*paning'kala*	*p*	*nu*	(paning'kalanu)	4;5	Molly
	i.	*ning'kala*		*nu*	(nganing'kalanu)	4;5	Molly
	j.	*paning'kala*	*p*	*nu-nga*	(paning'kalanu-nga)	4;5	Molly
	k.	*paning'kala*		*parra*	(paning'kala-xxx)	4;5	Molly
III	l.	*kaning'kala*	*p*	*nu*	(kaning'kalanu)	5;3	Nathan
	m.	*paning'kala*	*p*	*nu*	(paning'kalanu)	5;4	Nathan
	n.	*kaning'kala*	*p*	*nu*	(kaning'kalanu)	6;1	Molly
	o.	*kaning'kala*	*p*	*nu*	(kaning'kalanu)	6;1	Molly

* These examples are constructed based on analysis relating to the production of other trisyllabic and tetrasyllabic verbal PWords before age 3.
** Adam's language production is typically behind the focus children and is excluded from the majority of data analysis (see § 4.2). This example is included here as it helps to demonstrate the observed stages of development with regard to the verb 'climb up'.

Two stages of development, II-B and III, are observed in the corpus for the verb 'to climb up'. However, based on broader findings in this chapter, I hypothesise five potential stages of development, as shown in Table 15. At stage I-A, typically before age 3, tetrasyllabic verbal PWords may be reduced to a single trochaic foot, as was observed in (49) and (50) for other verbs of this type. At stage I-B the trochaic foot

40. Tokens with inter-stem morphology have been omitted as these increase the length of the verbal PWord.

produced by the child resembles the foot at the right edge of the adult target PWord, as shown in (b). At stage II-A and II-B children tend to produce tetrasyllabic verbal PWords as trisyllabic PWords. At stage II-A the initial syllable may be realised as a filler syllable. Adam, who was excluded from the study (§ 4.2), produces a form of 'to climb up' that illustrates this stage of development. In (c) he produces a relatively well-formed trochaic foot at the right edge of the verbal PWord preceded by a filler syllable *a*. This pattern of omission was also observed for other tetrasyllabic verbal PWord targets as in (54). At stage II-B, observed between 3;6 and 4;5, children produce both well-formed and truncated verb forms. In truncated forms the initial syllable is omitted. The segment which is produced as the initial unstressed syllable by the child may be either the first syllable of the adult target, as in (d) and (g), or the second syllable of the adult target as in (i). The production of verbal PWords at this stage is represented by the structure in (56). At stage III, observed between 5;3 and 6;1, no more errors of omission impacting tetrasyllabic verbal PWords are produced as shown in (l)–(o).[41]

5.1.1.5 *Developmental stages of verbal PWords*

In analysing children's productions of bipartite stem di-, tri- and tetrasyllabic verbal PWords, I have identified a number of commonalities in development. The production of these verbs is sensitive to the prosodic structure of the adult target language and factors of perceptual salience. The development of these verbs in this corpus can be categorised in a number of stages.

Initially, at stage I-A,[42] children's early verbs tend to be disyllabic verbal PWords. Consequently, tri- and tetrasyllabic verbal PWords will be reduced to a single trochaic foot. Also at this stage the syllable at the right edge of the PWord is more salient and consequently tends to more closely resemble the adult target syllable across children's productions. This stage was observed in children 2;8 and younger. At stage I-B children begin to produce more trisyllabic verbal PWords, although many of these are still reduced to a single trochaic foot. This variation in production may even be observed for individual children producing a single lexical item in adjacent utterances, as in (46). Well-formed tetrasyllabic verbal PWords are still rare at this stage. Children tend to omit one or two of the initial syllables for verbs of this type. At stage I-B children still appear to prefer disyllabic verbal PWords although they begin to permit more trisyllabic PWords. Productions of this

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41. Another interesting observation regarding the production of the verb 'climb up' throughout the corpus is the production of a [p] consonant immediately following the verb core as shown in (f), (i), (k), (m), (n), (o) and (p). This was identified as an 'error' but it is unclear what may be the cause of this error. I am not aware of other similar errors in the corpus and investigation of this phenomenon is left for future research.

42. These stage numbers refer to the order of stages identified in this study. Stage I-A for example does not imply that this is the first stage of development in verb acquisition.

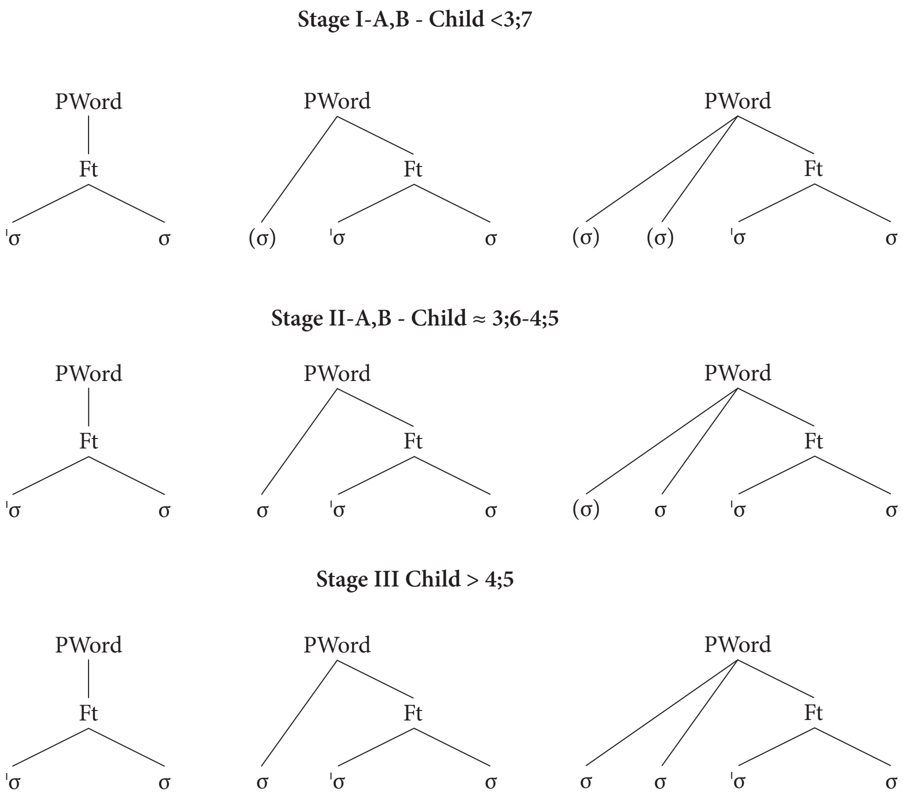

Figure 2. Developmental stages of verbal PWords

type are largely observed between 2;7 and 3;6. At stages II-A, B children tend to no longer truncate trisyllabic verbal PWords, showing that this is now an acceptable prosodic verbal structure. Children do, however, continue to truncate tetrasyllabic PWords. The initial syllable of these verbs is prone to omission, resulting in trisyllabic PWords. At stage II-A the initial syllable may be realised as a filler syllable. At stage II-B the phonemic form associated with either the first or second syllable may be preserved or omitted. Productions representative of this stage are observed between 3;6 and 4;5. After around 4;5, at stage III, errors of omission impacting tetrasyllabic verbal PWords are not observed.[43]

The developmental pathway described in this analysis shows children beginning at the right edge of the verbal PWord and then expanding leftwards through the gradual licensing of additional syllables accounted for by a prosodic licensing

43. Children learning Murrinhpatha must also learn to produce verbal PWords with cores greater than 4 syllables. There is, however, very limited data available in the corpus for verbs of this type so this is left for future research. It is likely, however, that these would also develop in the same way as the verb structures discussed here.

model (e.g. Demuth, 1996b, 2001). This leftward development from a right edge has also been described for a number of other languages with complex verb morphology, such as Mohawk (Mithun, 1989) and several Mayan languages (C. Pye et al., 2007). The analysis of Murrinhpatha early verbs has also shown that children's early verb productions are sensitive to factors of perceptual salience (Peters, 1985; Slobin, 1985a). Children are drawn to the right edge of the verbal PWord by the presence of lexical stress in a trochaic foot, and the stable form of the lexical stem comparative to the classifier stem. Furthermore, children find the final syllable of the verbal PWord particularly salient. As a consequence this tends to most closely resemble the adult target form in early verb productions. These factors help explain why children begin at the right edge of the verbal PWord.

This pathway also has morphological implications for Murrinhpatha acquisition. It means that the lexical stem is produced earlier by children as it occurs at the right edge of the verbal PWord. This pattern of development also means that classifier stems are prone to omission. Lexical stems therefore tend to behave more like verb stems in other languages, whereas classifier stems behave more like inflectional morphology. This has potential consequences for how children may begin to decompose bipartite stem verbs into their morphological parts and increases the likelihood that children will treat the lexical stem as the 'true' verb stem, thus potentially associating verb semantics with this part of the verb (see Chapter 7).

5.2 Semantics and pragmatics of early verbs

This section provides a brief overview of the semantics and pragmatics of children's early verbs in the corpus. It also provides a brief overview of the morphological structure of these early verbs and how this relates to function. The table below lists the spontaneous verb use of children under 3 in the corpus listed by lexical stem. Acacia's verb use at 1;9–1;10 is based on 3 recordings, of which approximately 100 minutes of interaction was transcribed. Acacia had begun speaking by this stage, however, these recordings were largely dominated by her older sister Mavis, who was aged between 3;7–3;9. Emily's verb use at 2;4–2;6 is based on three recording sessions, of which approximately 60 minutes has been transcribed. Acacia's verb use at 2;6–2;7 is drawn from four recording sessions, of which approximately seventy minutes has been transcribed.[44] This table shows a substantial increase in verb use by Acacia over a 6-month period. Acacia is also using verbs much more frequently than Emily at a similar age.

44. Providing precise figures of the amount of interaction transcribed is difficult as when recordings involved younger children, in particular children under 3, I did not transcribe lengthy stretches of interaction. Instead I focused on smaller, often quite short segments, in which the children were speaking and where potential verbs were identified.

Table 16. Spontaneous early verb use: Acacia (1;9–1;10) Emily (2;4–2;6) and Acacia (2;6–2;7)

Verbs			Children		
Lexical stem	Classifier stem	Verb meaning	Acacia (1;9–1;10)	Emily (2;4–2;6)	Acacia (2;6–2;7)
–	SIT(1)	'be (sitting)'			3
–	STAND(3)	'be (standing)'			2
–	BE(4)	'be'			2
–	GO(6)	'go'			3
–	HANDS(8)	'do'			3
-art	GRAB(9)	'get'	1	1	1
-bat	DOWN:INTR(18)	'fall'			1
-bat	SLASH(23)	'hit'			1
-birl	HANDS:RR(10)	'turn to look'	2	1	2
-gurduk	----(13)	'drink'			2
-ku	TRAVEL(7)	'throw'			1
-kut	TRAVEL(7)	'gather'			1
-lele	BASH(14)	'bite'			1
-lili	BE(4)	'walk'			1
-pak	DOWN(17)	'put down'		1	1
-pirt	----(32)	'take off'			1
-rithuk	HANDS(8)	'be a nuisance'			1
-watha	HANDS(8)	'make'		3	
-yit	HANDS(8)	'hold'		1	1
Total			**3**	**7**	**28**

Acacia (1;9–1;10) and Emily use only general-purpose verbs including 'do', 'give' 'put' 'make' 'hold' and 'turn to look' in their observed verb use. Acacia (2;6–2;7) uses both general-purpose verbs as well as a number of verbs that encode more specific semantics, such as 'be a nuisance' and 'drink'. This observation could suggest that children may initially produce 'generic' verbs before producing verbs which are semantically more specific or 'heavier', similar to claims regarding English and Hebrew acquiring children (e.g. Clark, 1993; Ninio, 1999b).

Additional support for this pattern of development is also observed in Acacia's use of the simple verb 'do' as a directive at age 2;7. This verb is constructed using the 2nd singular future form of CSP HANDS(8) *na-* and the 1st singular indirect object marker *-nga*.[45] Acacia uses this verb in two distinct contexts where semantically

45. It is unclear whether this is actually a form of CSP hands(8) or a special form of CSP say/do(34) used for 2nd singular subjects in combination with indirect object markers as hands(8) does not typically have this general 'do' meaning.

more specific or heavier verbs would be more appropriate. The first instance of this type occurs when Acacia asks the researcher to draw a snake for her on the ground, given in (57). In this instance the verb *nangawatha* 'you make it for me' or *nangayerl* 'you draw it for me' would have been more appropriate. *Nangawatha*, however, is also a semantically relatively generic verb.

(57) Acacia 2;7

1 ***na-nga***
2sgS.HANDS(8).FUT-1sg.IO
'do it for me'

2 *pangkuy*
long
'snake' (LAMP_20130524_WF_01_V1 00:07:58)

The other instance involves Acacia using *nanga* 'you do it for me' in place of *nangarara* 'you peel it for me', shown in (58). Acacia is attempting to peel an orange without success. As a result she asks her mother Valerie to 'do' the orange for her (line 1). Valerie responds by telling Acacia to ask 'deaf one' to 'do it for her'. Valerie also uses a different form of the semantically generic verb 'do' in her response to Acacia rather than potentially modelling the use of 'peel'.

(58) Acacia 2;7

1 *Acacia:* *mama* ***nanga*** *mi* *orange* *xxx*
Mo **2sgS.HANDS(8).FUT-1sg.IO** CLF:VEG orange xxx
nanga
2sgS.HANDS(8).FUT-1sg.IO
'mum do the orange for me, do it for me'

2 *Valerie:* *tebala* *ma-mpa* *dharra*
deaf.one 3sgS.HANDS(8).FUT-2sg.IO MOVING
'deaf one will do it for you, go'

3 *Mavis:* *Acacia* *mi* *xxx* *Acacia*
name CLF:VEG xxx name
'Acacia food xxx Acacia'

4 *Acacia:* *tebala*
deaf.one
'deaf one'
[Acacia walks towards 'deaf one']
(LAMP_20130524_WF_01_V1 00:32:35)

Interestingly, both of the verbs that would be more appropriate in the above contexts also contain the CSP HANDS(8). The verb 'peel' is constructed from HANDS(8) and the lexical stem *-rara*, whereas 'make' is constructed from HANDS(8) and the lexical stem *-watha*. It is unclear, however, whether the relationship between these verbs helps to drive the use of a more generic general-purpose verb in these contexts or whether this is coincidental. These data suggest that children may initially rely on general-purpose verbs when acquiring Murrinhpatha before acquiring semantically more specific verbs. However, given the small data set this claim requires further investigation.

With regard to the function of early verbs Emily and Acacia's verb use is comprised largely of directives and commissives. Acacia initially only produces directives at age 1;9–10. Verbs used as directives function to direct the attention of caregivers, as shown in (59), as well as to request action of a caregiver, as shown in (60). Directives are predominantly realised as imperative verbs and occasionally as 2nd person singular future indicative verbs. These constructions are structurally very similar and are only differentiated by the presence or omission of the tense marker *-nu*.[46]

(59) Emily 2;4
nerl
AT: **ne-birl**
2sgS.HANDS:RR(10).FUT-turn.to.look
'look'
[Emily shows the toy hammer she has picked to Pauline]
(LAMP_20120711_WF_01_V1 00:12:48)

(60) Acacia 1;10
unga
AT: **nangart**
na-nga-art
2sgS.GRAB(9).FUT-1sg.IO-**get**
'get it for me' (LAMP_20120831_WF_01_V1 00:03:25)

Commissives are used by both Emily and Acacia to state their intent to act. These utterances are mostly realised as 1st singular future indicative verbs as in (61) and (62).

(61) Emily 2;4
mart
ma-art
1sgS.GRAB(9).FUT-get
'I will get it'
[Emily reaches out and grabs a toy hammer]
(LAMP_20120711_WF_01_V1 00:12:32)

46. Mansfield (2014) finds, for young men's speech, that the presence or absence of the tense marker *-nu* is not categorical in differentiating indicative and imperative uses. This further highlights the structural similarity of these constructions.

(62) Acacia 2;7
nukuwarda
AT: **ngunu-ku-warda**
1sgS.FEET(7).FUT-throw-NOW
'I will throw it'
[Acacia throws an object] (LAMP_20130524_WF_01_V1 00:29:06)

These observations are consistent with findings mostly from English that children's early verbs are commonly used to refer to their own actions and to request action or attention from a hearer (e.g. Huttenlocher et al., 1983; Naigles et al., 2009). They are also consistent with broader crosslinguistic findings that children produce directives from an early age (e.g. Küntay et al., 2014).

As well as using verbs as directives and commissives, Acacia (2;6–7) uses verbs as representatives to describe the actions, locations and existence of other entities, particularly other people in the recording environment. Emily is not observed using verbs in this way. When describing the actions of another person, these verbs either anticipate the actions of a person, as in (63), or describe an ongoing state of affairs, as in (64). In (63) Acacia utilises a future indicative construction similar to directives and commissives, except that the verb encodes a 3rd person singular subject. Interestingly, the verb in (64) has a non-future classifier stem as well as a serialised verb element used to encode an ongoing state of affairs in adult Murrinhpatha (Nordlinger & Caudal, 2012, p. 88). This usage potentially represents more advanced verb use by Acacia as it is not representative of her verb use more broadly at this age. Furthermore, such forms are not found in Emily's speech at a similar age or in Acacia's earlier verb use at 1;9–1;10.

(63) Acacia 2;7
buy-bat-nu *Mavis*
3sgS.LOWER:INTR(18).FUT-fall-FUT name
'Mavis will fall'
buy-bat-nu=nga
3sgS.LOWER:INTR(18).FUT-fall-FUT=DM
'she will fall'
[Acacia is pointing towards Mavis who is climbing a fence,
while talking towards Bill]
(LAMP_20130524_WF_01_V1 00:15:15)

(64) Acacia 2;7
Bill ***manithu-kanam***
AT: **marntithuk-kanam**
mam-rithuk=kanam
name **3sgS.HANDS(8).NFUT-be.a.nuisance=3sgS.BE(4).NFUT**
'Bill she's being a nuisance' (LAMP_20130524_WF_01_V1 00:26:55)

Acacia also uses simple verbs, inflected for presentational TAM, to refer to the existence/location of 3rd person entities within the recording space. Presentational verbs indicate the epistemic authority of the speaker over an addressee and only occur in 3rd person forms (Mansfield, 2019b). A typical use of a presentational verb is given below.

(65) Acacia 2;7

1	*Tania:*	*ngarra ku-yu?*	
		where CLF:ANIM-DM	
		'where's that animal?'	
2	*Acacia:*	***kem***	*panguthu*
			pangu-kathu
		3sgS.SIT(1).PRSL	there-HITH
		'it's over that way'	
		[Acacia points to her left]	
3	*Tania:*	*mm*	
		'mm'	(LAMP_20130524_WF_01_V1 00:26:55)

In my interactions with young children around Wadeye these simple presentational verbs, in particular *kem* 3sgS.SIT(1).PRSL, *karrim* 3sgS.STAND(3).PRSL, *kanam* 3sgS.BE(4).PRSL and *kurran* 3sgS.GO(6).PRSL, are all used relatively frequently to either discuss the location of other people or when pointing to particular entities. The early use of these verbs by children is likely due to both their usefulness in referring to entities in the surrounding context, often being used to facilitate 'joint attention' with another speaker, as well as the fact that they are frequently used, short, morphologically simple, monomorphemic words.

Acacia and Emily only used verbs for a small range of functions; directives, commissives and to a lesser extent representatives. Each of these uses was typically encoded by a particular type of verb construction. Directives were largely imperative verbs, commissives were largely 1st singular future indicative verbs, and representatives included a mixture of 3rd singular future indicative, 3rd singular non-future and 3rd singular presentational verbs. This results in only a small portion of Murrinhpatha's rich verbal morphology being utilised. This may impact the development of CSPs, which encode subject person and number as well as TAM. A CSP has 42 morphological property sets, of which only a small number are attested in Acacia and Emily's early verbs. The following graph represents the different classifier stem property sets used by Acacia between age 2;6 to 2;7. This data comes from two recordings sessions of which approximately 70 minutes was transcribed and coded. During these recordings Acacia produced 28 standard (i.e., adult-like) verb tokens. Across these 28 verb tokens only 5 different classifier stem morphological property sets were used. Interestingly these property sets also have in common that they encode singular subjects and the majority encode future tense. Therefore, it appears that only a small core of morphological property sets are encoded by classifier stems in children's verb use at this age. These findings suggest a potential link between the development of classifier stem paradigms and the function of early verbs. The development of CSP cell diversity is explored further in Chapter 6.

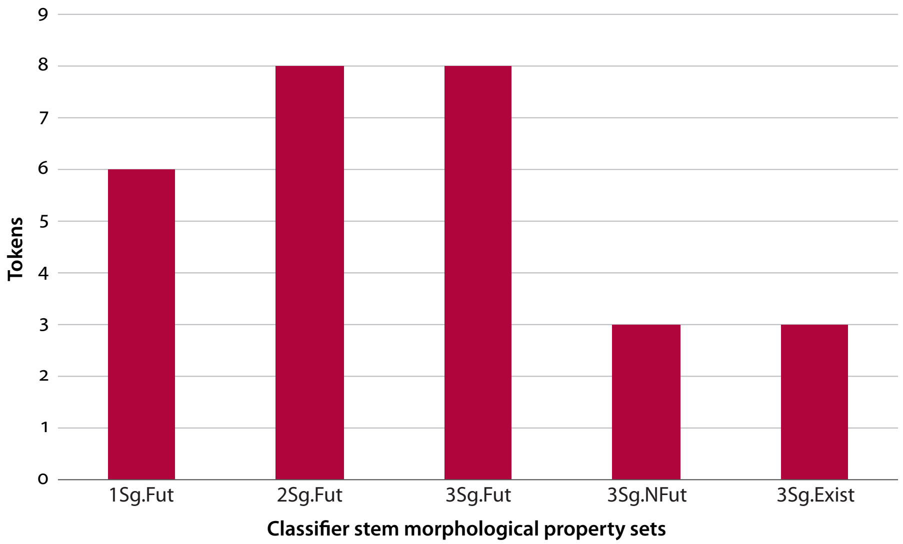

Figure 3. Classifier stem morphological property sets: Acacia 2;6–2;7

In a number of languages imperative verbs are acquired early and may be used by children at increased rates compared to adult speech (e.g. Salustri & Hyams, 2003). Salustri and Hyams (2003, 2006) argue that this is due to the underspecification of agreement and tense, the same underlying factors used to account for an optional infinitive stage in some languages (Schütze & Wexler, 1996). My findings regarding Murrinhpatha verb acquisition, however, suggest that the early acquisition and potentially higher rate of imperative verb use early in development may be linked to the early use of directives. The early use of imperatives is also likely influenced by the fact that they tend to be frequent in child-directed speech (Belletti & Guasti, 2015; Cameron-Faulkner et al., 2003) and that in inflecting languages imperatives tend to be morphologically simple (König & Siemund, 2007). Interestingly, in languages with an optional infinitive stage it has been noted that root infinitives have a similar directive function to imperative verb forms in other languages (Salustri & Hyams, 2006). Future research could be undertaken to explore whether the optional infinitive stage may be linked to the development of pragmatic function.

5.3 Summary

This chapter has shown that the structure of children's early verbs in Murrinhpatha can be accounted for by a prosodic licensing model (e.g. Demuth, 1996b, 2001), with some influence from factors of perceptual salience (Peters, 1985; Slobin, 1985a). Children initially produce the trochaic foot at the right edge of the verbal PWord and then gradually incorporate preceding syllables as they acquire the prosodic structure of verbs in Murrinhpatha. With regards to semantics, there is some evidence to suggest that children initially rely on 'general purpose' verbs before acquiring more semantically specific verbs, consistent with findings for English and some other languages (e.g. Bloom, 1991; Clark, 1993; Ninio, 1999a). There is also some evidence to suggest that early verbs in Murrinhpatha are used for a small range of pragmatic functions as has been described for English (e.g. Huttenlocher et al., 1983; Naigles et al., 2009). In particular, early verb use displayed a self-interest bias with directives used to request action or attention from a hearer or commissives used to state a child's intention to act predominating usage. The following chapter examines how children acquire the complex morphological patterns of CSPs, building on observations in this chapter that children initially only use a small core of morphological property sets and that there is a potential link between the way in which verbs are used and the development of verbal morphology.

CHAPTER 6

Acquisition of classifier stem paradigms

This chapter considers the acquisition of complex paradigms by focusing on the acquisition of Murrinhpatha classifier stem paradigms (CSPs), see § 2.2.4, across the corpus. In Murrinhpatha there are 38 CSPs each with 42 morphological property sets or cells (Mansfield, 2019a).[47] There is a great amount of homophony, suppletion and irregularity across and within CSPs (Nordlinger, 2015). Complex verbal paradigms such as these, common in polysynthetic languages, pose a great problem for the language learner: their inflectional patterns are typically not regular enough to allow for a rule-based approach to morphological acquisition, yet the inflectional patterns are so large and complex that it seems impossible for children to learn all forms of paradigms individually (Mithun, 2010).

In building Murrinhpatha verbal paradigms, I will argue that children first build item-based miniparadigms (Pinker, 1984) constructed of a small number of formally and semantically related rote-learned forms. Children then gradually begin to expand these paradigms based on both intra- and inter-paradigmatic patterns of form and meaning (§ 6.2). The application of these patterns can result in errors. These errors provide evidence that these patterns are both salient to children, as well as (at least partially) productive (§ 6.3). Although it is not clear exactly what drives the development of paradigms, it is likely that function plays a role, with early verbs potentially restricted in function as discussed in § 5.2. As children get older and need to use verbs for a wider variety of functions, they also begin to use a more diverse range of classifier stem cells. I argue that there is a discernible pattern in the order of acquisition of CSP cell categories.

These findings are problematic for dual-route accounts of morphological acquisition (e.g. Clahsen, 2006a; Pinker & Prince, 1991; Pinker & Ullman, 2002), which propose a psychological distinction between regular and irregular inflection and an emphasis on abstract rules, as outlined in § 3.4.1. Given that is difficult to even generate regular inflectional rules for such systems (e.g. Dąbrowska, 2001; Krajewski et al., 2012; Mirković et al., 2011), dual-route approaches do not adequately capture the processes of morphological acquisition that are occurring. I will argue that these

47. The categories of number and TAM can be further modified by other verbal morphology increasing the complexity of the Murrinhpatha verb. I do not explore the acquisition of this part of the system in this study.

findings are more consistent with single-route usage-based accounts (e.g. Bybee, 1995; Marchman, 1997), see § 3.4.2, which claim that morphological systems can be acquired through a single general learning mechanism resulting in the emergence of schemas based on associative networks of inflected word forms. Such approaches highlight how children build and utilise relationships between related word forms and meaning rather than building meaning from the bottom up.

6.1 Development of CSP cell diversity

It was observed in chapter 5 that children initially use only a small number of the 42 morphological property sets encoded by CSPs. As children get older, their CSP cell use becomes more diverse. The question then is how we can best track and account for changes in classifier stem cell diversity. One option is to consider the types of morphological property sets attested at different stages of development by individual speakers. This is shown in the table below for Acacia between the age of 2;6–2;7 and Molly between the age of 6;0–6;1. These samples were chosen as they represent verb use at the youngest and oldest ends of the corpus, for which standard verb production data is available. The table also includes classifier stem cell use for the girls' grandmother Carla from a single recording session (LAMP_20131105_WF_01_V1). Although the samples are not taken from the same sessions, which would be preferable, the verb use was recorded in similar contexts.

Table 17. Child and adult classifier stem cell use

Classifier stem cell category (Morphological property set)	**Acacia 2;6–2;7**	**Molly 6;0–6;1**	**Carla (Adult)**
1SGS.FUT	6	40	6
1SGS.NFUT	–	9	–
1INCLS.FUT	–	12	4
1INCLS.PIMP	–	–	1
2SGS.FUT	8	72	55
2SGS.NFUT	–	2	1
2DUS.PIMP	–	–	1
3SGS.FUT	8	10	2
3SGS.NFUT	3	24	6
3SGS.PRSL	3	39	10
3PLS.NFUT	–	–	1
Total Tokens	**28**	**208**	**87**
Total Categories Attested	**5**	**8**	**10**

Firstly, it is important to remember that making direct comparisons across the above samples is problematic due to the fluctuation in sample sizes. This is taken into account in measures used later in this chapter. The purpose at this stage is to observe the diversity of classifier stem cell use in a real speech sample of an individual speaker at a certain stage of development. The most striking feature of the above table is that the majority of potential classifier stem cell categories are not attested either in the child or adult speech samples. This is to be expected given the small speech samples and that typically some cells will be highly frequent, and others will be vanishingly rare (e.g. Lignos & Yang, 2016; Tomasello & Stahl, 2004). Investigating the acquisition of these rarer categories would require the collection of 'dense' corpora or experimental methods (e.g. Savičiūtė et al., 2018). See Forshaw (2014) for preliminary experimental research in this area.

Despite the lack of potential diversity displayed by the samples, it is apparent that a greater number of cell categories are used by the older child Molly as well as by Carla, who use 8 and 10 categories respectively in contrast to Acacia's 5. Interestingly, the categories used by only Carla and by Molly and Carla suggest that the development of classifier stem cell diversity may have a discernible pattern. For example, the categories used by only Molly and Carla include 1st inclusive subjects as well as non-future forms, both of which are absent in Acacia's sample. The categories attested in only Carla's speech include categories with dual and plural subjects as well as past imperfective TAM. This suggests that certain categories encoded by classifier stems may be acquired later than others and that this progression may be predictable. However, looking at the data in this way alone does not give an accurate picture of classifier stem cell diversity. This is because it does not show the extent to which individual CSPs are inflected for different categories. It only shows that these categories are attested across all CSP forms in a given sample.

In order to evaluate the diversity of classifier stem cells I adopt the measure of Normalised Mean Size of Paradigm (Xanthos et al., 2011; Xanthos & Gillis, 2010), outlined in § 3.4.5. This measure is designed to quantify the inflectional diversity of a morphologically analysed speech sample. In its raw form MSP is defined by the following ratio where $|F|$ represents the number of word forms (types) and $|L|$ represents the number of lemmas (types) contained in a particular sample.

(66) *Mean Size of Paradigm*

$$\text{MSP} = \frac{|F|}{|L|}$$

In this study, a sample is all verbs recorded and coded for a focus child during an individual fieldtrip. This means samples can cover a period of up to 3 months and be drawn from 1 to 4 recording sessions. The age reported with measures of these samples is the child's age at the end of the fieldtrip. As we are only seeking to measure diversity with regard to classifier stem paradigms, |*L*| will represent the number of CSPs used in a given sample, which will range potentially from 1–38. |*F*| will represent the number of classifier stem morphological property sets used in a given sample. This measure is no doubt more reliable for larger samples. This is often problematic for longitudinal acquisition studies as small samples are often the norm. As a result, I only calculate MSP for samples which have 30 or more members. This is an arbitrary cut-off point but was chosen in reference to the various samples across the corpus to ensure that the largest amount of data could be included in analysis without calculating relatively meaningless values for smaller samples.

The raw measure of MSP is impacted by sample size, as with other type/token measures. Xanthos and Gillis (2010) address this by proposing a measure of 'Normalised MSP'. This measure uses a method of statistical 'bootstrapping' (Baayen, 2008), in which a number of subsamples are taken from a given sample *without replacement*[48] for which MSP is to be calculated. MSP is calculated for each of these subsamples. The mean value of MSP for this group of subsamples is then reported. Criteria for determining the optimal size of the subsample *S* are not given by Xanthos and Gillis (2010), although they do provide some discussion of impacts to be considered when setting the value of *S*. Firstly, *S* must be equal to or lower than the sample size of the smallest sample to be measured, in this case *S* must be equal to or less than 30 as this is the size of the smallest sample. If *S* is set to a larger number it will produce a value closer to the MSP of the entire sample. If *S* is set to a lower value it will provide a better estimate of the variance of the sample. There is consequently a trade off in setting the value of *S* in terms of capturing variance of a sample and the diversity of the entire sample.

Xanthos and Gillis (2010) propose that the number of subsamples (*B*) to be calculated for a given sample should be a function of the size of subsamples *S* and the size of a given sample *N* for which MSP is to be calculated. The number of subsamples to be constructed is calculated according to the formula $B = N/S$, rounded to the closest integer. This is so that, on average, each token is only sampled once in the whole set of subsamples. I initially trialled this approach but found that the values of MSP(*S*) were too unstable, particularly for the smaller samples. Instead I calculated 100 subsamples for each given sample, based partly on an approach to measuring inflectional diversity with statistical bootstrapping proposed by Malvern et al. (2004). I then calculated the mean size of paradigm for MSP(10), MSP(20) and MSP(30), in order to evaluate which measure captured any potential development of diversity across the corpus. MSP(10) showed no significant increase in

48. Without replacement in sampling means that each unit only has one chance to be selected in the sample. Once a unit is selected in a given sample it cannot be selected again.

the diversity of classifier stem use across the corpus compared with age, Pearson's $r = -0.182$ and $p = 0.50$. This shows that MSP(10) is likely not an effective measure of classifier stem diversity for samples in this corpus. This is because setting the value of *S* so low means that capturing the classifier stem cell diversity of the entire sample is deprioritised in favour of capturing the variance of the sample.

By contrast there was a correlation between age and MSP for both MSP(20), $r = 0.515$ and $p = 0.041$, and MSP(30) $r = 0.687$ and $p = 0.003$. The figure below shows the values of MSP(30) for each child across the corpus.

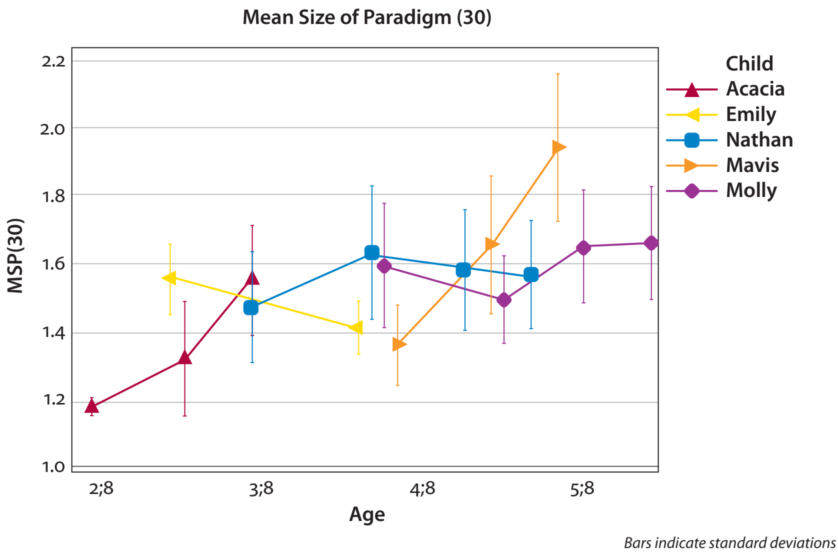

Figure 4. Mean size of paradigm (30) by child

Although overall there is an increase in the value of MSP(30) with age, there is still considerable variation within the sample. This variation in diversity may be due to a variety of additional factors, such as context, knowledge of inflection and the lexical diversity of the sample. There have been a number of studies (Aguado-Orea, 2004; Aguado-Orea & Pine, 2015; Krajewski et al., 2012) investigating the acquisition of inflectional morphology that have attempted to mitigate these factors by comparing 'matched' child and adult speech samples, which only include verbs present in the adult and child samples and exclude inflections not yet acquired by the child. Although it is beyond the scope of this study to utilise such an approach, it is possible to control the lexical diversity, or more precisely the CSP diversity, in the sample. The speech samples investigated across the corpus vary greatly in the diversity of CSPs used. For example, between age 3;0 and 3;2 74 verb tokens are analysed from Acacia's speech. In these 74 tokens only 8 CSPs are attested.

Similarly, 73 verb tokens were analysed from Nathan's speech between age 4;10 and 4;11. However, in this sample 17 CSPs were attested. The number of CSPs found in a sample will impact the value of MSP, as this is the value |*L*|. It is therefore probable that samples with a greater diversity of CSPs will have a lower value of MSP than they would if this variation was controlled for. It is therefore advantageous to control for this variation when calculating MSP, particularly with small samples. I therefore consider a more 'matched' sample of children's classifier stem use by limiting analysis to a subset of four CSPs. The four CSPs chosen for analysis were BE(4), HANDS(8), POKE(19) and SAY/DO(34). These particular paradigms were selected based on a number of criteria to ensure that enough data was available for analysis, that the selected CSPs showed diversity in terms of classifier stem cell use, and that the sample investigated displayed varied characteristics representative of the broader system.[49]

6.2 Development of CSP cell diversity in a matched sample

The selected 'matched' sample of four classifier stem paradigms BE(4), HANDS(8), POKE(19) and SAY/DO(34) accounts for 45.19% (n=767) of standard verb use across the entire child language corpus. The frequencies of each of these paradigms in terms of the matched sample are given below in Table 18. SAY/DO(34) and HANDS(8) are the most frequently used followed by BE(4) and POKE(19). 16 different classifier stem cell categories are attested in the matched sample. These vary greatly in their frequency of use, with half of these categories used on fewer than seven occasions and two categories, 1st singular future (24.64%) and 2nd singular future (31.94%), accounting for more than half of all classifier stem use. The frequency of use of each of these categories is given in Table 19.

Table 18. CSP use in matched sample

CSP	Tokens	% of matched sample
BE(4)	157	20.46
HANDS(8)	242	31.55
POKE(19)	88	11.47
SAY/DO(34)	280	36.51
Total	**767**	**100.00**

49. See Forshaw (2016, Ch. 6) for a discussion regarding the selection of these four CSPs.

Table 19. Classifier stem cell use in matched sample

TAM	Number	Person	Classifier stem cell category	Tokens	%
Future	Singular	1	1st Singular Future	189	24.64
		2	2nd Singular Future	245	31.94
		3	3rd Singular Future	33	4.30
		1st Inclusive	1st Inclusive Future	17	2.22
	Plural	2	2nd Plural Future	2	0.26
Non-Future	Singular	1	1st Singular Non-Future	59	7.69
		2	2nd Singular Non-Future	21	2.74
		3	3rd Singular Non-Future	128	16.69
		1st Inclusive	1st Inclusive Non-Future	3	0.39
	Dual	1	1st Dual Non-Future	1	0.13
		3	3rd Dual Non-Future	1	0.13
	Plural	3	3rd Plural Non-Future	6	0.78
Past Imperfective	Singular	1	1st Singular Past Imperfective	3	0.39
		3	3rd Singular Past Imperfective	2	0.26
	Dual	1	1st Dual Past Imperfective	4	0.52
Presentational	Singular	3	3rd Singular Presentational	53	6.91
			Total	767	100.00

As with the previous section, children's data was divided into various samples based on recordings undertaken during a particular fieldtrip. Restricting investigation to a limited set of CSPs reduced the number of tokens in each child's sample. The token counts of standard verb use for each child sample are given in the table below. Unsurprisingly there is great variation in the size of the various samples, ranging from 0 standard verb tokens to 98. This variation is in part due to the lower rate of verb use at earlier stages of development, and differences in the amount of interaction transcribed for focus children for each fieldtrip (§ 4.4).

Table 20. Standard verb tokens by child and fieldtrip for 'matched' sample

	Fieldtrip (Age Y;M)								Total
	1		2		3		4		
Acacia	0	(1;10)	9	(2;7)	48	(3;2)	54	(3;7)	111
Emily	4	(2;6)	30	(3;1)	5	(3;5)	17	(4;3)	56
Nathan	22	(3;7)	49	(4;4)	44	(4;11)	42	(5;4)	157
Mavis	14	(3;9)	27	(4;7)	56	(5;1)	87	(5;6)	184
Molly	98	(4;5)	43	(5;2)	33	(5;8)	85	(6;1)	259

Based on these samples a measure of MSP(20) was calculated for all samples greater than 20. The decision not to calculate MSP(30) was made due to the reduction in sample sizes caused by the matched sample. This is offset by the reduction in the potential maximum value of |*L*| from 38 to 4. This means that although there is a reduction in the value of *S*, diversity is still likely to be captured as there is also a reduction in the value of |*L*|. The results of MSP(20) are shown in Figure 5.

The results show development in the diversity of classifier stem cell use with age, as MSP(20) correlates with age, Pearson's $r = 0.799$ and $p = 0.001$. The trajectory of this rise in diversity appears to taper off after 3;7. The level of diversity found in the speech of Emily and Acacia at 3;1 and 3;2 is fairly limited with a value of MSP(20) less than two. A sharp rise in this value is observed by 3;7 and after this point the value of MSP(20) is consistently above or just below 2.5. After 3;7 diversity continues to grow with MSP(20) rising to around 3 by 5 years of age. There is, however, variability across individual samples; in particular, the values of MSP(20) calculated for Nathan do not show a clear trajectory of diversity over time. A larger data sample would likely provide a more stable picture of the growth of classifier stem cell diversity. However, despite the variation in MSP(20) in Nathan's samples, the values do appear to be consistent with other children at a similar age.

In order to investigate potential pathways of development, children's verb use is divided into the five age brackets listed below. The three middle age brackets are each a year in length. Considering children's verb use in this way suggests that the rise in classifier stem cell diversity observed in the matched sample represented by MSP(20) is associated with children beginning to encode specific additional

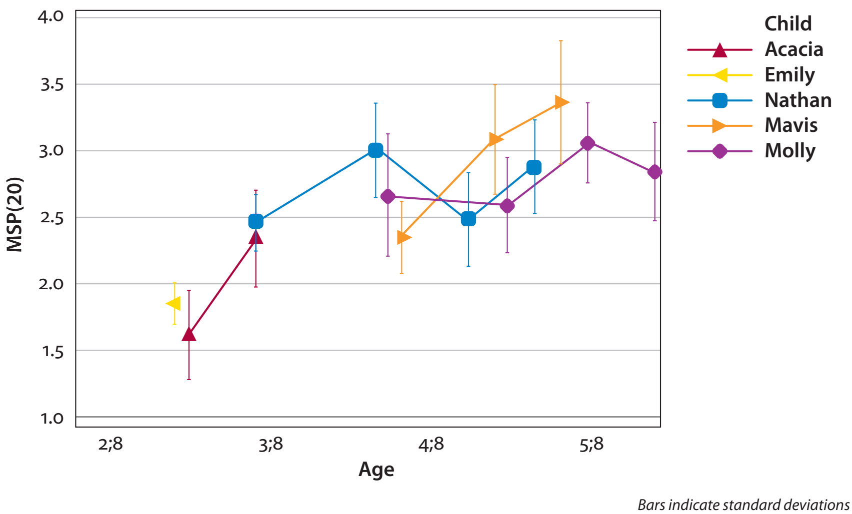

Figure 5. MSP(20) for CSPs BE(4), HANDS(8), POKE(19) and SAY/DO(34) by Child

categories. The rise in diversity is not due to children randomly producing verbs with more varied classifier stem cell categories; instead, this rise appears to follow a predictable progression. Potential pathways of development are observed with regard to the encoding of both subject and TAM categories.

(67) **Age Brackets:** I – < 2;8
II – 2;8–3;7
III – 3;8–4;7
IV – 4;8–5;7
V – > 5;7

Figure 6 shows the encoding of subject categories by classifier stems across the five age brackets. Dual and plural categories are not distinguished for person due to their low rate of use.[50] During the first age bracket before age 2;8 subjects are predominantly 1st and 2nd person singular, as was observed in chapter 5. During the second age bracket (2;8–3;7) children begin to use 3rd singular forms as in (68). The use of 1st inclusive forms, shown in (69), is then found in the third age bracket (3;8–4;7). Finally, the use of dual and plural forms, illustrated in (70) and (71) respectively, is observed in the final two age brackets (4;8–6;1), although their use is infrequent.

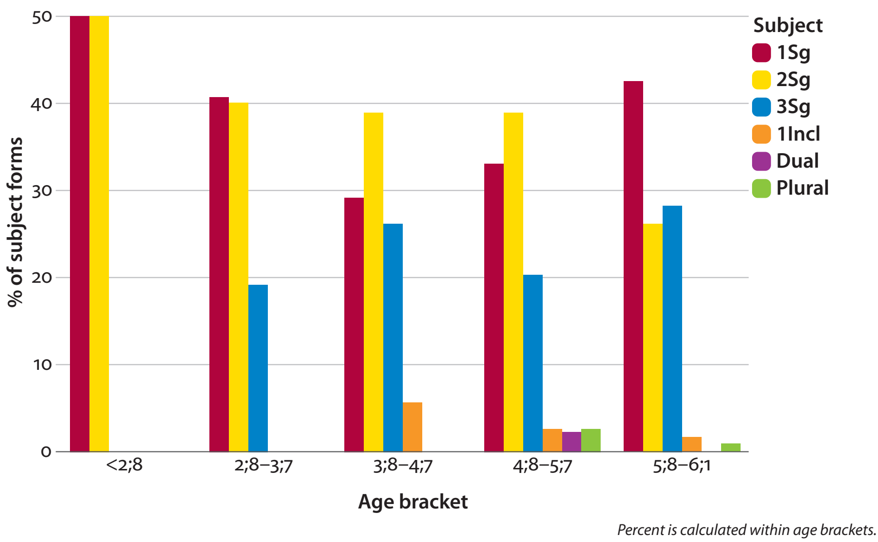

Figure 6. Distribution of classifier stem subject use for all focus children by age bracket

50. Presentational verbs are not included as they can only be 3rd singular.

(68) 3rd singular – Acacia 3;7
kayitunu *Daisy-yu*
AT: **ka-yiwik-nu** Daisy-yu
3sgS.poke(19).fut-drown-fut name-dm
'Daisy is going to drown' (LAMP_20140531_WF_01_V1 00:10:00)

(69) 1st inclusive – Mavis 4;5
kay-ya ***pa-riwak***
let's.go-dm **1inclS.poke(19).fut-follow**
'Come on let's follow him' (LAMP_20130423_WF_01_V1 00:12:40)

(70) Dual classifier – Mavis 5;4
ngarnamka-la-ngime
1duS.be(4).nfut-climb-pc.f
'We all climbed in (to the car)' (LAMP_20140413_WF_01_V1 00:43:13)

(71) Plural – Mavis 5;6
mere the ***numa-bath***
neg ear **2plS.hands(8).fut-take**
'You (pl.) don't know' (LAMP_20140531_WF_01_V1 00:43:44)

This suggests that one way in which children gradually build verbal paradigms is by learning to encode a wider variety of subject categories. Initially verb use is restricted largely to 1st and 2nd singular[51] forms before growing to include 3rd singular and then 1st inclusive forms. Dual and plural classifier stem cells only emerge at later stages of development.[52] This progression is shown in (72). These non-discrete stages represent general tendencies in children's use of classifier stem cell categories and provide a broad picture of one way in which children learn to construct large verbal paradigms. Further evidence of this pathway would be the use of earlier acquired subject categories in place of later acquired categories. However, no errors of this type are found in the corpus.

(72) Development of CSP Subject Categories
1st & 2nd singular > 3rd singular > 1st inclusive > dual & plural

It is beyond the scope of this study to determine what factors may underpin this progression. Initially, however, the structure of children's early verbs has potentially been shown to be associated with how verbs are used, see chapter 5. It is likely that

51. With the exception of 3rd singular presentational verbs which are excluded from the current discussion.

52. Note that this refers only to the form of the classifier stem. Given that subject number is also encoded by other morphs children may encode non-sibling dual subjects before this time. Furthermore, the use of a dual classifier does not imply the encoding of a dual subject as in (69).

function and discourse context will continue to play some role in determining the types of subjects encoded by classifier stems as children get older. Other factors such as frequency, markedness, as well as children's ability to acquire concepts of plurality relating to verbs with multiple subjects should also be investigated in future studies.

A discernible pathway is also observed in relation to the encoding of TAM categories by CSPs. The encoding of different TAM categories across the five age brackets is shown in Figure 7. Initially children are only observed using future and presentational classifier stem forms as was shown in chapter 5. During the second age bracket (2;8–3;7) children begin to use non-future forms. Past imperfective forms are only observed in the final three age brackets (4;8–6;1) and are used infrequently.[53] Examples of non-future and past imperfective constructions are shown in (73) and (74) respectively.

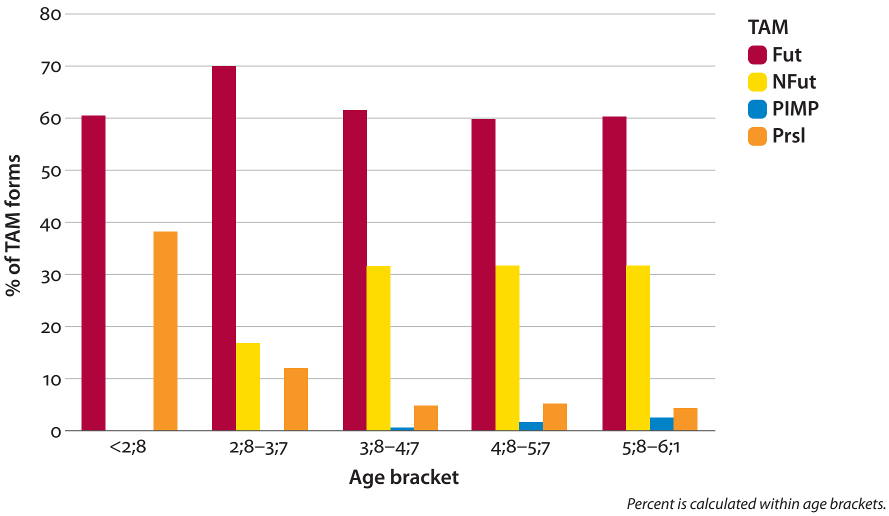

Figure 7. Distribution of classifier stem TAM use for all focus children by age bracket

(73) Non-future – Nathan 3;7
dam-nhi-riwak=kanam
3sgS.poke(19).nfut-1incl.do-follow=3sgS.be(4).nfut
'He's following us' (LAMP_20120830_WF_01_V1 00:07:01)

53. No past irrealis classifier stems were attested in the corpus. This is likely due to their formal similarity with past imperfective forms. Consequently what have been described by others (e.g. Nordlinger & Caudal, 2012) as two categories are likely coded here as a single category.

(74) Past imperfective – Nathan 4;4

mi	*yilulul*	*ngay-yu*	***ngardi-thek-dha***	*xxx*	*mi*	*yilulul-lu*
CLF:VEG	liquid.excreta	1SG-DM	**1SGS.BE(4).PIMP-excrete-PST**	XXX	CLF:VEG	liquid.excreta

'I've already been to the toilet' (LAMP_20130521_WF_01_V1 00:50:02)

The data suggests a developmental pathway with regard to the encoding of TAM by CSPs, as shown in (75). This provides an additional dimension by which children gradually 'build-up' verbal paradigms from an initial core. As with subject encoding it is likely that function plays some role in the development of TAM categories. For example, when children begin to talk about past events, past imperfective classifier stems become increasingly useful. Further support for this pathway is provided by children's errors of commission, where future forms are used in place of non-future forms as discussed momentarily in § 6.3.1.

(75) Development of CSP TAM categories
Future, Presentational > Non-Future > Past Imperfective

These observed pathways of development can be related to the values of MSP(20) discussed previously, see Figure 5. Initially the value of MSP(20) in the matched sample is small, as classifier stems encode only very few categories. The sharp rise in the value of MSP(20) by 3;7 (the end of age bracket 2) is due to the use of forms encoding non-future and 3rd singular categories, both of which are used relatively frequently for the remainder of the corpus. The more gradual increase in MSP(20) after this point is due to the use of forms that encode a number of different categories, 1st inclusive, dual and plural classifier stem cells as well as past imperfective TAM. The increase in MSP(20) associated with the use of these categories is not as great as they are only used relatively infrequently and consequently contribute less to the overall diversity of classifier stem cell use as represented by MSP(20).

These findings provide a broad picture of the development of four frequent CSPs in a sample of child speech controlled for CSP diversity. Children begin by using a small number of rote-learned inflected word forms. These word forms tend to encode similar classifier stem cell categories. This is in part due to how children use early verbs, as discussed in § 5.2. These few rote-learned verbs form miniparadigms (Pinker, 1984), based on semantic and phonological similarities, which provide the initial core of verbal paradigms. Children then gradually begin to expand these paradigms. This is achieved by adding additional dimensions to existing miniparadigms that are applied across the categories that have already been acquired. New dimensions are hypothesised by children based on the relationship of form and function between associated forms. Put more concretely, a child may initially construct a miniparadigm for a given lemma/CSP. This consists of three related forms, which encode 1st, 2nd and 3rd singular subjects all of which encode future events. The child then begins to also use an associated 1st singular non-future word form to describe events they have just completed. I hypothesise that this form shares properties with all forms of the existing miniparadigm, but most strongly with the 1st singular future form based on phonological and semantic similarities. The difference in the strength of the links between associated forms leads to an additional paradigmatic dimension being created. Based on knowledge of the existing miniparadigm this leads to the realisation of the existence of corresponding non-future forms associated with 2nd singular and 3rd singular future forms. This is represented below with the strength of lines offering an impression of the strength of relationships between word forms. It should be noted however, that it is unclear whether this pattern of development would also be found in less frequent CSPs. Furthermore, greater investigation is needed to explore whether early diversity may be either lexically or CSP specific.

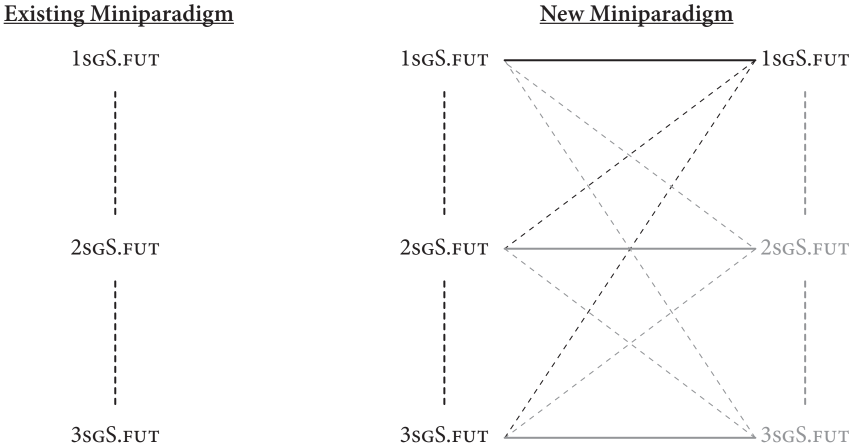

Figure 8. Impressionistic development of miniparadigms

That children begin to build classifier stem paradigms in this manner is supported by the fact that new paradigmatic dimensions are not restricted to certain categories. Let us consider the emergence of non-future CSPs in this matched sample more closely. The below figure shows the distribution of non-future forms across the most commonly used subject categories 1st, 2nd and 3rd singular. The use of the non-future TAM category across frequent subject categories appears to be relatively stable. For each age bracket the 3rd singular non-future category is the most frequently used, followed by 1st and 2nd singular categories. If the addition of new forms did not lead to a new paradigmatic dimension we might anticipate that the use of non-future might be more restricted in terms of its combination with various subject categories. It is also possible that due to the size of the age brackets used for analysis any stage of restricted use might be hidden. The development of this dimension would benefit from future investigation with a denser corpus.

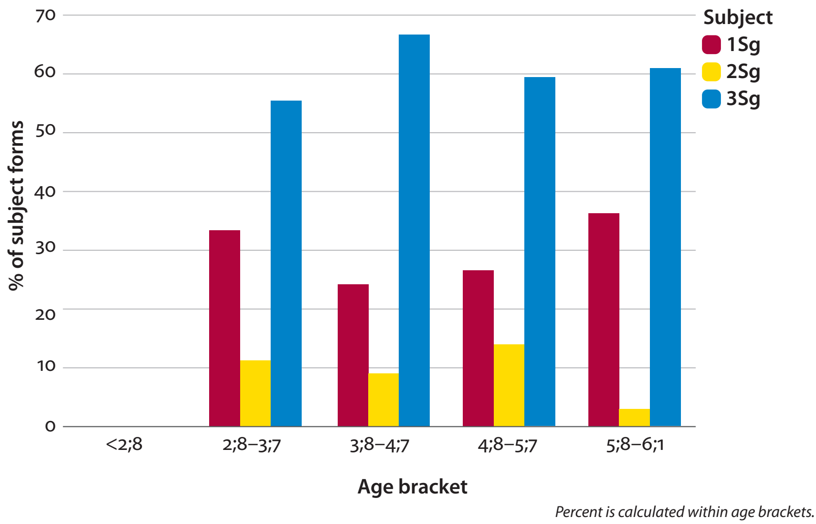

Figure 9. Distribution of non-future across frequent subject categories for all children by age bracket

It is important to remember that the growth of paradigms and addition of new dimensions as shown in (72) and (75) previously do not represent discrete stages. These are general tendencies in development attested in the CSPs in the matched sample. As will be shown momentarily, the use of new dimensions in verbal paradigms occurs in a piecemeal fashion across CSPs with a dimension being used for one verbal paradigm yet to be acquired for another.

6.3 Errors of commission and the development of diversity

Further evidence that children's verbal paradigms develop from initial cores in a somewhat predictable way is found in children's errors of commission. These errors show children's restricted knowledge of adult-like verbal paradigms as well as indicating that children use knowledge of early miniparadigms to infer the forms of new inflected word forms (§ 6.3.1). Errors also show that children are sensitive to inflectional patterns of CSPs (§ 6.3.2 & 6.3.3). The errors of commission reported here are drawn from the entire corpus and not just from examples related to the production of CSPs in the matched sample. This was necessary as errors of commission are relatively rare in the corpus, which is common crosslinguistically in spontaneous speech data (e.g. Deen, 2009; Savičiūtė et al., 2018).

6.3.1 Future precedes non-future

There are a number of errors across the corpus that support the finding that future forms tend to be acquired before non-future forms for at least some verbs. Firstly, children are found to use future verb forms in contexts where non-future verbs are required. This suggests that at this point in time the child may not yet have acquired the non-future forms of a verbal paradigm or alternatively, that their knowledge of the future is more entrenched and thus more accessible. As a result, the child uses a verb form which they already know, which is associated with the event being encoded. The following two examples show the use of future verb forms in contexts where the use of a non-future verb is required. Each of the relevant verbs appears in bold. In (76) Emily aged 3;1 closes the lid of a drinks cooler, which Acacia has been attempting to close. After closing the cooler successfully, Emily says 'I *will close* it' rather than 'I *closed* it', using the future classifier stem form instead of the non-future form.

(76) Emily 3;1
ngay-wa ***ngadhap***
1sgS.poke(19).fut-close
nganthap
AT: ngay=wa **ngam-dhap**
1sg=foc **1sgS.poke(19).nfut-close**
'I will close it' (LAMP_20130502_WF_01_V1 00:29:37)

A similar type of error is produced by Nathan at 3;6 in (77). In this instance Eleanor is trying to get Molly to put on her microphone backpack. She directs Molly to put it on in line 1 using the imperative verb construction *duyrdi*. Nathan then states that 'he will put it on' despite the fact that he is already wearing his backpack. Eleanor interprets Nathan's statement as intending to point out that he is already wearing his backpack and is behaving well. The intended verb production meaning 'I am wearing it' requires a non-future classifier stem.

(77) Nathan 3;6

1 *Eleanor:* *kirra* *kirra* *duyrdi*
wunkerrere wunkerrere duy-rdi
quickly quickly 2sgS.LOWER:INTR(18).FUT-put.on
duyrdi
duy-rdi
2sgS.LOWER:INTR(18).FUT-put.on
'quickly quickly put it (microphone backpack) on put it on'
[Eleanor is telling Molly to put on her microphone backpack properly]

2 *Nathan:* *ngay-matha nga-wa* ***buyrdinu***
1sgS.LOWER:INTR(18).FUT-put.on-FUT

AT: **banurdi-ngem**
ban-rdi=ngem
1sg-INTS INTJ-EMPH **1sgS.LOWER:INTR(18).NFUT-put.on-1sgS.SIT(1).NFUT**
'Hey, I am wearing it'

(LAMP_20120716_WF_01_V1 00:18:35)

These errors are produced by children at ages, 3;1 and 3;6, when other non-future verb forms are commonly used in the corpus. In the matched sample non-future forms began to be used during the second age bracket between 2;8 and 3;7. Their use increased in age bracket three between 3;8 and 4;7. Their rate of use remained stable during age brackets four and five. This is consistent with findings cross-linguistically that morphological development progresses in a piecemeal fashion rather than a certain feature being acquired and then widely applied broadly across all word forms of the relevant type. This is a point often highlighted by usage-based approaches (e.g. Krajewski et al., 2012). Importantly, these errors suggest that future verb forms precede non-future verb forms as errors are only attested in this direction. I have found no evidence, for example, of non-future verb forms being used in contexts which require future verb forms.

Further evidence that paradigms develop according to the model described here is found in children's errors of commission based on intra-paradigmatic knowledge of already acquired word forms. The examples presented here suggest that children construct non-future verb forms in particular, based in part on their knowledge of future verb forms. This is consistent with findings that future verb forms tend to precede non-future forms in the matched sample. In the following Example (78), Molly aged 4;5 produces the verb *pim-ngime* instead of the target *thim-ngime,* producing a non-standard initial consonant.

(78) Molly 4;5
ya mange pirdithme ya
INTJ ??? long.time INTJ
AT: ****pim-ngime*** ****pim-ngime***
thim-ngime **thim-ngi**me
1INCLS.SIT(1).NFUT-PC.NSIB **1INCLS.SIT(1).NFUT-PC.NSIB**
'we've been here for too long'
(LAMP_20120830_WF_01_V1 00:30:50)

The source of this error is likely the related future form of the classifier stem SIT(1) *pi*-. This can be understood by considering the structure of this paradigm more generally, a partial CSP is shown below in Table 21.

Table 21. Partial CSP SIT(1)

	FUT	NFUT	
1SG	*ngi*	*ngem*	
2SG	*thi*	*thim*	
3SG	*pi*	*dim*	
1INCL	*pi*	*thim*	*(*pim)*

In CSP SIT(1) non-future forms have a final *-m* and in many cases this is all that differentiates non-future and future forms. The source of the error in (78) appears to come from Molly's knowledge of the 1st inclusive future form *pi*- as well as the knowledge of the intersecting formative pattern which adds a suffix *m* in non-future forms. It is likely that the initial consonant is preserved from the future form in this instance as this is the pattern found in frequent 1st and 2nd person forms.

Further support for this analysis would be the use of the future form of SIT(1) in a similar context at a similar or earlier age. No such productions are attested in Molly's speech. Molly does, however, use standard 1st inclusive future forms of other CSPs at the same age that have the same prefix consonant formative pattern as shown in (79) below.

(79) Molly 4;5
kay-ya ***paningkala-xxx-nu***
kay=ya **pani-ngkala-xxx-nu**
let's.go=DM **1INCLS.BE(4).FUT-climb.onto-XXX-FUT**
'come on, let's climb up' (LAMP_20120830_WF_01_V1 00:13:11)

Errors of this type that can be explained via intra-paradigmatic associations are rare in the corpus. They show, however, that children are sensitive to semi-regular intra-paradigmatic patterns of inflection in acquiring CSPs. Other errors of commission may result from the overgeneralisation of inter-paradigmatic inflectional patterns, such as those associated with intersecting formatives. I explore these errors now.

6.3.2 Closely related CSPs

There is a great amount of syncretism found across CSPs in Murrinhpatha (Nordlinger, 2015). This syncretism is at its most extreme in pairs of phonologically related CSPs, which are only distinguished in the non-future, see § 2.2.4. The partial paradigms below show two pairs of closely related CSPs HANDS(8) and GRAB(9) as well as SEE(13) and BASH(14).[54] The development of closely related CSPs provides a great opportunity to consider the impact of inter-paradigmatic inflectional patterns because these paradigms only differ in terms of the inflectional pattern of the suffix formative linked to tense.

Table 22. Partial CSPs HANDS(8) and GRAB(9)

HANDS(8)

	FUT	NFUT	PIMP
1SG	ma	mam	me
2SG	na	nam	ne
3SG	ma	mam	me
1INCL	puma	thumam	thume

GRAB(9)

	FUT	NFUT	PIMP
1SG	ma	mangan	me
2SG	na	nangan	ne
3SG	ma	mangan	me
1INCL	puma	thumangan	thume

Table 23. Partial CSPs LOOK(13) & BASH(14)

SEE(13)

	FUT	NFUT	PIMP
1SG	ba	bam	be
2SG	da	dam	de
3SG	ba	bam	be
1INCL	puba	thubam	thube

BASH(14)

	FUT	NFUT	PIMP
1SG	ba	bangam	be
2SG	da	dangam	de
3SG	ba	bangam	be
1INCL	puba	thubangam	thube

54. These are partial paradigms which do not include dual and plural dimensions and are restricted to three TAM categories, future, non-future and past imperfective. Full CSPs are given in an appendix. Mansfield (2019a, p. 114) treats (8) and (9) as well as (13) and (14) as single classifier stems which follow two inflectional patterns each.

It has been shown that children initially use predominantly future verbs in Murrinhpatha. This means that, based on children's production at this stage there is no formal distinction between CSPs hands(8) and grab(9) as shown by the pair of examples in (80) and (81).

(80) hands(8)
na-watha
2sgS.hands(8).fut-make
'you make it' (constructed)

(81) grab(9)
na-kut
2sgS.grab(9).fut-collect
'you collect it' (constructed)

Equally there is no formal distinction between CSPs look(13) and bash(14), as shown by the pair of examples in (82) and (83). This means that there are likely strong links between word forms containing related CSPs at the early stages of development.

(82) see(13)
ba-ngkardu-nu
1sgS.see(13).fut-look-fut
'I will look' (constructed)

(83) bash(14)
ba-rdurt-nu
1sgS.bash(14).fut-find-fut
'I will find it' (constructed)

The influence of the strong relationships between closely related paradigms is observed in children's acquisition of non-future forms. Children are found to use the non-future forms of hands(8) in target verb constructions formed with grab(9) as in (84) and (85).

(84) Mavis 4;11
yawu mup ku karrath
intj stop clf:anim devil
mam-nhi-tha=kanam *mam*
3sgS.hands(8).nfut-
AT: **mangan-nhi-tha=kanam**
3sgS.grab(9).nfut-2sg.do-chase=3sgS.be(4).nfut 3sgS.say/do(34).nfut
'she said, "wait the devil is chasing you"'
(LAMP_20131025_WF_01_V1 00:16:49)

(85) Molly 5;0,

	ngawu	*nayp*	*ngay*	***mangimart***	*Lauren*
				mam-ngi-ma-art	
				3sgS.hands(8).nfut-	
AT:				**mangangimart**	
				mangan-ngi-ma-art	
	intj	knife	1sg	**3sgS.grab(9).nfut-1sg.do-appl-take**	name

'hey he took my knife from me Lauren'

(LAMP_20130527_WF_01_V1 00:37:01)

Similarly the non-future forms of see(13) may be used in place of bash(14), as in (86) and (87).

(86) Mavis 4;11

	maka	*mi*	*wan*	***bam-nga-rdurt***
				3sgS.see(13).nfut-
AT:				**bangam-nga-rdurt**
	Fa:Mo	clf:veg	one	**3sgS.bash(14).nfut-1sg.io-find**

'grandma he found one (yam) for me'

(LAMP_20131105_WF_01_V1 01:27:45)

(87) Mavis 4;11

	mi	*ngala*	***bam-nga-rdurt***	*ngay-yu*
			3sgS.see(13).nfut-	
AT:			**bangam-nga-rdurt**	
	clf:veg	big	**3sgS.bash(14).nfut-1sg.io-find**	1sg-dm

'he found a big yam for me' (LAMP_20131105_WF_01_V1 01:29:38)

These errors of commission are only observed in these directions. It might be anticipated, based on findings from usage based accounts of the acquisition of inflectional morphology (e.g. Behrens, 2009; Bybee, 1985, 1995), that type frequency of CSPs, in terms of the number of lexical stems they combine with, would play a role in which pattern is overgeneralised. This, however, does not seem to be the case with regard to individual paradigms. Although hands(8) has a much higher type frequency compared with grab(9) in children's speech (31 observed combinations to 5), this is not the case for CSPs see(13) and bash(14), where bash(14) is used with 10 lexical stems compared with 3. It is also possible that the token frequency of the relevant CSPs would explain this error. CSP hands(8) is indeed used much more frequently by children than grab(9); however, see(13) and bash(14) are used at relatively similar rates, suggesting this is also not the common source of the error.

Type frequency does, however, explain the nature of the above errors if we consider the intersecting formative suffix class. Both hands(8) and see(13) belong to the class m.nfut, whereas grab(9) belongs to ngan.nfut and bash(14) belongs to NGAM.NFUT (see § 2.2.4). These classes have greatly different type frequencies in terms of the number of CSP members in each class. Based on the CSPs given in Blythe et al. (2007), the M.NFUT class is found with some variation, in 20 of the 38 CSPs. By contrast, the NGAN.NFUT and NGAM.NFUT classes have just 3 and 6 clear members respectively.[55] Consequently, in both pairs of related CSPs it is the intersecting formative suffix class with a much higher type frequency that is overgeneralised.

Interestingly, overgeneralisations of the M.NFUT inflectional pattern are not readily observed in paradigms that do not have a closely related CSP with this inflectional pattern. This suggests that it is the combined factors of the type frequency of the intersecting formative class as well as the close formal relationship of CSPs that brings about these errors of commission. An important part of this explanation is that children appear to learn future forms of verbs first and that these related CSPs are not distinguished formally for this TAM category. These findings suggest that children are encoding differences in meaning through alternations in whole word forms rather than attaching meaning to individual inflectional elements, such as a classifier stem final *-m* encoding non-future. The fact that this error of commission is observed in closely related CSPs is neatly explained by Bybee's Network Model (1995), which argues that a pattern of inflection is more likely to be overgeneralised if the target word forms are phonologically similar.

6.3.3 Singular subject person supra-inflection classes

There are also errors of commission observed related to patterns of inflection relating to the encoding of singular subject person. These errors provide evidence that children have knowledge of these inflectional patterns and they may utilise them to further build verbal paradigms based on analogy with other CSPs. In § 2.2.4 I outlined three supra-inflection classes relating to the encoding of singular subjects in CSPs, NG.SBJ, M.SBJ and B.SBJ. This was based largely on observations by Green (2003) and later by Mansfield (2019a), that the initial element of classifier stems often encodes subject person. For example, in the NG.SBJ class 1st singular is associated with an initial *ng-* whereas in the M.SBJ class 1st and 3rd singular are associated with an initial *m-*. Examples of partial CSPs belonging to each of the three classes are given below.[56] As with non-future classes these supra-inflection

55. It is possible that these each have one or two additional members as some CSPs potentially fall into multiple classes based on the currently available data.

56. Note that although each of these CSPs belong to different supra-inflection classes relating to singular subject encoding they all belong to the same supra-inflection class with regard to the relationship of future and non-future forms M.NFUT.

classes differ greatly in terms of their type frequency. Based on the CSPs of Blythe et al. (2007), 26 CSPs belong to the NG.SBJ class, 5 belong to M.SBJ and 6 belong to B.SBJ. CSP SAY/DO(34) is a mixture of classes NG.SBJ and M.SBJ.

Table 2. Partial CSPs representing singular subject person supra-inflection classes

NG.SBJ – POKE(19)

	FUT	NFUT	PIMP
1SG	nga	ngam	ngani
2SG	tha	tham	thani
3SG	ka	dam	dani

M.SBJ – HANDS(8)

	FUT	NFUT	PIMP
1SG	ma	mam	me
2SG	na	nam	ne
3SG	ma	mam	me

B.SBJ – LOOK(13)

	FUT	NFUT	PIMP
1SG	ba	bam	be
2SG	da	dam	de
3SG	ba	bam	be

As with the non-future it is the supra-inflection class with the highest type frequency, NG.SBJ, which tends to be overgeneralised. Errors of this type are relatively infrequent in the focus children's speech but are attested in 1st and 2nd singular classifier stem contexts.[57] Example (88) shows the overgeneralisation of 1st person NG.SBJ marking to a verb which belongs to the B.SBJ class by Mavis at age 4;11.

Overgeneralisation of NG.SBJ -1st singular

(88) Mavis 4;11

	ya	*mange*	*ngay* ***ngu-pak-nu***
AT:			**bu-pak-nu**
	INTJ	by.myself	**1SGS.LOWER(17).FUT-put.down-FUT**

'hey I will put it down myself'

[Mavis is putting the yam in the fire. Her grandmother tries to do it for her.]
(LAMP_20131105_WF_01_V1 01:27:45)

Example (89) also shows the overgeneralisation of NG.SBJ marking by Acacia at age 3;2. In this instance, however, the target verb belongs to the M.SBJ inflection class and it is the 2nd person pattern which is overgeneralised. Interestingly, the forms produced by Mavis and Acacia in these examples are actually well-formed verbs but with meanings different to those intended. The verb produced by Mavis

57. There is some evidence that this may also occur in 3rd singular contexts also see Forshaw (2016, pp. 242–243)

means 'to paint up' whereas the verb used by Acacia means 'to insult'. I explore this observation in detail in § 7.3.

Overgeneralisation of NG.SBJ – 2nd singular

(89) Acacia 3;2
tharnuthuk-thanam *xxx*
AT: **narntithuk-thanam**
nam-rithuk=thanam
2SGS.HANDS(8).NFUT-be.a.nuisance=2SGS.BE(4).NFUT
'you're being a nuisance' (LAMP_20131202_WF_01_V1 00:45:54)

The salience of patterns associated with supra-inflection classes, in particular the NG.SBJ class, is also observed in children's acquisition of 'impersonal' (M. J. Walsh, 1987) or 'experiencer object' verbs (Evans, 2004). These are verbs in which the experiencer is encoded as a grammatical object and the grammatical subject, which in Murrinhpatha is fixed as 3rd singular, denotes the stimulus for the experienced state. An example of this construction type is given in (90) for the verb 'be thirsty'. The 1st person experiencer is encoded as a direct object.

(90) *dem-ngi-ralal=ngurran*
3SGS.POKE:RR(21).NFUT-1SG.DO-be.thirsty=1SGS.GO(6).NFUT
'I'm thirsty' (Nordlinger, 2010: 25)

If we consider the production of this verb by Mavis at age 4;6, it appears that she attempts to encode the experiencer as a grammatical subject in the classifier stem. Instead of producing a grammatical 3rd singular subject classifier stem form, Mavis utilises the 1st singular subject form from the same CSP POKE:RR(21). This shows that Mavis at this stage associates an initial *ng-* with 1st singular subjects and that this association is salient when learning to construct verb forms. Furthermore, it also shows that Mavis is yet to master the use of impersonal verb constructions and seeks to encode herself as an experiencer as a grammatical subject.

(91) Mavis 4;6
1 *martnu* *(kura)* *patha-wa*
ma-art-nu kura patha=wa
1SGS.GRAB(9).FUT-get-FUT CLF:WATER good=EMPH
'I will get some water'

2 ***ngerntalal*** *ngay-yu*
ngem-ralal
1SGS.POKE:RR(21).NFUT-
AT: **dem-ngi-ralal**
3SGS.POKE:RR(21).NFUT-1SG.DO-be.thirsty 1SG-DM
'I'm thirsty' (LAMP_20130524_WF_01_V1 00:14:55)

6.4 Discussion

When acquiring the inflectional patterns of Murrinhpatha CSPs children initially ‘start small’, using only a small number of CSP cells associated with certain functions. Children then gradually expand these paradigms to encode new feature dimensions potentially driven by the new diverse ways children use verbs, such as to refer to past events. Children are sensitive to semi-regular, intra-, and inter-paradigmatic inflectional patterns, as evidenced by their errors. However, overgeneralisations are largely limited to contexts where there are also other formal similarities between the target word forms and the source of the error as shown most clearly by the development of closely related CSPs (§ 6.3.2).

The findings in this chapter are relatively consistent with several accounts of the acquisition of morphology, including Protomorphology (Dressler & Karpf, 1995), Pinker’s (1984) nativist model, and Bybee’s (1995) Network Model, in terms of the initial stages of morphological development. These approaches argue that children’s early inflected word forms are rote learned and do not indicate knowledge of underlying morphological structure. Children then gradually uncover morphological patterns across these rote-learned forms. The crosslinguistic typological approach of Protomorphology (Bittner et al., 2003a), see § 3.4.3, has found that children tend to become aware of morphological structure earlier in languages with rich morphological systems (Laaha & Gillis, 2007). Earlier morphological awareness is also promoted in languages with regular morphological systems such as in Turkish (Aksu-Koç & Ketrez, 2003). This awareness, referred to as the protomorphological stage, is typically indicated by the production of errors of commission and the emergence of true miniparadigms, the use of three inflected forms for a given lemma (see § 3.4.3 for a more detailed definition of ’true miniparadigms’ and the protomorphological stage).

Given the rich morphology of Murrinhpatha CSPs we might anticipate that children become aware of their morphological structure quite early. However, this does not seem to be the case. This is likely due in part to the fusional nature of CSPs and the degree of irregularity within and across paradigms. Although an analysis of a denser corpus is required to determine the onset of the protomorphological stage, it appears that this may only emerge between 2;6–3;0 years of age. This is based on the fact that the errors of commission analysed in this chapter occurred mostly after age three with many after age four. Furthermore, the value of MSP(30) is less than 1.2 at 2;7 and rises to between 1.4 and 1.6 by 3;8, see Figure 4. In the matched sample the value of MSP(20) was less than 2 at ages 3;1 to 3;2, see Figure 5. These measures suggest the late emergence of true miniparadigms (Bittner et al., 2003b) and the onset of the protomorphological stage with regard to CSPs. By contrast, the beginning of the protomorphological stage is observed earlier in languages such as Turkish (1;6) (Aksu-Koç & Ketrez, 2003), German (1;11) (Bittner, 2003) and Yucatec (2;1) (Pfeiler, 2003). Furthermore, the use of verbs in Murrinhpatha has already been noted to be relatively infrequent in early development, see chapter 5, therefore it is understandable that little CSP cell diversity is observed in the early stages of development. By contrast in Yucatec, an agglutinative language, after age 2;0 verb tokens represent around 50% of utterances (Pfeiler, 2003, p. 383). Despite the inflectional richness of Murrinhpatha CSPs the lack of early verb use partnered with the complexity of the system may result in the later recognition of the morphological patterns of CSPs by children. I return to this point in § 8.3.

As with other complex inflectional systems, Murrinhpatha CSPs raise problems for rule-based approaches, as simply generating the rules to account for such a system is problematic (e.g. Dąbrowska, 2001; Krajewski et al., 2012; Mirković et al., 2011). There was, however, evidence of children overgeneralising inflectional patterns, which suggests that children associate certain classifier stem segments with certain meanings. For example, an initial *ng-* is associated with 1st singular subjects. These associations, however, did not appear to result in the acquisition of abstract rules central to rule-based accounts (e.g. Pinker, 2006; Pinker & Prince, 1991). Instead, overgeneralisations often relied on further similarity of whole word forms, suggesting that it is the alternations and contrasts between whole word forms that are salient for children as opposed to storing individual segments with associated meanings to then be combined 'on-line'.

These findings better support a usage-based network account of morphological acquisition (e.g. Bybee, 1995). The approach focuses on the associations between networks of word forms. The strength of the links between word forms is based on semantic and phonological similarities, similar to Pinker's (1984, Chapter 5) organisation of miniparadigms. Children are sensitive to patterns across these networks that then lead to the creation of schemas. The strength of schemas is associated with the type frequency of inflectional patterns meaning that patterns with high type frequency are more likely to be overgeneralised. This was shown to be the case for various patterns in § 6.3.2 and § 6.3.3. Importantly, a usage-based account also explains why errors of commission are found more regularly in contexts where the non-standard form shares similarities with other standard forms and patterns in its associated networks. Links between whole word forms do not disassociate inflectional morphology, meaning that the whole word form impacts the patterns to which children are sensitive when producing certain structures. If a network of word forms for a verb shares strong links with another network, these networks are more likely to influence each other in some way. I return to this discussion in § 8.3.

CHAPTER 7

Acquisition of bipartite stem verbs

There has been no detailed study of how children acquire bipartite stem verbs like those found in Murrinhpatha. There have, however, been many studies which have investigated the acquisition of constructions with structural similarities, such as compound constructions (e.g. Argus & Kazakovskaya, 2013; Berman, 2011; Clark et al., 1985, 1986; Dressler et al., 2010, 2017, 2019a; Nicoladis, 2002, 2007), Persian light verb phrases (Family, 2009), Georgian preverbs (Imedadze & Tuite, 1992), and German complex verbs (e.g. Behrens, 1998). These constructions are similar to Murrinhpatha bipartite stem verbs in that they are constructed of two elements that both contribute to the core semantics of a complete word or phrase. These studies have focused on children's acquisition of the underlying compositional principles of these systems. The strongest evidence of acquisition have been children's productions of novel combinations either on grounds of frequency or semantics (Clark, 1981; Family, 2009; Imedadze & Tuite, 1992).

The acquisition of bipartite structures has been found to relate to a number of factors, including frequency of use, the productivity or richness of constructions as well as their morpho-semantic transparency (e.g. Dressler et al., 2019). In terms of frequency, as observed in many areas of acquisition (Ambridge et al., 2015), the more frequent a construction type the earlier it will be acquired. For example, it has been shown that compound constructions tend to be acquired earlier in languages where they occur frequently in CDS compared with languages where they are less frequent (Clark & Berman, 1987). With regard to productivity, children will acquire the underlying compositional principles of more productive construction types earlier (e.g. Dressler et al., 2019). More productive patterns are characterised by a construction type's regular use in neologisms, particularly with recent loan-words (Dressler, 2007b). Finally, with regard to transparency children are found to acquire the underlying principles of more morpho-semantically transparent constructions earlier (e.g. Berman, 2011; Dressler et al., 2019; Family, 2009). Morpho-semantically transparent constructions are also likely to encourage overgeneralisation errors (Family, 2009).

In this chapter I explore children's bipartite stem verb use in Murrinhpatha and examine children's acquisition of the underlying compositional principles that have been described for this verbal system, see § 2.2.3. I focus on children's usage of contrastive stem combinations to encode changes in verbal meaning; in particular, the contrastive use of various CSPs with individual lexical stems. I find that despite the importance and frequency of bipartite stem verbs in Murrinhpatha grammatical structure, there is little use of contrastive CSPs in the corpus. Interestingly, children do not seem to overgeneralise CSPs based on semantic or frequency grounds, as might be predicted by previous research on similar construction types in other languages (Behrens, 1998; Family, 2009; Imedadze & Tuite, 1992). This may be due to the limited productivity of bipartite stem verbs (Dressler et al., 2019; Mansfield, 2016a). Children do, however, use related licit bipartite stem combinations in inappropriate contexts, in particular when CSPs are closely related such as reflexive/reciprocal alternations. These errors provide evidence of strong associative links between verbs with shared lexical stems and systematically related CSPs. I argue that bipartite stem verb combinations appear to be learned through the learning of associative networks between whole word forms as predicted by a usage-based model (e.g. Bybee, 1995), and do not support a rule-based approach to acquisition where children learn to store and segment individual stem elements with associated meaning while also learning how to combine these elements productively to produce verbal meanings (e.g. Pinker, 1984). The lack of productivity partnered with the number of morpho-semantically opaque constructions results in children acquiring the underlying compositional principles quite late. In fact, there is no evidence in the corpus to suggest that the focus children have acquired the underlying compositional principles at all. This raises the question as to what extent bipartite stem verbs are understood compositionally by adult speakers if at all.

7.1 Analysing contrastive CSP use

The majority of verbs in Murrinhpatha have a bipartite stem structure constructed of a classifier stem and a lexical stem. Together these encode the verbal semantics and argument structure of bipartite stem verbs and co-vary to encode different verbs (e.g. Nordlinger & Caudal, 2012). These combinations vary greatly in terms of their semantic transparency, ranging from idiosyncratic to transparent. They are also relatively unproductive illustrated by the fact that loan verbs are not adopted into this construction but rather are adopted as phrasal verbs (Mansfield, 2016a).

In analysing contrastive bipartite stem use I focus predominantly on the contrastive use of CSPs. CSPs are typically used in a wider variety of combinations than lexical stems and therefore are more likely to be used contrastively in the corpus. The fact they are used in more combinations partnered with their typically more general semantics also means they are more likely to be overgeneralised and result in errors of commission. In analysing how children use CSPs contrastively to encode alternations in verb semantics and argument structure it is important to consider the use of CSPs in a variety of verb contexts. In order to examine the contrastive uses of CSPs, I focus initially on the use of CSPs with particular lexical stems in focus children's speech. In these combination sets, groups of bipartite stem verbs with a shared lexical stem, it is the CSP which is essential to differentiating the meaning of verbs, if the meaning of the lexical stem is shared across the bipartite stem verbs. These groups of examples provide some evidence that children are utilising the CSP contrastively to encode a different verb, but it does not entail morphological decomposition.

In considering the child data, I adopt a broad definition of what constitutes contrastive CSP use as given below.

> A classifier stem paradigm (CSP) is considered to be used contrastively with a given lexical stem at the point in the corpus (reported as a child's age) that a child has produced at least two classifier stem forms from more than one CSP in combination with the same lexical stem.

This measure provides an indication of the constructions a child may utilise to uncover the underlying compositional principles of the system. The nature of these contrasts can then be examined in greater detail.

7.2 Contrastive CSPs

Across the corpus, 19 of the 159 lexical stems attested were used by individual focus children with more than one CSP. Of these 19 lexical stems, just four, *-bat, -bath, -ku* and *-wurl*, were used with more than one CSP by more than one focus child. The tables below show the CSPs used by each of the children in combination with these four lexical stems. They also show the age when this combination was first attested as well as the age at which contrastive CSP use was identified for this combination set according to the above definition. These show that identification of contrastive use is identified across a wide age range (2;7–5;8), and that children are able to use CSPs to differentiate verb meaning in combination with a variety of bipartite stem verbs.

Table 25. CSP combinations with *-bat*

CSP	Free translation	Acacia	Emily	Nathan	Mavis	Molly
FEET(7)	'throw at'	–	–	3;7	–	–
LOWER:RR(18)	'fall'	2;7	–	3;7	–	4;5
SLASH(23)	'hit'	2;7	–	–	4;9	–
CSP Contrast		2;7	–	3;7	–	–

Table 26. CSP combinations with *-bath*

CSP	Free translation	Acacia	Emily	Nathan	Mavis	Molly
HANDS(8)	'take'	–	4;3	4;4	–	4;3
the + HANDS(8)	'know' (lit. take ear)	–	–	4;10	4;11	–
WATCH(28)	'watch'	–	–	3;7*	4;11	4;5
CSP Contrast		–	–	4;4	4;11	4;5

* Truncated classifier stem

Table 27. CSP combinations with *-ku*

CSP	Free translation	Acacia	Emily	Nathan	Mavis	Molly
SIT(1)	'go quickly'	3;6	–	4;4	3;9	4;3
STAND(3)	'go quickly'	–	–	–	5;4	5;8
BE(4)	'fish with a line'	–	–	4;4	–	6;1
FEET(7)	'throw'	2;7	–	4;4	5;4	4;3
CSP Contrast		3;6	–	4;4	5;4	4;3

Table 28. CSP combinations with *-wurl*

CSP	Free translation	Acacia	Emily	Nathan	Mavis	Molly
HEAP(25)	'get water'	–	–	4;10	4;11	4;3
TURN:RR(30)	'return'	–	–	4;10	5;6	5;8
CSP Contrast		–	–	4;10	5;6	5;8

A broader view of bipartite stem verb use shows that, although the numbers are small, contrastive CSP use increases with age. The figure below illustrates the stage at which individual contrastive CSP uses were first identified for children. These have been categorised according to the age brackets used in chapter 6. The majority of contrastive CSP uses are identified in the corpus after age 3;7. Only 4 contrastive combination sets are identified before this age, with the earliest contrastive CSP use with an individual lexical stem identified at age 2;7 in Acacia's speech, see Table 25. The low number of new contrastive uses after 5;7 months is likely due to the small amount of data in this age bracket in the corpus.

Given that the majority of verbs in Murrinhpatha are bipartite stem verbs and that children must learn to co-vary stem elements in acquiring the system, it is somewhat surprising that so few examples of contrastive CSP use are identified in the corpus and that these tend to emerge at later stages of development. Bipartite stem verbs are a prevalent part of the Murrinhpatha verbal repertoire and consequently we might anticipate the principles of this system to be acquired early.

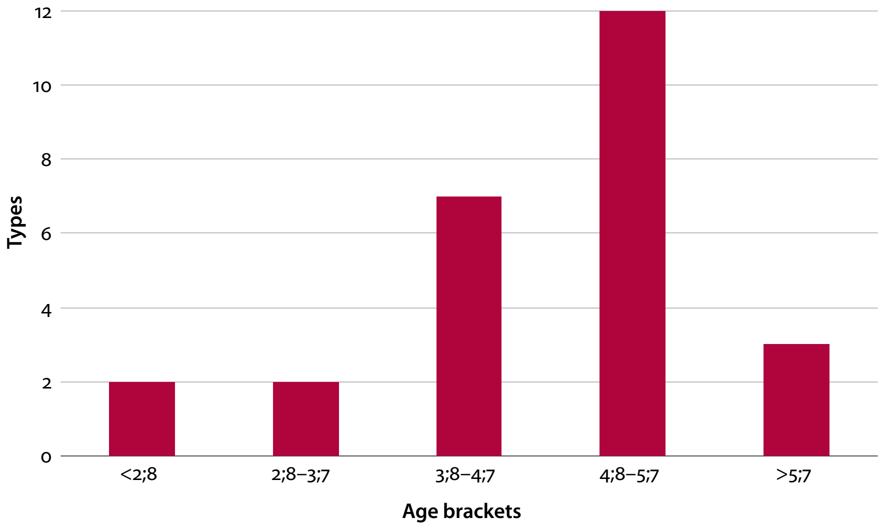

Figure 10. First contrastive CSP use across five age brackets

There are a number of factors that may contribute to the low levels of contrastive CSP use identified in the corpus. Firstly, this may in part be due to the complexity of the system. Since parts of the bipartite system are not particularly transparent or regular, it may take a long time to acquire contrastive combinations and to acquire the underlying semantic compositional principles underlying the more regular parts of the system. That is, the overall characteristics of the system may disguise the bipartite stem structure of many verbs. Secondly, bipartite stems appear to no longer be particularly productive constructions, which has been found to delay acquisition in similar constructions in other languages (e.g. Dressler et al., 2019). Finally, it should also be noted that we would expect to find greater contrastive CSP use earlier in a denser corpus of child speech. I now discuss several contrastive CSP uses identified in the corpus, ranging from semantically opaque to semantically transparent bipartite stem verbs.

7.2.1 Semantically opaque contrastive CSPs

For a number of the contrastive CSP combination sets it appears unlikely that the different combinations actually contain the same lexical stem. Instead, in these cases the lexical stems are likely distinct but homophonous and do not provide evidence of children using CSPs to encode different verbal meanings. Consider the following two examples produced by Molly, which contain verbs with the lexical stem -*wurl*.

Relevant verbs in examples appear in bold throughout this chapter. In (92) *-wurl* is used in combination with the CSP FORM(25) to mean 'get water', whereas in (93) it is used in combination with TURN:RR(30) to mean 'return'.

(92) Molly 4;3
mama-wu ***thi-nga-wurl*** *kura* *therrikan*
Mo-DM **2SGS.FORM(25).FUT-1SG.IO-get.water** CLF:WATER jerry.can
kanhi-re *nga*
this-INST TAG
'mum get water for me from the jerry can with this'
(LAMP_20120717_WF_01_V1 00:48:41)

(93) Molly 5;8
pana-dhangu ***thurdi-wurl***
there-SOURCE **2SGS.TURN:INTR(30).FUT-return**
'go back there where you came from'
(LAMP_20131201_WF_01_V1 00:15:24)

It is difficult to determine what the shared meaning of these lexical stems might be. Consequently, this set of examples does not appear to be evidence that Molly is using CSPs to encode alternations in verbal semantics or argument structure. Instead the verbs in (92) & (93) are likely learned as fixed stem combinations and illustrate the lack of morpho-semantic transparency in parts of the system.

7.2.2 Semantically transparent contrastive CSPs

Many of the contrastive CSP uses identified in the corpus occur in more semantically transparent combinations and it is the CSP that is used in an adult-like manner to encode a different verb. In this sense, CSPs are not just encoding subject person/number and TAM, but are also integral in differentiating the verb from other semantically related verbs with the same lexical stem. I discuss these examples as CSP 'alternations'.

7.2.2.1 *'On' alternation*

The following example shows Molly at age 5;1 using two different CSPs contrastively with a single lexical stem in a single interaction. Consider the verb productions by Molly in lines 2, 5 and 6 in the example below. These verbs, differentiated by the CSP, mean 'turn on' and 'be on' and contain the same lexical stem *-wum*. In line 2 she tells me that the tap at the barge landing is 'working'. To indicate this she uses a verb *pirrimmum* formed with the lexical stem *-wum* and the CSP STAND(3). This verb is later contrasted by the verb *mammum* in line 6 formed with the CSP HANDS(8) meaning 'turn it (the water) on'.

(94) Nathan 4;4, Molly 5;1 & Felicity 6;6

1	*Nathan:*	*kanhi-thu*	*kanthin=kem*		*kanhi-thu*		
		here-HITH	3SGS.HAVE(22).NFUT=3SGS.SIT(1).NFUT		here-HITH		
		'come here he's got it, come here'					
2	*Molly:*	*yawu*	*kura*	***pirrimmum***	*kanhi*	*Bill*	
		yawu	kura	**pirrim-wum**	kanhi	Bill	
		hey	CLF:WATER	**3SGS.STAND(3).NFUT-be.on**	there	name	
		'hey Bill the water there is working'					
3	*Nathan:*	*wurda*	*Bill*	*kura*	*wiye-nga=ya*		
		no	name	CLF:WATER	bad-DM=DM		
		'no Bill that water's bad'					
4	*Felicity:*	*Bill*	*mam-ka*				
		Bill	mam=ka				
		name	3SGS.SAY/DO(34).NFUT=FOC				
		pirrimmum	*xxx*				
		pirrim-wum	xxx				
		3SGS.STAND(3).NFUT-be.on	xxx				
		'Bill she said it's on xxx'					
5	*Molly:*	***pirrimmummatha***					
		pirrim-wum-matha					
		3SGS.STAND(3).NFUT-be.on-ALREADY					
		'it's on already'					
6	*Molly:*	*mama*	*ngay*	***mammum***			
		mama	ngay	**mam-wum**			
		Mo	1SG	**3SGS.HANDS(8).NFUT-be.on**			
		'my mum turned it on'					

(LAMP_20130521_WF_01_V1 00:14:33)

This alternation of appropriate CSPs by Molly shows that she understands the role of these CSPs in relation to the lexical stem *-wum*. The lexical stem maintains its meaning across both combinations of something being on/or working. It is the variation in CSP that differentiates the meaning of 'to be on/working' from 'to make on/working', encoding a difference in argument structure. In combination with HANDS(8) a transitive verb is composed encoding an agent which 'turns something on' and a patient object which is the thing 'turned on'. In combination with STAND(3) this is an intransitive verb where the grammatical subject is the thing which may 'be on'. However, the question remains as to what extent Molly considers these verb structures to be composed of two independent stem elements with their own associated meanings or whether it is simply the contrast in whole word forms which is salient. These examples show that Molly can use these CSPs contrastively in this context but does not provide evidence that she associates meaning with CSPs independent of these bipartite stem combinations.

7.2.2.2 *'Close' alternation*

Another interesting example of CSP use by children is in relation to the verb 'to close' constructed with the lexical stem -*dhap*. This lexical stem is attested in the corpus in combination with three different CSPs HANDS(8), POKE(19) and POKE:RR(21) although Nathan is the only child to use -*dhap* contrastively with more than one CSP. In this section I focus on the alternation between HANDS(8) and POKE(19). I consider uses with POKE:RR(21) in § 7.2.2.3.

Both of these combinations involving CSPs HANDS(8) and POKE(19) encode verbs that mean 'to close something'. The verb composed of POKE(19) and -*dhap* means 'close something' in general, whereas the verb composed of HANDS(8) and -*dhap* specifically means 'to be quiet', literally 'to close one's mouth'. These contrasting combinations are shown below. In Examples (95) and (96) Emily and Nathan are closing items such as drinks coolers and plastic containers and thus the CSP POKE(19) is utilised.

(95) Emily 3;1
ngay-wa ***ngadhap***[58]
AT: **nganthap**
ngam-dhap
1SG-FOC **1SGS.POKE(19).NFUT-close**
'I closed it' (LAMP_20130502_WF_01_V1 00:29:37)

(96) Nathan 5;4
ngay ne-birl
1SG 2SGS.HANDS:RR(10).FUT-turn.to.look
ngandhapwarda
ngam-dhap-warda
1SGS.POKE(19).NFUT-close-NOW
'look I'm closing it (plastic container) now'
(LAMP_20140524_WF_01_V1 00:15:23)

By contrast, in Example (97) Mavis is demanding someone to be quiet, literally telling them to close their mouth, which therefore utilises CSP HANDS(8).

(97) Mavis 5;6
ma-nhi-rlarr-nukun-warda ***na-dhap***
1SGS.HANDS(8).FUT-2SG.DO-whip-FUTIRR-NOW **2SGS.HANDS(8).FUT-close**
wunkerrere
quickly
'I'll whip you if you don't be quiet quickly'
(LAMP_20140531_WF_01_V1 00:25:52)

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58. Emily produces an inappropriate classifier stem in terms of TAM. This error is considered in § 6.3.1.

These examples show that the lexical stem -*dhap* can be used by children with more than one CSP in an adult-like manner. In these combinations a consistent meaning can be associated with the lexical stem, showing that the CSP helps to encode the verbal meaning. These utterances show children beginning to use the bipartite stem system to construct different but related verbs. Such examples provide children with the relevant data to morphologically decode bipartite stem verbs but do not provide evidence that the compositional principles of the system have been acquired.

7.2.2.3 *Reflexive/reciprocal alternations*

A number of the contrastive CSP alternations identified in the corpus relate to verbs where a change in the CSP results in a change in argument structure. In these combinations the meaning of the verb remains relatively stable and the meaning shifts from one which is prototypically transitive to one that is either intransitive or reflexive/reciprocal. As was outlined in § 2.2.3, there are a number of systematic relationships between different CSPs that encode this type of alternation (Nordlinger, 2011).[59]

Children's use of these related CSPs provides clear examples that they are using the classifier stem to encode more than subject person/number and TAM and provide opportunity for children to uncover the bipartite stem verb system. In these instances the classifier stem has a clear role in constructing the argument structure of the verb. The clearest example of the contrastive use of this alternation is produced by Molly, who uses the related CSPs HANDS(8) and HANDS:RR(10) in combination with the lexical stem –*dharl* 'open'. In Example (98), Molly, aged 4;5, uses HANDS:RR(10) to encode reflexivity when she sees the boot of a car open via remote control. In this context the subject and object of the verb 'open' are not distinct. These arguments co-refer to the car known as 'little terminator'.

(98) Molly 4;5
mentharl-pirrim
mem-dharl=pirrim
3SGS.HANDS:RR(10).NFUT-open=3SGS.STAND(3).NFUT
nerl
AT: ne-birl
2SGS.HANDS:RR(10).FUT-turn.to.look
terminayta *akal*
AT: wakal
name small
'look it's opening itself, little terminator'
(LAMP_20120830_WF_01_V1 00:02:16)

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59. These CSP alternations are not actually a strict shift between transitive and intransitive constructions as outlined in Nordlinger (2011). For the purposes of this discussion however, what is most important to remember is, that there are a number of CSPs with systematic relationships. These alternations of related CSPs impact the argument structure of the clause but do not change the meaning of the verb.

This reflexive construction clearly contrasts with another construction by Molly at a similar age (99). In this case Molly combines HANDS(8) with *–dharl* to mean 'open something'. It is the alternation in these systematically related CSPs that encodes this difference in argument structure.

(99) Molly 4;3
kura *kopi* *xxx* ***na-Ø-dharl*** *mani*
CLF:VEG coffee xxx **2SGS.HANDS(8).FUT-3SG.DO-open** be.able
kura *kopi*
CLF:VEG coffee
'coffee xxx, try and open the coffee' (LAMP_20120716_WF_01_V1 00:06:15)

Similar CSP contrasts with an individual lexical stem are found in the data of other focus children. Nathan uses the lexical stem *-dhap* 'close' in combination with the related CSPs POKE(19) and POKE:RR(21). These contrasting constructions are found at similar ages 5;3 and 5;4 as shown in (100) & (101).

(100) Nathan 5;3
[Telling someone to close the door of a car]
tha-dhap=nga
2SGS.POKE(19).FUT-close=DM
'close it [the door]' (LAMP_20140417_WF_01_V1 00:06:18)

(101) Nathan 5;4
1 *Nathan:* *pigipigi-nu-ngatha* *xxx* *ngay-ka* *ngi-nu*
pig-DAT-if xxx 1SG-FOC 1SGS.SIT(1).FUT-FUT
kanhi-damatha ***nge-nu-ma-dhap-nu***
there-INTS **1SGS.POKE:RR(21).FUT-RR-APPL-close-FUT**
'if the pig comes I will sit right there and close myself in (the car)'
2 *Molly:* *ngaydengu*
ngay-de-wunku
1SG-same-also
'me too' (LAMP_20140524_WF_01_V1 00:14:12)

In Example (100), involving POKE(19), Nathan is instructing someone else to close a car door. In this case the subject 'the addressee' and the object 'the car door', which is a morphological zero, are clearly distinguished. In the second more complex example Nathan combines POKE:RR(21) with *-dhap* 'close'. This construction also includes the reflexive/reciprocal marker *-nu-* as well as an applicative marker *-ma-*. In this case Nathan is 'closing himself in'. In this construction Nathan is co-indexed as both the subject and direct object of the verb whereas the car door is not encoded as a core argument. These constructions again show a child using related CSPs with the same lexical stem to encode a distinct verbal structure. These alternate combinations are both appropriate and contrastive. They provide evidence that Nathan is using bipartite stem morphology contrastively for the verb 'close' at 5;4.

Although there are a number of contrastive reflexive/reciprocal alternations in the corpus they are still relatively infrequent. This is likely because one of the CSPs in an alternation is generally used much less frequently than the other. This makes the identification of contrastive CSPs with an individual lexical stem less likely. For example, all the focus children used the lexical stem *-dharl* in combination with HANDS(8) to mean 'to open something'. However, only Molly produced the reflexive/reciprocal equivalent with HANDS:RR(10) shown in (98). This bias can also be illustrated by considering the overall use of related CSPs in the corpus. For example, HANDS(8) is used in 284 verbs whereas HANDS:RR(10) occurs with just 10.[60] Similarly, POKE(19) is used in 114 verbs whereas POKE:RR(21) is used in 25. Despite this bias this is still one of the most frequently attested transparent CSP alternations across the corpus and is therefore one of the most likely alternations that children will acquire early, use productively, and potentially overgeneralise.

In examining the younger children's language use it appears that they initially have not acquired an adult-like competency in regard to the relationship between the related CSPs HANDS(8) and HANDS:RR(10). In particular, there are examples of constructions in which one of these CSPs is used in place of the other. This suggests that children are aware of a relationship between these forms from an early age, but they are not yet aware of the nature of the CSP alternation. This results in the use of licit bipartite stem combinations in inappropriate contexts. This type of error and its importance is explored more broadly in the corpus in § 7.3. An example of this type of error is shown in (102), where a reflexive/reciprocal verb is used in place of its transitive equivalent. In this example Acacia is inside a parked car in the front passenger seat. The door is closed. Her *pipi* (father's sister) comes to the door and opens it. Once out of the car Acacia attempts to say that she opened the door but does not do this in an adult manner. Acacia uses the verb *mentharl* 'it's open', a 3rd singular non-future reflexive form of 'open' formed with HANDS:RR(10), which describes a state. This is used in place of the adult target *mantharl* 'I opened it', a 1st singular non-future transitive form of 'open' formed with HANDS(8). This is understood to be the target verb given Acacia's preceding use of the 1st singular pronoun *ngay*. It appears in this context that Acacia is unable to construct the appropriate 1st singular non-future transitive form of the verb 'open' *mantharl*.

60. This excludes productions of the verb *nebirl* which uses HANDS:RR(10). It is excluded as it is a frequent relatively frozen verb form and does not relate to the encoding of a reflexive/reciprocal alternation.

Instead she juxtaposes two words she does know, *ngay* 'I' and *mentharl* 'it's open', to construct her intended meaning in this context.

(102) Acacia 3;6
ha ha ngay ***mentharl***
mem-dharl
1sgS.hands:rr(10).nfut-open
AT: **mantharl**
mam-dharl
ha ha 1sg **1sgS.hands(8).nfut-open**
'I opened it' (LAMP_20140413_WF_01_V1 00:32:34)

In addition to the above use of the reflexive/reciprocal alternation of the verb 'open', Acacia also produces appropriate forms of the transitive alternation of 'open', specifically producing two forms of this verb. In (103) Acacia uses *-dharl* in combination with hands(8) to refer to opening a door. In this instance the classifier stem encodes a 1st singular subject and future tense.

(103) Acacia 3;6
1 *Acacia:* *Adam* ***madharllu*** *kanhi ne?*
ma-dharl-nu
name **1sgS.hands(8).fut-open-fut** this tag
'Adam I'll open this yeah?'
2 *Acacia:* *ki?*
key
'key'
3 *Adam:* *XX*
'xx'
4 *Acacia:* *ki* ***ma-dharl-lu***
ma-dharl-nu
key **1sgS.hands(8).fut-open-fut**
'I'll open it with a key'
(LAMP_20140416_WF_01_V1 00:36:09)

In (104) Acacia uses *-dharl* in combination with hands(8) to refer to opening an orange. In this instance the classifier stem encodes a 2nd singular subject and future tense.

(104) Acacia 3;7
mama ***na-nga-dharl*** *mani*
Mo **2sgS.hands(8).fut-1sg.io-open** be.able
'Mum can you open it (an orange) for me'
(LAMP_20140531_WF_01_V1 00:11:23)

Taken together, these three examples show that Acacia knows a variety of forms of the verb 'open' including forms with the CSP HANDS(8) and at least one with the CSP HANDS:RR(10). Acacia likely has strong associative links between these forms, which result in the use of HANDS:RR(10) in an inappropriate context. It appears that Acacia is aware of a link between these forms but has not yet acquired the meaning of the CSP alternation with regard to the lexical stem *-dharl* 'open'. It is also a possibility that the error in (102) is due to the fact that Acacia has not acquired non-future forms of the verb 'open' with CSP HANDS(8) at this stage. This explanation seems less likely as non-future forms of classifier stems begin to emerge in children's speech between age 2;8 and 3;7 as shown in chapter 6.

These observations are consistent with findings regarding the development of cell diversity in CSPs, where children tend to acquire the future forms of verbs, in particular 1st and 2nd singular forms, first as described in chapters 5 and 6. By 3;6 Acacia has also learnt the form of the reflexive 3rd singular non-future form of 'open' *mentharl*. It is perhaps not surprising that she has learnt this particular reflexive form as it would likely be the most common form of this stem combination as it is used to describe that various things are 'open' including doors and the shop. By contrast a 1st singular form meaning 'I open myself' will logically be less useful and less frequent.

These various forms of the verb 'open' constitute a miniparadigm (Pinker, 1984) in Acacia's lexicon, with strong associations between these word forms as shown below. In the usage-based approach of Bybee (1995) this would constitute the early foundation of a source-orineted schema. I hypothesise that stronger connections will exist between *ma-dharl* and *na-dharl* and between *ma-dharl* and *men-tharl* than between *men-tharl* and *na-dharl* due to semantic and phonological similarities between the various forms. Importantly the structure of this miniparadigm contains verbs which contain HANDS(8) and those which contain HANDS:RR(10). This highlights the emergence of this CSP alternation and shows that children have not yet decomposed this structure into the two stem elements. As children gradually acquire this CSP alternation later in development it will likely be associated with the emergence of product- and source-oriented schemas (Bybee, 1995), which will allow for the extension of this pattern to new contexts.

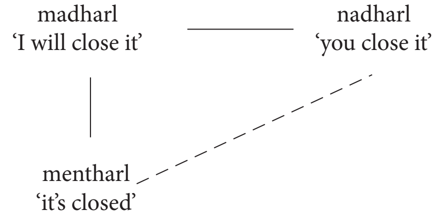

Figure 11. Miniparadigm of 'to open' Acacia (3;6–3;7)

Children's use of POKE:RR(21), the reflexive reciprocal alternative of POKE(19), shows some similar characteristics to that of HANDS:RR(10). There is evidence that children are aware of a link between related transitive and reflexive/reciprocal constructions but acquiring the meaning of this alternation takes time, occurring in a piecemeal fashion. Nathan used this alternation appropriately at age 5;4 in relation to the verb 'close', but other examples show children have not acquired this alternation for other verbs at age 4;11.

Evidence of a strong relationship between these related bipartite stem combinations is illustrated by the use of related licit stem combinations in inappropriate contexts. The following example involving Emily and Mavis, aged 3;7 and 4;11 respectively, interacting with Emily's mother Tania, shows both Emily and Mavis using POKE(19) in place of POKE:RR(21).[61] The three participants are sitting around a fire. Tania is tending to the fire and boiling water in a billy can. Emily notices that the billy can is balancing on the fire at a precarious angle. She calls out to Tania in line 1, Mavis then reiterates Emily's observation in line 2. Tania then seeks to clarify what is going to tip and in doing so models the girls' productions back to them. In doing this she importantly uses CSP POKE:RR(21) where the girls have both produced POKE(19).[62] Tania then adjusts the billy can.

(105) Emily 3;7, Mavis 4;11

1	*Emily:*	***ka-yipak-nu***	
		3SGS.POKE(19).FUT-spill-FUT	
	AT:	**ke-winhipak-nu**	
		3SGS.POKE:RR(21).FUT-spill-FUT	
		'it's going to spill'	
2	*Mavis:*	***ka-wiyipak-nu***	
		3SGS.POKE(19).FUT-spill-FUT	
	AT:	**ke-winhipak-nu**	
		3SGS.POKE:RR(21).FUT-spill-FUT	
		'it's going to spill'	
3	*Tania:*	***ke-winhipak-nukun***	*ngarra?*
		3SGS.POKE:RR(21).FUT-spill-FUTIRR	what
		'what might spill?'	(LAMP_20131105_WF_01_V1 00:16:14)

61. It is possible that the form of Mavis's production is influenced by Emily's preceding production.

62. Tania models the pronunciation of the lexical stem -*winhipak* along with using the more appropriate tense inflection -*nukun* in place of -*nu*.

In this example Emily and Mavis both use an inappropriate CSP using the verb 'pour' instead of the related verb 'spill'. These verbs are distinguished by the alternation in CSP between POKE(19) and POKE:RR(21), respectively. Emily and Mavis are using the transitive CSP instead of the required reflexive equivalent in this instance. Both children produce the correct subject person/number and TAM category for the classifier stem, but they take this form from the wrong but related CSP. These examples show evidence of associations between word forms with contrastive CSPs but do not provide evidence of the acquisition of the underlying compositional principles of bipartite stem verbs.

7.3 Non-standard bipartite stem combinations

As noted previously children's errors of commission provide some of the best evidence of their understanding of linguistic structures (e.g. Stoll, 2015). In the acquisition of systems with similarities to Murrinhpatha's bipartite stem verbs (§ 3.5), children produce errors of commission overgeneralising particular elements of a word or phrase on grounds of frequency or semantics (e.g. Clark, 1981; Family, 2009; Imedadze & Tuite, 1992). These errors are evidence that children may associate meaning with certain elements that contribute to the final compositional meaning of the construction and that children are aware of the compositional principles of these structures.

Children acquiring Murrinhpatha interestingly do not produce novel bipartite stem combinations. The lack of novel bipartite stem combinations suggests that children either do not acquire the underlying compositional principles of the bipartite stem verb system in the age range considered due to its complexity, or that the system itself is not regular or transparent enough to allow for verbs to be formed compositionally from distinct stem elements with their own associated meanings. Instead children acquire associative networks of semantically and phonologically related bipartite stem combinations. Children do, however, produce licit bipartite stem combinations in inappropriate contexts, as shown already in this chapter in Examples (102) and (105).

7.3.1 Learning 'to find'

One environment where children use licit stem combinations in inappropriate contexts is observed in relation to bipartite stem verbs which contain the lexical stem form *-rdurt*. This lexical stem combines with BASH(14) to mean 'find' and with HANDS(8) to mean 'wake someone'. Interestingly, children use the verb form meaning 'wake someone' in contexts where the target verb is 'find'. Consider the following examples from Molly at age 4;5, which were produced in a single recording session around twenty minutes apart. I have provided glossed examples and translations for both the child production and the adult target in both cases. This is because although Molly does not produce the intended target her utterance is still 'meaningful' in the adult language. Molly is attempting to start either a game of 'chasey' or 'hide and seek' with Nathan. She attempts to say to Nathan 'you find me', *dangirdurtnu*, but instead produces a verb with the same lexical stem but a different CSP meaning 'you wake me', *nangirdurtnu*. The difference between the target verb and the verb produced is the CSP used. Interestingly, both the target and produced bipartite stem verbs are acceptable meaningful combinations in the adult language.

(106) Molly 4;5
ngay ne ***na-ngi-rdurt-nu***
1SG TAG **2SGS.HANDS(8).FUT-1SG.DO-find-FUT**
'you wake me'
AT: ngay ne **da-ngi-rdurt-nu**
1SG TAG **2SGS.BASH(14).FUT-1SG.DO-find-FUT**
'you find me' (LAMP_20120830_WF_01_V1 00:12:28)

(107) Molly 4;5
bere ***na-ngi-rdurt-nu*** *Nathan nhinhi-yu*
alright **2SGS.HANDS(8).FUT-1SG.DO-find-FUT** name 2SG-DM
'alright you wake me, Nathan you'
AT: bere **da-ngi-rdurt-nu** Nathan nhinhi-yu
alright **2SGS.BASH(14).FUT-1SG.DO-find-FUT** name 2SG-DM
'alright you find me, Nathan you'
(LAMP_20120830_WF_01_V1 00:33:45)

These errors could potentially be explained by the fact that HANDS(8) is a CSP with high type frequency. Children would be argued to first select a lexical stem and then add additional morphology to this base form in order to build-up the meaning of the bipartite stem verb. A key choice in this process is the selection of an appropriate CSP. However, if this were the case we would expect CSPs with high type frequencies to also be used with lexical stems with which they do not occur in the adult language.

Errors of this type point towards a process of acquisition in which meaning is developed through the contrasting relationships of word forms, consistent with a usage-based approach (e.g. Bybee, 1995), rather than the construction of meaning through bases and affixation which must be extracted from the input. The source of Molly's errors in (106) and (107) are due to the relationship between the paradigms relating to the verbs ‘find’ and ‘wake’. This relationship appears to be based primarily on the phonological similarity of the lexical stems. It is unclear why this error occurs in this direction and without further data and a better understanding of how these verbs are used in adult speech speculating as to the cause is difficult. It is likely, however, that this would be explained by factors such as the frequency of the word forms or the CSPs, or indeed the frequency of the supra-inflection classes to which the CSPs belong. This type of error shares great similarity with those attested regarding the acquisition of the reflexive/reciprocal alternation (§ 7.2.2.3), although in those instances the related verbs shared a close semantic as well as phonological relationship.

7.3.2 Learning ‘to throw/fish’

The use of licit stem combinations in inappropriate contexts is also found in children’s use of bipartite stem verbs with the lexical stem *-ku*. This lexical stem is used by children in combination with four different CSPs in the corpus. It combines with SIT(1) and STAND(3) to mean ‘to go quickly’ (108) & (109), with BE(4) to mean ‘fish with a line’ (110) and with FEET(7) to mean ‘throw’ (111). Each of these combinations is exemplified below.

(108) Acacia 3;6
kay=ya ***pi-ku*** *mani=ka*
let’s.go=DM **1INCLS.SIT(1).FUT-move.quickly** be.able=DM
‘come on let’s go’ (LAMP_20140416_WF_01_V1 00:32:33)

(109) Mavis 5;4
bere-matha tharra ***ngibimka-ku-ngime***
then-INTS quickly **1DUS.STAND(3).NFUT-move.quickly-PC.F.NSIB**
‘and then we (excl.) all quickly ran’ (LAMP_20140413_WF_01_V1 00:45:36)

(110) Molly 5;8
[Molly is describing a stick figure picture of herself fishing with a handline.]
ngay ngay pithing ***nganam-ku***
1SG 1SG fishing **1SGS.BE(4).NFUT-move.quickly**
‘me me I’m fishing’ (LAMP_20131216_WF_01_V1 00:11:50)

(111) Molly 4;3
thunu-ku *xxx ngarra lalingkin*
2SGS.FEET(7).FUT-move.quickly xxx LOC salt.water
‘throw it in the salt water’ (LAMP_20120717_WF_01_V1 00:27:43)

In addition to these combinations *-ku* can be used in combination with CSPs SIT(1) and STAND(3) to mean 'fish with a line'. Adult productions of these combinations are given in (112) & (113). This means that the combination of *-ku* with these two stems, SIT(1) and STAND(3), can be used to mean either 'go quickly' or 'fish with a line', depending on the context.

(112) Lauren
ku *nugunu-dha* ***ngem-nge-ku***
CLF:ANIM 3SG.F-XXX **1SGS.SIT(1).NFUT -3SG.F.IO-move.quickly**
Emily-nukun
name-POSS
'it's her fish, I caught it for Emily' (LAMP_20140601_WF_01_V1 01:04:23)

(113) Joseline
ku *pithing xxx* ***thirrim-ku***
CLF:ANIM fishing xxx **2SGS.STAND(3).NFUT-move.quickly**
'you are fishing with a line' (LAMP_20131206_WF_02_V1 00:10:11)

The majority of these stem combinations are used by children in the corpus without interference from related combinations. The combination of BE(4) and *-ku* to mean 'fish with a line', however, causes some problems for acquisition. Some children are found to use the stem combination meaning 'throw', composed of FEET(7) and the lexical stem *-ku*, in contexts where the target verb is 'fish with a line'. This error is best exemplified in an example from outside the corpus, produced in an experimental setting. In the following Example (114), Felicity, aged 7;1, is shown a picture on a computer monitor of her father and grandfather fishing with hand reels. An anonymised version of this picture is shown below.[63] She is then asked by a Murrinhpatha speaking research assistant, Carla, who cannot see the picture, to describe it.

In lines 4 and 6 Felicity constructs a verb from CSP FEET(7) and the lexical stem –*ku* meaning 'throw'. Although this is an acceptable combination it does not denote the event of 'fishing with a line' that Felicity is attempting to describe. Instead, Felicity's production is best translated as 'he is throwing fish.' The fact that Felicity has produced an error is highlighted by Carla's initial reaction to seek clarification of Felicity's production in line 5, and then Carla's subsequent laughter and reproduction of Felicity's error in line 7. In line 10 Carla models the appropriate target construction the only difference being the CSP utilised which is BE(4) instead of FEET(7). Felicity takes up this correction in line 11 but reverts to her initial non-standard production in line 18 when asked again to describe what her father, pictured in the stimulus, is doing.

63. In the experiment photos of relatives faces were placed on the stick figures shown.

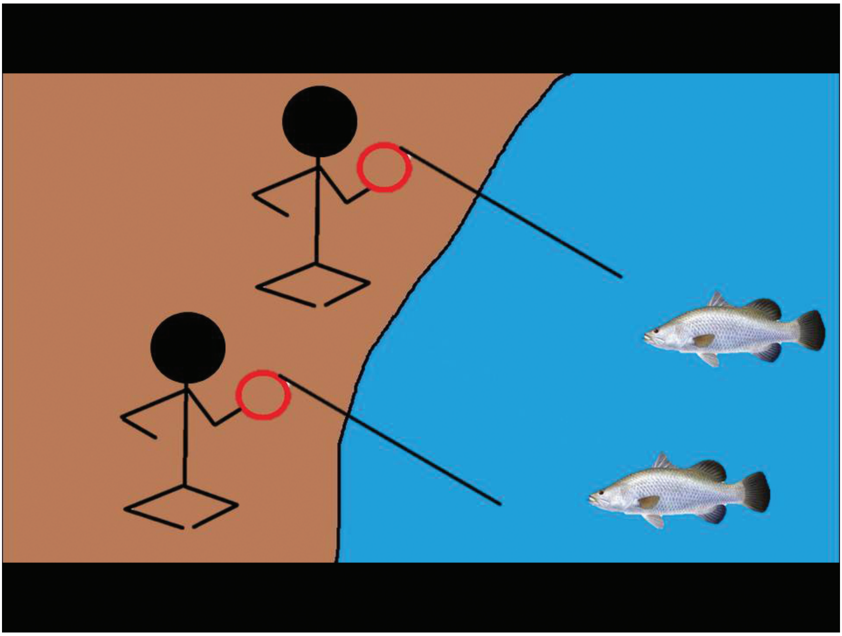

Figure 12. Anonymised fish with a line stimulus

(114) Felicity 7;1

1 *Carla:* *thangku dam-ngkardu=thim?*
what 2SGS.SEE(13).NFUT-see=2SGS.SIT(1).NFUT
'what do you see?'

2 *Felicity:* *dedi ngay*
Fa 1SG
'my dad'

3 *Carla:* *ngarra mam=pirrim?*
what 3SGS.SAY/DO(34).NFUT=3SGS.STAND(3).NFUT
'what's he doing?'

4 *Felicity:* *ku ngurlmirl* ***nungam-ku***
CLF:ANIM fish **3SGS.FEET(7).NFUT-move.quickly**
'he's throwing fish'

5 *Carla:* *ay?*
INTJ
'huh?'

6 *Felicity:* *ku ngurlmirl* ***nungam-ku***
CLF:ANIM fish **3SGS.FEET(7).NFUT-move.quickly**
'he's throwing fish'

7 *Carla:* *ha ha ku ngurlmirl* ***nungam-ku***
ha ha clf:anim fish **3sgS.feet(7).nfut-move.quickly**
'ha ha he's throwing fish'

8 *Bill:* *could you say it louder?*

9 *Carla:* *lurruth-kathu thim-nga-ngerren*
strong-hith 2sgS.sit(1).nfut-1sg.io-speak:rdp
'speak loudly to me'

10 *Carla:* *ku ngurlmirl* ***kanam-ku***
clf:anim fish 3sgS.be(4).nfut-**move.quickly**
thama
2sgS.say/do(34).fut
'say he's fishing'

11 *Felicity:* *ku ngurlmirl* ***kanam-ku***
clf:anim fish **3sgS.be(4).nfut-move.quickly**
'he's fishing'

12 *Bill:* *i nangkal?*
and who
'and who?'

13 *Carla:* *i nangkal?*
and who
'and who?'

14 *Felicity:* *dedi ngay*
Fa 1sg
'my dad'

15 *Carla:* *thangku wan nukunu=yu?*
what one 3sg.m=dm
'is he alone?'

16 *Bill:* *i*
and
'and'

17 *Carla:* *ngarra mam=pirrim dedi=yu?*
what 3sgS.say/do(34).nfut=3sgS.stand(3).nfut Fa=dm
'what's dad doing?'

18 *Felicity:* *ku ngurlmirl* ***nungam-ku***
clf:anim fish **3sgS.feet(7).nfut-move.quickly**
'he's throwing fish' (LAMP_20131216_WF_02 00:04:18)

Another example of this same error is produced by Nathan at age 4;4. He is about to go fishing and produces an utterance meaning something like 'I will throw fishing' instead of the adult target 'I will fish with a line'. This is once again an example of feet(7) being used in place of be(4).

(115) Nathan 4;4
pithing-wa ***ngunu-ku-nu***
fishing-FOC **1SGS.FEET(7).FUT-move.quickly-FUT**
'I will throw fishing.'
AT: pithing-wa **ngani-ku-nu**
fishing-FOC **1SGS.BE(4).FUT-move.quickly-FUT**
'I will go fishing.' (LAMP_20130521_WF_01_V1 00:38:13)

Appropriate uses of the target verb 'fish with a line' are also used at the same age that errors are produced. This is shown by Nathan's production in line 3 of (116). This example comes from the same recording session as the error shown in (115). Nathan's adult-like production in (116) may in part be due to the use of this verb by his *pipi* (FaZi) Estelle in line 1.

(116) Nathan 4;4
1 *Estelle: nangkal-wa pani-ku-nu=yu*
who-EMPH 3SGS.BE(4).FUT-move.quickly-FUT=DM
'who is going to fish?'
2 *Felicity: Nathan*
name
'Nathan'
3 *Nathan: awu ku nhinhi* ***thani-ku-nu***
no CLF:ANIM 2SG **2SGS.BE(4).FUT-move.quickly-FUT**
'no you can fish' (LAMP_20130521_WF_01_V1 00:04:37)

The use of the verb 'throw' in place of 'fish with a line' is the only example of a licit verb containing the lexical stem *-ku* being used in an inappropriate context. This raises the question of what the source of this error is and why there are not errors identified in the production of other verbs, which also contain the lexical stem *-ku* given its combinatorial flexibility.

In considering the production and structures of other related verbs with the lexical stem *-ku*, it appears that this error is in part due to the phonological similarity of the verb forms, similar to the discussion of the verb 'to find' in the previous section. However, in this instance the error also appears due to the semantic similarity of the constructions. Both stem combinations with BE(4) and FEET(7) encode events that involve throwing an object. In the first instance this relates to casting a fishing line and in the second instance this refers to throwing an object in general. Indeed, given the appropriate context the verb 'throw' can be used to refer to casting a line highlighting the semantic similarity of these verbs. This is shown in the adult production in (117) where the verb 'throw' is preceded by the overt object *pithing layn* 'fishing line'. Similar productions are also found in children's speech.

The example in (118) is taken from experimental data outside the corpus. In this example Matthew aged 6;10 is describing picture stimulus similar to that shown previously in Figure 12 of his brother Cameron fishing with a line.

(117) *ngay=ka pithing layn* ***ngunu-ku-nu***
1SG=FOC fishing line **1SGS.FEET(7).FUT-throw-FUT**
'I will throw a fishing line'
(Lucy Davidson Personal Communication 20150414)

(118) Matthew 6;10
pithing line ***nungam-ku*** *Cameron*
fishing line **3SGS.FEET(7).FUT-move.quickly** name
'he is throwing the fishing line, Cameron
(LAMP_20131217_WF_02_V1 00:14:01)

The close phonological and semantic similarity of these stem combinations is the likely source of the errors illustrated in (114) & (115). It is not that the CSP FEET(7) is overextended based on its own individual frequency or associated semantics. It is likely that 'throw' is the verb that is overextended as it is semantically more general and can encode the meaning of 'casting a fishing line' central to the activity of 'fishing with a line'. By contrast, throw is not overextended to contexts where the verb 'go quickly', typically constructed of the CSP SIT(1) and lexical stem *-ku*, is the target verb. This is potentially due to the frequency of this bipartite stem verb and the fact that there is less semantic similarity between these verbs than between 'throw' and 'fish with a line'.

These findings support the position that children do not associate semantics with CSPs independently in bipartite stem combinations and that CSPs are not overgeneralised on either semantic or frequency grounds, as might have been anticipated given findings from other systems with structural similarities (e.g. Clark, 1981; Dressler et al., 2019; Family, 2009; Imedadze & Tuite, 1992). It suggests that, at the stages of development considered in the corpus, children acquire specific bipartite stem combinations and make associations between word forms rather than learning to abstract classifier and lexical stems and constructing verbs compositionally.

7.4 Development of bipartite stem verbs

Despite the frequency of bipartite stem verbs in Murrinhpatha, there is little evidence to suggest that children in the corpus, aged 1;9–6;1, have acquired the underlying compositional principles of the bipartite stem verb system. This suggests that due to the complexity of the bipartite stem verb system the underlying principles take some time to acquire and are potentially not acquired by 6;1. Despite initial expectations that children would overgeneralise CSPs and acquire the underlying principles relatively early given the frequency of this construction, this is not observed in the corpus. Murrinhpatha bipartite stem verbs appear to be so complex that the underlying compositional principles are acquired much later than constructions with structural similarities in other languages (e.g. Dressler et al., 2019). This raises the possibility that speakers may not need to acquire the underlying compositional principles of bipartite stem verbs at all and that CSP lexical stem combinations could be learned as singular units.

There is, however, evidence that children build associative networks between bipartite stem verbs consistent with usage-based models of acquisition (e.g. Bybee, 1995). This is most readily observed in children's use of CSP alternations, where there is a predictable relationship between sets of CSPs such as reflexive/reciprocal alternations § 7.2.2.3. As children build these networks they are likely able to extend patterns to new verbs. These patterns, however, are based on relationships between word forms and stem combinations and do not entail the association of meaning with individual independent stem elements.

CHAPTER 8

Discussion

This monograph has investigated the acquisition of verbs in Murrinhpatha by five children over a two-year period covering an age range from 1;9 to 6;1. As a polysynthetic language, Murrinhpatha presents a number of unique challenges to the language learner, the study of which can help strengthen our understanding of language acquisition crosslinguistically (Kelly et al., 2014). In this final chapter I reconsider some of these issues in light of the results.

8.1 Structure of early verbs

In many languages children's early verb forms are often truncated in some way (e.g. Demuth, 1996b). Accounts of this phenomenon have tended to fall into two categories, those which highlight the influence of prosodic/phonological factors (e.g. Demuth, 1996b; Slobin, 1985a) and those which highlight the influence of morphosyntactic factors (e.g. Rizzi, 1993; Wexler, 1998). The analysis of children's early verb productions in Murrinhpatha (§ 5.1) found that children do truncate some early verb productions and that some verbs continue to be truncated until at least 4;5. These productions exhibited a developmental pathway largely predicted by a prosodic licensing model (e.g. Demuth, 1996b, 2001). Initially when children produced truncated verbs, the trochaic foot at the right edge of the PWord in the adult target form was preserved. Children's verb productions then grow leftward from the initial head trochee at the right edge of the verbal PWord.

This leftward development of complex verbs has been attested in a number of morphologically complex languages, including Mohawk (Mithun, 1989), Navajo (Courtney & Saville-Troike, 2002) and a number of Mayan languages (C. Pye et al., 2007), although it is by no means a universal feature of the acquisition of morphologically complex verbs, see Quechua (Courtney & Saville-Troike, 2002). This developmental pathway is predicted by a combined model of perceptual salience (Peters, 1985; Slobin, 1985a) and prosodic licensing (e.g. Demuth, 1996b, 2001). While it has been shown for Murrinhpatha that children truncate their verb productions according to prosodic licensing constraints, it is also necessary for a prosodic licensing model to account for why the child begins at the right edge of the verbal PWord instead of somewhere else, for example at the left edge. Children acquiring

Murrinhpatha begin by producing the trochaic foot at the right edge of the verbal PWord for a number of reasons. Firstly, this foot includes the penultimate primary stressed syllable, which is salient for children and is also predictive of the end of the verbal PWord. Furthermore, this is also the part of the word that contains the lexical stem, which is formally more stable than the classifier stem.

Notably, the corpus reveals a great amount of variation in the way Murrinhpatha children truncate their early verb productions, as is commonly found in other languages (Deen, 2005). Although there are tendencies with regard to the type of prosodic structures produced by the focus children and patterns of truncation, it was not uncommon for children to truncate and not truncate similar word structures at the same age. A prosodic licensing account, while allowing for this variation, does not predict when and where it will occur. Research into contexts of truncation has been undertaken in relation to the acquisition of Inuktitut (Skarabela & Allen, 2004; Swift & Allen, 2002). This research suggests that in addition to structural factors, errors of omission may be influenced by emotional and discourse-pragmatic factors. This was not explored in this monograph, although it provides an interesting avenue for future research. It may also be that this variation in truncation is lexically-specific and that individual differences may account for some of this variation (Kidd & Donnelly, 2020).

Morphosyntactic explanations of children's early verb forms (e.g. Rizzi, 1993; Wexler, 1998), outlined in § 3.2.2, propose that children are aware of morphological structure from an early age and that the omission of inflectional morphology is due to the underspecification of particular grammatical categories (e.g. Schütze & Wexler, 1996) or the truncation of syntactic representations (Rizzi, 1993). These approaches have in common a reliance on Baker's (1985) Mirror Principle, which states that the ordering of morphological affixes reflects the order of syntactic derivations. This allows for the construction of syntactic trees to reflect the composition of polymorphemic words. The omission of morphemes is consequently linked to underspecification or omission at a specific node. Although this approach is attractive for describing the acquisition of languages where the Mirror Principle holds, the application of such theories is difficult in languages with fusional morphology, as constructing appropriate trees is not a straightforward process. Murrinhpatha CSPs encode subject number/person and TAM as well as contributing to verb semantics and argument structure. Therefore, in cases where the classifier stem is omitted it is not clear whether this is due to an underspecification of subject agreement, tense agreement or perhaps related to verbal semantics. Furthermore, Murrinhpatha has been described as having templatic morphology meaning "that affix ordering cannot be given a semantic, syntactic or phonological explanation synchronically, but that the ordering of affixes is determined by very specific morphological environments" (Nordlinger, 2010, p. 332). This means that it is not possible to construct an underlying syntactic representation of complex verb forms according to the Mirror Principle (Baker, 1985) as morphs are not linked to hierarchically structured nodes. The application of such a syntactic model would thus be problematic for Murrinhpatha and lacks empirical motivation, given that early verb forms have been accounted for by prosodic factors and are not able to be explained in relation to the underlying grammatical structure of verbs. Furthermore, if children's verb productions are to be influenced by morphosyntactic factors, children will need to be aware of the internal morphological structure of verbs in their language. In a morphologically complex language such as Murrinhpatha, the complexity of the verbal morphology may prevent the influence of such morphosyntactic factors on early verb productions.

8.2 Semantics and pragmatics of early verbs

There has been relatively little study with regard to the semantics and pragmatics of early verbs in first language acquisition, whether in specific languages or cross-linguistically. With regard to semantics, a common claim for English-acquiring children is that general-purpose verbs tend to be acquired before those which are semantically more specific (Bloom, 1991; Clark, 1993, 1978). Studies have also suggested that children's early verbs may be pragmatically restricted (Huttenlocher et al., 1983; Naigles et al., 2009; Smiley & Huttenlocher, 1995). These tend to be used as directives to request action or gain attention from a hearer or as commissives to state a child's intention to act, what could be described as a 'self-interest' bias. These functions reflect the fact that children's speech is centred on their own communicative needs and wants (Edwards & Goodwin, 1986). However, these claims have remained underexplored, particularly from a crosslinguistic perspective.

The semantics and pragmatics of early Murrinhpatha verb use in the corpus, analysed in § 5.2, lend some support to claims that general-purpose verbs are acquired earlier than those which are semantically more specific (Bloom, 1991; Clark, 1993, 1978). This included cases where children overgeneralised more semantically general verbs to contexts where a semantically more specific verb was expected. Regarding pragmatics, the findings were consistent with the existence of a 'self-interest' bias in children's early verb use. In particular early verbs were either directives, used to request action or attention from a hearer, or commissives, which encoded the child's intention to act. Given that Murrinhpatha verbs are polysynthetic and encode subject and object information, they can be very powerful tools for young children. For example, the task of asking someone to peel an orange for them can be achieved with a single complex verb. The usefulness of these constructions for doing things that children want and need to do potentially underpins why certain types of verbs might be acquired earlier than others. It should be kept in mind, however, that given the relatively sparse nature of the corpus, semantically general verbs are more likely to be identified in comparision with semantically more specific verbs (Tomasello & Stahl, 2004) and that differences in frequency may influence acquisition rather than semantic generality (Theakston et al., 2004).

Despite the small corpus, the possible existence of a self-interest bias in children's early verb use and its influence on the acquisition of verbal morphology is one that warrants further investigation. In Murrinhpatha early verb use, directives were typically realised as imperative verbs, commissives were typically realised as 1st singular indicative verbs, and representatives were realised as both 3rd singular non-future and 3rd singular presentational verbs. I suggest that this is potential evidence of a link between the way in which children use early verbs and the acquisition of verbal morphology. If children tend to produce these types of inflected verb forms first, these will also be the verb forms which are used to construct initial verb-specific miniparadigms and which will be used to begin to extract morphological patterns. This link between form and function also helps to explain why imperative constructions are acquired early in a wide variety of non-related languages. Although others have suggested that this is due to imperative verbs being tenseless and propose that they are an analogue to root infinitives in other languages (Salustri & Hyams, 2003), I argue that the early acquisition of imperative verbs is driven by the fact that children produce directives from an early age, even before they begin to speak (Bates et al., 1975, 1976), and that imperatives are a default construction for encoding directive function (König & Siemund, 2007; Levinson, 1983; Sadock & Zwicky, 1985). Similar explanations have been made for the acquisition of verbal morphology in other languages (e.g. Laalo, 2003, p. 346). Consequently, despite great differences typologically, imperative verbs will be acquired early in a wide variety of languages due to children's early use of directives (Küntay et al., 2014) and the link between directives and imperative constructions (Sadock & Zwicky, 1985).

8.3 Acquisition of complex verb paradigms

Complex verbal paradigms pose a problem for acquisition as they are typically too complex to learn through the acquisition of abstract rules and consist of so many forms that learning all forms individually would seem to be beyond the capabilities of the learner (Mithun, 2010). In chapter 6 I investigated the development of inflectional diversity in a 'matched' sample of four CSPs using both qualitative investigation and an adapted measure of Normalised Mean Size of Paradigm (MSP) (Xanthos & Gillis, 2010), see § 6.2. It was found that the inflectional diversity of these CSPs increased markedly between the ages of 3;1 to 3;7, with an initial

MSP(20) of less than 2 growing to around 2.5. After this age the rise in inflectional diversity was more gradual, rising to around 3 by 5 years of age. This development in diversity coincided with children using verbs in new ways such as encoding past events and encoding multiple subjects. This suggests that children acquire complex verbal paradigms by first learning a small number of inflected forms. These inflected verbs form miniparadigms which children gradually build upon with the addition of new paradigmatic dimensions to construct more complex verbal paradigms.

Findings regarding the acquisition of CSPs are consistent with various proposals of morphological acquisition, including Pinker's Generativist Model (1984), Protomorphology (e.g. Dressler & Karpf, 1995) and Bybee's Network Model (1995). These argue that children are initially unaware of the morphological composition of words and initially acquire rote learned chunks (MacWhinney, 1978). When children have acquired a number of phonologically and semantically related verb forms, these are used to form miniparadigms ('source-oriented' schemas in a Network Model). Children are sensitive to the 'regular/semi-regular' morphological patterns of these miniparadigms and extend these patterns to new forms. This brings about the production of errors of commission. This stage is defined as the beginning of the protomorphological stage in Protomorphology (Dressler, 2007a). Studies in Protomorphology have found that this stage tends to emerge earlier in languages with rich morphology (Laaha & Gillis, 2007). Despite the rich morphological patterns of Murrinhpatha CSPs, this stage appears to emerge relatively late around age 3;0 (§ 6.4). This is likely due to the fusional nature of CSPs and to the high degree of irregularity within and across paradigms. This supports findings that fusional morphology delays the onset of the protomorphological stage, and that fusional morphology is more difficult to acquire than agglutinative morphology (e.g. Laaha & Gillis, 2007). At the onset of the stage of protomorphology, the various approaches to morphological acquisition considered diverge in a number of ways.

The Generativist Model (Pinker, 1984) and Protomorphology (e.g. Dressler & Karpf, 1995) focus on the existence and emergence of an autonomous morphological module respectively, whereas a network model (e.g. Bybee, 1995) does not propose such a disassociation. The existence of a morphological module is most clearly associated with the existence of regular morphological rules by Generativist approaches. In this case, children store both stem and inflectional morphology as individual elements and are able to construct inflected verb forms through the application of abstract rules (Pinker & Prince, 1991). This approach presents problems for the acquisition of complex verbal paradigms, as simply devising a set of rules to account for the inflectional patterns of Murrinhpatha CSPs is not a simple task. It therefore seems unlikely that children will be able to acquire such a collection of complex rules and, even if they could, that this would be beneficial to the acquisition process. Similar arguments have been made by researchers investigating the acquisition of complex inflectional paradigms in languages such as Polish (Krajewski et al., 2012) and Serbian (Mirković et al., 2011).

Furthermore, generativist models do not highlight, although some allow for, the fact that children are sensitive to 'semi-regular' patterns in complex morphological systems. In a network model (e.g. Bybee, 1995), however, it is the contrast of associated whole verb forms, or in this case cells of a CSP, which encode meaning rather than the composition of smaller meaningful morphemes. Children are sensitive to patterns across these stored forms through product- and source-oriented schemas. Schemas with high type frequency are likely to be more productive and result in the production of novel forms just as has been observed in the acquisition of Murrinhpatha CSPs (§ 6.3).

The debate about whether this is truly a rule or simply an extremely productive schema is somewhat inconsequential to the current discussion, as both predict and explain similar morphological systems. The key question of interest is whether these types of morphology are processed differently both by adults and by children. This question is best addressed through the use of neurological research methods rather than through the analysis of spontaneous speech data using more traditional linguistic methods. The current study does, however, highlight that theories need to recognise the range of regularities found in morphological systems and propose accounts which are sensitive to the nature of the system being acquired. It follows, then, that usage-based approaches (e.g. Bybee, 1995) that can account for a wider range of morphological systems should be preferred over dual-route accounts, which focus on explaining only certain types of systems such as those with regular morphology.

This study also raises the question of how complex and irregular a morphological system can become before morphological patterns are no longer useful to the acquisition process. The other side of this question is how many forms of a paradigm can be learned by rote? Further investigation of this question requires the use of experimental techniques to examine children's acquisition of rarer word forms that are less likely to be stored in the lexicon and more likely to need to be generated through analogy with other forms similar to recent studies of a number of European languages (Granlund et al., 2019; Savičiūtė et al., 2018). Deficient paradigms would suggest rote learning of forms, whereas errors of commission for rare forms would suggest the use of analogy. These studies could be partnered with measures of morphological complexity being developed for morphological theory (e.g. Ackerman & Malouf, 2013; Stump & Finkel, 2013).

8.4 Acquisition of bipartite stem verbs

Chapter 7 considered children's acquisition and use of contrastive bipartite stem morphology and explored whether children acquire the semantic compositional principles which underlie the transparent end of this verbal system. Central to this investigation was whether children learn to construct verbal meaning compositionally from two stem elements, or whether these two elements are learned as fixed combinations with contrastive alternations of stem morphology emerging based on the juxtaposition of whole word forms. This question is similar to the debate regarding the acquisition of inflectional morphology between abstract rule-based (e.g. Pinker & Prince, 1991) and usage-based (e.g. Bybee, 1995) approaches describing the acquisition of morphology.

Analysis of the Murrinhpatha corpus suggests that children do not readily divide meaning across bipartite stem verb elements. The core semantic meaning of verbs are either associated with the lexical stem alone or are associated with the whole stem *combination*. There was no clear evidence in the corpus that children had acquired the compositional principles of the bipartite stem verb system by age 6;1. Children did, however, use CSPs contrastively in an adult-like manner to contribute to the meaning and argument structure of the verb. There was also evidence of associative links between phonologically and semantically related verb forms with different CSPs, illustrated by the use of licit stem combinations in inappropriate contexts.

These findings raise a number of questions for future investigation. Key amongst these is whether the lack of contrastive use of CSPs and lack of novel stem combinations, which would indicate the acquisition of underlying compositional principles, is due to the fact that these have not yet been acquired by children during the age range considered in this study. This would likely be best addressed through an experimental cross-sectional methodology examining what semantic information children associate with CSPs, at what stage this emerges, what types of semantic associations are acquired earlier or later, and whether children are able to comprehend or produce novel stem combinations. Such a study would also benefit from a better understanding of how adults process bipartite stem verbs. The question of whether adults associate CSPs in bipartite stem verbs with specific semantic information remains largely open. Furthermore, the extent to which adults are able to either produce or comprehend novel stem combinations should be explored. If this is not something that adults are able to do, then there is logically not a need for children to acquire such an ability. Issues such as this are likely to arise when conducting research on underdescribed languages, where much remains to be done regarding the description of adult language.

To understand why bipartite stem verbs are not acquired in a compositional rule-based manner, it is important to consider the overall structure of the system similar to the acquisition of Murrinhpatha CSPs. Findings from other languages regarding the acquisition of bipartite constructions have shown that children acquire the underlying compositional principles more quickly when systems are frequent, productive and transparent (Behrens, 1998; Clark, 1981; Dressler et al., 2019; Family, 2009; Imedadze & Tuite, 1992). This analysis suggests that despite the frequency of bipartite stem verb use, the Murrinhpatha bipartite verb system is not transparent, regular or productive enough to be salient for children by age 6;1. As with the acquisition of Murrinhpatha CSPs the lack of regularity, transparency and in this case productivity across the bipartite stem verb system means that it is not well suited to a semantically compositional rule-based approach to acquisition. Instead, the acquisition of combinations and the reliance on associative networks of phonologically and semantically related verb forms to acquire certain stem alternations is more plausible.

8.5 Reflections and future directions

This monograph provides insights into the acquisition of a complex verbal system and contributes to the growing crosslinguistic understanding of how children acquire language. The importance of crosslinguistic validity in our understanding of first language acquisition is fundamental (Bowerman, 2011; Kelly et al., 2015; Stoll & Bickel, 2013). Theories that aim to address the question of how children can acquire any language they are raised in must consider findings from a diverse typological perspective in order to identify and accommodate for linguistic and culturally specific factors. It is my hope that the research reported here contributes to this larger aim by beginning to fill a typological gap in acquisition research through the study of an Australian polysynthetic language.

The need to study the acquisition of typologically diverse languages is currently an urgent one in the context of rapid language endangerment and loss (Romaine, 2017). With each language that is no longer acquired by children, the opportunity is lost to consider how children acquire that specific language with its own unique set of complexities and characteristics. This is particularly the case in Australia, where only 12 of the over 250 traditional Indigenous languages spoken at the time of colonisation continue to be acquired by children as a first language (*National Indigenous Languages Report*, 2020). It must be weighed, however, to what extent academic urgency and the need to gather 'data' is compatible with and able to support the various aspirations language communities have for their own languages (e.g. Roche, 2020; Singer, 2020). The academic field of linguistics, including language acquisition, has tended to treat languages as abstract phenomena to be investigated for scientific purposes. "Linguists" have had scientific authority over language communities derived from the power and prestige of their western academic institutions imposing their own analytic categories on the cultural others they investigate (e.g. Dobrin & Berson, 2011). The field of language acquisition, particularly where it overlaps with language documentation, needs to embrace decolonial approaches (e.g. Leonard, 2018). I recognise that my own future work and research must seek to be more collaborative than what is presented in this monograph.

Morphological complexity has been shown to be a major factor in the acquisition of Murrinhpatha verb morphology. Complexity has impacted nearly all areas I have considered, including children's early verb productions, the acquisition of CSPs and the acquisition of bipartite stem morphology. Complexity broadly includes factors such as morphological transparency, predictability/regularity of inflectional patterns, morphological richness, factors of type and token frequency and productivity, which interact to make a morphological system more or less complex. The greater the complexity of a morphological system, the longer it will take children to acquire. Morphological complexity as a typological variable needs to become better understood within the field of first language acquisition through greater engagement with current morphological theory (e.g. Ackerman & Malouf, 2013; Arkadiev & Gardani, 2020; Blevins et al., 2018; Stump & Finkel, 2013). Morphological typologists seek to understand the range of complexity possible in morphological systems and what factors make systems more or less complex. Acquisition research must seek to better understand how this range of morphological complexity impacts the process of language acquisition as well as investigating what factors make a system more or less complex for children acquiring language.

Morphological complexity and the diversity of morphological systems must become central to our understanding of morphological acquisition while not losing sight of the fundamental social nature of language acquisition. This will allow us to better understand how differences in morphological systems crosslinguistically, as well as how children and their interlocutors use these systems in their daily lives, impacts language acquisition. This leads necessarily to the analysis of complexity in use becoming central to our understanding of the acquisition of morphological systems.

APPENDIX

Murrinhpatha classifier stem paradigms

This Appendix provides a comprehensive list of Murrinhpatha's approximately 38 classifier stem paradigms. It is an adaptation of the work of Blythe et al. (2007) and Mansfield (2019a) both of which are based upon the foundational documentation work of Street (1987) and Walsh (2011).

SIT(1)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngem*	*ngi*	*ngini*	*ngini*
	2	*thim*	*thi*	*thini*	*thini*
	3	*dim / kem*	*pi / ki*	*dini*	*dini*
1 INCL		*thim*	*pi*	*thini*	*thini*
DU	1	*ngarrimka**	*nge*	*ngarrine*	*ngarrine*
	2	*nirrimka*	*ne*	*nirrine*	*nirrine*
	3	*pirrimka / karrimka*	*pe / ke*	*pirrine*	*pirrine*
PL	1	*ngarrim*	*nguyu*	*ngarrini*	*ngarrini*
	2	*nirrim*	*nuyu*	*nirrini*	*nirrini*
	3	*pirrim / karrim*	*puyu / kuyu*	*pirrini*	*pirrini*

* These greyed out dual forms throughout the appendix are constructed from the corresponding plural forms with the addition of a morph *-ka-*. They are not required in the paradigms but are included as they are more in keeping with current Murrinhpatha educational materials such as Street (1987, 2012).

LIE(2)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngabim*	*ngu*	*ngu*	*ngungi*
	2	*thibim*	*thu*	*thu*	*thungi*
	3	*yibim / kabim*	*pu / ku*	*yu*	*yungi*
1 INCL		*thibim*	*pu*	*thu*	*thungi*
DU	1	*ngarrimka*	*nge*	*ngarrine*	*ngarrine*
	2	*nirrimka*	*ne*	*nirrine*	*nirrine*
	3	*pirrimka / karrimka*	*pe / ke*	*pirrine*	*pirrine*
PL	1	*ngarrim*	*nguyu*	*ngarrini*	*ngarrini*
	2	*nirrim*	*nuyu*	*nirrini*	*nirrini*
	3	*pirrim / karrim*	*puyu / kuyu*	*pirrini*	*pirrini*

STAND(3)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngarrim*	*ngirra*	*ngirri*	*ngirrangi*
	2	*thirrim*	*thirra*	*thirri*	*thirrangi*
	3	*pirrim / karrim*	*pirra / kirra*	*pirri*	*pirrangi*
1 INCL		*thirrim*	*pirra*	*thirri*	*thirrangi*
DU	1	*ngibimka*	*ngira*	*nge*	*ngirangi*
	2	*nibimka*	*nira*	*ne*	*nirangi*
	3	*pibimka / kibimka*	*pira / kira*	*pe*	*pirangi*
PL	1	*ngibim*	*ngira*	*ngi*	*ngirangi*
	2	*nibim*	*nira*	*ni*	*nirangi*
	3	*pibim /kibim*	*pira / kira*	*pi*	*pirangi*

BE(4)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*nganam*	*ngani*	*ngardi*	*ngani*
	2	*thanam*	*thani*	*thardi*	*thani*
	3	*kanam / kanam*	*pani / kani*	*kardi*	*kani*
1 INCL		*thanam*	*pani*	*thardi*	*thani*
DU	1	*ngarnamka*	*ngarne*	*ngarde*	*ngarne*
	2	*narnamka*	*narne*	*narde*	*narne*
	3	*parnamka / karnamka*	*parne / karne*	*parde*	*karne*
PL	1	*ngarnam*	*ngarni*	*ngardi*	*ngarni*
	2	*narnam*	*narni*	*nardi*	*narni*
	3	*parnam / karnam*	*parni / karni*	*pardi*	*karni*

ALOFT(5)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*nganthim*	*ngintha*	*nginthanhi*	*nginthangi*
	2	*thinthim*	*thintha*	*thinthanhi*	*thinthangi*
	3	*pinthim / kanthim*	*pintha / kintha*	*pinthanhi*	*pinthangi*
1 INCL		*thinthim*	*pintha*	*thinthanhi*	*thinthangi*
DU	1	*nganthimka*	*ngintha*	*nginthanhe*	*nginthange*
	2	*ninthimka*	*nintha*	*ninthanhe*	*ninthange*
	3	*pinthimka / kanthimka*	*pintha / kintha*	*pinthanhe*	*pinthange*
PL	1	*nganthim*	*ngintha*	*nginthanhi*	*nginthangi*
	2	*ninthim*	*nintha*	*ninthanhi*	*ninthangi*
	3	*pinthim / kanthim*	*pintha / kintha*	*pinthanhi*	*pinthangi*

GO(6)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngurran*	*ngurru*	*ngurrini*	*ngurri*
	2	*thurran*	*thurru*	*thurrini*	*thurri*
	3	*wurran / kurran*	*purru / kurru*	*wurrini*	*wurri*
1 INCL		*thurran*	*purru*	*thurrini*	*thurri*
DU	1	*ngumpanka*	*nga*	*ngurne*	*nguye*
	2	*numpanka*	*na*	*nurne*	*nuye*
	3	*pumpanka / kumpanka*	*pa / ka*	*purne*	*puye*
PL	1	*ngumpan*	*nguru*	*ngurni*	*nguyi*
	2	*numpan*	*nuru*	*nurni*	*nuyi*
	3	*pumpan / kumpan*	*puru / kuru*	*purni*	*puyi*

FEET(7)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngunungam*	*ngunu*	*nguna*	*nguni*
	2	*thunungam*	*thunu*	*thuna*	*thuni*
	3	*nungam / kunungam*	*punu / kunu*	*na (nura)*	*nuy*
1 INCL		*thunungam*	*punu*	*thuna*	*thuni*
DU	1	*ngunnungamka*	*ngunna*	*ngunna*	*ngunne*
	2	*nunnungamka*	*nunna*	*nunna*	*nunne*
	3	*punnungamka/ kunnungamka*	*punna / kunna*	*punna*	*punne*
PL	1	*ngunnungam*	*ngunnu*	*ngunni*	*ngunni*
	2	*nunnungam*	*nunnu*	*nunni*	*nunni*
	3	*punnungam / kunnungam*	*punnu / kunnu*	*punni*	*punni*

HANDS(8)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*mam*	*ma*	*me*	*me*
	2	*nam*	*na*	*ne*	*ne*
	3	*mam / kumam*	*ma / ma*	*me*	*me*
1 INCL		*thumam*	*puma*	*thume*	*thume*
DU	1	*ngumamka*	*nguma*	*ngume*	*ngume*
	2	*numamka*	*numa*	*nume*	*nume*
	3	*pumamka / kumamka*	*puma / kuma*	*pume*	*pume*
PL	1	*ngumam*	*nguma*	*ngume*	*ngume*
	2	*numam*	*numa*	*nume*	*nume*
	3	*pumam / kumam*	*puma / kuma*	*pume*	*pume*

GRAB(9)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*mangan*	*ma*	*me*	*me*
	2	*nangan*	*na*	*ne*	*ne*
	3	*mangan / kumangan*	*ma / ma*	*me*	*me*
1 INCL		*thumangan*	*puma*	*thume*	*thume*
DU	1	*ngumanganka*	*nguma*	*ngume*	*ngume*
	2	*numanganka*	*numa*	*nume*	*nume*
	3	*pumanganka / kumanganka*	*puma / kuma*	*pume*	*pume*
PL	1	*ngumangan*	*nguma*	*ngume*	*ngume*
	2	*numangan*	*numa*	*nume*	*nume*
	3	*pumangan / kumangan*	*puma / kuma*	*pume*	*pume*

HANDS:RR(10)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*mem*	*me*	*mena*	*mena*
	2	*nem*	*ne*	*nena*	*nena*
	3	*mem / kumem*	*me / me*	*mena*	*mena*
1 INCL		*thumem*	*pume*	*thumena*	*thumena*
DU	1	*ngumemka*	*ngume*	*ngumena*	*ngumena*
	2	*numemka*	*nume*	*numena*	*numena*
	3	*pumemka / kumemka*	*pume / kume*	*pumena*	*pumena*
PL	1	*ngumem*	*ngume*	*ngumena*	*ngumena*
	2	*numem*	*nume*	*thumena*	*thumena*
	3	*pumem / kumem*	*pume / kume*	*pumena*	*pumena*

BREAK(11)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*mungam*	*mu*	*muni*	*muy*
	2	*nungam*	*nu*	*nuni*	*nuy*
	3	*mungam / mungam*	*mu / mu*	*muni*	*muy*
1 INCL		*thumungam*	*pumu*	*thuni*	*thumuy*
DU	1	*ngumungamka*	*ngumu*	*ngumune*	*ngumuy*
	2	*numungamka*	*numu*	*numune*	*numuy*
	3	*pumungamka / kumungamka*	*pumu / kumu*	*pumune*	*pumuy*
PL	1	*ngumugnam*	*ngumu*	*ngumuni*	*ngumuy*
	2	*numungam*	*numu*	*numuni*	*numuy*
	3	*pumungam / kumungam*	*pumu / kumu*	*pumuni*	*pumuy*

PEER(12)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*mim*	*mi*	*mina*	*mina*
	2	*nim*	*ni*	*nina*	*nina*
	3	*mim / mim*	*mi / mi*	*mina*	*mina*
1 INCL		*thumim*	*pumi*	*thumina*	*thumina*
DU	1	*ngumimka*	*ngumi*	*ngumina*	*ngumina*
	2	*numimka*	*numi*	*thumina*	*thumina*
	3	*pumimka / kumimka*	*pumi / kumi*	*pumina*	*pumina*
PL	1	*ngumim*	*ngumi*	*ngumina*	*ngumina*
	2	*thumim*	*numi*	*thumina*	*thumina*
	3	*pumim / pumim*	*pumi / kumi*	*pumina*	*pumina*

SEE(13)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*bam*	*ba*	*be*	*be*
	2	*dam*	*da*	*de*	*de*
	3	*bam / bam*	*ba / ba*	*be*	*be*
1 INCL		*thubam*	*puba*	*thube*	*thube*
DU	1	*ngubamka*	*nguba*	*ngube*	*ngube*
	2	*nubamka*	*nuba*	*nube*	*nube*
	3	*pubamka / kubamka*	*puba / kuba*	*pube*	*pube*
PL	1	*ngubam*	*nguba*	*ngube*	*ngube*
	2	*nubam*	*nuba*	*nube*	*nube*
	3	*pubam / kubam*	*puba / kuba*	*pube*	*pube*

BASH(14)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*bangam*	*ba*	*be*	*be*
	2	*dangam*	*da*	*de*	*de*
	3	*bangam / bangam*	*ba / ba*	*be*	*be*
1 INCL		*thubangam*	*puba*	*thube*	*thube*
DU	1	*ngubangamka*	*nguba*	*ngube*	*ngube*
	2	*nubangamka*	*nuba*	*nube*	*nube*
	3	*pubangamka / kubangamka*	*puba / kuba*	*pube*	*pube*
PL	1	*ngubangam*	*nguba*	*ngube*	*ngube*
	2	*nubangam*	*nuba*	*nube*	*nube*
	3	*pubangam / kubangam*	*puba / kuba*	*pube*	*pube*

BASH:RR(15)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*bem*	*be*	*bena*	*bena*
	2	*dem*	*de*	*dena*	*dena*
	3	*bem / kubem*	*be / be*	*bena*	*bena*
1 INCL		*thubem*	*pube*	*thubena*	*thubena*
DU	1	*ngubemka*	*ngube*	*ngubena*	*ngubena*
	2	*nubemka*	*nube*	*nubena*	*nubena*
	3	*pubemka / kubemka*	*pube / kube*	*pubena*	*pubena*
PL	1	*ngubem*	*ngube*	*ngubena*	*ngubena*
	2	*nubem*	*nube*	*nubena*	*nubena*
	3	*pubem / kubem*	*pube / kube*	*pubena*	*pubena*

HEAR(16)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*bim*	*bi*	*bina*	*bina*
	2	*dim*	*di*	*dina*	*dina*
	3	*bim / kubim*	*bi / bi*	*bina*	*bina*
1 INCL		*thubim*	*pubi*	*thubina*	*thubina*
DU	1	*ngubimka*	*ngubi*	*ngubina*	*ngubina*
	2	*thubim*	*pubi*	*thubina*	*thubina*
	3	*pubimka / kubimka*	*pubuy / kubuy*	*pubina*	*pubina*
PL	1	*ngubim*	*ngubi*	*ngubina*	*ngubina*
	2	*nubim*	*nubi*	*nubina*	*nubina*
	3	*pubim / kubim*	*pubi / kubi*	*pubina*	*pubina*

LOWER(17)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ban*	*bu*	*buni*	*buy*
	2	*dan*	*du*	*duni*	*duy*
	3	*ban / kuban*	*bu / bu*	*buni*	*buy*
1 INCL		*thuban*	*pubu*	*thubuni*	*thubuy*
DU	1	*ngubanka*	*ngubu*	*ngubune*	*ngubuy*
	2	*nubanka*	*nubu*	*nubune*	*nubuy*
	3	*pubanka / kubanka*	*pubu / kubu*	*pubune*	*pubuy*
PL	1	*nguban*	*ngubu*	*ngubuni*	*ngubuy*
	2	*nuban*	*nubu*	*nubuni*	*nubuy*
	3	*puban / kuban*	*pubu / kubu*	*pubuni*	*pubuy*

LOWER:INTR (18)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*bam*	*buy*	*bana*	*bana*
	2	*dam*	*duy*	*dana*	*dana*
	3	*bam / kubam*	*buy /buy*	*bana*	*bana*
1 INCL		*thubam*	*pubuy*	*thubana*	*thubana*
DU	1	*ngubamka*	*ngubuy*	*ngubana*	*ngubana*
	2	*nubamka*	*nubuy*	*nubana*	*nubana*
	3	*pubamka / kubamka*	*pubuy / kubuy*	*pubana*	*pubana*
PL	1	*ngubam*	*ngubuy*	*ngubana*	*ngubana*
	2	*nubam*	*nubuy*	*nubana*	*nubana*
	3	*pubam / kubam*	*pubuy / kubuy*	*pubana*	*pubana*

POKE(19)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngam*	*nga*	*ngani*	*nge*
	2	*tham*	*tha*	*thani*	*the*
	3	*dam / kam*	*pa / ka*	*dani*	*de*
1 INCL		*tham*	*pa*	*thani*	*the*
DU	1	*ngarramka*	*nga*	*ngarrane*	*ngerra*
	2	*narramka*	*na*	*narrane*	*nerra*
	3	*parramka / karramka*	*pa / ka*	*parrane*	*perra*
PL	1	*ngarram*	*nga*	*ngarrani*	*ngerra*
	2	*narram*	*na*	*narrani*	*nerra*
	3	*parram / karram*	*pa / ka*	*parrani*	*perra*

ARRIVE(20)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngangam*	*nga*	*ngani*	*nge*
	2	*thangam*	*tha*	*thani*	*the*
	3	*pangam / kangam*	*pa / ka*	*dani*	*de*
1 INCL		*thangam*	*pa*	*thani*	*the*
DU	1	*ngarramka*	*nga*	*ngarrane*	*ngerra*
	2	*narramka*	*na*	*narrane*	*nerra*
	3	*parramka / karramka*	*pa / ka*	*parrane*	*perra*
PL	1	*ngarram*	*nga*	*ngarrani*	*ngerra*
	2	*narram*	*na*	*narrani*	*nerra*
	3	*parram / karram*	*pa / ka*	*parrani*	*perra*

POKE:RR(21)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngem*	*nge*	*ngena*	*ngena*
	2	*them*	*the*	*thena*	*thena*
	3	*dem / kem*	*pe / ke*	*dena*	*dena*
1 INCL		*them*	*pe*	*thena*	*thena*
DU	1	*ngerremka*	*nge*	*ngerrene*	*ngerrene*
	2	*nerremka*	*ne*	*nerrene*	*nerrene*
	3	*perremka / kerremka*	*pe / ke*	*perrene*	*perrene*
PL	1	*ngerrem*	*nge*	*ngerrena*	*ngerrena*
	2	*nerrem*	*ne*	*nerrena*	*nerrena*
	3	*perrem / kerrem*	*pe / ke*	*perrena*	*perrena*

HAVE(22)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*nganthin*	*nga*	*nganthi*	*nge*
	2	*thanthin*	*tha*	*thanthi*	*the*
	3	*kanthin / kanthin*	*pa / ka*	*kanthi*	*de*
1 INCL		*thanthin*	*pa*	*thanthi*	*the*
DU	1	*nganthinka*	*nga*	*nganthe*	*ngerra*
	2	*nanthinka*	*na*	*nanthe*	*nerra*
	3	*panthinka / kanthinka*	*pa / ka*	*panthe*	*nerra*
PL	1	*nganthin*	*nga*	*nganthi*	*ngerra*
	2	*nanthin*	*na*	*nanthi*	*nerra*
	3	*panthin / kanthin*	*pa / ka*	*panthi*	*nerra*

SLASH(23)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngan*	*ngu*	*nguni*	*nguy*
	2	*than*	*thu*	*thuni*	*thuy*
	3	*pan / kan*	*pu / ku*	*puni*	*puy*
1 INCL		*than*	*pu*	*thuni*	*thuy*
DU	1	*ngumpanka*	*ngu*	*ngurne*	*nguye*
	2	*numpanka*	*nu*	*nurne*	*nuye*
	3	*pumpanka / kumpanka*	*pu / ku*	*purne*	*puye*
PL	1	*ngumpan*	*ngu*	*ngurni*	*nguyi*
	2	*numpan*	*nu*	*nurni*	*nuyi*
	3	*pumpan / kumpan*	*pu / ku*	*purni*	*puyi*

SLASH:RR(24)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngam*	*nguy*	*ngana*	*ngana*
	2	*tham*	*thuy*	*thana*	*thana*
	3	*pam / kam*	*puy / kuy*	*pana*	*pana*
1 INCL		*tham*	*puy*	*thana*	*thana*
DU	1	*nguyemka*	*nguy*	*nguyena*	*nguyena*
	2	*nuyemka*	*nuy*	*nuyena*	*nuyena*
	3	*puyemka / kuyemka*	*puy / kuy*	*puyena*	*puyena*
PL	1	*nguyem*	*nguyu*	*nguyena*	*nguyena*
	2	*nuyem*	*nuyu*	*nuyena*	*nuyena*
	3	*puyem / kuyem*	*puyu / kuyu*	*puyena*	*puyena*

FORM(25)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngingam*	*ngi*	*nginga*	*nginga*
	2	*thingam*	*thi*	*thinga*	*thinga*
	3	*yingam / kingam*	*pi / ki*	*yinga*	*yinga*
1 INCL		*thingam*	*pi*	*thinga*	*thinga*
DU	1	*ngingamka*	*nge*	*nginga*	*nginga*
	2	*ningamka*	*ne*	*ninga*	*ninga*
	3	*pingamka / kingamka*	*pe / ke*	*pinga*	*pinga*
PL	1	*ngingam*	*ngi*	*nginga*	*nginga*
	2	*ningam*	*ni*	*ninga*	*ninga*
	3	*pingam / kingam*	*pi / ki*	*pinga*	*pinga*

WIPE(26)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngilam*	*ngila*	*ngila*	*ngilangi*
	2	*thilam*	*thila*	*thila*	*thilangi*
	3	*dilam / kilam*	*pila / kila*	*dila*	*dilangi*
1 INCL		*thilam*	*pila*	*thila*	*thilangi*
DU	1	*ngillangamka*	*ngilla*	*ngilla*	*ngillangi*
	2	*nillangamka*	*nilla*	*nilla*	*nillangi*
	3	*pillangamka / killangamka*	*pilla / killa*	*pilla*	*pillangi*
PL	1	*ngillangam*	*ngilla*	*ngilla*	*ngillangi*
	2	*nillangam*	*nilla*	*nilla*	*nillangi*
	3	*pillangam / killangam*	*pilla / killa*	*pilla*	*pillangi*

HEAT(27)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*nginangam*	*ngina*	*nginanga*	*nginangi*
	2	*thinangam*	*thina*	*thinanga*	*thinangi*
	3	*ninangam / kinangam*	*pina / kina*	*ninga*	*ninga*
1 INCL		*thinangam*	*pina*	*thinanga*	*thinangi*
DU	1	*nginnangamka*	*nginna*	*nginnanga*	*nginnangi*
	2	*ninnangamka*	*ninna*	*ninnanga*	*ninnangi*
	3	*pinnangamka / kinnangamka*	*pinna / kina*	*pinnanga*	*pinnangi*
PL	1	*nginnangam*	*nginna*	*nginnanga*	*nginnangi*
	2	*ninnangam*	*ninna*	*ninnanga*	*ninnangi*
	3	*pinnangam / kinnangam*	*pinna / kinna*	*pinnanga*	*pinnangi*

WATCH(28)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngirrangan*	*ngirra*	*ngirra*	*ngirrangi*
	2	*thirrangan*	*thirra*	*thirra*	*thirrangi*
	3	*dirrangan / kirrangan*	*pirra / kirra*	*dirra*	*dirrangi*
1 INCL		*thirrangan*	*pirra*	*thirra*	*thirrangi*
DU	1	*nganganka*	*ngira*	*ngira*	*ngirange*
	2	*nanganka*	*nira*	*nira*	*nirange*
	3	*panganka / kanganka*	*pira / kira*	*pira*	*pirange*
PL	1	*ngangan*	*ngira*	*ngira*	*ngirangi*
	2	*nangan*	*nira*	*nira*	*nirangi*
	3	*pangan / kangan*	*pira / kira*	*pira*	*pirangi*

TURN(29)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngurdan*	*ngurdu*	*ngurdini*	*ngurdi*
	2	*thurdan*	*thurdu*	*thurdini*	*thurdi*
	3	*wurdan / kurdan*	*purdu / kurdu*	*wurdini*	*wurdi*
1 INCL		*thurdan*	*purdu*	*thurdini*	*thurdi*
DU	1	*nguddanka*	*ngudda*	*nguddene*	*ngudde*
	2	*nuddanka*	*nudda*	*nuddene*	*nudde*
	3	*puddanka / kuddanka*	*pudda / kudda*	*puddene*	*pudde*
PL	1	*nguddan*	*nguddu*	*nguddini*	*nguddi*
	2	*nuddan*	*nuddu*	*nuddini*	*nuddi*
	3	*puddan / kuddan*	*puddu / kuddu*	*puddini*	*puddi*

TURN:INTR(30)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngurdam*	*ngurdi*	*ngurdana*	*ngurdana*
	2	*thurdam*	*thurdi*	*thurdana*	*thurdana*
	3	*wurdam / kurdam*	*purdi*	*wurdana*	*wurdana*
1 INCL		*thurdam*	*purdi*	*thurdana*	*thurdana*
DU	1	*nguddamka*	*ngudde*	*nguddana*	*nguddana*
	2	*nuddamka*	*nudde*	*nuddana*	*nuddana*
	3	*puddamka / kuddamka*	*pudde*	*puddana*	*puddana*
PL	1	*nguddam*	*nguddi*	*nguddana*	*nguddana*
	2	*nuddam*	*nuddi*	*nuddana*	*nuddana*
	3	*puddam / kuddam*	*puddi*	*puddana*	*puddana*

EAT(31)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngulam*	*ngula*	*ngule*	*ngule*
	2	*thulam*	*thula*	*thule*	*thule*
	3	*wulam / kulam*	*pula / kula*	*wule*	*wule*
1 INCL		*thulam*	*pula*	*thule*	*thule*
DU	1	*ngullamka*	*ngulla*	*ngulle*	*ngulle*
	2	*nullamka*	*nulla*	*nulle*	*nulle*
	3	*pullamka / kullamka*	*pulla / kulla*	*pulle*	*pulle*
PL	1	*ngullam*	*ngulla*	*ngulle*	*ngulle*
	2	*nullam*	*nulla*	*nulle*	*nulle*
	3	*pullam / kullam*	*pulla / kulla*	*pulle*	*pulle*

REMOVE(32)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngungan*	*ngungu*	*ngunguni*	*ngunguni*
	2	*thungan*	*thungu*	*thunguni*	*thunguni*
	3	*yungan / kungan*	*pungu / kungu*	*yunguni*	*yunguni*
1 INCL		*thungan*	*pungu*	*thungi*	*thungi*
DU	1	*ngunganka*	*ngungu*	*ngungune*	*ngungune*
	2	*nunganka*	*nungu*	*nungune*	*nungune*
	3	*punganka / kunganka*	*pungu / kungu*	*pungune*	*pungune*
PL	1	*ngungan*	*ngungu*	*ngunguni*	*ngunguni*
	2	*nungan*	*nungu*	*nunguni*	*nunguni*
	3	*pungan / kungan*	*pungu / kungu*	*punguni*	*punguni*

REMOVE:RR(33)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngungam*	*ngungi*	*ngungana*	*ngungana*
	2	*thungam*	*thungi*	*thungana*	*thungana*
	3	*yungam / kungam*	*pungi / kungi*	*yungana*	*yungana*
1 INCL		*thungam*	*pungi*	*thungana*	*thungana*
DU	1	*ngungamka*	*ngunge*	*ngungana*	*ngungana*
	2	*nungamka*	*nunge*	*nungana*	*nungana*
	3	*pungamka / kungamka*	*punge / kunge*	*pungana*	*pungana*
PL	1	*ngungam*	*ngungi*	*ngungana*	*ngungana*
	2	*nungam*	*nungi*	*nungana*	*nungana*
	3	*pungam / kungam*	*pungi / kungi*	*pungana*	*pungana*

SAY/DO(34)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngamam*	*ngama*	*me*	*mi*
	2	*nam*	*thama*	*ne*	*ni*
	3	*mam / kamam*	*pama / kama*	*me*	*mi*
1 INCL		*thamam*	*pama*	*thume*	*thumi*
DU	1	*ngamamka*	*nguyema*	*ngume*	*ngumi*
	2	*namamka*	*nuyema*	*nume*	*numi*
	3	*pamamka / kamamka*	*puyema / kuyema*	*pume*	*pumi*
PL	1	*ngamam*	*nguyema*	*ngume*	*ngumi*
	2	*namam*	*nuyema*	*nume*	*numi*
	3	*pamam / kamam*	*puyema / kuyema*	*pume*	*pumi*

BALANCE(35)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*nganthangan*	*ngantha*	*ngantha*	*nganthangi*
	2	*thanthangan*	*thantha*	*thantha*	*thanthangi*
	3	*kanthangan / kanthangan*	*pantha / kantha*	*kantha*	*kanthangi*
1 INCL		*thanthangan*	*pantha*	*thantha*	*thanthangi*
DU	1	*nganthanganka*	*ngantha*	*ngantha*	*nganthangi*
	2	*nanthanganka*	*nantha*	*nantha*	*nanthangi*
	3	*panthanganka / kanthanganka*	*pantha / kantha*	*pantha*	*panthangi*
PL	1	*nganthangan*	*ngantha*	*ngantha*	*nganthangi*
	2	*nanthangan*	*nantha*	*nantha*	*nanthangi*
	3	*panthangan / kanthangan*	*pantha / kantha*	*pantha*	*panthangi*

BECOME(36)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngirrim*	*ngirri*	*ngirri*	*ngirrini*
	2	*thirrim*	*thirri*	*thirri*	*thirrini*
	3	*dirrim / kirrim*	*pirri / kirri*	*dirri*	*dirrini*
1 INCL		*thirrim*	*pirri*	*thirri*	*thirrini*
DU	1	*ngim*	*ngiri*	*ngi*	*ngiri*
	2	*nim*	*niri*	*ni*	*niri*
	3	*pim / kim*	*piri / kiri*	*pi*	*piri*
PL	1	*ngim*	*ngiri*	*ngi*	*ngiri*
	2	*nim*	*niri*	*ni*	*niri*
	3	*pim / kim*	*piri / kiri*	*pi*	*piri*

DRY(37)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*ngilim*	*ngili*	*ngili*	*ngilingi*
	2	*thilim*	*thili*	*thili*	
	3	*dilim / kilim*	*pili / kili*	*dili*	*dilingi*
1 INCL		*thilim*	*pili*	*thili*	*thilingi*
DU	1	*ngillimka*	*ngilli*	*ngilli*	*ngillingi*
	2	*thillimka*	*nilli*	*nilli*	*nillingi*
	3	*pillimka / killimka*	*pilli / killi*	*pilli*	*pillingi*
PL	1	*ngillim*	*ngilli*	*ngilli*	*ngillingi*
	2	*thillim*	*nilli*	*nilli*	*nillingi*
	3	*pillim / killim*	*pilli / killi*	*pilli*	*pillingi*

MISS(38)

		NFUT (/PRSL)	FUT (/FUTIRR)	PIMP	PSTIRR
SG	1	*nginim*	*ngini*	*nginanga*	*nginanga*
	2	*thinim*	*thini*	*thinanga*	*thinanga*
	3	*ningam / kiningam*	*pini / kini*	*ninga*	*ninga*
1 INCL		*thinim*	*pini*	*thinanga*	*thinanga*
DU	1	*nginnangamka*	*nginni*	*nginnanga*	*nginnanga*
	2	*ninnangamka*	*ninni*	*ninnanga*	*ninnanga*
	3	*pinnangamka / kinnangamka*	*pinni / kinni*	*pinnanga*	*pinnanga*
PL	1	*nginnangam*	*nginni*	*nginnanga*	*nginnanga*
	2	*ninnangam*	*ninni*	*ninnanga*	*ninnanga*
	3	*pinnangam / kinnangam*	*pinni / kinni*	*pinnanga*	*pinnanga*

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Many theories of language acquisition struggle to account for the morphological complexity and diversity of the world's languages. This book examines the acquisition of complex morphology of Murrinhpatha, a polysynthetic language of Northern Australia. It considers semi-naturalistic data from five children (1;9–6;1) collected over a two-year period. Analysis of the Murrinhpatha data is focused on the acquisition of polysynthetic verb constructions, large irregular inflectional paradigms, and bipartite stem verbs, which all pose interesting challenges to the learner, as well as to theories of language acquisition. The book argues that morphological complexity, which broadly includes factors such as transparency, predictability/regularity, richness, type/token frequency and productivity, must become central to our understanding of morphological acquisition. It seeks to understand how acquisition is impacted by differences in morphological systems and by the ways in which children and their interlocutors use these systems.

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