

# Intergenerational changes in Gurindji Kriol

## Comparing apparent-time and real-time data

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This paper explores intergenerational changes in Gurindji Kriol, in order to determine whether differences between adults and children are the result of an abrupt generational shift or an extended acquisition process. We analyse the production of Gurindji in the speech of five age groups of Gurindji Kriol speakers, using a set of 176 picture-prompt narratives from 70 different speakers. The data is analysed both synchronically (in apparent-time) and diachronically (in real-time). The synchronic snapshot of the data reveals that adults use significantly more Gurindji than children which can be interpreted as a generational shift towards Kriol. Nonetheless the real-time data shows that most children increase their use of Gurindji as they age which suggests an extended acquisition of Gurindji. Although contradictory on the surface, this study argues that these processes are occurring in tandem, with the extended acquisition of Gurindji by children slowing down the inter-generational shift towards Kriol.

**Keywords:** language change, acquisition, Gurindji Kriol, mixed languages

### 1. Introduction

Previous studies of Gurindji Kriol have shown a number of differences between the speech of the current adult and child generations of speakers (§2.4), however the nature of these changes is not well understood. Specifically, it is not known whether these changes are the result of an abrupt generational shift or an extended acquisition process of Gurindji by children. This study aims to identify the processes responsible for intergenerational changes in Gurindji Kriol through a quantitative analysis of noun and verb production in three subsets of the Gurindji Kriol corpus.

We use three datasets derived from the larger 165 hour Gurindji Kriol corpus (§3.1). The datasets consist of recordings of picture-prompt narratives using two

books – *Frog, Where are You* (Mayer, 1994 [1969]) and *The Monster Story* (O’Shannessy, 2004) (§3.2). The first dataset consists of 176 Frog and Monster stories told by 70 speakers. We conducted an apparent-time analysis of differences in noun and verb use between adults and four groups of children (§3.3.1). The second dataset consists of 48 recordings from 24 children who have narrated the Frog story multiple times over a number of years, allowing for a real-time analysis of changes in these children’s speech patterns as they have aged (§3.3.2). The final dataset consists of 20 recordings of 10 adults telling the Frog story to both adults and children under the age of 5 years (§3.3.3). This dataset allows for an analysis of the input received by children in Kalkaringi (northern Australia) in the form of adult-directed and child-directed speech.

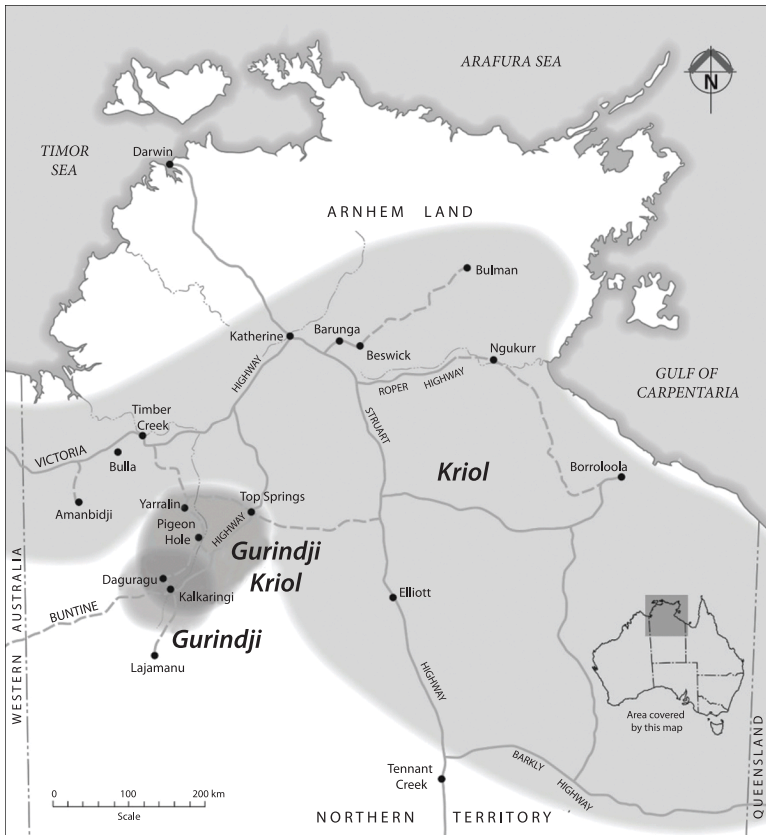
Our study aims to understand how the current adult and child generations of Gurindji Kriol speakers vary with regards to their use of Gurindji or Kriol-derived nouns and verbs in picture-prompt narratives. We use a synchronic snapshot of the Gurindji corpus to show a distinct difference in the use of Gurindji in child and adult speech which is suggestive of language shift to Kriol. We then examine whether this apparent-time data is mirrored by real-time data for a subset of the same child group. If the hypothesis of an abrupt intergenerational change is correct, we would expect to see no difference in the use of Gurindji across an individual child’s life. In fact, we find an overall increase over time in the use of Gurindji by individual child speakers. This dataset supports an extended acquisition scenario rather than an abrupt intergenerational change. We suggest that these processes are in fact not contradictory but that, although there is a general shift to Kriol underway, the extended acquisition of Gurindji is slowing down this shift (§4.1). Finally, we aim to determine possible motivating factors for the different processes observed in the apparent-time and real-time data through the child-input dataset (§4.2). We also find differences across the datasets between the production of nouns and verbs, which we discuss in §4.3.

## 2. Language change in the Gurindji community

### 2.1 The origins of Gurindji Kriol

Gurindji Kriol is a mixed language spoken in northern Australia. It is the dominant language of the Gurindji communities of Kalkaringi and Daguragu, and it is also spoken further north in the Bilinarra and Ngarinyman communities of Nitjpurru (Pigeon Hole) and Yarralin (see Figure 1). Kalkaringi and Daguragu were established as separate communities, but due to their close proximity (situated only 8kms apart from each other) and similar socio-political situations (with

shared kin relations and administration), they essentially function as a single community (Meakins, 2008b, p.300). The name “Kalkaringi” is used in this paper to refer to both communities, unless otherwise stated.



**Figure 1.** Areas in northern Australia where Gurindji, Kriol and Gurindji Kriol are spoken (Meakins, Hua, Algy, & Bromham, 2019, p.299)

Empirical evidence for the origins of mixed languages is quite scarce, and Gurindji Kriol’s recent emergence has provided a rare opportunity to observe the linguistic and socio-political factors responsible for the genesis of such a variety. Kalkaringi is a highly multilingual community, with Gurindji, Warlpiri, Gurindji Kriol, English and Kriol in use. (Differences between Gurindji, Gurindji Kriol and Kriol will be explained in §2.2). General conversation between community members most often takes place in Gurindji and Gurindji Kriol, as well as a small amount of Kriol (Meakins, 2008b). It is not uncommon for speakers to switch between varieties within a single conversation, especially during cross-

generational conversations, as in (1). This example is an excerpt from a conversation between four women from Kalkaringi, aged between 19 and 48 years, during a fishing trip at Yarralin. In this example, Gurindji elements are presented in italics, with Kriol-derived elements in plain font. CS refers to code-switching and the names of participants have been anonymised.

(1) (Meakins, 2008b, p.285)

- a. SS: Kylie-mob weya dei bin gon bij-in-bat?  
Kriol Kylie-group where they PST go fish-ing-ing  
(19 years) “Kylie and that lot – where did they go fishing?”
- b. EO: *Marntaj* wi kan *liwart* hiya wi *ngurra nyawa-ngka-rni*.  
GK CS ok we can wait here we camp this-LOC-ONLY  
(48 years) “OK we can wait here, we’ll camp right here.”
- c. FO: *Wanyjika-warla nyila ngu-lu ya-ni*?  
Gurindji where-FOC that CAT-they go-PST  
(43 years) “Where did they go?”
- d. CA: Dei neba tok *ngayiny* dei bin jas tok ‘ai-m gon bij-in’.  
GK they never talk me.DAT they PST just talk I-POT go fish-ing  
(21 years): “They didn’t tell me, they just said ‘I’m going fishing.’”

Gurindji Kriol derives from code-switching practices, such as those used by the older speakers in (1). In the 1970s, code-switching between Gurindji and Kriol was observed to be the dominant language practice in Kalkaringi (McConvell, 1988). Over time, this pervasive code-switching eventually stabilised into an autonomous mixed language variety (McConvell & Meakins, 2005; Meakins, 2011a). The recent history of Gurindji people also provides a socio-political context for the emergence of the mixed language. The post-invasion period of Gurindji history is one of the better-documented periods of Australian history (Charola & Meakins, 2016; Hardy, 1968; Ward, 2016). This is likely due to the Gurindji people’s impact on Australian politics. The Gurindji people gained significant media attention for their nine-year workers strike between the years of 1966 – 1975, which eventually culminated in the legal transfer of the land at Wave Hill station back to the Gurindji people in 1986. This was the first successful land claim for an Aboriginal group in Australia, and it generated a great deal of momentum for the broader Australian Indigenous land rights movement. The Gurindji people became famous for their determination during this time, and their eventual triumph further solidified the strength of the Gurindji identity. This strength of identity has probably driven the maintenance of many elements of the Gurindji language, despite Kriol becoming increasingly dominant in the area, superseding many traditional languages and coming to represent a pan-north

Australian Aboriginal identity (Meakins, 2008a, p. 86). These socio-political and linguistic factors provided the motivation for the emergence of Gurindji Kriol.

## 2.2 The source languages of Gurindji Kriol

### 2.2.1 *Gurindji*

Gurindji is the traditional language of the Gurindji people. It is a prototypical Pama-Nyungan language, exhibiting relatively free word order and an extensive use of both inflectional and derivational suffixing morphology. Overt nominals in Gurindji are obligatorily marked for case according to an ergative-absolutive system, whilst bound pronominals follow a nominative-accusative pattern. Verbs are expressed using one of 34 inflecting verbs that are inflected for tense (past and present), aspect (perfect and imperfect) and mood (potential, imperative), or a complex predicate which combines the inflecting verb with a coverb that is largely uninflecting but carries the semantic weight of the verbal predicate (Meakins & McConvell, 2021). An example of a typical Gurindji sentence is given in (2):

- (2) Kirrawa ngu-lu-ø pangkily pa-ni ngarlaka-ngka kajirri-lu.  
 goanna CAT-they-it hit.head hit-PST head-LOC woman-ERG  
 “The old women hit the goanna on the head.”

(adapted from Meakins, 2008b, p. 288)

### 2.2.2 *Kriol*

Kriol is an English-lexifier Creole language spoken throughout much of northern Australia, which has replaced traditional languages in many areas. The structure of Kriol is a fusion of mostly English lexicon with the phonology and semantics of traditional Australian languages (Munro, 2011; Sandefur, 1979; Schultze-Berndt, Meakins, & Angelo, 2013). Most of the lexicon is derived from English, with some forms derived from traditional Australian languages (Dickson, 2015). Grammatical relations are expressed through word order and the verb consists of a main verb inflected for transitivity and telicity with a preceding auxiliary verb encoding TAM categories (past tense, potential mood, perfective etc). Example (3) illustrates a typical Kriol sentence:

- (3) Det olgamen dei bin kil-im det guana langa hed.  
 the old.women they PST hit-TR the goanna on head  
 “The old women hit the goanna on the head.”

(adapted from Meakins, 2008b, p. 292)

## 2.3 Structure of Gurindji Kriol

Gurindji Kriol shows a fairly even split of lexical and grammatical material derived from both source languages. Using a 200 word Swadesh list, about 35% of nouns and verbs are derived from Kriol, 28% from Gurindji and 37% have synonymous forms drawn from both languages. For example, for lexemes such as ‘jump’, the Gurindji-derived *tipart* and the Kriol-derived *jam* can be used interchangeably (Meakins, 2008b, p. 294). The mixed lexicon of Gurindji Kriol is reflected structurally. It is classified as a V-N (Verb-Noun) mixed language (cf. Bakker, 2015; Meakins, 2018), as it exhibits a split in its grammar – with the verbal frame derived from Kriol and the nominal frame derived from Gurindji.

Example (4) demonstrates the lexical and structural split of Gurindji Kriol. In addition to the mixed lexicon, some other features of note include the Kriol-derived SVO word order, the complex verbal predicate consisting of Kriol-derived elements, and the Gurindji-derived nominal elements such as the subject marker *-ngku* (derived from the ergative marker) and the locative marker *-ngka*.

- (4) Dat *kajirri-ngku* dei bin kil-im dat guana *ngarlaka-ngka*.  
 the woman-ERG they PST hit-TR the goanna head-LOC  
 “The old women hit the goanna on the head.”

(adapted from Meakins, 2008b, p. 295)

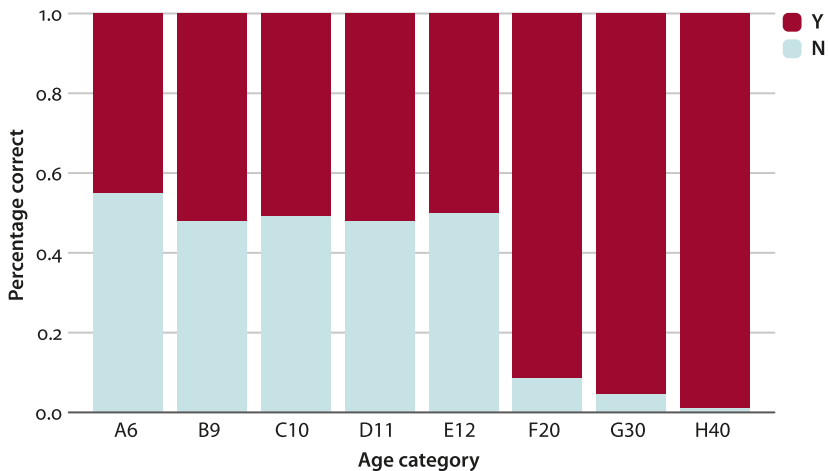
## 2.4 Previous intergenerational studies of Gurindji Kriol

Most of the work describing Gurindji Kriol has been undertaken with adult speakers. More recently, the language of the next generation has been studied and compared with the adult speakers, in particular spatial relations (§2.4.1), case-marking (§2.4.2) and the comprehension of Gurindji vocabulary (§2.4.3). Broader intergenerational studies of 185 lexical and grammatical features of the language have also been undertaken (Bromham, Hua, Algy, & Meakins, 2020; Hua, Meakins, Algy, & Bromham, 2021; Meakins et al., 2019).

### 2.4.1 Changes to the spatial relations system

Meakins and Algy (2016) observed intergenerational changes in the spatial relations systems of Gurindji Kriol speakers. They tested 109 Gurindji participants in eight age groups according to their active and passive knowledge of Gurindji terms for ‘north’, ‘south’, ‘east’ and ‘west’. They found that the current child generation had a lower active knowledge of the cardinal directions paradigm than the current adult generation, as shown in Figure 2 (which was also lower than the grandparent generation (Meakins, 2011b)). This was attributed to an abrupt generational shift between adults and children rather than extended acquisition due

to the large differences between the performance of adults and children, and the lack of a significant improvement across child age groups. If an extended acquisition process were at play here, the change in performance between the age groups of children would be expected to be quite gradual, with children steadily decreasing in performance of the Gurindji-derived system in each younger age group. However, the suddenness of the change is indicative of a generational shift, at least in the spatial relations system of the language.



**Figure 2.** Percentage of correct responses of cardinal directions according to age category (A6=6–8 yrs, B9=9 yrs, C10=10 yrs, D11=11 yrs, E12=12–14 yrs, F20=20–29yrs, G30=30–39yrs; H40=40+yrs) (Meakins & Algy, 2016, p.13)

Dunn, Meakins and Algy (2021) built upon this study by testing 30 Gurindji children's use of spatial description strategies, rather than their knowledge of these strategies. They compared the children's production with 10 adults using the 'Man and tree' task, developed by Levinson and others (Cognitive Anthropology Research Group, 1992). The 'Man and tree' task is a director–matcher game, in which two people sit side-by-side, facing the same direction, with a small wooden board placed vertically between them so they cannot see each other's pictures. The game consists of four sets of minimally different configurations of men and trees. The director of each session describes the configuration of the 'man' and 'tree' in each of the images in turn to the matcher who then chooses a picture they believe matches from a set of loose cards in front of them. Gurindji children used more landmark-based descriptions to describe the relation position of the 'man' and 'tree', rather than the cardinal directions system used by adult speakers, as shown in Table 1. Again, there was a clear difference in usage between children

and adults, but no significant differences between age groups of children, which is indicative of an abrupt generational shift.

**Table 1.** Use of spatial description strategies in ‘Man and tree’ tasks

	Cardinal	Landmark	Left/Right	Other	Total
children	34.5% ( <i>n</i> = 404)	47.5% ( <i>n</i> = 556)	4% ( <i>n</i> = 44)	14% ( <i>n</i> = 162)	1168
adults	77.5% ( <i>n</i> = 329)	4.5% ( <i>n</i> = 19)	0% ( <i>n</i> = 0)	18% ( <i>n</i> = 77)	425

**2.4.2** *Changes in case marking strategies*

A number of other studies have examined changes in the case-marking system of the current child generation of Gurindji Kriol-speakers. Meakins (2009, 2015) shows that optional subject marking has developed as a result of contact between Gurindji and Kriol whereby the Gurindji ergative marker was retained in the process of the formation of the mixed language, Gurindji Kriol, but became optional and was later re-analysed as nominative marking when it also came to mark intransitive subjects. Meakins and Wilmoth (2020) examined the use of nominative marking in the adult and child generations, and found that the extension of the historical ergative marker to intransitive subjects had largely gone to completion in Gurindji Kriol-speaking children.

For some Gurindji children, the shift in the argument marking system has progressed further. Van den Bos, Meakins and Algy (2017) have observed the emergence of a relative case system in some Gurindji Kriol-speaking children where the historical ergative marker is now used to encode transitive and intransitive subjects, but also possessors. The innovation was shown to be entirely language-internal, indicating the emergence of a new, distinct generational variety of Gurindji Kriol.

This generational shift in the argument marking system has also been observed in a comprehension study. O’Shannessy and Meakins (2012) explored the argument marking strategies of both Gurindji Kriol and Light Warlpiri speakers, both Australian mixed languages. For both languages, intergenerational differences in the interpretation and interaction of case-marking (derived from Gurindji and Warlpiri, respectively) and word order (derived from Kriol) were measured. Both Light Warlpiri and Gurindji Kriol-speaking children showed a gradual increase in their use of the ergative case-marking strategy in interpreting argument relations as they aged. This gradual change, in contrast to the sudden shift seen in changes to Gurindji Kriol’s spatial relations systems, seems to be indicative of an extended acquisition process for this aspect of Gurindji Kriol.



### 2.4.3 Changes in lexical comprehension

A final study in intergenerational language change examined differences in the comprehension of Gurindji nouns for two generations of Gurindji Kriol speakers (Meakins & Wigglesworth, 2013). A 40-item vocabulary comprehension task was administered to 52 participants from Kalkaringi across five age groups. The comprehension task consisted of 40 Gurindji nouns. The test was administered to participants in the model of the Peabody Picture Vocabulary Test. Images were arranged in a 2×2 grid consisting of the target picture and three distracter pictures. Participants were presented with the 2×2 grid of pictures and heard a pre-recorded Gurindji token twice. They then pointed to the picture they thought corresponded to the word they had heard, and their response was recorded. Adults were found to have better overall comprehension of Gurindji nouns than children, and the performance of children showed a gradual decline for each younger age group, as shown in Table 2.

**Table 2.** Number and percentage of items in/correct according to age groups (Meakins & Wigglesworth, 2013, p. 183)

	20–30 years		12–15 years		9–11 years		7–8 years		4–6 years	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Correct	261	93	303	84	271	75	373	67	308	59
Incorrect	19	7	57	16	89	25	182	33	212	41
Total	280	100	360	100	360	100	555	100	520	100

The difference between adult and child groups is not as abrupt as in the other studies and could be indicative of an extended acquisition process for Gurindji nominals (with children's comprehension increasing as they age). However, Meakins and Wigglesworth (2013) correlate this change with the decreasing amount of Gurindji input received by younger children. The comprehension of a lexical item was linked to the frequency of input received by children for that item (based on a 60 hour corpus of child-input data). This points towards a gradual and continued shift away from Gurindji for Gurindji Kriol speakers in Kalkaringi, and identifies the input received by children as a possible contributing factor for this change.

## 2.5 Perspectives on intergenerational changes to Gurindji Kriol

Perceptions of intergenerational changes in Gurindji Kriol differ between generations of Gurindji people, as well as between linguists and the Gurindji commu-

nity. Firstly, perceptions of Gurindji Kriol vary between different generations of Gurindji people. Adult speakers of Gurindji Kriol view intergenerational changes as representative of an extended acquisition process for Gurindji, believing that children learn Gurindji Kriol first and learn more Gurindji vocabulary as they age. This approach treats traditional Gurindji not as a standard for communication, but as a cultural object, framing Gurindji Kriol as the default variety of the community (Meakins, 2011a, pp.61–63). Adult Gurindji Kriol speakers consider Gurindji to be a harder language to learn than Kriol, which is the reason for this late acquisition. McConvell (1991) suggests that this perception has resulted in a higher level of Kriol input for children, as this is seen as an easier language for children to acquire and use. Our study shows some support for this observation, as will be discussed in §3.4.3. On the other hand, older generations who learnt Gurindji as children offer a different perspective, mostly viewing these changes as representative of a general decline in the use of Gurindji, which may eventually result in the loss of the language.

Linguists view the synchronic snapshot of intergenerational data presented in §2.4 more like older generations of Gurindji people, that is, as a decline in Gurindji. This type of data can be framed in terms of the apparent-time hypothesis which proposes that synchronic differences between speakers of different ages are indicative of language change (Bailey, Wikle, Tillery, & Sand, 1991; Labov, 1963). Under the apparent-time hypothesis, the decrease in the comprehension and production of Gurindji would be interpreted as language shift. This approach is limited, however, as it assumes that speakers will continue to use the same linguistic resources for the rest of their lives (Meyerhoff, 2011, p.60). This limitation is highlighted in studies of linguistic change over individuals' lifespans which have shown that individual speakers contribute to community change in different ways depending on factors observable in real-time. For example, Sankoff and Blondeau (2007) observed that 'early adopters' of change for the production of /r/ in Montreal French remained stable later in their lives, while 'later adopters' underwent a greater degree of change. A number of other sociolinguistic studies have also investigated 'leaders' and 'laggers' of linguistic change across multiple variables in both apparent-time and real-time (Brand, Hay, Watson, & Sóskuthy, forthcoming; Nevalainen, Raumolin-Brunberg, & Mannila, 2011; Waters & Tagliamonte, 2017). In the case of Gurindji Kriol, if an extended acquisition of Gurindji is underway (as suggested by adult Gurindji Kriol speakers), then the apparent-time hypothesis would produce an unrepresentative picture of Gurindji vitality, as the linguistic practices of children would not yet have stabilised. It is for this reason that this study presents an analysis of both apparent-time data and real-time data in the form of a panel study, which involves data from the same speakers as they age (Meyerhoff, 2011, p. 139). This type of data allows

for a retroactive analysis of changes to speakers' linguistic practices, providing us with a means of testing extrapolations made from apparent-time data.

### 3. Inter-generational differences in the use of nouns and verbs

#### 3.1 Corpus

The data for this study is drawn from the Gurindji Kriol corpus (Meakins, Algy, & Wilmoth, 2021), which consists of 165 hours of recordings from 157 different speakers, with accompanying CLAN and ELAN files. The corpus was collected by Meakins and Algy, and transcribed, translated and annotated in CLAN by a number of students, including Sasha Wilmoth, during three University of Queensland Summer Research Programs (see acknowledgements). Wilmoth then cleaned up the corpus, anonymised the transcripts and converted them to ELAN for use by other researchers not familiar with CLAN. We use speaker initials throughout this paper which means the speakers are recognisable to community members but anonymous to non-community members.

Each morpheme in the transcripts has been coded for grammatical information such as transitivity, grammatical relations, animacy, part of speech and source language (Gurindji or Kriol). The part of speech and source language tagging is used for this particular study. Three subsets of data are drawn from the corpus for this study: apparent-time data (§3.3.1), real-time data (§3.3.2) and child-directed data (§3.3.3).

#### 3.2 Elicitation materials

The data used in this study are recordings of the Frog Story and Monster Story picture-prompt narratives. We chose this data from the broader corpus to maximise comparability across adults and children, and adult-directed and child-directed speech. In aiming for comparability, we acknowledge that we are sacrificing naturalness somewhat in the use of picture-prompt narratives (Klamer & Moro, 2020). Note though, that despite the number of Western items in Frog stories, this does not artificially inflate the number of English/Kriol words used since Gurindji people often use Gurindji words for modern items.

Participants were shown a story consisting of multiple images (without words). They were asked to tell a story as they viewed the images (as if they were describing the events to somebody else). The Frog Story is well known and has been used world-wide in many cross-linguistic studies (see for example Slobin, 2004; Slobin & Berman, 1994). The Monster Story was designed by Carmel

O'Shannessy (2004) as a part of a picture book series aimed at Warlpiri children in Central Australia. It depicts scenes in which a dog is stolen by a large monster, trapped inside an enclosure and ultimately rescued by its child owners. This book has also been used in comparisons between Light Warlpiri and Gurindji Kriol (for e.g., Meakins & O'Shannessy, 2010).

The Frog and Monster stories depict multiple subjects performing a variety of different actions. This makes them highly effective for testing lexical usage, that is, the use of a Gurindji-derived or a Kriol-derived word to describe a certain object or event. Since all participants are describing the same objects and events in picture-prompt narratives, this type of data presents an effective measure of consistency and variation within a single speech community. In addition, because this type of data was recorded from the same speakers at different points in time, we are able to effectively measure changes to these individuals' speech patterns in a highly consistent and comparable way.

### 3.3 Datasets

Searches were run in CLAN to extract the Gurindji and Kriol noun and verb tokens from the transcriptions. Importantly, the total number of unique tokens (types) used in each recording was counted, not the number of times that each token is used. In other words, this study does not measure how many times speakers use certain words – rather, it measures whether a speaker uses a Gurindji or a Kriol-derived noun or verb when they are describing a certain referent or event. For example, when a speaker refers to a dog, they may choose to use the Kriol-derived *pappap* or the Gurindji-derived *warlaku*. Even if the speaker uses the Gurindji-derived variant *warlaku* several times, it is only recorded as one type to represent the choice of the Gurindji-derived variant rather than the Kriol-derived variant. If each occurrence of the word was counted as an individual token (i.e., 12 instances of *warlaku* equals 12 Gurindji tokens), then words used to describe more common events and referents in the picture-prompt narratives (such as children, dogs and monsters) would skew the data. In instances where the same speaker used both languages for the same referent at different points both types were counted.

#### 3.3.1 Apparent-time data

The apparent-time data consists of 2,622 noun types and 3,880 verb types. These tokens were extracted from 176 Frog and Monster stories, totalling seven hours and 47 minutes of recording. This includes 105 renditions of the Frog Story and 71 renditions of the Monster Story told to age peers. These narratives are sourced from 70 different speakers – 12 males and 58 females. The disproportionate num-

ber of males versus females in the data is due to cultural restrictions on women working with adult men who are not elders in the community (Meakins, Green, & Turpin, 2018, p.248). As a result, the only males recorded were children. Gender is not included in the analysis for this reason.

The speakers are aged between five and 35 years old. They are split into four child age groups and one adult group. The child age groups are: 5–9 years, 10–11 years, 12–14 years and 15–17 years. The adults in this study were aged between 21 and 35 years. These age categories were chosen to reflect stages of child development and Australian schooling stages. The 5–9 years category are children in transition and early primary school, the 10–11 years category represents late primary school, 12–14 years represents the early years of secondary school and 15–17 years represents speakers in the late stages of secondary school. The speaker ages and number of narratives are given in Table 3. Note that the proportion of narratives in each age category is uneven. This is because the categories were determined to reflect different stages of development, rather than to create evenness across age categories, which may have led to an unrepresentative analysis due to the higher number of narratives performed by 10–14 year-old children.

**Table 3.** Number of picture-prompt narratives in the apparent-time data subsection, per age category

Age category	Category code	Number of narratives
5–9 years	A5	35
10–11 years	B10	60
12–14 years	C12	43
15–17 years	D15	14
Adults (21–35 years)	E21	24

### 3.3.2 *Real-time data*

The real-time data subset of the corpus consists of 903 noun types and 1,197 verb types. These tokens were produced by the 24 children (4 male, 20 female) for whom multiple recordings of the Frog Story were collected over a timespan of one or more years. For each of these speakers, the initial and the most recent recordings were analysed. 48 recordings were analysed, approximately 2.5 hours.

The time between the initial and most recent recordings ranged from one year to seven years. Children were aged between seven and 14 at the time of their initial recordings, and between 11 and 17 at the time of their most recent recordings. Table 4 shows each speaker's age at the first and the most recent recordings of the Frog story.

**Table 4.** List of speakers and ages at first and most recent recordings in the real-time data

Speaker	Age (first recording)	Age (most recent recording)
SB	10	16
BP	7	12
CZ	11	14
CH	8	15
CT	12	15
DB	9	15
DO	8	13
ED	11	12
EM	11	14
GI	12	14
JB	10	17
KB	10	13
KE	11	14
KH	11	13
MR	11	13
MI	8	15
NS	14	17
QF	11	13
RC	10	12
RA	13	14
SH	10	14
TB	9	12
VS	10	11
XR	10	13

### 3.3.3 *Child-directed data*

The child-directed data contains 464 noun types and 703 verb types. These tokens come from 10 adult female speakers who had been recorded telling the Frog Story both by themselves with other adults present and separately to children under the age of 5 years. These speakers are aged between 20–34 years. This subset contains 20 different recordings, with one directed to a child and the other directed to an adult for each speaker. In total, these 20 files represent approximately 1 hour and 20 minutes of recordings.

### 3.4 Results

This section reports on the results of the apparent-time, real-time and child-directed data analyses.

#### 3.4.1 *Apparent time data*

The proportion of Gurindji-derived and Kriol-derived nouns and verbs for each age category in the apparent-time data is shown in Table 5 and Table 6, respectively.

**Table 5.** Percentage of Gurindji and Kriol-derived nouns by age category

	A5 (5–9 years)		B10 (10–11 years)		C12 (12–14 years)		D15 (15–17 years)		E21 (21–35 years)	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Gurindji	148	33.79	237	32.29	211	32.02	84	34.85	203	47.99
Kriol	290	66.21	497	67.71	448	67.98	157	65.15	220	52.00
<b>Total</b>	<b>438</b>		<b>734</b>		<b>659</b>		<b>241</b>		<b>423</b>	

**Table 6.** Percentage of Gurindji and Kriol-derived verbs by age category

	A5 (5–9 years)		B10 (10–11 years)		C12 (12–14 years)		D15 (15–17 years)		E21 (21–35 years)	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Gurindji	116	15.36	178	15.05	159	16.77	70	21.15	211	31.83
Kriol	639	84.64	1005	84.95	789	83.23	261	78.85	452	68.17
<b>Total</b>	<b>755</b>		<b>1183</b>		<b>948</b>		<b>331</b>		<b>663</b>	

The noun and verb production data for the apparent-time data subsections were analysed using generalised linear mixed models (glm2 package in R) (Marschner, 2011). All noun and verb tokens in the apparent-time data subsection were coded for one dependent variable (source language) and two independent variables (age category and part of speech) to test whether any differences in the use of nouns and verbs between age groups were significant. Speaker and type of picture-prompt narrative (Frog story or Monster story) were coded as random variables. The use of these random variables allows the model to account for both idiolectal variation and differing degrees of contribution to the corpus from each speaker and each picture-prompt narrative. This model is summarised as follows:

**Dependent variable**

Source language

**Independent variables**

Age category

Part of speech

Random variables Speaker  
Narrative type

The output of the GLMM analysis is given in Table 7.

Table 7. Output of generalised linear mixed models’ analysis of apparent time data

	Estimate	Std. error	z value	Pr(> z )
Intercept	0.71578	0.11709	6.113	$p < .001$
B10	0.04190	0.09067	0.462	0.6440
C12	−0.03676	0.09348	−0.393	0.6941
D15	−0.28334	0.12127	−2.337	$p < .05$
E21	−0.81237	0.09603	−8.459	$p < .001$
Verb	0.88308	0.05958	14.821	$p < .001$

The GLMM analysis shows that adult speakers (E21 age category) produced significantly more Gurindji words in Frog and Monster stories than did child speakers ( $p < .001$ ). The oldest group of children also produced more Gurindji than the younger groups of children ( $p < .05$ ), although the difference is not as great (Figure 3). All groups are also more likely to produce more Gurindji nouns than verbs ( $p < .001$ ) (Figure 4).

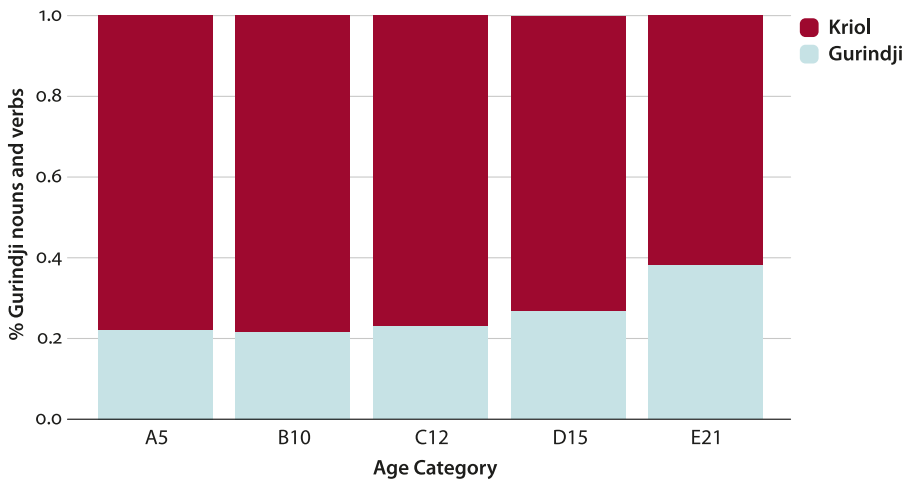
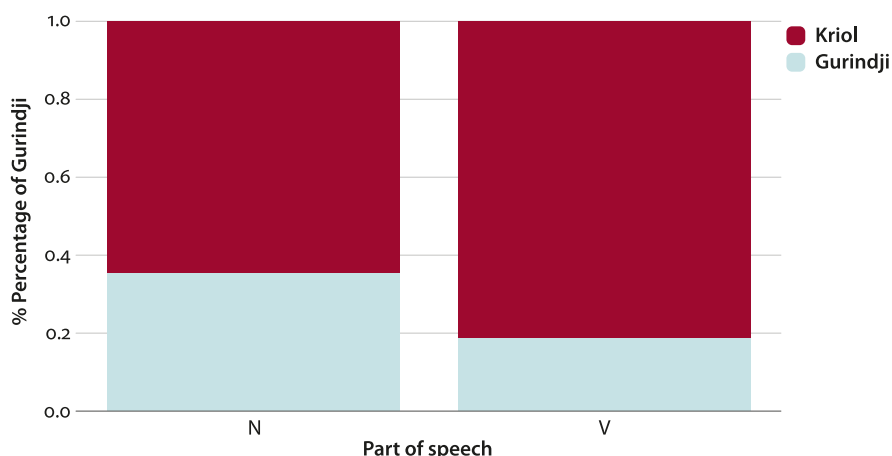


Figure 3. Percentage of Gurindji and Kriol-derived nouns and verbs in Gurindji Kriol speech by age category. A5 = 5–9 years, B10 = 10–11 years, C12 = 12–14 years, D15 = 15–17 years, E21 = Adults 21–35 years





**Figure 4.** Percentage of Gurindji and Kriol nouns and verbs in Gurindji Kriol by part of speech

### 3.4.2 Real time data

The results of the real-time data were plotted according to children's age and their percentage of Gurindji-derived words used, so that real-time change can be observed for each individual speaker. The real-time changes in individual speakers' use of Gurindji and Kriol-derived nouns and verbs in Gurindji Kriol speech as they age are shown in Table 8.

**Table 8.** Changes in individual children's use of Gurindji-derived nouns and verbs over time (*italics* refers to increase and **bold** to decrease)

Speaker	Age	Nouns Gurindji %	Increase/ decrease	Verbs Gurindji %	Increase/ decrease
FSB	10	20.83%		9.68%	
	16	36.84%	<i>16.01%</i>	17.39%	<i>7.71%</i>
FBP	7	31.25%		23.53%	
	12	35.00%	<i>3.75%</i>	16.13%	<b>-7.40%</b>
FCZ	11	21.05%		17.24%	
	14	37.50%	<i>16.45%</i>	13.04%	<b>-4.20%</b>
FCH	8	31.58%		18.52%	
	15	22.73%	<b>-8.85%</b>	20.69%	<i>2.17%</i>
FCT	12	22.22%		22.73%	
	15	27.78%	<i>5.56%</i>	22.58%	<b>-0.15%</b>

Table 8. (continued)

Speaker	Age	Nouns Gurindji %	Increase/ decrease	Verbs Gurindji %	Increase/ decrease
FDB	9	17.39%		12.00%	
	15	35.00%	17.61%	23.81%	11.81%
FDO	8	27.78%		8.33%	
	13	37.50%	9.72%	21.43%	13.10%
FED	11	28.57%		11.54%	
	12	30.00%	1.43%	17.39%	5.85%
FEM	11	27.78%		26.09%	
	14	46.15%	18.38%	23.08%	−3.01%
FGI	12	20.00%		16.67%	
	14	26.32%	6.32%	17.86%	1.19%
FJB	10	17.65%		11.11%	
	17	36.84%	19.20%	17.39%	6.28%
FKB	10	21.74%		12.50%	
	13	20.00%	−1.74%	13.33%	0.83%
FKE	11	46.15%		9.52%	
	14	33.33%	−12.82%	16.67%	7.14%
FKH	11	22.73%		10.71%	
	13	26.32%	3.59%	17.14%	6.43%
FMR	11	29.17%		13.64%	
	13	38.46%	9.29%	7.14%	−6.49%
FMI	8	37.50%		14.81%	
	15	35.29%	−2.21%	19.05%	4.23%
FNS	14	18.18%		14.29%	
	17	30.00%	11.82%	18.52%	4.23%
FQF	11	22.22%		13.04%	
	13	33.33%	11.11%	20.83%	7.79%
FRC	10	38.89%		10.53%	
	12	30.77%	−8.12%	13.04%	2.52%
FRA	13	41.18%		13.64%	
	14	27.78%	−13.40%	15.79%	2.15%
FSH	10	26.67%		23.08%	

Table 8. (continued)

Speaker	Age	Nouns Gurindji %	Increase/ decrease	Verbs Gurindji %	Increase/ decrease
FTB	14	26.32%	−0.35%	19.05%	−4.03%
	9	26.32%		13.64%	
	12	32.00%	5.68%	14.29%	0.65%
FVS	10	23.81%		12.00%	
	11	23.81%	0.00%	25.00%	13.00%
FXR	10	42.86%		26.67%	
	13	17.39%	−25.47%	24.14%	−2.53%

Of the 24 children in the real-time data, 15 showed an increase in their usage of Gurindji-derived nouns as they aged, while seven children showed a decrease (and thus an increase in Kriol-derived nouns). The remaining two children maintained their level of Gurindji-derived nouns (with a less than 1% change). The changes in verb usage over time show a similar pattern. 15 children increased their usage of Gurindji-derived verbs over time, while six children decreased their usage (and thus increased their usage of Kriol-derived verbs). Three of the children maintained similar verb choice patterns over time ( $\pm < 1\%$ ).

Overall, these results show a general trend of increasing use of Gurindji-derived nouns and verbs in children’s Gurindji Kriol over time. This trend is reflected in Figure 5, which plots changes in individual children’s Gurindji-derived noun and verb usage over time.

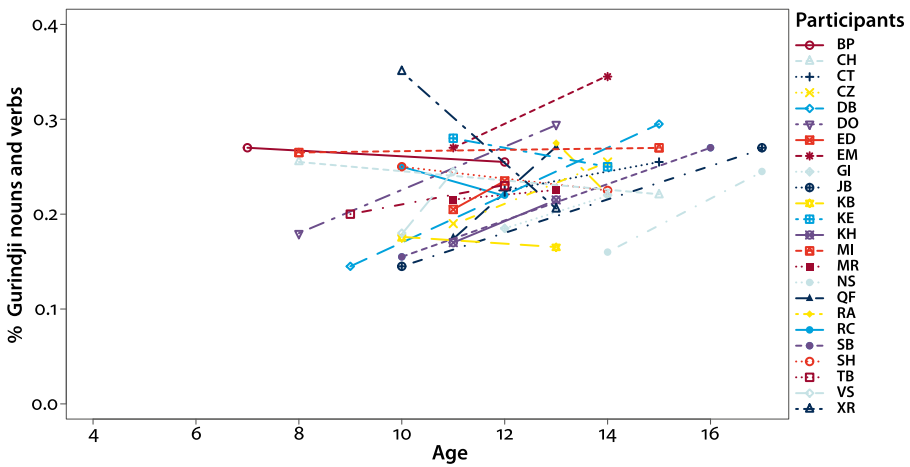


Figure 5. Changes in individual children’s use of Gurindji nouns and verbs over time

3.4.3 *Child-directed data*

Table 9 shows the total number of Gurindji and Kriol-derived nouns and verbs in child-directed speech in the child-directed data. The results for adult-directed speech are shown in Table 10.

**Table 9.** Proportion of Gurindji and Kriol-derived nouns and verbs in Gurindji Kriol child-directed speech

	Nouns		Verbs		Total	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Gurindji	97	41.10	98	26.34	195	32.07
Kriol	139	58.90	274	73.66	413	67.93
Total	236	38.82	372	61.18	608	

**Table 10.** Proportion of Gurindji and Kriol-derived nouns and verbs in Gurindji Kriol adult-directed speech

	Nouns		Verbs		Total	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Gurindji	106	46.49	111	33.53	217	38.82
Kriol	122	53.51	220	66.47	342	61.18
Total	228	40.79	331	59.21	559	

To test whether differences in the use of Gurindji were influenced by audience and part of speech (noun or verb), tokens in the child-directed data were coded for one dependent variable (source language) and two independent variables (audience and part of speech). Speaker was included as a random variable in order to account for idiolectal variation. Picture-prompt narrative was not included as a random variable in this model as it consists of Frog stories only. This model is summarised as follows:

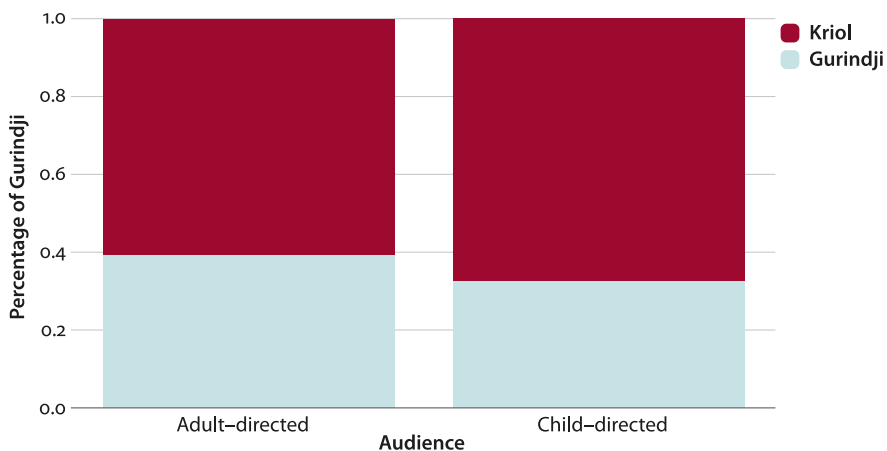
Dependent variable	Source language (Gurindji/Kriol)
Independent variables	Audience (adult/child-directed)
	Part of speech (noun/verb)
Random variable	Speaker

The output of the GLMM analysis is given in Table 11.

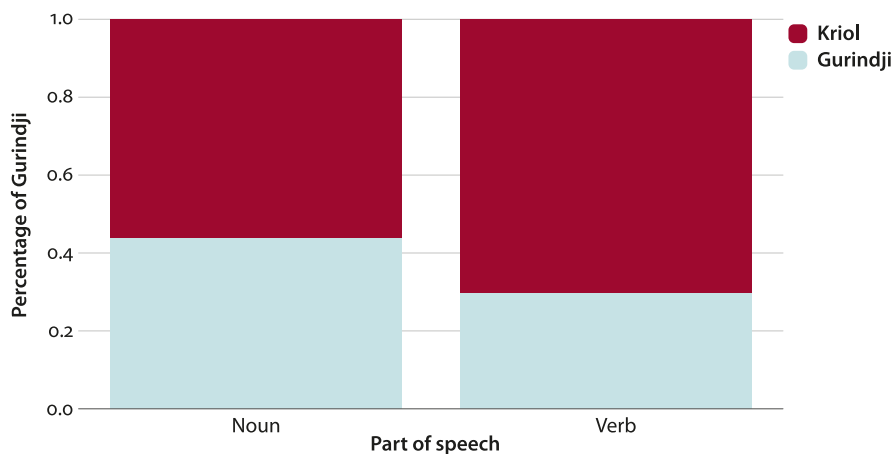
**Table 11.** Output of generalised linear mixed models analysis of child-directed data

	Estimate	Std. error	z value	Pr(> z )
(Intercept)	0.08358	0.13203	0.633	0.5267
Audience	0.31468	0.12555	2.506	$p < .05$
POS	0.61577	0.12594	4.889	$p < .001$

The analysis shows that Gurindji-derived nouns and verbs are used significantly less in child-directed speech than in adult-directed speech ( $p < .05$ ). The total percentage of Gurindji-derived nouns and verbs in adult-directed speech is 38.82%, compared to 32.07% for child-directed speech. This difference is reflected in Figure 6, which shows the proportion of all Gurindji and Kriol-derived tokens in adult-directed and child-directed speech.

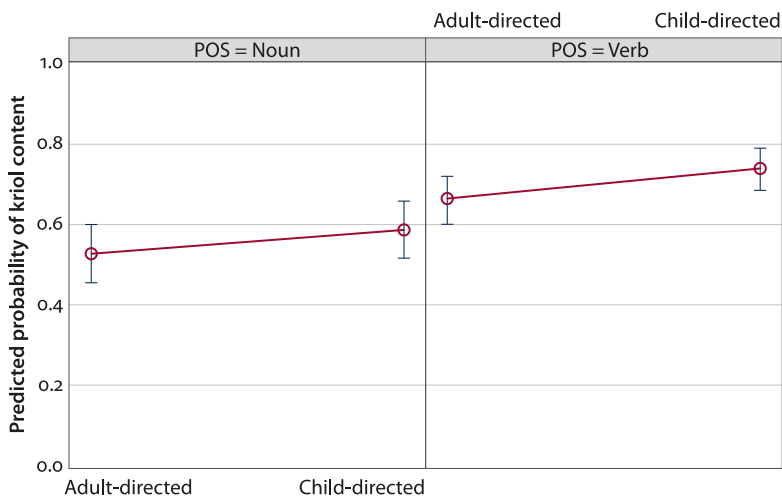
**Figure 6.** Proportion of Gurindji and Kriol-derived nouns and verbs by audience (adult/child-directed)

The significant difference in the use of Gurindji-derived words in child-directed speech is especially driven by verb production, with a significantly lower number of Gurindji-derived verbs used in both adult and child-directed speech ( $p < .001$ ). This is reflected in Figure 7, which shows the lower proportion of Gurindji-derived verbs compared to nouns in the adult and child-directed speech (combined).



**Figure 7.** Proportion of Gurindji-derived nouns and verbs in adult and child-directed speech

These results show that both nouns and verbs are more likely to be Kriol-derived than Gurindji-derived in child-directed speech than they are in adult-directed speech, and that the effect is more pronounced in verb production than in noun production. Figure 8 shows the predicted probability of Kriol nouns and verbs by audience.



**Figure 8.** Predicted probability of Kriol nouns and verbs by audience (adult/child-directed)

## 4. Discussion

The aim of this study was to determine whether differences between the speech of Gurindji Kriol-speaking adults and children can be attributed to a generational shift or an extended acquisition period. This investigation was guided by the questions of how these different generations vary with respect to their use of nouns and verbs in picture-prompt narratives, and whether or not an apparent-time analysis of such data would be reflected by real-time changes in individual children's speech.

The apparent-time data show that adults use significantly more Gurindji-derived nouns and verbs in picture-prompt narratives than children. 15–17 year old speakers also differed from the younger children. Under an apparent-time analysis, the lack of any significant changes between the different child age groups (with the exception of the 15–17 year olds) indicates that this change is not gradual, with the relative suddenness of the change between adults and children pointing towards the emergence of a new generational variety of Gurindji Kriol. This abrupt generational shift is consistent with other findings (Dunn, Meakins, & Algy, 2021; Hua, Meakins, Algy, Bromham, 2021; Meakins & Algy, 2016; van den Bos et al., 2017).

Although the analysis of the apparent-time data seems to point to the emergence of a new generational variety, the real-time data suggests a different story. This data show a pattern of increasing Gurindji-derived noun and verb use over time among individual children. This increase is most evident for older children above the age of 13 (see Figure 5). These data are suggestive of an extended acquisition process, which supports the community belief that children learn a baseline level of Gurindji Kriol first, then incorporate more Gurindji elements into their speech as they age (§ 2.5).

Given that we are now left with two sets of seemingly conflicting data, how do we adequately explain the nature of intergenerational changes in Gurindji Kriol?

### 4.1 Extended acquisition or generational shift?

The results of the apparent-time and real-time data appear contradictory, however in this section we suggest an integrated analysis of both sets of results reveals a more nuanced picture of language change. We suggest that the two processes – the emergence of a new generational variety and an extended acquisition period for Gurindji-derived elements – are not necessarily mutually exclusive. The most likely explanation for the seemingly conflicting processes is that the processes of intergenerational shift and extended acquisition are occurring in tandem and working to counteract each other somewhat. This means that an intergenerational

shift is occurring in Gurindji Kriol, with children generally orientating towards Kriol-derived nouns and verbs (see also Meakins et al., 2019). However, they are simultaneously slightly increasing their use of Gurindji-derived nouns and verbs as they age. Essentially, it appears that the process of generational change is leading to a decline in the level of Gurindji use by children, whilst an extended acquisition process slows the decline. This extended acquisition process is not significant enough to reverse or level out the change, however it does slow it down.

These results have implications for our understanding of Gurindji vitality and have the potential to be utilised in the school system to slow the decline in use of Gurindji. The analysis of the apparent-time and real-time data suggests that the loss of Gurindji within Gurindji Kriol is certainly still underway, but also that the effect is offset slightly by the late acquisition of certain elements of Gurindji. Understanding this process of extended acquisition has implications not just for Gurindji vitality, but also for our understanding of language acquisition, especially in multilingual societies such as Kalkaringi.

## 4.2 Understanding shifts towards Kriol and Gurindji

The shift towards Kriol seen in the apparent-time data is most likely the result of the increasing prevalence of Kriol in northern Australia, as discussed in § 2.1. Shifts towards Kriol are well-documented in north Australian communities, and the social pressure to shift towards English and English-based Creoles has been accompanied by the loss of many traditional languages in the area. However, the real-time shift towards Gurindji in individual children's speech is a newly observed phenomenon. The child-directed data provides clues for the shift towards Kriol coupled with the increasing use of Gurindji.

The analysis of the child-directed data shows that Gurindji words were used significantly less in child-directed speech than in adult-directed speech. This means that children under the age of five years in Kalkaringi are receiving less Gurindji input and more Kriol input in the speech directed at them than adults are. (Of course children will also hear various other types of speech all around them, including adult-directed speech). This difference between adult and child-directed speech mirrors the difference between the adult and child groups in the apparent-time data. This similarity suggests that the lower Gurindji input received by children might be a contributing factor to the process of extended acquisition observed in the real-time data. The use of Gurindji with children as they age probably increases according to the age-appropriate philosophy of the community. As the children age, they receive more Gurindji input, both through speech directed at them and more generally through more hours of exposure across a lifespan, which in turn increases their own Gurindji production.



### 4.3 Differences between noun and verb production

All of the datasets also show a more pronounced difference in the use of Gurindji-derived nouns as opposed to verbs. A higher proportion of Gurindji-derived nouns than verbs can be observed in the apparent-time and real-time data, and the child-directed speech. In the language contact literature, it has been observed that nouns are borrowed more easily and more often than verbs are (Aikhenvald & Dixon, 2007; Haugen, 1950; Meakins, Pensalfini, Zipf, & Hamilton-Hollaway, 2020; Muysken, 1981; Singh, 1982; Tadmor, 2009; Thomason & Kaufman, 1988) and this tendency is often attributed to the salience and referential functions of nouns in contact situations (Matras, 2009, p.168). These properties of nouns could also be relevant to the data here, especially if child-directed speech is being used as a pedagogical tool by adults in Kalkaringi. That is to say, it is possible that adults use more Kriol in general with children due its perception as an ‘easy language’ (see §2.5), leading to a higher level of Kriol-derived verbs (and consequently a lower level of Gurindji-derived verbs). However, this effect may be less pronounced in the production of nouns in child-directed speech due to their salience and referential function, driven by a desire to impart Gurindji cultural knowledge upon the younger generation (with Gurindji being framed as a cultural rather than a communicative object – see §2.5).

## 5. Conclusion

This study has explored intergenerational changes in Gurindji Kriol, a mixed language spoken in Kalkaringi, trying to tease out whether change is due to an extended acquisition process or a generational shift. Three datasets of the Gurindji Kriol corpus were brought to bear on this question. The apparent-time dataset was the largest, consisting of 176 picture-prompt narrative recordings, grouped into five age categories for a synchronic snapshot of the differences in noun and verb production between age groups. It showed an abrupt jump in the use of Gurindji across children and adults, suggesting intergenerational lects of Gurindji Kriol. The real-time dataset consisted of 48 recordings from 24 children who had performed the Frog story narrative task multiple times throughout their life. This dataset allowed for a diachronic analysis of changes to these children’s speech patterns as they aged, and showed an overall increase in the use of Gurindji across childhood, suggestive of an extended acquisition period. The final dataset, the child-directed speech data, consisted of recordings of adult participants telling the same picture-prompt narratives both to young children and adult peers. This dataset showed less Gurindji used with children versus adults.

The datasets tell apparently conflicting stories of intergenerational changes and an extended acquisition process for Gurindji. Nonetheless we argued that these two processes are not mutually exclusive, but probably processes which occur in tandem. The processes of intergenerational shift (with children orienting towards less Gurindji) and extended acquisition (with most children increasing their use of Gurindji elements as they age) are likely working to counteract each other, but only somewhat. The extended acquisition, although slightly impeding the shift towards Kriol, is not substantial enough to level out or reverse this shift.

The shift towards Kriol is not unexpected here since similar shifts have been observed in many comparable north Australian communities. However, the extended acquisition of Gurindji is a newly observed phenomenon. The third dataset which compared child-directed and adult-directed Frog story narratives provides one explanation for dual processes of language shift and extended acquisition of Gurindji. Child-directed speech was found to contain fewer Gurindji-derived words than adult-directed speech which correlated with the generational differences in Gurindji production in the apparent-time data. The larger Kriol content of the child-language input is a possible motivating factor for the higher use of Kriol by children. It is likely that as the children age, more Gurindji content is used contributing to their continuing acquisition of Gurindji as they age.

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## Abbreviations

The list of glosses used in this paper are as follows

CAT	catalyst	ONLY	restrictive
DAT	dative	POT	potential
ERG	ergative	PST	past
FOC	focus	TR	transitive
LOC	locative		

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## Abstract (Gurindji Kriol)

Nyila peipa raitabat difredifren generation wen dei jarrakap Gurindji Kriol. Ngantipa burrum jangkakarni to yapayapa tok difrenwei. Maitbi nyarrulunywei or maitbi dei learnimbat Gurindji maitbi yamakwei. Ngantipangu recordimbat 70 karuwalija an jangkakarni. Ngantipangu raitimdan wije dei toktok – Gurindji or Kriol. Dei bin talim stori gat dat ngakparn buk and kaya buk. Ngantipangu rikordimbat difrendifren generation. An ngantipangu rikordimbat karu-walija wen jei bin yapakayi an wen jei bin jangkarni na. Jangkarngu dei jarrakap propa Gurindji an yapayapa tok Gurindji Kriol. Jala-ma dei jarrakapkarra nyarruluny onunwei. Wen dei jangkarni dei jarrakapkarra Gurindji na. Wen dei jangkarni dei lernimbat mor Gurindji. Karu-walija holdim Gurindji ngarlaka-ngka. Wen dei jangkarni deil nou toktok Gurindji.

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