Distributions of case allomorphy by multilingual children

Speaking Warlpiri and Light Warlpiri

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When a new linguistic code emerges and stabilizes, what are the roles of children and adults in leading and consolidating the changes? This question lies at the intersection of child language acquisition and contact-induced language change. Adults and children have played different roles in the development of a new mixed code, Light Warlpiri, spoken in a Warlpiri community in northern Australia that arose from code-switching practices among bilinguals. Elements from typologically dissimilar languages are combined systematically in the new language, with verbal and nominal structures derived from different sources. Verbal morphology is from English/Kriol (which have fixed nominative-accusative word order patterns), with the addition of some innovations, probably brought in by speakers who were then children. Nominal case morphology is from Warlpiri (with ergative-absolutive case-marking, and flexible word order). But Light Warlpiri shows redistributions of case suffix allomorphy derived from Warlpiri. The paper shows the emerging case-marking patterns in Light Warlpiri, and tracks the roles played by children and adults in the changes.

Keywords: Warlpiri; Light Warlpiri; mixed language; case-marking; allomorphy; morphology; Australian; endangered language; language creation; child language acquisition

1. Introduction

A central question at the intersection of child language acquisition and contact-induced language change asks what the roles of children and adults are when a new code emerges and stabilizes. In a remote community in Australia, a system of code-switching was nativized by an age cohort who are the parents of the children in this study (2013), and consequently the nativized system – called Light Warlpiri – is one of the first languages of both the multilingual children under focus here and their multilingual parents. Light Warlpiri combines the verbal
structure of Aboriginal English (e.g. Butcher, 2008), general Australian English varieties (cf. Burridge & Mulder, 1998) and/or Kriol (an English-lexified creole)\(^1\) with the nominal structure of Warlpiri, a Pama-Nyungan language. Lexical items are taken from all sources. It was formed in approximately the last 35 years from bilingual speakers code-switching between Warlpiri and varieties of English and/or Kriol (O’Shannessy, 2005, 2009, 2013). The term ‘varieties of English’ in this paper is used when a distinction between specific varieties is not important for the discussion at hand, and the term includes general Australian English varieties (cf. Burridge & Mulder, 1998: 12; O’Shannessy, 2013: 339) and Aboriginal English (eg. Butcher, 2008). When a distinction between these varieties is relevant in this paper, it is usually between Aboriginal English, spoken by Indigenous speakers, or Australian English as spoken by non-Indigenous speakers, and either Aboriginal English or English will be used to refer to these respectively.

The speakers of Light Warlpiri are adults and youth up to around age 35 in one Warlpiri community, Lajamanu, in the Northern Territory of Australia. The children learn both Light Warlpiri and their traditional language, Warlpiri, from birth, and they also learn varieties of English and/or Kriol (an English-based creole) as they grow up. When the current parent group were children, they created new structures in Light Warlpiri through reanalyses of variable features present in their input (O’Shannessy, 2013). In other words, they created grammatical structures that were not in the language directed to them.

Of interest now is the role of the current children – the next generation – in the life of the new language. These children also receive variable input – they are spoken to in Warlpiri and Light Warlpiri, which share many features, for instance, Warlpiri case marking, and differ in others, for instance, most verb forms and verbal structure. They are also spoken to in code-switched speech, and to a lesser extent in varieties of English and/or Kriol. In some other contexts children have regularized codes – creoles – created by the adult generation, and spoken to the children by adults alongside pre-existing codes – traditional languages and pidgins.

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1. For a discussion of the distinction between varieties of Australian English and Kriol, and the complex context of the community in focus, see O’Shannessy 2013. Briefly, Kriol is an English-based creole spoken in northern Australia. The variety of Aboriginal English spoken contains influences from Warlpiri and Kriol, and these can be the same elements, for instance, little use of fricatives. Aboriginal English and Kriol share some elements, both are spoken to some extent in the community, and it is difficult at times to distinguish clearly between acrolectal Kriol and Aboriginal English. Elements from all of these languages occur in Light Warlpiri. The term ‘Aboriginal English’ is used when that variety is being referred to specifically, and ‘English’ is used when the elements in focus occur in both Standard Australian English and Aboriginal English.
(Shnukal & Marchese, 1983; Jourdan, 1989). In the current context the new code is a mixed language, Light Warlpiri, and is spoken alongside Warlpiri and to some extent English and Kriol. The question is whether these children are regularizing the new code further, re-analyzing elements of the input, or reproducing the input they receive with the same distributions of forms and structures. The reason that the new code created by the adult generation might be subject to regularization by children is that the new code shows internal variation, and there is considerable variation in the input the children receive.

The sociolinguistic context observed here is that of young multilingual children speaking a language, Light Warlpiri (O’Shannessy, 2005, 2012, 2013), which is only spoken by one preceding generation, their parents, and maintaining a language spoken by all speakers older than them, Warlpiri. This situation has not previously been observed and the opportunity to do this allows us to ask what the roles of adults and children are in language maintenance, language shift and new language stabilization. In this paper language stabilization refers to either maintenance of variation within subsystems, or increased systematicity within subsystems.

The complex linguistic situation described here allows observation of how speakers make use of each code and, consequently, how each source influences the new system. A striking typological difference between the source languages of Light Warlpiri is that in Warlpiri core and peripheral grammatical relations are indicated by case-marking suffixes, and in English and Kriol core cases are indicated by word order and prepositions. In Light Warlpiri the Warlpiri nominal case system is used, with some use of prepositions from varieties of English and Kriol in Light Warlpiri also. Distributions of Warlpiri nominal case systems in Warlpiri and Light Warlpiri are the focus of this paper, specifically, ergative case (which occurs on overt subjects of transitive verbs, and on instruments of transitive actions, e.g. ‘hit with a stick’), dative case (glossed as ‘for, to’), comitative case (glossed as ‘with’), allative case (glossed as ‘towards’) and locative case (glossed as ‘at, in, on’) systems.

In the case-marking systems, Warlpiri and Light Warlpiri share some changes in progress involving forms and distributions of case-markers with regard to vowel harmony. They differ in that in Light Warlpiri the changes are more advanced, with the consequence that vowel harmony is no longer necessary in some cases. Yet where there is a vowel present in a case-marker, vowel harmony operates as it does in classic Warlpiri. The term classic Warlpiri applies to Warlpiri as described in the early literature (Hale, 1982; Nash, 1986; Simpson, 1991; Swartz, 1991; Hale et al., 1995; Laughren et al., 1996).

The data show different patterns for some cases – ergative and dative cases have different distributions in Warlpiri versus Light Warlpiri, such that the two
systems are becoming less alike. In contrast, the comitative, allative and locative cases have the same distribution in both Warlpiri and Light Warlpiri, which means that the two systems are similar. For younger speakers it appears that a new case-form is becoming established for ergative and dative cases. In each language children and adults have the same distributional patterns overall, meaning that the speakers who are now adults must have led the changes, and the current cohorts of children are conforming to them.

The plan of the paper is as follows. In the next section I provide some background on mixed languages, and in Section 3 on contact-induced language change and language acquisition. In Section 4 I describe the sociolinguistic situation of Warlpiri and Light Warlpiri in the community in focus, and in Section 5 I describe the case-marking systems in classic Warlpiri and contemporary Warlpiri, and the methods of data collection and analysis. In Section 6 the results of the analyses are presented, and these are discussed in Section 7. I conclude in Section 8.

2. Mixed languages

Mixed languages have grammar and lexicon from more than one source, and must be categorized as having more than one parent language (Thomason & Kaufman, 1988; Matras & Bakker, 2003). A common type of mixed language combines lexicon from one language with grammatical structure from the other, for example Media Lengua (Muysken, 1994, 1997) and Anglo-Romani (Matras et al., 2007). The category of mixed language which includes Light Warlpiri is that in which the verbal structure is mostly drawn from one source, and the nominal structure mostly from the other, such that there is a verb-noun structural split. An example from Light Warlpiri illustrates this in (1). In all examples elements from Warlpiri are in italics, and from varieties of English and Kriol in plain font. An innovative element -m, is underlined (See O’Shannessy 2013 for details).

\[
\text{(1) } \text{Nyarrpara-rla nyuntu yu-m bugi?}
\]

where-LOC you you-NONFUT swim

‘Where did you swim?’

In example (1), the words \textit{nyarrpara} ‘where’ and \textit{nyuntu} ‘you’, and the grammatical element \textit{-rla} ‘at, on, in’ are from Warlpiri. The word \textit{bugi} ‘swim’ is from Kriol, and the word \textit{yu-m} ‘you-NONFUTURE’ is made up of the word ‘you’, with a new element attached to it. The element \textit{-m} ‘NONFUTURE’ is derived from English \textit{I’m}, and also from Kriol and Aboriginal English \textit{im} ‘he, him, she, her, it’ and \textit{dem} ‘they/them’, but in Light Warlpiri it has the meaning of ‘NONFUTURE’, which is not a structural category that occurs in Warlpiri, English, Aboriginal English or Kriol.
Other examples of mixed languages with a structural verb-noun split include Michif, which combines verbal structure from Cree and nominal structure from French (Bakker, 1994, 1997), and Gurindji Kriol, which combines verbal structure from Kriol and nominal structure from Gurindji (McConvell & Meakins, 2005). This type of language is relatively rare, but common language contact mechanisms of code-switching led to the emergence of Light Warlpiri and Gurindji Kriol (McConvell & Meakins, 2005; O’Shannessy, 2012, 2013). Speakers of a mixed language may also speak one or more of the source languages, but usually the mixed language develops independently of the sources, indicated by changes which occur in the mixed language but not in the source language (e.g. Bakker, 2003: 126).

3. Contact-induced language change and child multilingual acquisition

Increasingly there is research on children learning their first languages in complex multilingual environments (Stavans & Swisher, 2006; Meakins, 2008; Quay, 2008; O’Shannessy, 2012; Hoffmann, 2013). Most research is from contexts in which the input environment is stable in the sense that there is no change in progress in the speech community. The main question in these contexts is how the children deal with input from multiple linguistic systems. It is now well accepted that young bilingual and multilingual children can differentiate two or more linguistic systems from early on (Genesee, 1989; Lanza, 1992; Genesee et al., 1995; Lanza, 2004; de Houwer, 2005).

There is some research available on multilingual contexts in which change is in progress, and as the sociolinguistic contexts differ, so do the linguistic outcomes and the roles of children versus adults. In some contexts of nativization of creole languages, adults have created new structures and children have regularized paradigms (Shnukal & Marchese, 1983; Jourdan, 1989). In the case of Nicaraguan Sign Language, school-aged children created the new system, and then subsequent cohorts of young children have developed further morphosyntactic structures (Kegl et al., 1999; Senghas & Coppola, 2001; Senghas, 2003). In contexts of multi-dialectal input and change, school-aged children have developed koines (Amery, 1993; Kerswill & Williams, 2000). In a monolingual English context in which there was a change in progress, children aged 3–4 years pushed the change further than their parents did (Roberts, 1997). In the emergence of the mixed language in focus in this paper, Light Warlpiri, adults conventionalized code-switching patterns and young children systematized them further, adding structural innovations in the verbal complex which are not in the source languages (O’Shannessy, 2012, 2013). In another context of nativization of a mixed language, Gurindji Kriol, it appears that each generation of speakers has regularized the system more than
the previous generation in some areas of the grammar, including case-marking (Meakins, 2007). From these differences we can conclude that rather than generalizing across contexts, researchers need to examine each context independently.

4. The sociolinguistic situation of Warlpiri and Light Warlpiri

Warlpiri and Light Warlpiri are spoken in the small, remote community of Lajamanu, at the north of the Tanami Desert in Australia. Warlpiri is also spoken in other communities and in some towns, and there are approximately 4,000 speakers (Laughren et al., 1996). The community of Lajamanu was established in 1948–49 (Berndt & Berndt, 1987; Rowse, 1998), through forced relocation of Warlpiri from a community further south. Warlpiri is highly endangered, as there is great pressure for speakers to shift to English. Light Warlpiri was formed about 35 years ago, when young children, who had received input consisting of code-switching between Warlpiri, English and Kriol, analyzed the input as a single system, and added the structural innovations shown in example (2b) (O’Shannessy, 2012, 2013).

Light Warlpiri retains nominal morphology from Warlpiri, combined with verbal structure from Aboriginal English and Kriol, along with an innovative structure in the verbal auxiliary.

(2)

a. Nyarrpara-wana-npa-ø payi-ma-nu nyampu Nungarrayi?
   where-near-2SGS-3SGO buy-CAUSE-PST this name

b. Nyarrpara-wana yu-m payi-im nyampu Nungarrayi?
   where-near 2SGS-NFUT buy-TR this name

c. Weya yu bin payi-im det-wan Nungarrayi?
   where 2SGS PST buy-TR that-one name
   ‘Where did you buy this Nungarrayi?’

Example 2b is an interrogative sentence in Light Warlpiri, and 2a and 2c are constructed examples in Warlpiri and Aboriginal English/Kriol, respectively. The examples show that nyarrpara-wana ‘where-near’, nyampu ‘DETERMINER’ and the name Nungarrayi are from Warlpiri, payi-im ‘buy-TRANSITIVE’ is from Aboriginal English/Kriol, and yu ‘you’ is present in varieties of English and Kriol. The suffix -m ‘NONFUTURE’ attached to yu ‘you’ is an innovative structure in Light Warlpiri, with its form from English and Kriol, but with grammatical and semantic influence from Warlpiri (O’Shannessy, 2013).

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2. Nungarrayi is one of 16 subsection terms used in Warlpiri to denote kin relationships. Subsection terms are retained in Light Warlpiri.
5. Case-marking forms and vowel harmony in Warlpiri

5.1 Classic Warlpiri

The core case-marking system in classic Warlpiri is ergative-absolutive. To describe this system I will use Dixon’s (1979) terms of A argument to indicate the subject of a transitive verb, S to indicate the subject of an intransitive verb, and O to indicate the object of a transitive verb. Absolutive case, which occurs on S and O arguments, is realized as null marking.

The ergative case-marker (ERG), which occurs on A arguments, has four allomorphs, conditioned by stem length and vowel harmony. The forms are -ngku/-rlu (where ng represents a velar nasal, and rl represents a retroflex lateral) depending on the length of word stem, and they become front vowel forms, -ngki/-rli when attached to a word ending in a front vowel (Hale, 1982; Nash, 1986; Harvey & Baker, 2005). A nasal form occurs on words of two morae, as in jarntu-ngku ‘dog-ERG’ and wati-ngki ‘man-ERG’, and a lateral form occurs on words of three or more morae, as in wirriya-rlu ‘boy-ERG’ and ngamirni-rli ‘uncle-ERG’.

Allomorphy of the dative (DAT), comitative (COM) and allative (ALL) case-markers is distributed according to vowel harmony only. A back vowel form attaches to words ending in a back vowel, as in karnta-ku ‘woman-DAT’, yapa-kurlu ‘person-COM’, rdaku-kurra ‘hole-ALL’. The forms take a front vowel when following a stem ending in a front vowel, as in wati-ki ‘man-DAT’, maliki-kirli ‘dog-COM’, yirdiyi-kirra ‘road-ALL’.

Allomorphs of the locative case-marker (LOC) are distributed according to length of word stem only – a nasal form occurs on words of two morae, as in ngurra-ngka ‘home-LOC’, and a lateral form occurs on words of three or more morae, as in watiya-rla ‘tree-LOC’. The distributions of all case forms are summarized in Table 1.

Vowel harmony on words borrowed from English. Warlpiri words end in a vowel, but many English words do not. English borrowings which end in consonants are given a final epenthetic vowel. The default epenthetic vowel for a consonant-final borrowed word is /i/, but a back vowel may be applied when the vowel preceding the final consonant is a high back vowel (Harvey & Baker, 2005:1462). For instance, ‘Alice Springs’ becomes Yalijipiringi, ‘yard’ becomes yarti, but ‘school’ becomes kuurlu (Laughren, et al., 1996:201–205). So the vowel harmony rule which applies to consonant-final borrowed words is that an underlying /i/ form harmonizes to /u/ following a back vowel (Nash, 1986; Harvey & Baker, 2005).

Not all speakers apply the rule, and the variation is both individual and dialectal, but speakers of northern dialect are reported to apply the harmony (Nash, 1986;
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Harvey & Baker, 2005), and many older speakers of that dialect live in Lajamanu community. Borrowed words which are vowel final, such as waya ‘wire’, or fatha ‘father’ take a case-marker with a back vowel, as do Warlpiri words. Note that varieties of Australian English are not rhotic – there is no word-final post-vocalic [ɹ] in varieties of Australian English unless the following word begins with a vowel.

The following section discusses changes in progress in Warlpiri case-marker forms and distributions. To distinguish these from Warlpiri as described in the literature, I use the label ‘contemporary Warlpiri’. The patterns in use in contemporary Warlpiri apply more to speakers under approximately age 70 and much less to the oldest speakers.

5.2 Contemporary Warlpiri

Changes within Warlpiri noticed in the 1980s included increased SVO word order, and some omission of ergative marking from A arguments (Bavin & Shopen, 1985). Final vowel deletion, mentioned above for verbs, also occurs on suffixes, for example, the suffix -lk ‘then’, is often pronounced -lk, as in jinta-kari-lk ‘one-other-then’ (O’Shannessy, 2005, 2012, 2013).

The functions of all of the case-marking subsystems in contemporary Warlpiri are the same as in classic Warlpiri. But some case-marking forms have undergone changes, involving omission of vowels and reduction of consonant clusters. The new forms are used in addition to the classic forms.

Table 1. Case-marker forms in classic Warlpiri

<table>
<thead>
<tr>
<th>Case forms with vowel harmony</th>
<th>On stems with a final back vowel</th>
<th>On stems with a final front vowel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ergative on stems with 2 morae</td>
<td>-ngku</td>
<td>-ngki</td>
</tr>
<tr>
<td>on stems with 2+ morae</td>
<td>-rlu</td>
<td>-rli</td>
</tr>
<tr>
<td>Dative</td>
<td>-ku</td>
<td>-ki</td>
</tr>
<tr>
<td>Comitative</td>
<td>-kurlu</td>
<td>-kirli</td>
</tr>
<tr>
<td>Allative</td>
<td>-kurra</td>
<td>-kirra</td>
</tr>
<tr>
<td>Possessive</td>
<td>-kurlangu</td>
<td>-kirlangu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case forms without vowel harmony</th>
<th>On stems with 2 morae</th>
<th>On stems with 2+ morae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locative on stems with 2 morae</td>
<td>-ngka</td>
<td>-rla</td>
</tr>
<tr>
<td>Locative on stems with 2+ morae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ablative on any stem</td>
<td>-jangka</td>
<td></td>
</tr>
<tr>
<td>Evitative on any stem</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Case-marker forms in contemporary Warlpiri

<table>
<thead>
<tr>
<th>Case forms with vowel harmony</th>
<th>On stems with a final back vowel</th>
<th>On stems with a final front vowel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ergative on stems with 2 morae</td>
<td>-ngku, -ngu, -ng</td>
<td>-ngki, -ngi, -ng</td>
</tr>
<tr>
<td>Ergative on stems with 3+ morae</td>
<td>-rlu, -ngku, -ngu, -ng</td>
<td>-rli, -ngki, -ngi, -ng</td>
</tr>
<tr>
<td>Dative</td>
<td>-ku, -k</td>
<td>-ki, -k</td>
</tr>
<tr>
<td>Comitative</td>
<td>-kurlu, -kurl</td>
<td>-kirli, -kirl</td>
</tr>
<tr>
<td>Allative</td>
<td>-kurra</td>
<td>-kirra</td>
</tr>
<tr>
<td>Possessive</td>
<td>-kurlangu, -kang</td>
<td>-kirlangu, -kang</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case forms without vowel harmony</th>
<th>On stems with 2 morae</th>
<th>On stems with 3+ morae</th>
<th>Ablative³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locative</td>
<td>-ngka, -nga</td>
<td>-rla, -ngka, -nga</td>
<td>-jangka, -janga</td>
</tr>
<tr>
<td>Ablative³ on stems of any length</td>
<td>-jangka, -janga</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ergative case.** The ergative case-marker in contemporary Warlpiri, which occurs on overt subjects of transitive verbs, has an increased number of forms – the four forms described above for classic Warlpiri, plus three additional nasal forms. The additional forms omit the stop consonant after the velar nasal, creating -ngu and -ngi, and another form omits the vowel also, creating -ng. The distribution of forms is also changing, as noted by Bavin and Shopen (1985). Word stem length was a conditioning factor for ergative and locative case-markers in classic Warlpiri, but now the stem length requirement does not always apply. For example, Bavin and Shopen (1985: 89) noted kurlarda-ngku ‘spear-ERG’ instead of the classic Warlpiri kurlarda-rlu ‘spear-ERG’. The extent of these redistributions in contemporary Warlpiri in Lajamanu is discussed later in the paper, in comparison to Light Warlpiri.

(3) *paka-rn watiya-ng mayi?
    hit-pres tree-ERG QN
    ‘Did a tree hit him?’ (C02_5_1)

Example (3) shows the velar form of the ergative case-marker, with no vowel, on a three syllable word. It also shows a verb with the final vowel on the present tense inflection omitted.

³ The ablative, possessive and evitative cases are not discussed in this paper.
Comitative, dative and possessive cases. The final vowel is often omitted from the comitative form, creating -kurl/-kirl in addition to -kurlu/-kirli. The vowel is also often omitted from the dative form, creating -k in addition to -ku/-ki. A similar process is applied to the possessive form, creating -kurlang/-kirlang in addition to -kurlangu/-kirlangu, and most of the first syllable is sometimes omitted, creating -kang.

Allative case. There has been no change to the form of the allative, -kurra/-kirra, probably because *krra is not a possible combination in Warlpiri, and *kurr/kirr do not have possible Warlpiri codas.

Locative case. The locative now has an additional nasal form without a velar stop, -nga, and it can occur on word stems of any length. The lateral form also still occurs, usually on words which end in a consonant, which are usually English borrowings.

5.3 Prepositional system in Aboriginal English and Kriol

Some prepositional forms used in Light Warlpiri are derived from English, but the phonology and semantics are not necessarily the same as in Standard Australian English, rather, they are in line with Kriol (e.g. fo/bo ‘for, of, to’). The examples of prepositions here are not exhaustive, but give an indication of some aspects of the system. In (8) the preposition fo translates as ‘about’ or ‘over’ in English.
In (9) the preposition *la* has the meaning of English ‘in’ or ‘into’.

(9) *i garra ged-ap la tri*

\[ \text{3SGs FUT/OBL get-up PREP tree} \]

‘S/he’ll climb into the bushes.’

(Lee, 2002)

In (10) *la* has the meaning of English ‘to’.

(10) *yu jeinj-bek la im*

\[ \text{2SGs change-back PREP 3SGo} \]

‘Give him his change.’

(Lee, 2002)

In (11) *langa* translates as English ‘to’.

(11) *imin git langa jeil du*

\[ \text{3SGs:PST go:PST PREP jail too} \]

‘S/he went to jail too.’

(Lee, 2002)

When either case-markers or prepositions occur in the Light Warlpiri data, case-markers make up 95% of all occurrences (606 case-markers vs. 35 prepositions). Only case-markers relevant to this paper and which have a preposition as a possible alternative structure are included in the count (dative, comitative, allative, locative). Note that within Light Warlpiri prepositions are only occasionally a viable alternative, since the speakers clearly do not alternate freely between case-markers or prepositions. The fact that case-markers are almost always used is one of the indicators that Light Warlpiri has conventionalized as an independent linguistic system. That is, speakers are not free to choose between case-markers or prepositions at random, rather, case-markers are almost always the appropriate choice. The use of prepositions is constrained almost entirely to the dative case, and further constraints have not been identified at this point.

The research questions for this study are: do speakers of Light Warlpiri follow the case-marking forms and distributions of Warlpiri? And, do the children follow the same patterns as older speakers?

5.4 Data collection and method of statistical analysis

The Warlpiri and Light Warlpiri data were collected by me between 2002 and 2008 in Lajamanu community. The children’s caregivers signed consent forms for their children to participate, and permission was obtained from the Warlpiri staff at the local school, the local Community Council and the Central Land Council.
Participants. Participants were two groups of children, mean ages 7;0 (5 girls, 5 boys, age range 6;1–8;0) and 9;0 (7 girls, 2 boys, age range 8;2–9;5) and three groups of adult women. The children were grouped according to age because they were 6 years old or older, and Mean Length of Utterance (MLU) is not a useful measurement at that age. The group with mean age 7;0 is referred to as ‘age 7’, and the group with mean age 9;0 is referred to as ‘age 9’. All adults in the study are women, because in the community it is culturally appropriate for me as a female researcher to work with female adults. The three adult groups are: (1) 8 women aged 19–23 years; (2) 6 women aged about 30–50 years (referred to as ‘age 50’); and (3) 7 women aged about 60–70 years (referred to as ‘age 70’).

Materials. The data for the case-marking analyses consist of stories told from picture stimuli (Egan, 1986; O’Shannessy, 2004). In each set a series of pictures creates a narrative. All were created to be culturally appropriate. One story (Egan 1986) was written by a Warlpiri author and illustrator for use in the Warlpiri schools’ bilingual education program, and the text was removed. Five picture books were created by me to contain culturally appropriate content. Three were designed to elicit overt subjects of transitive verbs (which can be elided in both Warlpiri and Light Warlpiri), both animate and inanimate, one was designed to elicit locative structures, and one with no specific linguistic structures in mind. An example is given in Appendix 8, and the stories are available online at: http://www-personal.umich.edu/~carmelos/. Some examples of English glosses of transitive verbs elicited include ‘take’, ‘chase’, ‘get’, ‘pick up’, ‘frighten’, ‘push’, ‘carry’, ‘hit’, ‘kill’, ‘bite’ and ‘pierce’. Examples of English glosses of overt transitive subjects of those verbs are Warlpiri pronouns, e.g. nyanungu ‘he, she, it’, and nouns such as ‘bottle’, ‘brother’, ‘coconut’, ‘dog’, ‘lightning’, ‘man’, ‘monster’, ‘mother’, ‘rain’, ‘sister’, ‘snake’, ‘stick’ and ‘woman’.

Procedure. To cue the children into the target language of the task, they were played a 2–3 minute video, created specifically for the purpose, in which they heard a voice-over narrative in either Warlpiri or Light Warlpiri. The children were asked by me to speak like the person they just heard, telling stories about the picture books in front of them. Children could hold the books, A4-sized, laminated, in color, and turn the pages themselves. The narrations were recorded on either video (all of the children and some adults) or audio (some adults, who felt more comfortable with audio rather than video recordings). Warlpiri speakers told each story once, and Light Warlpiri speakers told each story once in each language, with the order of languages counter-balanced for each person, and the narrations two weeks apart.

Types of analysis. The narratives were transcribed by me in CHAT format (MacWhinney, 2000), sometimes with a Warlpiri research assistant. Quantitative analyses of the case-marking distributions were conducted from the texts of
the stories in each language, for each age group. Cases which have similar morphophonological properties were grouped for analysis, that is, ergative and dative cases were combined in one analysis because they both have new allomorphs in which there is no vowel (-ng [ergative], -k [dative]), in addition to allomorphs with front or back vowels (e.g. -ngu/-ngi [ergative], -ku/-ki [dative]). Allative and comitative cases were combined in another analysis, because they both have two allomorphs, with front or back vowels (-kurra/-kirra [allative], -kurlu/kirli [comitative]). Locative case distributions were analyzed separately, because the allomorphy is conditioned by length of word stem only. In previous work (O’Shannessy, 2006, 2009) children were grouped into two age groups, called age 7 and age 9, and in some instances the age 7 group showed differences from the other groups (O’Shannessy, 2009). For the analyses in this paper the children are grouped the same way, for comparison.

For each set of data a mixed effects logistic regression analysis was used, specifically the lme4 package in R (Pinheiro & Bates, 2000; Baayen, 2008; Bates et al., 2012). This analysis is appropriate for several reasons. In each analysis the dependent variable is binary, that is, there are only two options for the occurrence of each form, so the data are not normally distributed. The design involves repeated measures as the Light Warlpiri speakers tell narratives in both Light Warlpiri and Warlpiri. In addition, each speaker produces many clauses, so the data points from those clauses are not independent, and some speakers produce more clauses with case-markers in them than others do, so the number of data points per speaker is not uniform. If the individual units of analysis are treated as independent and their relationships to each other are ignored, and/or if it is assumed that each speaker contributes the same number of data points, the results might be misleading or not as informative as they could be (Goldstein, 2003). A mixed effects logistic regression analysis takes each of these attributes of the data into account. The advantages of the model for categorical data are described in Jaeger (2008). In the analysis, individual speakers and individual stories are treated as random effects, meaning that idiosyncratic attributes of a speaker or story are taken into account in the analysis, and are less likely to skew the results.

6. **Case-marking forms and vowel harmony in Light Warlpiri and Warlpiri**

6.1 **Case-marker forms with vowel harmony: ergative and dative**

The questions about each of the case-markers which involve vowel harmony are (a) how the forms and distributions in Light Warlpiri and contemporary Warlpiri
Distributions of case allomorphy by multilingual children

compare to each other and to classic Warlpiri, and (b) how the case allomorphs are conditioned. The distributions in Light Warlpiri are discussed first, then both languages are compared.

*Light Warlpiri.* Ergative and dative markers are discussed together because their occurrence in Warlpiri is dependent on vowel harmony (and additionally for the ergative, length of word stem). In Light Warlpiri the ergative marker has all seven allomorphs of contemporary Warlpiri, as in Table 2 above, but the allomorph with no vowel, \(-ng\), is the one which is most often produced. In Light Warlpiri the \(-ng\) form of the ergative accounts for 93% of occurrences, compared to 12% in contemporary Warlpiri. Conversely the lateral-initial allomorphs rarely occur. The dative marker has the three allomorphs of contemporary Warlpiri, but the \(-k\) form, with no vowel, accounts for 78% of occurrences, compared to 27% in contemporary Warlpiri.

When a word stem is consonant-final, an epenthetic vowel form is usually inserted, as in *gait-i-ng* ‘gate-EPEN-ERG’ and *raid-i-k* ‘ride-EPEN-DAT’. In Light Warlpiri the epenthetic vowel is not usually present when there is no suffix, so that words often end in a consonant, which is permitted in English and Kriol but not in classic Warlpiri. Several of the words which often have ergative or dative case-marking were checked for their form when they occur in Light Warlpiri without a case-marker. (Not all of the words occur in the texts without case-markers.) When there is no case-marker attached, the following words occur in the data without a final vowel: *bottle*, *boy-one* ‘boy’, *girl*, *man*, *fence* (pronounced *fins*/*fens*), *gate*, *snake*, *sun*, *ride*, *motorbike*, *help*, *lightning*, *shirt*, *yellow-one* ‘yellow’, *woman*. These data show that in Light Warlpiri these words can be consonant-final, and the vowel present before the case-marker can be considered to be added to the stem along with the case-marker, for example, *boi-wan-i-ng* ‘boy-one-EPEN-ERG’, *fins-i-ng* ‘fence-EPEN-ERG’. The presence of the vowel is relevant for vowel harmony because if speakers add \(-i-ng\) or \(-u-ng\) to a consonant-final word, they have the option of harmonizing the vowel, or not. Since the epenthetic vowels are added when there is a case-marker attached, the case-markers with epenthetic vowels were re-coded as with-vowel forms. That is, *san-i-ng* ‘sun- EPEN-ERG’ is counted as *san-ing* ‘sun-ERG’, with a vowel present in the case-form, because the vowel is not otherwise part of the word stem; *karnta-ng* ‘woman-ERG’ is counted as a no-vowel case form, because the vowel is part of the word stem. When vowel epenthesis is counted as a vowel being present in the case forms, the \(-ng\) form then accounts for 62% of all tokens of ergative forms, compared to 11% in contemporary Warlpiri. For the dative marker the \(-k\) form then accounts for 61% of tokens of all forms, compared to 12% in contemporary Warlpiri. Even with the conservative coding of vowel presence, in Light Warlpiri the no-vowel forms occur most often.
Tokens rather than types were counted because different tokens can occur on the same word stem, even within the speech of one speaker. For instance, one speaker may say both wirriya-ngu ‘boy-ERG’ and wirriya-ng ‘boy-ERG’.

(12) jinta-kari-ng na i-m ged-im kanta
    one-other-ERG DIS 3SGS-NFUT get-TR bush.coconut
    ‘Now the other one is getting the bush coconut.’ (ERGstoryLC39)

(13) an papap-i-ng i-m hab-um ngapa
    conj puppy-EPEN-ERG 3SGS-NFUT have-TR water
    ‘And the puppy is drinking water.’ (ERGstoryLA70)

Examples (12) and (13) show velar nasal forms of the ergative case-marker without a final vowel, in example (13) on an English-derived word. The occurrences of forms in each language are summarized in Table 3. Items were coded separately for language source of stem and whether words are consonant or vowel final, because in contemporary Warlpiri words are occasionally pronounced without a final vowel. In addition, items were coded for whether they follow the vowel harmony patterns used by adult speakers, because the use of any case from with a vowel entails a decision as to which vowel form to apply.

Table 3. Percentage of short forms of ergative and dative case-markers in Warlpiri and Light Warlpiri

<table>
<thead>
<tr>
<th>% short forms</th>
<th>Epenthetic vowel counted as part of case form?</th>
<th>Not counted</th>
<th>Counted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contemp. Warlpiri</td>
<td>LW</td>
<td>Contemp. Warlpiri</td>
</tr>
<tr>
<td>Ergative</td>
<td>12</td>
<td>93</td>
<td>11</td>
</tr>
<tr>
<td>Dative</td>
<td>27</td>
<td>78</td>
<td>12</td>
</tr>
</tbody>
</table>

LW = Light Warlpiri; Contemp. Warlpiri = contemporary Warlpiri

Distributions of forms. The distributions of case-markers are compared in two ways. First, to see if there are differences in distributions within Warlpiri across age groups, distributions are compared across all age groups in Warlpiri texts only, in two analyses. Second, to see if Light Warlpiri speakers show different distributions in Warlpiri versus Light Warlpiri, distributions are compared in texts in both languages by Light Warlpiri speakers only, i.e. young adults and children, also in two analyses. For data analysis mixed effects logistic regression analyses from the lme4 package in R (Pinheiro & Bates, 2000; Bates, et al., 2012) were conducted, because in each analysis the dependent variable is binary, that is, either one case form or another occurs on nouns. ‘Speaker’ and ‘story’ were included in
the analyses as random effects because speakers might not have contributed to the data in exactly the same ways. For instance, some speakers produced more tokens than others, some might produce one form more often than another form, and the stories might lead to differences which are not obvious. This might occur if, for example, some word stems favor one form over another, and those word stems occur more often in one story than in another.

**Analyses of Warlpiri data only.** The analysis of the Warlpiri-only data examines the occurrence of case forms with or without a vowel (vowel-novowel). The independent variables were age (7, 9, 20 or 50), and final sound of word stem (back vowel, consonant, front vowel). The age 70 group was not included because there are no forms without vowels in texts from that group. There were 492 tokens from 31 speakers in the analysis. The distribution of vowel vs. novowel forms for each age group is given in Table 4. Speaker and story stimulus were random effects. The outputs of all analyses are given in the appendices.

**Table 4. Distributions of ergative and dative forms with and without a vowel in Warlpiri, by age**

<table>
<thead>
<tr>
<th>Age groups</th>
<th>7</th>
<th>9</th>
<th>20</th>
<th>50</th>
<th>70</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>with vowel</td>
<td>44</td>
<td>87</td>
<td>70</td>
<td>188</td>
<td>408</td>
<td>797</td>
</tr>
<tr>
<td>no vowel</td>
<td>28</td>
<td>23</td>
<td>20</td>
<td>32</td>
<td>0</td>
<td>103</td>
</tr>
</tbody>
</table>

The results for the vowel-novowel analysis on the Warlpiri-only data (in Appendix 1) show that there are no significant differences across age groups in the use of a case form with or without a vowel. Age group 50 was just outside significance ($p = 0.06$), and as seen in Table 4, that age group produced relatively fewer no-vowel forms than the younger age groups. In other words, when speaking Warlpiri, all age groups below age 70 use approximately the same ratio of case forms with and without a vowel.

The second question is whether the case vowel forms which do occur conform to classic Warlpiri vowel harmony rules. Table 5 shows the distribution of case forms by age and agreement with rules of Warlpiri vowel harmony. As Table 5 shows, there were only three forms that disagreed with Warlpiri vowel harmony rules, from children aged 7. In this instance a statistical analysis is not necessary.

To sum up, when speaking Warlpiri, all age groups used similar proportions of forms without a vowel, and when a vowel is present in a case form, the speakers followed the rules of classic Warlpiri vowel harmony.
Table 5. Distributions of ergative and dative forms in Warlpiri by vowel harmony rules and age

<table>
<thead>
<tr>
<th>Harmony</th>
<th>7</th>
<th>9</th>
<th>20</th>
<th>50</th>
<th>70</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>45</td>
<td>83</td>
<td>70</td>
<td>188</td>
<td>408</td>
<td>794</td>
</tr>
<tr>
<td>Disagree</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

The results (in Appendix 2) for the vowel-novowel analysis between languages show that when the language was Warlpiri, relatively more case forms with vowels were produced (p < 0.001). When the final sound of the word stem was a consonant, front vowel case forms were applied most often (p < 0.001). This is because when the word stem ends in a consonant, an epenthetic vowel is needed, and the default epenthetic vowel in Warlpiri is a front vowel. So this finding is consistent with Warlpiri vowel harmony rules. There are no significant differences between age groups.

The second between-language analysis examined whether the extent to which case vowel forms that did occur conformed to classic Warlpiri vowel harmony rules. The independent variables were age (7, 9, 20), and whether or not the case vowel applied follows vowel harmony rules of classic Warlpiri (harmony agrees vs. disagrees). There were 323 tokens in the analysis. The distribution of case forms across age groups is given in Table 7.
Table 7. Distributions of ergative and dative forms in Warlpiri and Light Warlpiri by vowel harmony rules and age

<table>
<thead>
<tr>
<th>Harmony</th>
<th>7</th>
<th>9</th>
<th>20</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>72</td>
<td>112</td>
<td>130</td>
<td>314</td>
</tr>
<tr>
<td>Disagree</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

Speaker and story stimulus were random effects. The results of the vowel harmony analysis (in Appendix 3) are that there was no difference between languages, and one difference between age groups. There was more disagreement with vowel harmony rules for the age 7 group ($p = 0.03$), and for all ages when the word stem ended in a front vowel ($p = 0.002$). Note that the raw figures are very small, for example for age 7, there are only 4 instances of disagreement out of 76 tokens.

To sum up both analyses, Light Warlpiri speakers use more ergative and dative case forms without a vowel when they speak Light Warlpiri than when they speak Warlpiri. But when these same speakers use case forms with vowels, in both languages, for the most part they follow the rules of classic Warlpiri vowel harmony, with the exception that age group 7 does this slightly less often than the other age groups.

6.2 Case-marker forms with vowel harmony: Comitative and allative

The comitative (-kurlu/-kirli ‘with’/‘instrument’) and allative (-kurra/-kirra ‘to, towards, along’) case markers are discussed together because case allomorphs of these with front and back vowel distinctions occur in Light Warlpiri. There are no allomorphs with no-vowel forms. For the comitative marker, -kurlu/-kirli, the final vowel is often omitted, but the first vowel remains, so vowel harmony is still an option for a speaker. Accordingly, the forms -kurlu and -kurl are coded as a back vowel form and -kirli and -kirl are coded as a front vowel form. For the allative marker, -kurra/-kirra, there are no abbreviated forms.

(14) inya-nga ngurra-kurra i-m run away jarntu-kurlu there-LOC home-ALL 3SG-NONFUT run away dog-COM

Example (14) shows allative, comitative and locative case-markers in a Light Warlpiri sentence.
To test the distribution of the allomorphs of the two case-markers, the data were grouped into two sets. First, an analysis was conducted over all of the Warlpiri texts, for all ages, to see if there was a difference in case-marking distributions within Warlpiri according to age. Second, an analysis was run over both Warlpiri and Light Warlpiri texts, spoken by young adults and children. Speaker and story were included as random effects, for the reasons explained above.

For the Warlpiri-only data, there were 587 tokens. The distributions are given in Table 8.

Table 8. Distributions of comitative and allative forms in Warlpiri by vowel harmony rules and age

<table>
<thead>
<tr>
<th>Harmony</th>
<th>Age groups</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>9</td>
<td>20</td>
<td>50</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>74</td>
<td>116</td>
<td>92</td>
<td>175</td>
<td>116</td>
<td>573</td>
</tr>
<tr>
<td>Disagree</td>
<td>3</td>
<td>6</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>14</td>
</tr>
</tbody>
</table>

As Table 8 shows, only approximately 14 tokens out 587 disagree with Warlpiri vowel harmony rules. When the numbers that disagree are so small, there is no need for a statistical analysis. Clearly all age groups below age 70 follow Warlpiri vowel harmony rules almost all the time, and the age 70 group always does so.

In the between-language analysis, conducted on data from young adults and children in both Warlpiri and Light Warlpiri, there were 630 tokens. The analysis asked to what extent the vowel harmony rules of Warlpiri are being followed by these speakers, for each language, and for each age group. The distributions are given in Table 9.

Table 9. Distributions of comitative and allative forms in Warlpiri and Light Warlpiri by vowel harmony rules and age

<table>
<thead>
<tr>
<th>Harmony</th>
<th>Age groups</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>9</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>164</td>
<td>169</td>
<td>268</td>
<td></td>
<td></td>
<td>601</td>
</tr>
<tr>
<td>Disagree</td>
<td>4</td>
<td>9</td>
<td>16</td>
<td></td>
<td></td>
<td>29</td>
</tr>
</tbody>
</table>

The results, in Appendix 4, are that for all age groups, when a stem ends in a consonant or a front vowel, harmony rules are followed less often (p < 0.001 for each variable).
6.3 Case-marker form without vowel harmony: Locative

In classic Warlpiri, locative allomorphs are distributed according to word stem length only. A nasal form occurs on words of two morae, as in *warlu-ngka* 'fire-LOC', and a lateral form occurs on words of three or more morae, as in *yuwarli-rla* 'building-LOC' (see Section 5.1). In contemporary Warlpiri and Light Warlpiri both nasal-initial and lateral-initial forms of the locative marker occur, but are distributed differently from in classic Warlpiri.

(15) *pens-rla yu-rra shat-im-ap ngula-j*
  fence-LOC 2SF-FUT shut-TR-up ANAPH-TOP
  ‘Lock that one up inside the fence.’ (A35:C02.13c)

(16) *i–m look kankarl watiya-nga kanta-k*
  3SG-NFUT look high tree-LOC bush.coconut-DAT
  ‘He looked up high in the tree for a bush coconut.’ (ERGstoryLA21)

Example (15) shows a Light Warlpiri clause with a lateral-initial form on a word ending in a consonant, even though the stem has only one syllable, and (16) shows a nasal-initial form on a longer word ending in a vowel.

Additionally, in Warlpiri, in an exception to the stem length rule, determiners *nyampu* (this/here) and *(y)inya* (that/there) take the *-rla* locative allomorph. In Light Warlpiri they take both the *-nga/-ngka* and *-rla* allomorphs. In order to be able to code for stem length consistently, clauses with determiners were found and removed from the corpus (sixteen clauses were found and removed). To find the conditioning factors of locative allomorphy, two regression analyses were conducted, on Warlpiri data across all age groups, and between Warlpiri and Light Warlpiri.

The first analysis, on Warlpiri data only, was to see if the allomorphy follows the stem-length conditioning of classic Warlpiri. The dependent variable was whether the form agrees or disagrees with Warlpiri stem length patterns, and the independent variables were age (7, 9, 20, 50 or 70), stem length (2 or fewer morae, or more than 2 morae), and final sound of word stem (vowel or consonant). Story and speaker were random effects. There were 296 items in the analysis. The distributions of case forms across ages are given in Table 10.

Table 10. Distributions of locative forms in Warlpiri by stem length rules and age

<table>
<thead>
<tr>
<th>Harmony</th>
<th>7</th>
<th>9</th>
<th>20</th>
<th>50</th>
<th>70</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>15</td>
<td>21</td>
<td>30</td>
<td>74</td>
<td>88</td>
<td>228</td>
</tr>
<tr>
<td>Disagree</td>
<td>8</td>
<td>13</td>
<td>18</td>
<td>27</td>
<td>2</td>
<td>68</td>
</tr>
</tbody>
</table>

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The results (in Appendix 5) show that when a word stem has a length of 3 or more
morae, the case form applied is more likely to follow Warlpiri rules than when the
stem is shorter (p = 0.004). There are no differences across age groups or according
to the final sound of the stem.⁴

The second analysis was conducted on the texts of young adults and children
in both Warlpiri and Light Warlpiri. The dependent variable was whether the form
agrees or disagrees with Warlpiri stem length patterns, and the independent vari-
ables were language (Warlpiri or Light Warlpiri), age (7, 9, 20), stem length (2 or
fewer morae, or more than 2 morae), and final sound of word stem (vowel or
consonant). There were 162 items in the analysis. The distributions of case forms
across ages are given in Table 11.

Table 11. Distributions of Warlpiri and Light Warlpiri locative forms
by stem length rules

<table>
<thead>
<tr>
<th>Language</th>
<th>Warlpiri</th>
<th>Light Warlpiri</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>66</td>
<td>28</td>
<td>94</td>
</tr>
<tr>
<td>Disagree</td>
<td>39</td>
<td>29</td>
<td>68</td>
</tr>
</tbody>
</table>

The analysis (in Appendix 6) shows that there was no difference between age
groups or between languages. When the length of the word stem has 3 or more
morae, the case form applied is less likely to agree with Warlpiri stem length rules
(p < 0.001). When the final sound of the word stem is a vowel, the case form
applied is more likely to agree with Warlpiri stem length rules (p < 0.001). The
interpretation of the results is that on words with three or more syllables, a velar
allomorph instead of a lateral allomorph (as in classic Warlpiri) occurs relatively
often, and that words that end in consonants, mostly English-derived words, take
a lateral allomorph regardless of stem length.

6.4 English/Kriol prepositions in Light Warlpiri

The preposition which occurs most often in Light Warlpiri is fo/bo, a reflex of
English for, which occurs in local Aboriginal English and in Kriol, as in (17).

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⁴ When three independent variables are included in the analysis the two variables that
are not significant contribute to the analysis in some way, and the result given may be less
accurate. The two insignificant variables were removed from the analysis and the result is that
reported above.
In Light Warlpiri fo/bo functions like the Warlpiri dative case marker, which includes that of purposive. The Warlpiri dative case marker translates in English as “for, to, in relation to” (Nash, 1986:261), as in example (18).

(18) \text{wanti-ja-rla leda-ju jarntu-ku} \\
\text{fall-PAST-DAT ladder-TOP dog-DAT} \\
‘The ladder fell on the dog.’ \hfill \text{(ERGstoryLA29)}

In Light Warlpiri the English-derived fo/bo is used in this function. Examples are given in (19) and (20). In (20) a dative-marked noun is also present.

(19) \text{i-m fal-dan fo im kata-kurra} \\
\text{3SGS-NFUT fall-down DAT 3SGO head-ALL} \\
‘And the stone fell down near her head.’ \hfill \text{(ERGstoryLC57)}

(20) \text{an dat leda i-m faldan fo im jarntu-k} \\
\text{conj that ladder 3SG-NONFUT fall-down DAT 3SGO dog-DAT} \\
‘And that ladder fell down on the dog.’ \hfill \text{(ERGstoryLA26)}

In the Light Warlpiri data, when the resultative verb faldan ‘fall-down’ occurs and there is a direct effect on another participant in the event, the only collocation used is faldan fo/bo im ‘fall-down DAT 3SGO’, as in (19) and (20), and a dative marked noun, as in (20), is optional. There are 29 instances of fo/bo in the data, and 137 instances of the Warlpiri dative -ku/-ki/-k. The other English prepositions which occur in the data as prepositions are at (1 occurrence), with (1 occurrence), and in (4 occurrences). Each of these has an English-like meaning.

In addition, English prepositional forms occur in Light Warlpiri as verbal purposive markers, as they do in Fitzroy Valley Kriol (Hudson, 1983). Light Warlpiri examples are given in (21) and (22).

(21) \text{de-m ged-ap fo dem help-i-k} \\
\text{3PLS-NFUT get-up DAT 3PLO help-EPEN-DAT} \\
‘They got up and helped them.’ \hfill \text{(ERGstoryLA21)}

(22) \text{an yapa-wati-ng de-m help-im uuju kam-at fence-janga} \\
\text{conj person-PL-ERG 3PLS-NFUT help-TR horse come-out fence-ABL} \\
‘And the people helped the horse get away from the fence.’ \hfill \text{(ERGstoryLA26)}
7. Discussion

7.1 Ergative and dative case forms

Case forms without a vowel, -ng and -k, occur more often in Light Warlpiri than in contemporary Warlpiri. A form without a vowel is a departure from classic Warlpiri case distributions. When these forms occur on a vowel-final word, no vowel harmony is needed. But when a vowel is present in the case forms (including those with epenthetic vowels), vowel harmony remains intact, in both languages. In Light Warlpiri epenthetic vowels are applied to borrowed words along with a case-marker, and borrowed words are very often consonant-final, so it appears that the -i-ng and -i-k forms are becoming conventionalized as additional allomorphs of each case marker. The observation that change in use of case forms with no vowel is more advanced in Light Warlpiri than in contemporary Warlpiri indicates that for the ergative and dative subsystems case-marking in Light Warlpiri operates independently of that in Warlpiri. Interestingly the current cohort of children is not pushing the change further than the Light Warlpiri-speaking adults are. Both children and adults appear to be following the same motivations for case form distributions.

The analyses show that the distribution of ergative markers in Light Warlpiri differs from that in Warlpiri in several ways. In Light Warlpiri it occurs on only 60% of overt A arguments (O'Shannessy, 2008, 2009), and its form is changing in two ways. A velar-nasal-only form, -ng, occurs most often, regardless of word length, and it is possible that when attached to a consonant-final word, the form is becoming conventionalized as -ing. Previous analysis shows that the function of the ergative marker also differs from that in Warlpiri, as it indicates prominence in addition to marking overt A arguments (Meakins & O'Shannessy, 2010).

7.2 Comitative and allative forms

The distributions of comitative and allative forms are the same in both languages. This means that some processes taking place in the maintenance of Warlpiri are also taking place in the shift to, and stabilization of, Light Warlpiri. Speakers of all ages conform to the vowel harmony rules of classic Warlpiri, with a small number of exceptions.

7.3 Locative forms

The distribution of the locative marker differs between Warlpiri and Light Warlpiri, and follows classic Warlpiri stem-length rules more often in Warlpiri texts. For younger speakers, the distribution is the same in Warlpiri and Light Warlpiri, and follows Warlpiri stem-length rules relatively less often when the word stem is three
syrllables or longer, that is, longer words are given a velar-initial case form instead of a lateral-initial case form.

7.4 All forms

The changes taking place in the case system in Light Warlpiri involve regularization of allomorphy in several case subsystems, and for the locative, a redistribution of forms. In the context of mixed languages it is not unusual to see the mixed language develop independently of its source languages in some ways. Some changes have been seen in the case marking system of Gurindji Kriol (Meakins, 2011: 202), and in other parts of grammar in, for example, Sri Lanka Malay (Slomanson, 2006: 143), Michif (Bakker & Papen, 1996: 321) and Media Lengua (Muysken, 1994, 1997). Regularization of morphology is seen in language contact contexts (Shnukal & Marchese, 1983; Siegel, 2000; Jourdan, 2009), and in certain stages in first language acquisition (e.g. Cazden, 1968; Marcus et al., 1992; Marchman, 1997; Maratsos, 2000; Maslen et al., 2004; Kidd & Lum, 2008).

Children played a major innovative role in the development of the Light Warlpiri auxiliary in the 1980s (O’Shannessy, 2012, 2013), and that age-cohort – those now aged 20 – 35 – lead a smaller change in the distributions of case-markers in Light Warlpiri. The current cohort of children are not pushing those changes further, but remain in line with the distributional patterns of the young adult group. The reason for the stability might be that the children recognize Light Warlpiri and Warlpiri as two systems. The children have different names for Light Warlpiri and Warlpiri, Lajamanu stail ‘Lajamanu style’ and Yurntumu stail ‘Yundumu style’, respectively, indicating an awareness of two systems.

It is interesting that the amount of change in the ergative and dative markers differs between languages – the change in Light Warlpiri is more advanced, while the change in the comitative, allative and locative markers is the same in each language. Ergative and dative cases are core grammatical cases (Hale, 1982: 228) – they indicate grammatical relations in a basic transitive or dative clause. In this sense they have a different grammatical status from the semantic cases – allative, comitative and locative. Previous research has also shown change in the pragmatic use of the ergative marker in Light Warlpiri (Meakins & O’Shannessy, 2010). In the ergative and dative cases the final vowel can be deleted but the functions of the case-markers remain clear, so both types of form can maintain their grammatical roles but become available to be markers that signal differentiation. The cases may perform different language indexing functions for the speakers – ergative and dative markers might index Light Warlpiri in a way that the other markers do not. Light Warlpiri speakers align the allomorphs of the ergative and dative cases without a vowel with Light Warlpiri, and the with-vowel forms with Warlpiri. In
other words, forms of the ergative and dative markers might index the two codes, but the other cases might not.

8. Conclusion

The distribution of nominal case-marker forms is changing in both contemporary Warlpiri and Light Warlpiri. In general, children do not appear to be leading the changes, rather they appear to be following the patterns of the adults. Overall, where a vowel appears in a case form, the vowel harmony patterns in contemporary Warlpiri are being followed by all age groups, with some exceptions from age groups under 70.

For two cases, ergative and dative, the main change is that allomorphs without a vowel, -ng and -k, respectively, are being produced in both languages, and do not require vowel harmony except when following a consonant-final word. The ergative -ng allomorph occurs more often in Light Warlpiri than in Warlpiri, suggesting that there is some interlanguage influence, but also that the distribution is stabilizing independently in Light Warlpiri. The data suggest that when the -ng allomorph is applied to stems ending in a consonant, the allomorph is in the process of becoming conventionalized as -ing.

For comitative, allative and locative cases there is no difference in distribution between Warlpiri and Light Warlpiri, and no differences between age groups. For the locative case, word stem length rules are changing in both languages, and a velar-initial allomorph is being applied to longer words, in place of a lateral-initial allomorph. But an interesting split in the function of the two allomorphs is emerging – words that end in a consonant, usually English-derived words, take the lateral allomorph, and Warlpiri words increasingly take the velar allomorph, regardless of stem length.

In sum, changes to distributions of case-marker forms are taking place differently for different cases – for ergative and dative cases, Light Warlpiri patterns differently from Warlpiri. For comitative, allative and locative cases, changes in distributions pattern the same way in both languages. Children aged 7 to 9 do not appear to be leading the changes, rather they appear to be following the patterns of the adults.

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Distributions of case allomorphy by multilingual children


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Appendices

Appendix 1: Warlpiri data only, ergative and dative case-markers

Qn: Does the distribution of forms with or without a vowel differ by age or final sound of stem?

dat.lmer = lmer(casevowel ~ age + stemsound + (1|speaker) + (1|story), family= "binomial", data= dat)

Generalized linear mixed model fit by the Laplace approximation
Formula: casevowel ~ age + stemsound + (1 | speaker) + (1 | story)

Data: dat
AIC  BIC  logLik  deviance
476.7 510.3  -230.3  460.7

Random effects:
Groups Name     Variance  Std.Dev.
speaker (Intercept)  1.4172    1.1905
story (Intercept)   0.0000    0.0000
Number of obs: 492, groups: speaker, 31; story, 3

Fixed effects:

|                | Estimate | Std. Error | z value | Pr(>|z|) |
|----------------|----------|------------|---------|----------|
| (Intercept)    | 1.2026   | 0.6731     | 1.787   | 0.0740   |
| ageage50       | 1.5278   | 0.8119     | 1.882   | 0.0599   |
| ageage7        | 0.9269   | 0.8185     | -1.133  | 0.2574   |
| ageage9        | 0.1544   | 0.8080     | 0.191   | 0.8484   |
| stemsoundcon   | 0.7851   | 0.5475     | 1.434   | 0.1516   |
| stemsoundfront | 0.4634   | 0.4435     | 1.045   | 0.2961   |

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Appendix 2: Warlpiri and Light Warlpiri data, ergative and dative case-markers

Qn: Does the distribution of forms with or without a vowel differ by language, age or final sound of stem?

dat.lmer = lmer(casevowel ~ age2 + language + stemsound + (1|speaker) + (1|story), family= "binomial", data= dat)

dat.lmer

Generalized linear mixed model fit by the Laplace approximation
Formula: casevowel ~ age2 + language + stemsound + (1 | speaker) + (1 | story)
Appendix 3: Warlpiri and Light Warlpiri data, ergative and dative case-markers

Qn: Does the distribution of case-markers in each language follow Warlpiri vowel harmony rules?

> dat.lmer = lmer(harmony ~ age2 + language + stemsound + (1|speaker) + (1|story), family= "binomial", data= dat)
> dat.lmer

Generalized linear mixed model fit by the Laplace approximation
Formula: harmony ~ age2 + language + stemsound + (1 | speaker) + (1 | story)

Data: dat
AIC  BIC   logLik  deviance
77.68 107.9  -30.84   61.68

Random effects:
Groups Name   Variance   Std.Dev.
speaker (Intercept)  3.8832e-11  6.2316e-06
story (Intercept)  2.7391e-12  1.6550e-06
Number of obs: 323, groups: speaker, 37; story, 5
Appendix 4: Warlpiri and Light Warlpiri data, comitative and dative case-markers

Qn: Does the distribution of case-markers in each language follow Warlpiri vowel harmony rules, and does it differ by language, age or final sound of stem?

dat.lmer = lmer(harmony ~ age + language + stemsound + (1|speaker) + (1|story), family= "binomial", data= dat)

Generalized linear mixed model fit by the Laplace approximation
Formula: harmony ~ age + language + stemsound + (1 | speaker) + (1 | story)

Data: dat

AIC  BIC  logLik  deviance
209.1 244.7  -96.57  193.1

Random effects:
Groups    Name    Variance    Std.Dev.
speaker  (Intercept)  1.0050e-13 3.1702e-07
story    (Intercept)  2.6146e-10 1.6170e-05

Number of obs: 630, groups: speaker, 39; story, 6

Fixed effects:

|            | Estimate | Std. Error | z value | Pr(>|z|) |
|------------|----------|------------|---------|----------|
| (Intercept)| 4.03611  | 0.44218    | 9.128   | <2e-16***|
| ageage7    | 0.63798  | 0.59542    | 1.071   | 0.284    |
| ageage9    | -0.12318 | 0.50303    | -0.245  | 0.807    |
| languageWrlp| -0.01214 | 0.48609    | -0.025  | 0.980    |
| stemsoundcon| -2.63206 | 0.50159    | -5.247  | 1.54e-07***|
| stemsoundfront| -2.37725 | 0.51219    | -4.641  | 3.46e-06***|

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
Appendix 5: Warlpiri data, locative case-marker

Qn: Does the distribution of locative case-markers follow Warlpiri stem length rules, and does it differ by age or final sound of stem?

```r
> dat.lmer = lmer(WrlpRules ~ length + (1|speaker) + (1|story), family= "binomial", data= dat)
> dat.lmer
```

Generalized linear mixed model fit by the Laplace approximation
Formula: WrlpRules ~ length + (1 | speaker) + (1 | story)

Data: dat

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<td>0.029994</td>
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Number of obs: 296, groups: speaker, 41; story, 4

Fixed effects:

| Estimate  | Std. Error | z value | Pr(>|z|) |
|-----------|------------|---------|---------|
| (Intercept) | 0.8101     | 0.3308  | 2.449   | 0.01433* |
| lengthstem3 | 0.9554     | 0.3323  | 2.875   | 0.00403** |

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Appendix 6: Warlpiri and Light Warlpiri data, locative case-marker

Qn: Does the distribution of locative case-markers follow Warlpiri stem length rules, and does it differ by language, age or final sound of stem?

```r
> dat.lmer = lmer(WrlpRules ~ language + age + length + finalsound + (1|speaker) + (1|story), family= "binomial", data= dat)
> dat.lmer
```

Generalized linear mixed model fit by the Laplace approximation
Formula: WrlpRules ~ language + age + length + finalsound + (1 | speaker) + (1 | story)

Data: dat

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Random effects:

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<td>story (Intercept)</td>
<td>0.18937</td>
<td>0.43517</td>
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Number of obs: 162, groups: speaker, 34; story, 4
Fixed effects:

|                  | Estimate | Std. Error | z value | Pr(>|z|) |
|------------------|----------|------------|---------|----------|
| (Intercept)      | -1.9044  | 0.7518     | -2.533  | 0.0113*  |
| languageWrlp     | 0.4226   | 0.4451     | 0.949   | 0.3424   |
| ageage09         | -1.0564  | 0.6324     | -1.670  | 0.0948   |
| ageage20         | -0.8450  | 0.5744     | -1.471  | 0.1413   |
| lengthstem3      | -2.3036  | 0.5405     | -4.262  | 2.03e-05*** |
| finalsoundv      | 4.9233   | 0.8121     | 6.062   | 1.34e-09*** |

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ 1

Appendix 7: Abbreviations used in the interlinear glosses

2sgs 2nd person singular subject
3pls 3rd person plural subject
3sgo 3rd person singular object
3sgs 3rd person singular subject
all allative case
anaph anaphoric
cause causative
com comitative case
conj conjunction
dat dative case
det determiner
dis discourse marker
epen epenthesis
erg ergative case
fut future
fut/obl future/obligation
impf imperfective
loc locative case
nfut nonfuture
prep preposition
purp purposive
tr transitive
Appendix 8: Example of picture stimuli