Iwaidja *Jurtbirrk* songs: bringing language and music together

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Abstract

Song brings language and music together. Great singers are at once musicians and wordsmiths, who toss rhythm, melody and word against one another in complex cross-play. In this paper we outline some initial findings that are emerging from our interdisciplinary study of the musical traditions of the Cobourg region of Western Arnhem Land, a coastal area situated in the far north of the Australian continent 350 kilometres northeast of Darwin (see map). We focus on a set of songs called *Jurtbirrk*, sung in Iwaidja, a highly endangered language, whose core speaker base is now located in the community of Minjilang on Croker Island. In this article we will bring to bear analytical methodologies from both musicology and linguistics to illuminate this hitherto undocumented genre of love songs.

1. Introduction

Jurtbirrk is the Iwaidja name for a genre of didjeridu-accompanied songs that are often referred to in English as 'love songs'. *Jurtbirrk* songs are individually composed and owned, usually inspired by particular recent events. Their texts are in the Iwaidja language, one of a number of highly endangered languages spoken in north-western Arnhem Land.[1] The song corpus consists of thirty-two song texts recorded by the Iwaidja Documentation Project[2] team at Minjilang during 2003–2004. Since the beginning of the project in July 2003 we have recorded one hundred and thirty-six *Jurtbirrk* song items over the course of eight performances, representing thirty-two distinct song texts. Full details of these performances are available in the booklet accompanying the *Jurtbirrk* CD (Barwick, Birch & Williams 2005).[3] The collaborative work between linguists and the musicologist in the Iwaidja Documentation Project has produced a large corpus of well-described and annotated song texts, allowing us to investigate in some depth questions regarding the interrelationship of musical and linguistic structures in the songs. In this paper, after setting out general historical, ethnographic and social background on the *Jurtbirrk* song-set, its composers and its themes, we comment on the song corpus from the twin perspectives of musicology and linguistics.

The relationship between music and language, and between the academic disciplines that attempt to describe and explain their respective ontologies, is called into question in any analytical engagement with song. While we believe there is no inherent incompatibility between the two methodologies, a mono-disciplinary approach to the complex object of study might consciously or unconsciously avoid tackling aspects of song that are perceived as falling under the aegis of the other discipline, and thereby run the risk of failing to take full account of the phenomenon. Each discipline is naturally aware of the benefits of the other: there have been and continue to be numerous instances of cross-disciplinary collaboration in both theoretical and applied contexts.

The application in musical analysis of methodologies from the fields of linguistics, psychology and information theory was of particular interest in the second half of the twentieth century, as can be seen in the work of musical analysts such as George P. Springer (Springer 1956). Ian Bent and Anthony Pople discuss these theoretical developments from the perspective of musical analysis (Bent & Pople 2001, particularly section II.5 'History, 1945–70'), while Howard and Datteri provide a useful recent summary of cognitive psychology literature on music and language (Howard & Datteri 2004). Musical hermeneutics, the analysis of musical characteristics in relation to social context, is fundamental to the sub-discipline of ethnomusicology but impossible without rich linguistic, ethnographic and other contextual information.

In linguistics, recent years have seen the emergence of language documentation projects that aim to record language use in as wide a range of contexts as possible (Himmelmann 1998; Woodbury 2003), and music is very often one of the genres most often suggested for documentation by community collaborators (Barwick 2006b). In addition to providing rich data for linguistic analysis of various types, language documentation projects like the Iwaidja project can also provide a sound basis for establishing a fine-grained understanding of other domains of knowledge within a given society, especially if specialists from these domains participate in the documentation project. Barwick's involvement in the Iwaidja research team, along with the musical expertise and interests of other members and community enthusiasm for the documentation of their songs, has led to the collection of a considerable quantity of song recordings and discussions about songs and their cultural significance, which we draw upon in this article.

There is a long history of collaboration between linguistics and musicology in the study of Australian song: from Strehlow and Ellis (Ellis 1964; Strehlow 1971), Hercus and Ellis (Ellis et al. 1966), A. Moyle and Stokes (Moyle 1974; Stokes & Aboriginal advisers 1981) through to, in more recent times, Dixon and Koch (Dixon & Koch 1996), Hercus and Koch (Hercus & Koch 1999) and many others, including Marett, Barwick and Ford (Marett, Barwick & Ford 2001). Scholars trained in both disciplines, such as Turpin and O'Keeffe (both with contributions to this volume) are also emerging. The work presented in this paper, therefore, takes place within a long and ongoing Australian tradition of cross-disciplinary engagement.

2.   Diversity of language, diversity of song

Western Arnhem Land is famous for its linguistic diversity. The area bounded by Pine Creek in the south, the Mary River in the west, and the Liverpool and Mann Rivers in the east, and encompassing Cobourg Peninsula and the islands of Croker and Goulburn, is home to around a third of the continent's twenty-five language families.[4] This is roughly the area of territory associated with a single medium-sized language such as Warumungu or Wajarri elsewhere in the continent. Figure 1 shows the approximate locations of the Iwaidjan languages in the north-western part of Western Arnhem Land, on the Cobourg Peninsula and surrounding areas.

There are many competing, though not necessarily mutually exclusive, hypotheses that attempt to explain the extreme linguistic diversity of this area of the Australian continent. The size of social groups, time depth of settlement, isolation or interaction between groups, accretions of multidirectional borrowings, and the need for small groups to maintain distinct cultural and linguistic identities in order to assert their rights to country, have all been put forward as contributing factors. Linguistic diversity clearly does not arise in a social vacuum: it is cultivated and maintained by sociolinguistic practices, and supported by cultural beliefs: for example, the beliefs that
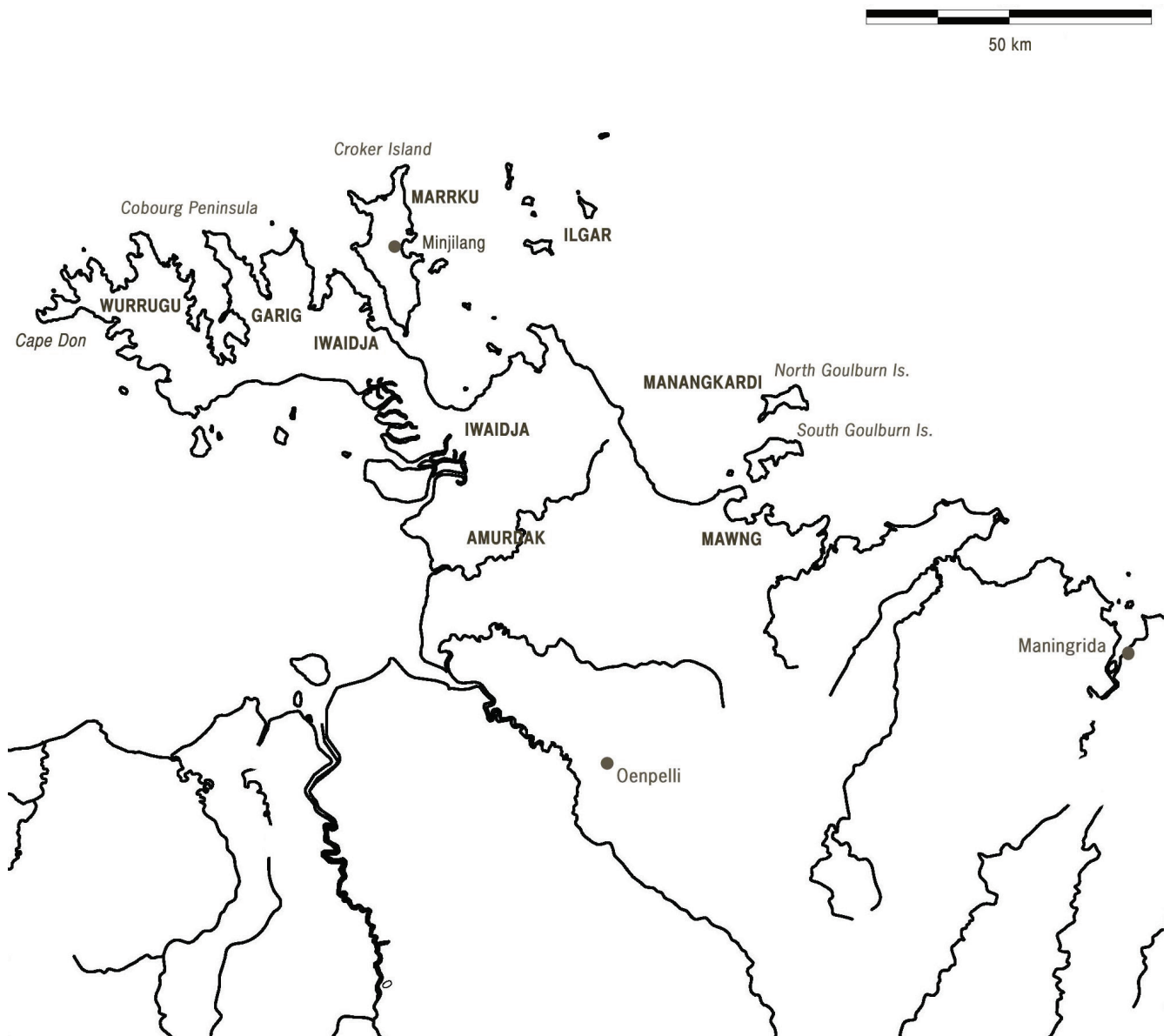
Figure 1: Map showing the approximate locations on the Cobourg Peninsula, Northern Territory, associated with the languages of the Iwaidjan language family: Iwaidja, Mawng and the near-extinct Wurrugu, Marrku, Amurdak, Ilgar-Garig and Manangkardi.

water sources become accessible only if addressed in the language associated with the country in which they occur, or that spirits assist those who speak the 'right' language, but harm those who do not (Brandl & Walsh 1982; Trigger 1987).

Staggering as the linguistic diversity is, however, the multiplicity of song styles in Western Arnhem Land is even greater. Examining this rich musical tradition provides us with the opportunity to study cultural and linguistic diversity from a new perspective, as the elements of song are selected and curated more consciously than those in speech. An initial stocktake of the Cobourg area reveals that the number of named and musically distinct song-sets exceeds the number of identifiable languages (see Table 1). A song-set is always associated with a particular language: *Manbam* with Marrku, *Milyarryarr* with Ilgar, *Yanajanak* with Amurdak, *Ngarnarru* with Manangkardi, *Inyjalarrku* with Mawng, and so on. Each language is associated with at least one distinct song-set, even languages that

Table 1: Associations of song genres and song-sets with language, collated from recordings and discussions at Minjilang during the course of the Iwaidja project 2003–2007. Song-sets marked with an asterisk (*) are no longer known or performed in Minjilang.

Language	Song genre	Song-sets
Iwaidja	Love songs Sea songs (Iwaidja *ldalha*)	*Jurtbirrk* *Kalajbari* 'frigate bird' **Murrwa* 'fish fry' **Alabanja* 'beach hibiscus'
Marrku	Sea songs	*Manbam* 'bowerbird' **Weleb* (meaning currently unknown)
Ilgar/Garig	Sea songs	*Milyarryarr* 'egret'
Amurdak	Stone country songs (Iwaidja *wardyad*)	*Yanajanak* 'stone country spirits' *Marrwakani* 'yam' **Ldungun* 'long yam'
Manangkardi	Sea songs	*Ulurrunbu* 'floating island' *Mirrijpu* 'seagull' *Ngarnarru* (meaning currently unknown)
Mawng	Love songs Sea songs (Mawng *kurrula*)	*Lumbuk* 'pigeon' *Itpi-itpi* 'grasshopper'[5] *Inyjalarrku* 'mermaid' *Nginji* (associated with 'mosquito')

no longer have fluent speakers. This is the case, for example, for the Ilgar *Milyarryarr* songs and the Manangkardi *Ulurrunbu, Mirrijpu* and *Ngarnarru* songs.

The song-sets listed in Table 1 form part of the overarching musical corpus referred to in Iwaidja as *manyardi*—roughly translateable as 'songs'. There is a broad division between 'true' songs received by known individuals from beings resident in the country—these comprise the 'sea song' genre (known as *ldalha* 'sea' in Iwaidja, or *kurrula* 'sea' in Mawng), and the 'stone country song' genre (known as *wardyad* 'stone country' in Iwaidja)—and songs composed spontaneously (that is, without spirit intervention) by known individuals, often inspired by local events. The 'love song' genre—comprising the Iwaidja *Jurtbirrk* song-set (the focus of this article), the *Itpi-itpi* song-set (in Kunwinjku, Kun-barlang and Mawng languages) and at least one song-set in Kunwinjku, the *Kun-nalk* ('crying songs')—belongs in the latter category, along with church songs (Iwaidja *Yiwarruj*) and guitar band songs such as those composed in Kunwinjku and English by the Bininj Band, whose main performers are resident in Minjilang. As a general rule, spontaneously composed songs (that is, songs in the love song, church song and guitar band genres) are 'in language', composed of glossable grammatical statements in one or more locally spoken languages. By contrast, with few exceptions, 'true' songs (in both the sea song *ldalha/kurrula* and stone country *wardyad* genres) tend to be sung with untranslateable fixed syllable strings that are 'for song', although the songs often have a particular reference or story associated.

Iwaidja people have shared in ceremonial and informal song performances with other groups from Western Arnhem Land in various places and ways. The earliest recordings of Iwaidja singers were in Oenpelli (Kunbarlanja) in 1948 (Mountford 1949), Beswick in 1961 (West 1963), and in Bagot (in Darwin) in 1962 (Moyle 1967). In each instance these performances took place in camps where Iwaidja people had gathered with people of several other different language groups, whose song traditions were also recorded. Each of these communities today continues to be multilingual, as do all the main communities in which Iwaidja is spoken, and there is a continuing practice of ceremonial exchange throughout the western Top End by which public ceremonial occasions such

as funerals are marked by importing singers from another community.[6]

The Western Arnhem Land region is of great musicological interest, having links to three contiguous but musically and ceremonially distinct areas: Central and Eastern Arnhem Land, the Daly region, and the Tiwi Islands, as is revealed in Alice Moyle's mapping of Australian musical styles (Moyle 1974). The music of Western Arnhem Land has been relatively sparsely documented by musicologists in recent years, compared to the considerable attention paid to the musics of neighbouring regions (especially northeastern Arnhem Land and the Daly Region). To our knowledge Iwaidja *Jurtbirrk* songs have never previously been recorded and published, although other Iwaidja songs in the *ldalha* 'sea song' genre were recorded by Simpson, West and Moyle (in the recordings previously mentioned). Given the multilingual social contexts in which *Jurtbirrk* songs have been created and performed, it is perhaps not surprising that they are similar in style to, and share musical components with, other public didjeridu-accompanied songs of the western Top End (for example, the *kun-borrk* of Western and Southern Arnhem Land, or the *wangga* and *lirrga* of the Daly region). Our discussion of *Jurtbirrk* songs therefore includes comparisons with recent work on *wangga* and *lirrga* by Marett and Barwick respectively (Barwick 2003, 2006a; Marett 2005) and on *kun-borrk* by Garde (2006; 2007).

3. The *Jurtbirrk* song-set

Jurtbirrk songs are sung in Iwaidja by one or two men (one of whom is often the composer), who accompany themselves on clapsticks and are supported by another man playing didjeridu in the 'Western' style (using a rhythmically patterned drone probably involving vocalising pitches as the player breathes into the didjeridu, and without the overblown hoot characteristic of northeast Arnhem Land styles) (Jones 1963, 1967). On ceremonial or celebratory occasions, women and men may dance (in separate groups), but this is optional, and the songs may equally be performed in informal social contexts, without dancing.

As shown in Table 2, our sample includes thirty-two songs by four different living composers: David Minyimak, Reggie Cooper, Ronnie Wandijak and Robert Cunningham. Appendix 3 contains a listing of the songs in the corpus.

Table 2: Composers of *Jurtbirrk* songs in our corpus.

Composer	Number of songs composed
David Minyimak (DM)	20
Reggie Cooper (RC)	6 (+ 3)
Ronnie Wandijak (RW)	4
Robert Cunningham (RoCu)	2
TOTAL	**32**

It is usual for the composer to lead singing of his own songs, but our corpus includes several song sessions that diverge from this convention. With twenty recorded songs, David Minyimak is the most prolific composer, but because his voice is no longer strong he usually asks another singer, Ronnie Wandijak or Reggie Cooper, to lead singing of his songs even when he is present, and both Wandijak and Cooper have authority to perform Minyimak's songs even when he is not present. Cooper's renditions of Minyimak's songs sometimes differ so greatly from the composer's own renditions that they can be considered as different compositions based on the same textual material: thus in addition to six recorded songs of his own composition, Cooper frequently performs his own adaptations of a further three songs originally composed by Minyimak. Ronnie Wandijak recorded his own four compositions interspersed with other songs originally composed by Minyimak and Cooper. The two songs composed by Robert Cunningham were both recorded for us by Reuben Arramunika, who also sang songs composed by Cooper and Minyimak but who did not record any songs of his own composition. Cunningham himself lives in a remote location at some distance from Minjilang and was thus unable to participate in our recording sessions or discuss his songs with us.

Jurtbirrk songs are spontaneous concoctions, along the lines of the blues songs that emerged from African-American culture in the twentieth century, and take as their subject intimate moments from everyday life. Composed by known individuals in the Iwaidja language, the songs typically deal with romantic or emotional topics. They are

composed of brief, evocative statements in accessible language, usually consisting of two lines of text, which are repeated in predictable combinations. *Jurtbirrk* may be composed and performed by anybody, as long as they are male. There are no known instances of a woman composing or performing a *Jurtbirrk* song, although women very much enjoy listening to, and talking about, the songs and the events portrayed in them, and also compose dances for and dance to *Jurtbirrk*.

  Jurtbirrk songs tell their story with great economy. The man who looks over his shoulder, waving and pointing ('Yangkuwilbarrjiny' JU13)[7] does that, and only that. The lyrics contain no further elaboration, and no names are mentioned. Table 3 shows a typical example, here presented showing full textual repetitions within the verse.

Table 3: Text, gloss and translation of 'Yangkuwilbarrjiny' (JU13), composed by Reggie Cooper, as performed by Reggie Cooper and David Minyimak, recorded by Bruce Birch, 9 August 2003 (item 20030809BBv3-08-JU13)[8] (Barwick, Birch & Williams 2005, song 29, track 37).

yawara	*yakunyulakan*
ya-wara	ya-kunyulakan
AWAY:3sg-go	AWAY:3sg-look_over_shoulder
'he's looking over his shoulder as he walks'	
yawara	*yakunyula'*
ya-wara	ya-kunyulakan
AWAY:3sg-go	AWAY:3sg-look_over_shoulder
'he's looking over his shoulder as he walks'	
yawara	*yakunyula'*
ya-wara	ya-kunyulakan
AWAY:3sg-go	AWAY:3sg-look_over_shoulder
'he's looking over his shoulder as he walks'	
yangkumarranyi	*yangkuwilbarrjiny*
yangku-marranyi	yangku-wilbarrjiny
AWAY:3A>ANG.O-wave	AWAY:3A>ANG.O-point

'he's waving and pointing'

As explained to us by one of the senior composers, David Minyimak, *Jurtbirrk* songs are inspired by actual events, rather than received from spirits during sleep (this distinguishes *Jurtbirrk* from the *ldalha* sea song repertories performed at Minjilang today, which are dream-composed). The events recounted in *Jurtbirrk* songs happened in an actual place and at a particular time. For those who have knowledge of the details, performance of the song brings back the memory of the circumstances of its composition. For those who are too young to know about it, the story may be told once again.

  The exact dates for the composition of the individual *Jurtbirrk* songs we have recorded are difficult to pinpoint, but the composers date the oldest songs from what is referred to as 'Cape Don Time.' This is the period roughly from World War II through to the early 1960s when many Iwaidja speakers were based at the lighthouse settlement at Cape Don, at the western end of Cobourg Peninsula. With the gradual relocation of most of the Iwaidja-speaking population to Croker Island during the fifties and sixties, Minjilang became the most important location for the composition of *Jurtbirrk*, a situation that continues to the present day.

  It is highly likely that *Jurtbirrk* and other 'love song' genres recorded by the Iwaidja project team in Minjilang are cognate with the 'gossip songs' recorded and transcribed by Catherine Berndt and Ronald Berndt in the Oenpelli and Goulburn Island areas in the 1940s (Berndt & Berndt 1951). During the Berndts' fieldwork in the Oenpelli and Goulburn Island areas from 1947 through to the 1980s, 'gossip' songs were common among Mawng, Kunwinjku and other associated language groups of the region. As Ronald Berndt describes them, 'gossip songs' are:

> . . . always about human beings and contemporary events; the messages they convey are relatively straightforward, except that they do not state *who* the participants in any one song really are. (Berndt 1987, p. 172)

Many characteristics of the Iwaidja *Jurtbirrk* song-set match this description. These public song-sets are to be distinguished from the various restricted song genres, sometimes also referred to in English as 'love songs,' that are or have been widespread across Aboriginal Australia (for example, *jarrarta* of the Roper region, or *yilpinji* of Central Australia) (Berndt 1978). Many of the latter are private or restricted in nature and not suitable for public performance.

  Jurtbirrk songs are mostly about sexual love. They are peopled with characters like the young

man combing his hair as he goes to meet 'someone' across the other side of the creek at Cape Don ('Nganayalkbarrki', JU29); or the woman who approaches a man as he walks along, grabs him by the chin, and kisses him ('Yakaldadbarjan', JU27); or the man who drifts off in mid-sentence because he's distracted by thoughts of his lover ('Wurruwarr', JU08). *Jurtbirrk* also takes as its subject matter the difficulties of relationships and liaisons. Jealousy is a recurrent theme. One composer sings about his women fighting amongst each other ('Ayunman wingalmu', JU18), another about being ignored by a woman who gets into another man's car ('Yarildariki', JU16). Still other songs tell of sulking ('Yangmanara' JU03), violence ('Ayiyakanjildiny', JU24), and the packing of bags and leaving home ('Riwujbakba', JU12).

More rarely, a *Jurtbirrk* song tells of something not obviously connected with love, like the image of a pearl lugger leaning over in a stiff breeze, from a song composed at Ldingi Point near Cape Don ('Dayibabu', JU21). A recent performance of this song brought back memories of the days when such 'diver boats' were a common sight around the bays and inlets of the Cobourg Peninsula, but nothing was mentioned that directly connected the song to a love affair or a sexual liaison (see Table 4).

4. Musical analysis of *Jurtbirrk*

4.1. Musical conventions of *Jurtbirrk*

Songs in the *Jurtbirrk* corpus use four different rhythmic modes[9] defined by combinations of clapstick tempo and vocal metre (see Table 5). Two clapstick tempo bands are used: 94 beats per minute and 105–115 beats per minute. The slower tempo band is associated with songs in simple metre (that is, with a consistent duple subdivision of the beat, transcribed in 3/4 or 4/4), and the faster tempo band with songs in compound metre (that is, those with an uneven or triple subdivision of the beat, usually transcribed in 9/8 or 12/8).[10] Songs within each of these broad categories can be further subdivided according to whether the text line occupies groupings of three or four beats

Table 4: Text of 'Dayibabu' (JU21), composed by David Minyimak, as performed by Reggie Cooper and David Minyimak, recorded by Bruce Birch 12 November 2004 (item 20041112BB-10-JU21) (Barwick, Birch & Williams 2005, track 19).

kudnayanjing	*baraka*	*dayibabu*	*baraka*
kudna-ayan-jing	baraka	dayibabu	baraka
2pl.IMP-see-OPT	DEM	pearling_lugger[11]	DEM
'do you see that pearling lugger there?'			

kudnayanjing	*baraka*	*dayibabu*	*baraka*
kudna-ayan-jing	baraka	dayibabu	baraka
2pl.IMP-see-OPT	DEM	pearling_lugger	DEM
'do you see that pearling lugger there?'			

kudnayanjing	*baraka*	*yabangkarrajangka*
kudna-ayan-jing	baraka	ya-bangkarrajangka
2pl.IMP-see-OPT	DEM	AWAY:3sg-lean_over
'do you see it leaning over in the wind?'		

yabangkarrajangka
ya-bangkarrajangka
AWAY:3sg-lean_over
'leaning over in the wind?'

(3/4 and 9/8 songs contrasting with 4/4 and 12/8 songs), yielding a four-category rhythmic modal system.

Table 5: Number of songs in each rhythmic mode, by composer. DM= David Minyimak; RC=Reggie Cooper; RW=Ronnie Wandijak; RoCu= Robert Cunningham.

Rhythmic mode	DM	RC	RW	RoCu
3/4 songs @ 94 bpm	10	-	-	-
4/4 songs @ 94 bpm	1	-	-	-
9/8 songs @ 105-115 bpm	7	6	4	2
12/8 songs @ 105-115 bpm	2	-	-	-
TOTAL	**20**	**6**	**4**	**2**

As can be seen from Table 5, David Minyimak's songs cover all four rhythmic modes in this system, while the other three composers use only one, namely 9/8 songs in 105–115 tempo band.

Typically for Western Arnhem Land didjeridu-accompanied songs, the final note of all *Jurtbirrk* songs matches the didjeridu fundamental (an octave lower than the final of the voice). There is some variation in the scales used.[12] Songs performed by Reggie Cooper and Robert Cunningham are mostly sung in the Aeolian or natural minor melodic mode (a descending series built on the didjeridu fundamental E would be E', D, C, B, A, G, F#, E), and Ronnie Wandijak's are mostly in Phrygian mode (which differs from the Aeolian by using a minor second above the tonic: so the corresponding Phrygian descending series would be E', D, C, B, A, G, F, E). David Minyimak's songs sometimes use modes with a major third above the tonic (Mixolydian, Lydian and Ionian modes).

Great variety can also be seen in David Minyimak's use of textual repetition patterns and melodic contour, while the other three composers tend to use a single melodic mode, textual repetition pattern, and melodic contour throughout their repertory. One characteristic unique to the two songs composed by Robert Cunningham is the use of more than one clapstick pattern within the same song: for the third line of text, these two songs employ a gapped pattern, in which the clapsticks beat at approximately half speed (see Figure 2, Musical notation of Robert Cunningham's song 'Kartbirljuju').

As previously mentioned, when Reggie Cooper performs songs by David Minyimak, he sometimes alters textual repetition pattern, melodic mode and melodic contour to conform to the conventions of his own repertory, to the extent that even people familiar with the repertory identify these songs as being new compositions by Reggie himself.

The strong correlation of composer with a particular cluster of musical characteristics is consistent with results of Marett's work on *wangga* songs in the Daly region (Marett 2005, pp. 194–195 and elsewhere). Marett also notes a reduction in musical complexity in recent performances of *wangga* compared to older recordings (2005, pp. 132–133; see also his paper in this volume), which may suggest that the great diversity of musical features we have observed being deployed by Minyimak represents an older musical practice in the *Jurtbirrk* tradition. More study is planned on the correlation of musical features with particular composers and performers, and the question of whether such differences can in turn be related to the musical characteristics associated with particular genres, languages or country.

A diagrammatic representation of the structural components of *Jurtbirrk* performances, song items and verses is set out in Figure 3. Each song item (defined as a continuous stretch of musical performance) occurs in the context of a performance, and successive song items are interspersed with informal discussion. As a performance progresses, new songs are introduced, each usually repeated once or twice in successive song items before moving to the next song. There is no strict ordering of songs in the set, although sometimes successive songs may have a common theme or melody. Across the whole corpus individual songs recur in different performances: the most common song, 'Yangmanara' (JU03), is performed in 20 different song items.

As is common in public didjeridu-accompanied songs throughout Western Arnhem Land and Daly regions, each song item is strophically organized into a number of verses. Didjeridu and clapsticks play throughout the item, while the vocal part consists of two or three verses per item, each of which repeats more or less exactly the same song text. With some notable exceptions, the same song text is performed with identical musical setting across items and performances. The sample on which we draw consists of a total of 351 verses across the 136 song items; because of the repetition of verses

Figure 2: Musical notation of robert cunningham's song 'Kartbirljuju' (Ju_0, third verse of item 200_0_2_BBv_-0_-Ju_0) (Barwick et al. 200_, track 2)

within an item, we have at least two renditions of every song text in the corpus. In the case of the most commonly performed song, 'Yangmanara' (JU03), we have complete renditions of the song text in 56 verses across the 20 song items in our sample.

The third part of Figure 3, which shows the internal components of the *Jurtbirrk* verse, is exemplified with reference to 'Kurrana' (JU05) (other *Jurtbirrk* songs may vary in the number and constitution of components at the various levels). In this case, the verse is composed of two sections. Section 1 contains two presentations of the first line of text, the second truncated (as indicated diagrammatically by the section boundary ending before the line boundary in Figure 3—see further discussion of this feature below). Section 2 contains line 2 followed by a string of vocables (marked 'voc' in Figure 3). Further detail on the internal constituents of 'Kurrana' (JU05) is set out in section 3.3 below.

4.2. *Musical expression of the rhetorical structures of Jurtbirrk*

Rhetorically, 'Kurrana' (JU05), like many other *Jurtbirrk* songs, is organised into an AAB pattern reminiscent of Afro-American blues songs, in which a repeated statement is capped by a second statement extending or explaining the first (Carroll 2005; Oliver 2001). As in the blues, the rhetorical structure of the *Jurtbirrk* song text is
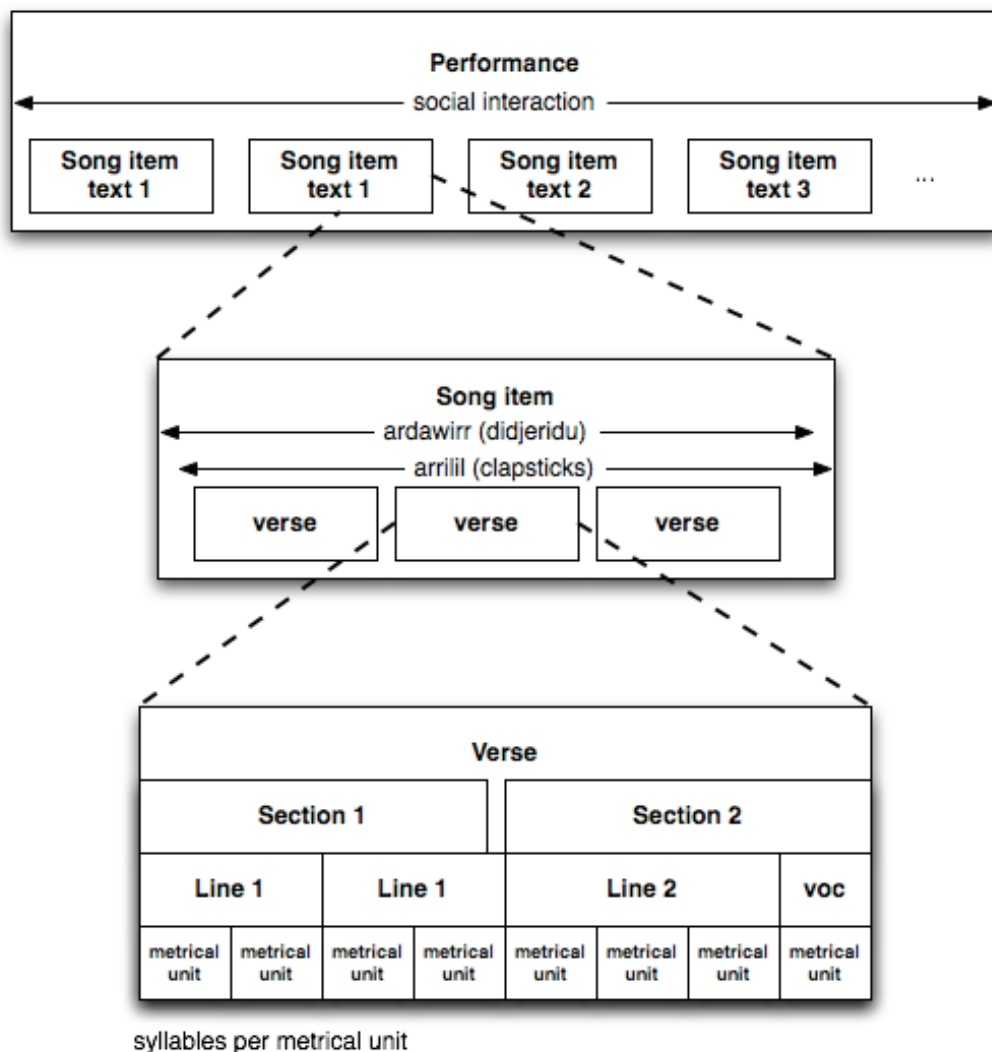
Figure 3: Structural components of *Jurtbirrk*, showing the analytical units adopted in this article. Internal verse structure varies from song to song: in this case 'Kurrana' (JU05) serves as a model.

supported by its rhythmic and melodic setting, as can be seen in Figure 4.

Rhythmic setting

In this song each word in the text is co-extensive with one metrical unit of three clapstick beats (here, transcribed as a 9/8 bar). In other songs that include words of one or two syllables two words may be presented over one metrical unit. The two-word text of line 1 (*a)rdalbardalba yuwuldakbalkba* is repeated to form section 1, but the second repetition omits both the unaccented first syllable *a-* and the final two syllables *-balkba*. The core syllables *–rdalbardalba yuwuldak-* are set over an identical rhythm each time. The unrepeated three-word text phrase of the second line is supplemented by a generic added vocable text 'ri ri ri'. Similar vocables occur in this position at the end of every *Jurtbirrk* song verse.

Melodic setting

The verse is divided into two sections, divided by the breath taken at the end of the second rendition of the first text line. Each section has an overall descending melodic contour within the Aeolian (natural minor) melodic mode built on the didjeridu-defined tonic E: the first section oscillates from the fifth (B) to the third scale degree (G), with the last two metrical units performed entirely on G, while the second section covers the descent from the seventh (D) to the tonic E, with the last two bars performed entirely on the final E.
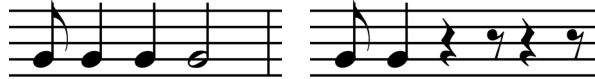
15

LINE 1
musical
setting

morphemes   *ardalbardalba*   *yuw-a-ldakbalkba*
gloss   be_quick   TOWARDS:2sg-IMP-reveal_thoughts
free translation   'quick, tell me what you're thinking'

LINE 1 (REPEAT)

(a)rdalbardalba   *yuw-a-ldak(balkba)*
be_quick   TOWARDS:2sg-IMP-reveal_thoughts
'quick, tell me what you're thinking'

LINE 2

imalda   *(a-)rakbalmalkba*   *kurrana[-yi]*
already   TOWARDS:3sg-rise   moon + VOCABLE
'before the moon comes up'

VOCABLE
TEXT

[ri ri ri ri ri]
VOCABLES

Figure 4: Musical and linguistic structures of 'Kurrana' (JU05, item 20030722LB02-21-JU05) (Barwick, Birch & Williams 2005, track 32).

The unresolved feel of the first section's cadence on G mirrors the rhetorical structure, where the unfinished repeat of the first statement leads strongly into its explication in the second line, where it becomes evident that the reason for the haste expressed in the first line is the imminent moonrise, which will reveal the lovers' movements to those watching. The resolution to the tonic E on the last word of the text—*kurrana* 'moon'—also mirrors the rhetorical structure, revealing at last the cause of the lover's anxiety. Marett (2005: 19-23) discusses similar ways in which the 'melody supports and reflects the structure of the text' in a *wangga* song).

4.3. Versification processes in Jurtbirrk songs

We have classified as 'versification processes' additions or deletions of text syllables apparently motivated by musical factors.

Partial reduplication

An example is:

    (1)   *ngaldalmalangkaj* → *ldalmalangka-yangka* ('Nganbaldakaniny' JU09)

Partial reduplication like this occurs in only one song in the *Jurtbirrk* song repertory. By contrast, other song repertories described by linguists have a large number of reduplications—see for example the Marri Ngarr *Lirrga* song texts analysed by Lysbeth Ford (Ford 2006).

Elision of syllables

A more regular feature of *Jurtbirrk* songs is the dropping of the final two syllables at the end of the first section. For example, in 'Kurrana' (JU05, cited in Figure 4 above), the repetition of the first line is truncated at the end of the second line, and the 'unsung' syllables are replaced by a vocal rest.

(2) *ardalbardalba yuldakbalkba / rdalbardalba yulda'* ('Kurrana' JU05)

Vocable insertion

Vocable insertion also occurs within some metrical units. The unit on which the vocables appear to be based is the syllable *ya*. This syllable is most commonly inserted once in a line, and is located at the end of a metrical unit, typically in instances where the preceding word, or combination of words, constitutes four syllables or less. The data also contain examples where the syllable *ya* appears to harmonize with the vowel in a preceding syllable, resulting in the variants *yu* and *yi* (See examples (6) and (9) below).

(3) *kudnuka* → *kudnuka-**ya*** ('Kudnuka ngartung' JU01)
(4) *jumung mana* → *jumung mana-**ya*** ('Kartbirljuju' JU10)
(5) *angkad birta* → *angkad birta-**ya*** ('Kudnuka ngartung' JU01)
(6) *angkiju* → *rdangkiju-**yi*** ('Angkiju' JU20)
(7) *yarukung* → *yaruku-**ya*** ('Angkiju' JU20)
(8) *anayanjing* → *rranayanji-**ya*** ('Kanangurrwu' JU19)
(9) *abanajukun* → *yabanajuku-**yu*** ('Ngadburriyingurriyi' JU17)

Note that in the examples (7–9), the vocable is inserted after deletion of the final consonant of a preceding word. Coda deletion resulting in the sequencing of CV (consonant, vowel) syllables is a strong tendency in both Iwaidja song and speech (see further below).

In a few instances the inserted vocable consists of two syllables rather than one, as the following examples show.

(10) *kirrimul* → *irrimul-**aya*** ('Jawina' JU14)
(11) *ngaldalmaldangkayangkaj* → *ldalmaldangkayangka-**yiya*** ('Nganbaldakaniny' JU09)

In other instances *ya* seems to be prosodically integrated into the word it appends to:

(12) *jawina* → *jawinya-**ya*** ('Jawina' JU14)

Vocables as melodic carriers over whole metrical unit

In several instances, a vocable or set of vocables encompasses an entire metrical unit, either as the first half of a text line:

(13) ***ayaya*** *nganbaldakani* ('Nganbaldakaniny' JU09, Line 3)
(14) ***ayaya*** *rrijumarludbu* ('Jawina' JU14, Line 3)

or as a whole line consisting of two or more metrical units:

(15) ***angakakayaya ri ri*** ... ('Kudnuka ngartung' JU01)
(16) ***ayangakayaya ri ri …*** ('Riwujbakba' JU12)
(17) ***uuu...*** ('Kartbiljuju' JU10, 'Bujikad' JU11)

Vocable insertion in David Minyimak's 3/4 songs (JU22–32)

An interesting case of metrically motivated vocable insertion is found in a set of songs composed by David Minyimak. Here a vocable we have transcribed as 'aa' is regularly inserted at the end of the first two words of each section, and two vowel vocables 'uu ii' (or similar) are regularly performed at the end of every verse (for an example, see Figure 5).

In this case the first vowel vocable 'uu' harmonises with the last vowel of the preceding word, 'janamirrakbun'. In several other songs that share this tune a rounded vocable is pronounced in a more forward position if the final syllable of the preceding word contains a different vowel: its quality is closer to 'o' after 'ngaldalmalangkaj' (JU23) and 'yakaldadbarjan' (JU27), and to 'ö' after 'angmungulkbajiny' (JU24), and 'yanawurnyakbin' (JU29). The final 'ii' vocable is possibly a variant of 'ri' (the vocable that is repeated at the end of most other *Jurtbirrk* songs). Dropping the consonant onset of words beginning with /r/ is also common in speech (for example, the 3sg.masc transitive prefix 'ri' is mostly realized without its consonant onset).

The basic rhythmic structure of this song is as follows (each metrical unit is a 3/4 bar, with each line composed of two 3/4 bars):

Figure 5: Musical notation of David Minyimak's song 'Akartalwan' (JU22, first verse of item 20041112BB-12-JU22), (Barwick, Birch & Williams 2005, track 32).

- Line A + *aa* (2 bars)
- Line B (2 bars)
- Line B truncated (2 bars)
- Line C + *aa* (2 bars)
- Line D + *uu* + *ii* (2 bars)

All other songs in this set follow exactly the same ten-bar pattern, although sometimes the text-line repetitions are structured AAABC rather than ABBCD.

From Figure 5 it can be seen that melodically (as opposed to rhythmically) the 'aa' belongs to the following line rather than the preceding one, so that melodically the song can be grouped as:

- Line A (descent from D-flat to E-flat)
- aa + Line B + Line B truncated (descent from upper E-flat to A-flat, lingering on B-flat en route)
- Line C (descent from D-flat to E-flat)
- aa + Line D + uu + ii (descent from upper E-flat to A-flat, lingering on the final)

4.4. Rhythmic setting of words in Jurtbirrk

In the *Jurtbirrk* song-set, regular patterns in the rhythmic setting of words can be identified, with variation according to rhythmic mode. As has been widely reported for other repertories of Australian song, there is a strong overall tendency for words to be set using short durations for

syllables at the beginning of the word and longer durations for word-final syllables. The following discussion abstracts the syllabic rhythmic values from the melodic settings (that is, it does not take account of melisma, where a syllable is performed over more than one pitch in the melody).

Matching of words to metrical units in David Minyimak's 3/4 songs

In the set of songs just discussed, there is also considerable regularity in matching of words to the 3/4 metrical unit, as outlined in Table 6 below.

Table 6: Matching of words of various syllable lengths to the 3/4 metrical unit in David Minyimak's 3/4 songs.

syllables	rhythm	example
2	♩ ♩	*nyarang* ('Kuluduk' JU25)
3	♫ ♩	*wularrud* ('Wularrud' JU32)
4	♫ ♪♩..	*kanayanjing* ('Akartalwan' JU22)
5	♬♪ ♪♩.	*angmarranguldiny* ('Akartalwan' JU22)
5	♬ ♪♩.	*janamirrakbun* ('Akartalwan' JU22)
6	♬♬ ♪♩..	*rrayunbaldakinngurn* ('Kuburruburr' JU28)

Note that all settings favour shorter notes at the beginning of the metrical unit and longer notes at the end of the metrical unit. It can be seen that there are two possible rhythmic settings of five-syllable words to the metrical unit: *angmarranguldiny* is set with an apparently longer second syllable, while *janamirrakbun* is set with an apparently longer third syllable (the usual setting for five-syllable words in this corpus). It is possible that this difference is due to underlying phonetic processes, such as the greater consonant duration of –*ngm*- in *angmarranguldiny*.

Similar patterns emerge for 9/8 songs, with the metrical unit of three clapstick beats corresponding to fairly predictable rhythmic settings of a word (or sometimes, with words of two or three syllables, to two words). In 9/8 songs there tends to be more use of swung and syncopated rhythms, and therefore more variability in the precise combinations of the shorter notes and their alignment with the clapstick beating. Table 7 shows that there is some evidence that particular composers or performers prefer slightly different settings of four-syllable words set to the three-beat metrical unit.

Note that in each case the final long syllable is of the same duration (a crotchet tied to a dotted crotchet). David Minyimak's version is the most commonly performed rhythmic setting, and can be found in performances by all singers. Reggie Cooper's rendition of *yabaninga* is unusual both within his repertory and within the whole *Jurtbirrk* corpus: it has a swung feel, as no syllable onset coincides with the second clapstick beat. The third setting, by Ronnie Wandijak, results in a duple rather than triple subdivision of the clapstick beat duration. This alteration is found throughout the *Jurtbirrk* repertory, but is especially prominent in performances by this singer.

5. *Jurtbirrk* songs: linguistics
5.1. *Phonology of Jurtbirrk*
Syllable Structure

Although the majority of Australia's indigenous languages have consonant-initial word structure, Iwaidja is one of a minority of Australian languages that allows words to begin with a vowel, the name of the language itself providing an example. In addition, Iwaidja has many words containing syllable-final

Table 7: Different rhythmic settings of four-syllable words in 9/8 songs by different composers.

Rhythmic setting of four-syllable word	Example	Singer/composer
♪♩ ♪♩ ♩. x x x	*rdalbardalba* ('Kurrana' JU05)	David Minyimak
♬♪ ♪♩ ♩. x x x	*yabaninga* ('Wurruwarr' JU08)	Reggie Cooper
♫ ♪.♪♩ ♩. x x x	*Yarrkbanaka* ('Yarrkbanaka' JU15)	Ronnie Wandijak

19

consonant clusters: for example, *warrkbi* 'man'. These are two ways, therefore, in which Iwaidja syllable structure diverges from the commonly posited universal preference for CV syllables. However, a comparison between the way isolated words are produced when spoken clearly (hyperarticulated) in Iwaidja, and the realizations of the same words in typical connected speech, shows a stark contrast in terms of syllable structure. There are a number of phonological processes observable in connected speech that appear to move syllables closer towards conforming to the universally preferred CV structure. These processes are shown below in examples (18–21).

Unsurprisingly perhaps, these processes are also observable in song. If anything, however, the syllable structure of sung Iwaidja moves even closer to the CV pattern. This is brought about in two ways.

Firstly, the processes shown above are augmented by a fifth process not observed in speech, namely the insertion of an epenthetic tap, either retroflex or alveolar, between two vowels. Hence the phrase given in (20) above may have the alternative realization given in (22) when sung.

Secondly, at the other end of the syllable, word-final consonant-deletion applies more broadly than in speech. While in speech this process is mainly limited to word-final velar nasals, and palatal nasals following high front vowels, in song we see a broader range of deletions, shown in (23) below.

Alignment of clapstick beats with consonant-vowel transitions of metrically strong syllables

Whilst other studies of indigenous music traditions in Australia have suggested that the stress patterns of words are altered significantly when

(18) Utterance-initial Vowel Deletion
    ang-mana-warlkbarrakany-mi-kbi → *a[ŋ]manawaɭkpaɾakaɲmikpin*
  2sg-FUT-old_person-INCH-ITER
    'you will grow old'

(19) Word-final Consonant Deletion
    bu-ma-ngung → *bumaŋu*
    3plA>3O-get-PST.HAB
    'they used to gather it'

(20) Vowel Coalescence
    yang-man-ara   *ang-mana-min* → *jaŋmanaɾamanamin*
    AWAY:2sg-FUT-go   2sg-FUT-tell
    'go and tell'

(21) Cluster Reduction
    warrkbi → *warəgʷi*
    man
    'man'

(22) Tap Epenthesis
    yang-man-ara   *ang-mana-min* → *jaŋmanaɾaramanamin*
    AWAY:2sg-FUT-go   2sg-FUT-tell
    'go and tell' ('Yangmanara' JU10)

(23)   *nganbaldakani**ny*** → *ngalbaldakani* ('Nganbaldakaniny' JU09)
    *ala**n*** > *ala* → 'Jawani jukan' (JU02)
    *wurruwa**rr*** → *wurruwa* ('Wurruwarr' JU08)
    *kirrimu**l*** → *irrimu* ('Ayunman wingalmu' JU18)
    *wularru**d*** → *wularru* ('Wularrud' JU32)

they appear in song texts (Hercus & Koch 1995; Strehlow 1971), in *Jurtbirrk* songs this is not the case. On the contrary, there is a strong tendency for the CV (consonant to vowel) transitions of metrically strong (stressed) syllables to align with clapstick beats throughout the song corpus.[13]

    Figure 6 below shows a spectrographic representation of the first line of a rendition of the song 'Kurrana' (JU05). The text is glossed in Example (24) below.

> (24) aˈʈalpaˈʈalpa   ˈjuw-a-lᶠakˈpalkpa
>   be_quick!   TOWARDS:2sg-IMP-reveal_thoughts
>   'quick, tell me what you're thinking'

In the spectrogram, clapstick beats can be seen aligning with the CV transitions of metrically strong syllables in both words: the twin syllables *ʈal* in the reduplicated form *aˈʈalpa ˈʈalpa*, and the syllable *palk* in *ˈjuwalᶠakˈpalkpa*.[14]

    The alignment of clapstick beats with the CV transitions of metrically strong syllables has two ramifications for the analysis of prosodic structure in spoken Iwaidja. Firstly, it supports the characterization of Iwaidja as a 'stress accent' language (Beckmann 1986), in which pitch accents align with metrically strong syllables, as opposed to a 'non-stress accent' language, where the intonation system is clearly oriented towards the chunking of speech into prosodic units, a well-known example being the accentual phrase in Korean (Jun 1998). Evidence for this in spoken Iwaidja comes not only from analysis of pitch accent placement (Birch 2000), but also from observations regarding variation in the quality of vowels, which tend to be peripheralized in accented syllables, and centralized or deleted in metrically weak syllables (Birch 2002a).

    In song, however, the intonation contour normally associated with a spoken word or phrase is subordinated to a melodic contour that varies in the same dimension—that is, F0[15] (pitch)—and according to different constraints. In the case of the *Jurtbirrk* songs, although the usefulness of F0 target alignment as a diagnostic of metrical strength is greatly reduced for this reason, it turns out that clapstick beat alignment provides a reliable substitute diagnostic. An analysis of the metrical structure of words in the *Jurtbirrk* song corpus based on the alignment of clapstick beats with CV transitions produces much the same results obtained for the spoken language using the diagnostics mentioned above.

    The second ramification of the alignment of clapstick beats with the CV transitions of metrically strong syllables in song is that it reflects the universal tendency for syllables to be structured as sequences of a consonant followed by a vowel (CV), as opposed to the inverse order, that is, a vowel followed by a consonant (VC). The songs constitute, in a sense, a naturally occurring analogue of experiments that have been conduct-
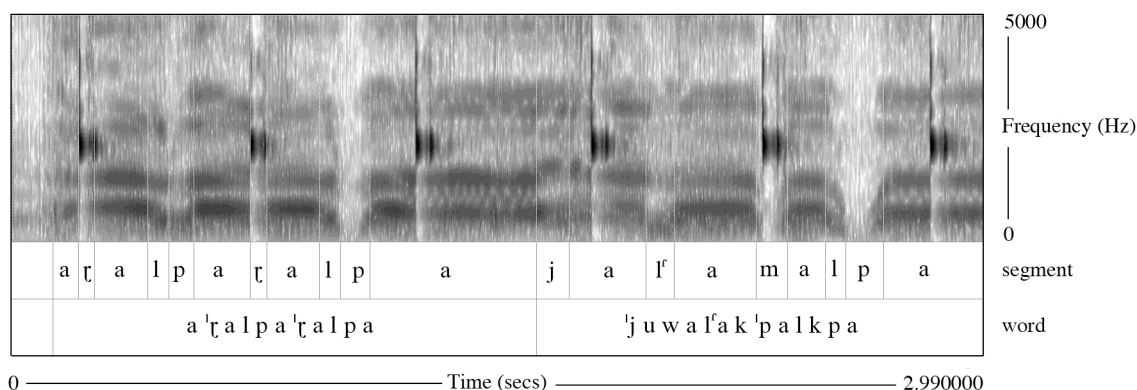

Figure 6. Line 1 of a rendition of 'Kurrana' (JU05, from dvR_040126_T3 31:32) exported from Praat (Boersma & Weenink 2006). This song is in 9/8, and the clapstick beats, visible in the spectrogram as broken narrow dark vertical lines, are aligned with the beats in the 3/4 vocal rhythm (3 beats to a line) occurring at intervals of a dotted crotchet, here approximately equivalent to 0.53 seconds.

ed to find the P-centre (perceptual centre) of syllables (Marcus 1981). In these experiments, when subjects were asked to synchronize clicks with syllables, it turned out that the clicks were aligned at a certain point, known as the P-centre, close to the CV transition of the syllable. The corresponding alignment of clapstick beats with CV transitions in *Jurtbirrk* songs adds support to evidence from phonotactics and connected speech processes[16] that syllabification in Iwaidja patterns according to the near-universally attested 'onset first' principle.

Word boundaries marked by melodic (F0) turning points

As mentioned in the previous section, in spoken Iwaidja, when two words or phrases are juxtaposed with no intervening pause, and where the first word or phrase ends in a vowel and the second begins with the same vowel, these two vowels coalesce to form a single long vowel, thus masking the edges of the words involved. Despite their deletion in the segmental layer in such cases, however, word boundaries frequently remain perceptually salient due to a feature of the Iwaidja intonation system, in which the right edges of words, or word-sized units, tend to align with low F0 targets or turning points in an intonation contour.[17]

In cases of vowel coalescence across a word boundary, therefore, a low F0 target, if present, provides a clear acoustic diagnostic of the location of the boundary, tending to be aligned as in Figure 7. Low targets or turning points align in this way even if the initial syllable of the following word or phrase is metrically weak (unstressed), suggesting that it is the boundary of a word or phrase that is being marked, rather than the edge of a smaller prosodic unit such as a stressed or accented syllable.

In the *Jurtbirrk* song corpus, there appear to be examples of this same phenomenon, though in this case incorporated into, and constrained by, the melodic contour of the song. Figure 8 shows a spectrogram and F0 trace of an excerpt from Line 1 of a rendition of 'Yangmanara' (JU03). The line from which the extract is taken is glossed in Example 25 below.

(25)   jaŋ-ˈman-aɻa   aŋ-ˈmana-min   ˈɹumuŋ
        AWAY:2sg-FUT-go   2sg-FUT-tell   3sg.OBL
        'go and tell her'

The spectrogram shows a long low coalesced vowel spanning the boundary between the words *jaŋˈmanaɻa* and *aŋˈmanamin*. Beginning at the left edge of the diagram, the F0 trace shows the pitch being maintained at the fourth scale degree (A) before descending to the third (G) at a point roughly simultaneous with the second visible clapstick beat.

The beginning of the next pitch transition, however, a rise from G to B, is not aligned with a clapstick beat. Rather, it appears to be aligned with a word boundary in the song text, anticipating the clapstick beat by some 0.126 seconds. As in speech, although the low vowels of the two words have coalesced, leaving no trace of a word boundary in the spectrogram, the location of a turning point in the F0 contour is consistent with the predicted location of a word edge. F0 rises through the onset-less first syllable of the word *aŋˈmanamin*, before reaching the next melodic target (B) at the clapstick beat, which has its typical alignment with the first metrically strong syllable of the word (see Section 4.1.2 above).

This example shows that although the usefulness of intonational features as diagnostics of prosodic structure is inhibited by the subordination of the intonation contour to the melodic contour, as suggested in the previous section, certain key elements of spoken intonation in Iwaidja may remain intact when a text is sung.

Vowel modification

In a quantitative study of vowel quality in spoken Iwaidja (Birch 2002b)[18] it was found that vowels are centralized in relation to the mean when they occur in frequently occurring lexemes or constructions, and when they occur in metrically weak syllables.[19] On the other hand it was found that vowels are peripheralized when they occur in syllables aligned with pitch accents. As the results of other studies (for example, Recasens 1985) predict, the study also found that the low central vowel *a* exhibited a greater degree of variation than the two high vowels.
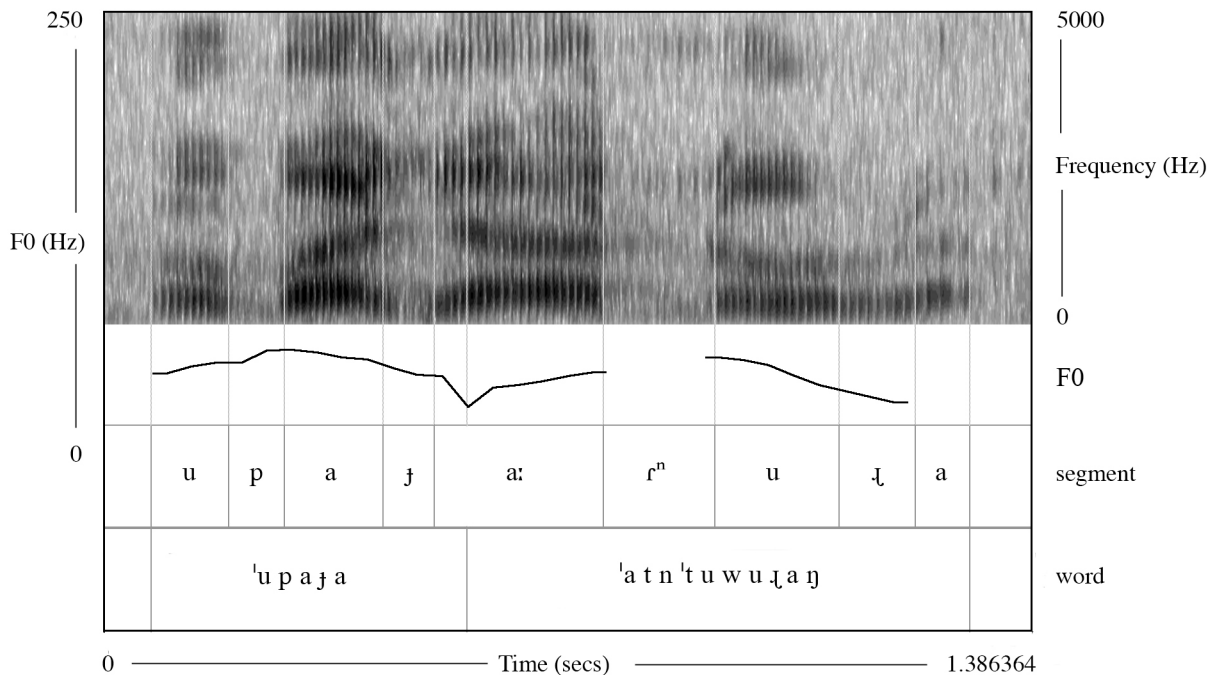
Figure 7: The phrase □upa□a □atn□tuwu□aŋ 'the police arrest us' (W_BN_riwudbarrki_01 29:16). The spectrogram shows the final vowel of □upa□a and the initial vowel of □atn□tuwu□aŋ have coalesced to form a single long low central vowel spanning the word boundary. The F0 trace, on the other hand, shows a low target aligning with the edges of the words.

In the *Jurtbirrk* texts, an examination of vowel quality reveals an almost inverse set of tendencies to those observed in speech. The low central vowel exhibits far less centralization than in spoken Iwaidja, whereas the two high vowels are lowered and centralized to a greater extent, the front high vowel typically being realized as ε, and the high back vowel typically being realized as ə or a. In addition, it would seem that the processes of centralization and lowering of vowels in song are not attributable to the factors influencing them in speech.

It is particularly illuminating to compare the formant values for vowels occurring in lengthened syllables in song with their counterparts in hyperarticulated emphatically accented syllables in spoken Iwaidja. Figure 9 shows a typical realization of a long high front vowel in the *Jurtbirrk* corpus.

The lengthened vowel in the second syllable, though phonologically high, having typical F1 and F2 values of around 420Hz and 2600Hz respectively under hyperarticulation, here has F1 and F2 values of 825.42Hz and 1795.54Hz. This gives the vowel the acoustic profile of a far lower and more central vowel, here transcribed as ε, and roughly equivalent to the long vowel in the English word *air.*

Figure 10 shows the word *ɟumuŋ* '3sg.OBL' extracted from the same performance. Hyperarticulated tokens of the low back vowel in spoken iwaidja have typical F1 and F2 values of 470Hz and 920Hz respectively. The realization of this vowel in the lengthened second syllable of *ɟumuŋ,* transcribed here as *a*, is more typical of a hyperarticulated low central vowel in Iwaidja, though slightly further back. It has an F1 of 904.35 and an F2 of 1469.44Hz.

In contrast to the two high vowels, which, when they occur in song, do not appear to exhibit the formant values typical of their hyperarticulated spoken language counterparts, the low central vowel exhibits a tendency to be hyperarticulated where it would typically be centralized or deleted in the spoken language.
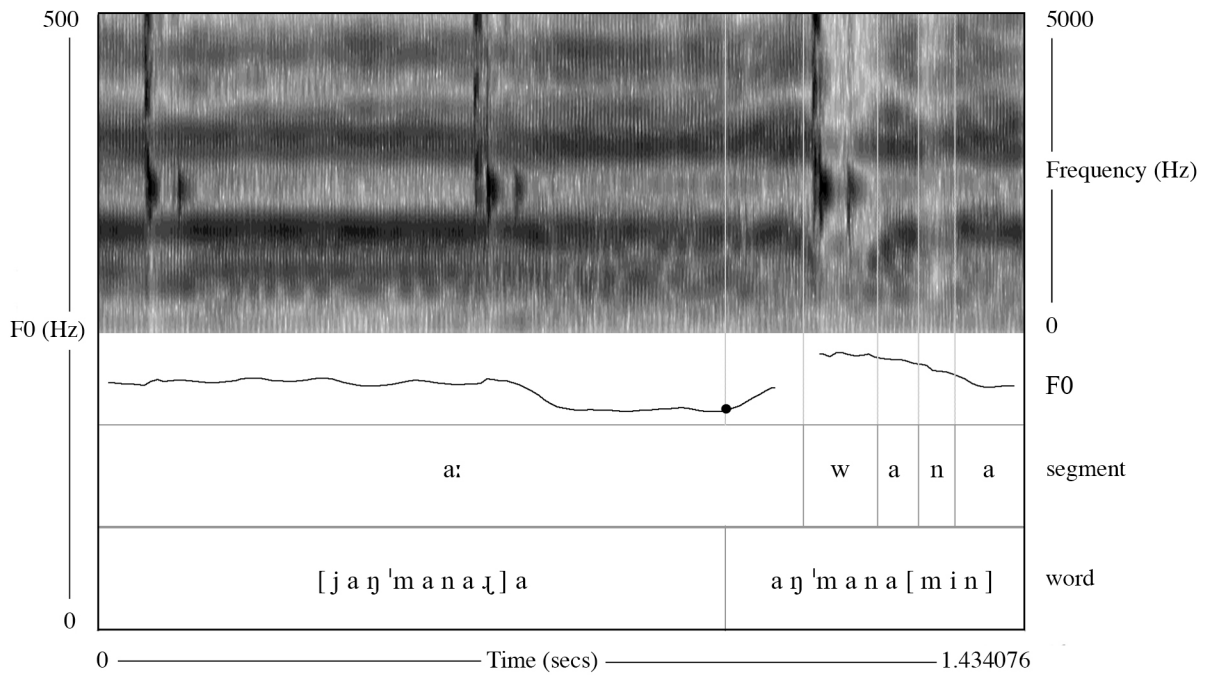
Figure 8: Spectrogram and F0 trace of an extract from the line *aŋ ꞌmanaɟa aŋ ꞌmanamin ꞌɟumuŋ* 'go and tell her' from a rendition of the song 'Yangmanara' (JU03, from dvR_040126_T3 03:59), showing the alignment of a melodic turning point with a word boundary indicated by the black dot. The text enclosed in square brackets on the 'word' tier shows preceding and following parts of the words not seen in the diagram. Notation of the word *aŋ ꞌmanamin* on the 'segment' tier shows the deletion of the first syllable coda (ŋ) and the lenition of the following bilabial nasal to the corresponding glide.
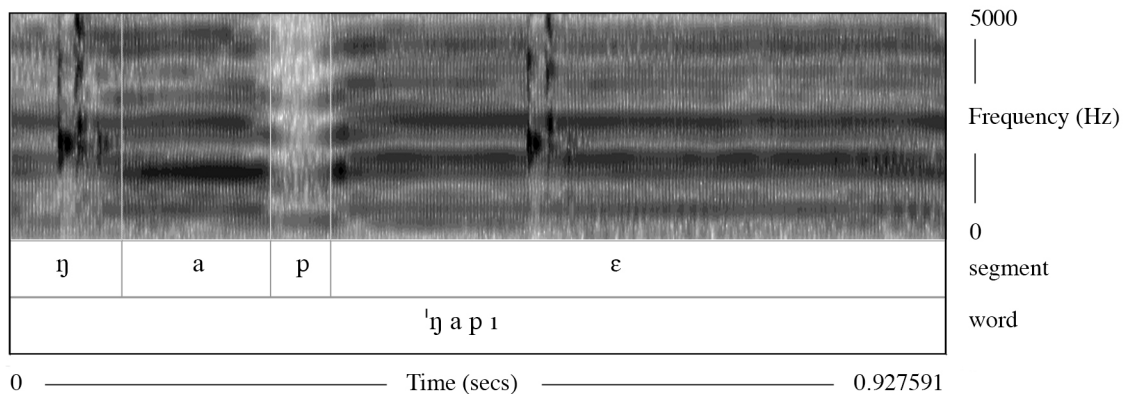

Figure 9. The word *ꞌŋapɪ* 'I' as sung by Reggie Cooper in a rendition of 'Yangmanara' JU03, from dvR_040126_T3 12:54).

An example of this occurs in the metrically weak syllables of the reduplicated form *a ˈɽalpa ˈɽalpa* (Figure 6 for reference). The two pre-retroflex low vowels in this word are commonly centralized to schwa or deleted in spoken Iwaidja, resulting in the variant realizations əˈɽalpəˈɽalpa and ɽalpəˈɽalpa. In this sung version, the first pre-retroflex low vowel has F1 and F2 values of 758.74Hz and 1546.18Hz respectively, whilst the second is slightly lower and further back with values of 804.55Hz and 1442.78Hz. In both cases, then, and in spite of the fact that they have short durations, the vowels are realized as typical low central vowels, showing no signs of centralization.

A probable motivation for the differences in vowel variation tendencies in sung, as opposed to spoken Iwaidja, is the need to maximize voice projection when singing. The high F1 values for all vowels suggest that the jaw is lowered in all cases. This suggests in turn that, as in the Western classical tradition where singers are trained to modify vowels in order that their unamplified voice may project above the level of an orchestra during performance, Jurtbirrk singers adopt similar techniques so that their voice can be heard above accompanying instruments and ambient party noise. Hyperarticulated high vowels with their constricted, more consonant-like articulations, are far from optimal in terms of maximizing voice projection, and are therefore likely to be avoided in such settings.

5.2. Grammar of Jurtbirrk songs

Jurtbirrk songs are sung in ordinary language, drawing on the full richness of Iwaidja grammar. Indeed, some grammatical devices are employed with particular frequency, so much so that our study of *Jurtbirrk* has advanced our understanding of one central part of Iwaidja grammar, as we discuss in this section.

A characteristic feature of Iwaidja grammar is that all verbs take their pronominal prefix from one of three *directional sets*: neutral, towards, and away. Examples (26-28) illustrate their use.

(26) *a-ra*
    3pl-go
    'They go, they are going along.'
(27)   *ijb-ara*
    AWAY:3pl-go
    'They go, they are going away.'
(28)   *ayuw-ara*
    TOWARDS:3pl-go
    'They come, are coming.'

Directionals are not especially unusual in Australian languages—for example, Warlpiri places the directionals *-rni/-rnu* 'hither; towards' and *-rra* 'thither: along, away, across' right after its verbs. But whereas in Warlpiri a single form can be combined more or less unchanged with all
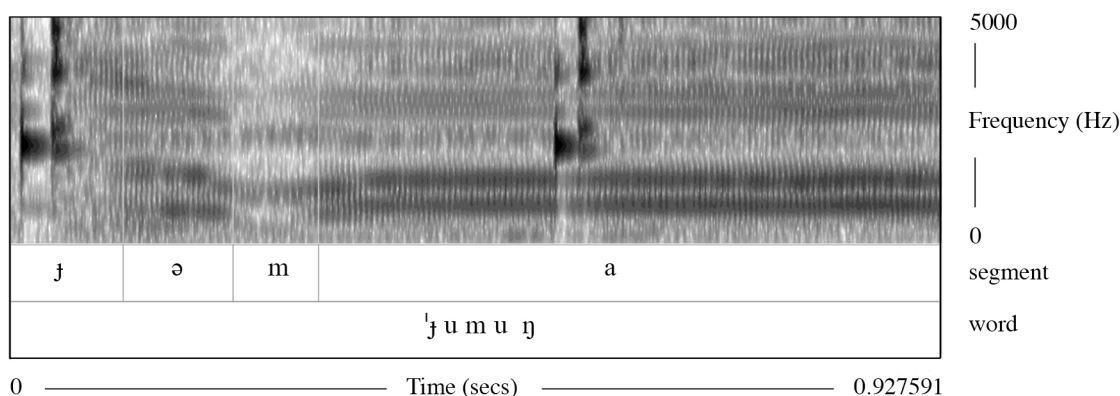

ɟ	ə	m	a

ˈɟumuŋ   word

5000

Frequency (Hz)

0

segment

Figure 10: The word ɟumuŋ as sung by Reggie Cooper in a rendition of *Yangmanara* (JU03, from dvR_040126_T3 12:49).

subjects and objects, in Iwaidja they get tangled up in a *paradigm* or multidimensional table where it is hard or impossible to say which sound(s) contribute which meaning(s). More precisely, every verb in Iwaidja takes a prefix encoding the following semantic dimensions:

(29) Subject: person x number (x gender just for 3sgSubj>3Obj)
       (If transitive—Object: person x number)
       Mood: (indicative versus irrealis versus imperative)
       Direction: neutral versus towards versus away

For example, the prefix *jarrubana-* means 'we, in the future, will act on him or her, in an away direction'. So if you said 'we will take him or her away' you could say *jarrubanawilimang,* combining it with the verb *wilimang* 'take'.

Multiplying the values in (29) means that each transitive verb has hundreds of possible prefix combinations that essentially need to be learned by heart, since you can't just put together a single bit (or 'morpheme') for each meaning. Table 8 compares some neutral and away forms; the right hand column gives the best guess about what the 'away' morpheme is, based on the difference between the two other forms. Since the interactions are complex and non-predictable, a large number of distinct forms need to be learned and documented, and obtaining a full set of paradigms is one of the slow chores of documenting—or completely learning—a language like Iwaidja.

To make matters worse, it appeared until recently that either some combinations were so unnatural that it was impossible to make up a context where you could sensibly ask for an example, or perhaps that some forms just didn't exist. (And it is not unusual that a language may not bother to have forms for very rare combinations. After all, children only learn a language by hearing it, and if they never hear rare forms, how would they know what they are?) The otherwise quite detailed description of Iwaidja by Pym & Larrimore (1979) has gaps for many combinations: all the 'away' forms involving a first or second person object (that is, of the type 'he > me away; I > you away', and so forth), and all the 'towards' forms involving interactions between first and second persons ('I > you towards', 'you mob > us towards' and so on). Based on three to four years of fieldwork in 1973–5 and 1977, they stated (Pym & Larrimore 1979, p. 94): 'According to the present data a complete set of directional-person-number prefixes is not in use with the transitive verb. Only those with third person objects are in common use.'

In recent years two of us (Evans, Birch) thought we might have more luck, and again tried eliciting some of these forms, trying to get people to describe situations like 'you gave it away to me', both in Iwaidja and the closely related Ilgar (now extinct). Speakers of these languages would just say 'you gave it to me'. Perhaps, we concluded, there was no need to express the meanings 'towards' or 'away' in interactions involving the speaker and the hearer, since the direction of transaction is clear anyway. To our language teachers' relief, we gave up trying to elicit these cells of the paradigm.

However, once we began recording and analysing *Jurtbirrk* songs, there was a new twist.

As it turns out, *Jurtbirrk* songs make incredibly frequent use of directional forms: of 32 songs in the collection, 22 have at least one directional form: 20 include at least one 'away' form, and 3 include at least one 'towards' form; one song has both. Considering that the major themes are

Table 8: The irregularity of 'away' forms.

	neutral prefix	*away prefix*	*'away' morpheme*
they	a-	ijb-	ijb-?
you (singular)	ang-	yang-	y-
you mob, you plural	kud-	yungkud-	yung-
I	nga-	ja-	ja-
she > him,her,it	ka-	yaka-	ya-

intimacy (getting your lover towards you) and abandonment or longing (your lover has gone away from you, or you are longing for your lover who is away) the basic reason is clear. Sometimes the directionals are used in their literal meaning of spatial movement, and sometimes in more metaphorical senses. In fact, the range of meanings that directionals express is more nuanced than this:

(a)   moving away / toward
(b)   moving along (away form)
(c)   continuous or ongoing action (away form; like English *talking away*)
(d)   action carried out at distance versus close (for example, cooking at distant versus close fire)
(e)   covering other gaps in the paradigm, with verbs whose object is filled by something else (for example, a thing given or cooked), so that 'away' can suggest 'to/for you' and 'towards' can suggest 'to/for me'[20]

Here are some translated examples from the *Jurtbirrk* collection illustrating these various uses:

Towards:
> • singer moving *toward location* of song ('Kuluduk' JU25)
> • addressee should reveal thoughts (*to* speaker) before the moon comes up (*towards*) ('Kurrana' JU05)
> • warning (to secret lover?) not to enter (*towards*) in case others see ('Yinang birta' JU07)

Away:
> • *loss* of sweetheard to a rival ('Ayiyakanjildiny' JU16)
> • pursuit of desired woman, *going over* to lover ('Yarrkbanaka' JU15; 'Angkiju' JU20)
> • intercession of friend *going to* talk to desired woman ('Yangmanara' JU03)
> • boat leaning *over* in wind ('Dayibabu' JU21)
> • wanting to go *to* country being struck by lightning ('Akartalwan' JU22)
> • thinking about *absent* addressee ('Ngaldalmaldangkaj' JU23)
> • punching lover *away* during fight ('Ayiyakanjildiny' JU24)
> • noticing bird song while walking *along* ('Kuluduk' JU25)
> • man walking *along*, then gets grabbed on chin and kissed by woman ('Yakaldadbarjan' JU27)
> • combing hair to make oneself look good while walking *off to* trysting place ('Nganayalkbarrki' JU29)
> • location (*away*) of cuddling lovers being observed ('Rildakbalambang' JU30)
> • lover lying *on side* and calls singer's name ('Dangkarrarnaka' JU31)
> • lover who is *away* has kept something (as a memento of absent person?) ('Wularrud' JU32)
> • singer was *off* at beach and misses meeting with addressee ('Yanjalmangung' JU04)
> • concern for absent person whose mind drifts *away* ('Wurruwarr' JU08)
> • looking back over shoulder while walking *along* ('Yangkuwilbarrjiny' JU13)
> • lover going *on* ahead to Cherry Beach (trysting place) ('Kartbiljuju' JU10)

Both:
> • contrast of friend (keep guard for me; *yuwukbanukan*) and outsider (voyeur peeping at me while washing; *ijuwumarludbang*) ('Jawina' JU14).

Not only do the directionals turn up frequently, but the *Jurtbirrk* collection also threw up examples of forms that previous investigations had suggested did not exist. An example comes from 'Ngaldalmaldangkaj' (JU23), composed by David Minyimak, Example (30).
    The prefix *yungkurrum-*[21] here fills out one of the supposed gaps in the paradigm. Here it makes complete sense: I am thinking about ABSENT you. This suggests that the reason that Pym, Larrimore

(30) *ngaran   duwa   yungkurrumburrwung   nga-ldalmaldangkaj*
     1sg-go-PST   just   AWAY:1sgA>2plO-have_in_mind-PST   1sg-feel_sick
     [You two went away, you didn't even say goodbye to me]
     'I went on thinking about (absent) you, I am sick with worry.'

and ourselves had not found the missing combinations was that we had been concentrating on the basic meaning, 'movement away', trying out the combinations with verbs like 'take'. But if we look at other uses of the prefix—such as the location of one participant away from the here-and-now—the combination makes sense, as in this song. We are now using this insight to double back and try getting the other missing elements in the paradigm.

4.3 Lexicon of Jurtbirrk: intimate vocabulary

The preceding section showed how song language can help us explore aspects of grammar we might otherwise have missed. We now turn to the *lexicon* or vocabulary, and again we see how song language throws up new vocabulary items that are easily overlooked if we just focus on spoken language.

Documenting a language is like carrying out a biological survey of fish or bird species. Common items are easy to detect, but as with any sampling procedure, rare items can easily be missed. A language documentation program is usually based on just a fraction of the number of hours' exposure that a normal speaker has to the language. We may sample everyday greetings and statements, or public narratives, but what about the words people say to each other in private, or to themselves in their thoughts? Here we show how *Jurtbirrk* songs give a particularly clear window into the 'intimate' vocabulary or interiority and feeling that characterises lovers' language.

In the Iwaidja spoken stories that we have recorded, there are of course many dealing with love relationships. Interestingly, though, the focus in these spoken stories is on outward events, and on the social consequences of these relationships, or how particular feelings motivate action, rather than on a fine depiction of the feelings themselves. Thoughts—in the rare situations where they are mentioned at all—are presented as speech. Desires are only mentioned to the extent that they impact on actions, physical forms (for example, changing from man into snake) or resultant social relations. In the *Jurtbirrk* songs, on the other hand, the focus is on a delicate and evocative characterisation of poignant feelings, and on vignettes of individual love relationships.

Let us begin by looking at a spoken story: the story of Yirrwartbart, which has been recorded from many languages and groups in Western Arnhem Land. This story concerns the 'eternal quadrangle' of a young girl, her mother who has promised her in marriage, the unappealing older man she is promised to, and the girl's handsome young lover. This plot implies a broad and passionate emotional range—love, lust, disappointment, jealousy, coercion, disappointment, revenge. But the only examples of emotional expressions that we have recorded, across several tellings of this story, involve
rather broad-brush, generic verbs for emotion or thought (31), or verbs of speech like *abiny* 'he said/did' framing reported thought (32). All are quite basic and had already been recorded many times before in other contexts. (Versions of this story that we have seen in other languages, such as Kunwinjku and Amurdak, are comparable). We exemplify here with a typical passage from a version of this story told by Joy Williams (Williams Malwagag & Birch 2005); emotional expressions in Iwaidja and English are in bold.

(31) *Jumung kukung wularrud kungmawiny, kukung ba warrkbi **kamurtbang**, karlu **kamiyardmangung**.*
Long ago a woman promised her daughter to her son-in-law, but the girl was **afraid** of going to him, she didn't **want/like**[22] him (and therefore didn't go to him).

(32) *Barda **abiny** janad wiyu, nganduka nganamin? Kurldingka nganangijan ambij.*
And so the old man **said to himself**, 'what am I going to do? Maybe I'll change into a snake.'

Similar vocabulary items come out during discussions or retellings of these stories, such as the following excerpts from commentary and partial retellings of this story by Tim Mamidba:

(33) ***Ralarrikban** manuk **kayang mardarraj**, Yirrwartbart kawudban **kamiyardmang** manuk.*
Water Python **spoiled** things, she fell in love with him and **took him as her lover**, she left Taipan and (only) **wanted** Water Python.

In the *Jurtbirrk* songs, there is a much more finely tuned emotional palette, focussing on more subtle emotions, or revelations of emotional state. In transcribing and translating the *Jurtbirrk* songs, we encountered a number of expressions previously unknown to us (and not included in Pym & Larrimore's Iwaidja dictionary file, resulting from their three to four years' work on the language in the 1970s). These included the following, all taken from *Jurtbirrk* composed by David Minyimak.

(34)   *aldakani* 'make someone sad, make someone sorry', as in 'Nganbaldakaniny' (JU09).
        *Malany maju nganb**aldakani**ny ngara baraka, ngaldalmalangkajangkaj.*
        Why is she trying to **make** me **sorry**, I'm feeling sick in the stomach.

(35)   *ldalmaldangkaj* 'feel churned up, feel sick in the stomach with worry or emotional turmoil', as in the
        example 34) but also in 'Ngaldalmaldangkaj' (JU23):
        *Ngaran duwa yungkurrumburrwung, nga**ldalmaldangkaj**.*
        I went on thinking about you two who are away, I am sick with worry.

(36)   *angmarranguldi* 'bring back memories, inspire longings for an absent person or place; particularly
        used when the memories are triggered by some meteorological phenomenon, for example, a change
        in the wind, lightning storm, or similar', as in 'Akartalwan' (JU22).
        *Kanayanjing akartalwan Wungarndurl **angmarranguldi**ny kirrimul baraka, janamirrakbun.*
        Look at the lightning, the sight of the distant storm **fills** me **with longing**, I'm going down
            there.

(37)   *ldakbalkba* 'reveal one's thoughts, say what one is thinking about, what is on one's mind', as in
        'Kurrana' (JU05).
        *Ardalbardalba yuwu**ldakbalkba**, imalda arakbalmalkbang kurrana.*
        Quick, **tell** me **what** you're **thinking**, before the moon comes up / the moon is already
            coming up.

This word is made up of a root *ldak* (~ *dak*) that occurs in many expressions of communication, plus a variant of the root *malkba* 'to appear, emerge, come up or out'. This same root *malkba* recurs later in the song, embedded inside another verb *balmalkba* 'to come up, of moon'. So the composer sets up an implicit parallel between the addressee of the thoughts of the addressee appearing or being revealed to the singer (specifically: where they are to meet) and the moon appearing in the sky—with *imalda* 'already' conveying the urgency that once the moon is fully up it will be hard for them to make their way in secret to the appointed trysting place.

6. Conclusion

The word *ldakbalkba* is particularly significant for us, as documenters of language and music faced with the challenge of coaxing out the knowledge that people hold in their minds into a tangible form that can assuredly be shared with future generations. Song, as a medium, gives us a special opportunity to reveal some of this fine cultural knowledge, which is in the minds of language speakers—both as songmen, and as 'ordinary' speakers—but which may only appear in the rare moments so delicately portrayed in this song genre. The multiple focus brought by interdisciplinary work can increase our sensitivity to the richness and logic of what is there. By incorporating a number of topics that might often be regarded as lying somewhere between the disciplines, such as the extent to which the rhetorical structures of song texts are supported by their musical setting; the nature of the musical and metrical constraints that lead to modification of the song text when it is sung as opposed to spoken, and observations on the phonology of the song texts in the context of the larger corpus of spoken Iwaidja, we hope that our article has gone some way towards integrating both perspectives and providing a clearer picture of the corpus.

At the same time, the sheer wealth of musical genres, and languages involved, confronts us with an enormous challenge. Though we have focussed on a single genre, *Jurtbirrk*, sung in a single language, Iwaidja, understanding the texture of musical life in Western Arnhem land requires us to study the full tapestry of different song genres and their associated languages: public performances usually draw on a wide selection from this rich gamut, the geographical symbolism of specific performance choices (for example, choosing sea

songs as opposed to stone country songs) draws on the mapping of the associated language onto clan lands, and song styles are defined with respect to the whole musical and linguistic ecology of the region. Many of the deeper issues we have raised in this article, such as the interdependence of song and speech in generating cultural diversity and specific local identities in the region, can only be addressed properly once we have an understanding of the entire rich panoply of musical genres in Western Arnhem Land. Our goal in this article has been to show how many angles the appreciation of even one of them has to be approached from.

Acknowledgements

Appendix 1: Abbreviations

A: transitive subject;
ANG: ang-class intransitive subject or object (historically an old neuter);
DEM: demonstrative;
FUT: future;
IMP: imperative;
HAB: habitual;
INCH: inchoative;
ITER: iterative;

O: object;
OBL: oblique;
OPT: optative;
pl: plural;
PP: past perfective;
PST: past;
sg: singular;
1, 2, 3: first, second, third person;
> 'acts upon', for example, 3plA>3O 'third person plural subject acts upon third person singular object'.

Appendix 2: Iwaidja Practical Orthography

Consonants in Iwaidja

	Bilabial	*Alveolar*	*Retroflex*	*Palatal*	*Velar*
Stop	b (p)	d (t)	rt (□)	j (□)	k
Nasal	m	n	rn (□)	ny (□)	ng (ŋ)
Approximant	w		r (□)	y (j)	h (□)
Fricative					
Tap		rr (□)	rd (□)		
Trill					
Lateral		l	rl (□)		
Flapped		ld (l□)	rld (□□)		
Lateral					

The consonant inventory shares much with other Australian languages, the exceptions being the velar fricative, which is an areal feature, and an expanded set of liquid phonemes where a flapped versus non-flapped contrast is superimposed on alveolar and retroflex laterals.

There are five place contrasts for oral and nasal obstruents, and four for approximants. There are two place contrasts (alveolar and retroflex) for taps, laterals, and flapped laterals.

Iwaidja has a triangular three-vowel system (a, i, u).

Appendix 2: *Jurtbirrk* song texts listing

Cross-referenced to song and track numbers for the *Jurtbirrk* CD (Barwick, Birch & Williams 2005). For full song texts, glosses and translations, see the CD booklet.

ID	Title	Song and track number(s) on CD	Composer
JU01	'Kudnuka ngartung'	Song 9, tracks 12 and 13	David Minyimak
JU02	'Jawani jukan'	Song 11, track 16	Reggie Cooper
JU03	'Yangmanara'	Song 10, tracks 14 and 15	Reggie Cooper
JU04	'Yanjalmangung'	Song 24, tracks 30 and 31	
JU05	'Kurrana'	Song 25, tracks 32 and 33	David Minyimak
JU06	'Angkakbaldurun'	Song 27, track 35	Reggie Cooper
JU07	'Yinang birta'	Song 28, track 36	Reggie Cooper
JU08	'Wurruwarr'	Song 26, track 34	David Minyimak and Reggie Cooper
JU09	'Nganbaldakaniny'	Song 5, tracks 6 and 7	David Minyimak
JU10	'Kartbirljuju'	Song 30, track 38	Robert Cunningham
JU11	'Bujikad'	Song 31, track 39	Robert Cunningham
JU12	'Riwujbakba'	Song 32, track 40	David Minyimak
JU13	'Yangkuwilbarrjiny'	Song 29, track 37	Reggie Cooper
JU14	'Jawina'	Song 6, tracks 8 and 9	David Minyimak
JU15	'Yarrkbanaka'	Song 7, track 10	Ronnie Wandijak
JU16	'Yarildariki'	Song 1, track 1	Ronnie Wandijak, David Minyimak dj Sam Namaruka
JU17	'Ngadburriyinurriying'	Song 2, tracks 2 and 3	Ronnie Wandijak
JU18	'Ayunman wingalmu'	Song 3, track 4	David Minyimak
JU19	'Kanangurrwu'	Song 4, track 5	Ronnie Wandijak
JU20	'Angkiju'	Song 12, tracks 17 and 18	David Minyimak
JU21	'Dayibabu'	Song 13, track 19	David Minyimak
JU22	'Akartalwan'	Song 14, track 20	David Minyimak
JU23	'Ngaldalmaldangkaj'	Song 15, track 21	David Minyimak
JU24	'Ayiyakanjildiny'	Song 16, track 22	David Minyimak
JU25	'Kuluduk'	Song 17, track 23	David Minyimak
JU27	'Yakaldadbarjan'	Song 18, track 24	David Minyimak
JU28	'Kuburruburr'	Song 19, track 25	David Minyimak
JU29	'Nganayalkbarrki'	Song 20, track 26	David Minyimak
JU30	'Rildakbalambang'	Song 21, track 27	David Minyimak
JU31	'Dangkarrarnaka'	Song 22, track 28	David Minyimak
JU32	'Wularrud'	Song 23, track 29	David Minyimak
JU34	'Yadndakbuliwa'	Song 8, track 11	David Minyimak

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NOTES

[1] Appendix 2 sets out the Iwaidja practical orthography used in this paper.

[2] The full name of the project is Yiwarruj, yinyman, radbihi lda mali: Iwaidja and Other Endangered Languages of the Cobourg Peninsula (Australia) in their Cultural Context. This project, funded by the Volkswagen Foundation under its DoBeS program (Dokumentation Bedrohter Sprachen), aims to document the languages of the Cobourg Region in their cultural context, and includes researchers from several other disciplines (musicology: Linda Barwick; anthropology: Murray Garde; material culture: Kim Akerman) in addition to linguists Nick Evans, Hans-Jürgen Sasse and Bruce Birch.

[3] Appendix 3 contains an identification listing of the thirty-two Jurtbirrk song texts in our corpus, including cross-reference to their occurrence on the CD. See the CD booklet for full texts, glosses and translations of the song texts.

[4] See Evans (2000, p. 94) for details behind this claim. The term 'language family', confusingly, has a range of meanings: here we are using it in the sense in which it has been used in the major classifications of Australian languages, such as those by O'Grady et al (O'Grady, Voegelin & Voegelin 1966; O'Grady et al. 1966) and Walsh

(1981), for the largest grouping that allows the identification of a basic quorum of shared vocabulary and grammatical material.

[5] Although the *Itpi-itpi* song-set is primarily associated with the Kunwinjku language, its name is a Mawng word for 'grasshopper', used to refer to a young woman. Although most song texts are in Kunwinjku, some songs in the set contain phrases in Kun-barlang and Mawng, reflecting the long-term cohabitation of people from these three language groups in Mawng country (the community of Warruwi on South Goulburn Island, and the nearby mainland).

[6] In the Daly region and southern Arnhem Land, circumcision ceremonies and ragburning ceremonies for the disposal of the belongings of the deceased are the main public performance occasions, but these ceremonies are no longer practiced in Minjilang, where the main performance occasions are now funerals and *mamurrng* ceremonies (for the return to a young person of a lock of hair taken at birth and given to another performance group) (Garde 2006).

[7] In this article, references to individual song texts in the *Jurtbirrk* repertory use a unique title (usually a word of the text) and a reference code (for example, JU13) as defined in the controlled vocabulary used in the DoBES archive, Max Planck Institute, Nijmegen. See Appendix 2 for a listing including reference to song and track numbers on the *Jurtbirrk* CD that appeared in 2005 (Barwick, Birch & Williams 2005).

[8] Throughout this article we refer to the individual song items by the persistent identifiers adopted in the archival records as deposited in the DoBeS archive, Max Planck Institute, Nijmegen.

[9] Our use of the term 'rhythmic mode' here follows the analysis of Daly region didjeridu-accompanied *wangga* and *lirrga* songs by Marett and Barwick (Barwick 2003, 2006a; Marett 2005).

[10] We have transcribed some songs (for example, 'Yangmanara' JU03) in a swung 3/4 rather than 9/8. The compound 9/8 metre is fairly unstable in all renditions, with the subdivisions of the beat sometimes having a duple rather than a triple feel, and some performers favouring 3/4 over 9/8. In these cases the clapstick tempo (105–115bpm) is the factor that distinguishes these from the 95bpm 3/4 songs, which always have a consistent duple feel to subdivisions of the beat.

[11] *Dayibabu* is a loan from the English 'diver boat'.

[12] For convenience this discussion refers to the different modal series used in *Jurtbirrk* songs by the names of the Western modes, but no connection between the modal systems is necessarily implied.

[13] This is not to imply that clapstick beats always align with stressed syllables. Long vowels may be sung across a number of clapstick beats, and furthermore syncopations result in an intentional non-alignment of CV transitions with clapstick beats. However, strong syllables do frequently align with clapstick beats, and when this is the case, it is the CV transition that aligns, rather than the nucleus, or coda.

[14] The initial stressed syllable *ja* of ˈ*juwalꞇakˈpalkpa* is not aligned with a clapstick beat. In this case the singer has chosen to phrase this word so that the pitch transition comes early. In the second verse of the same song item, he aligns this transition more precisely with the clapstick beat.

[15] F0 is the fundamental frequency of a sound.

[16] Both onset and coda consonants may be deleted in Iwaidja, particularly when they occur at the boundaries of larger prosodic constituents such as intonation phrases and utterances. However, only coda consonants are deleted word-internally.

[17] A similar tendency has been noted for neighbouring Bininj Gun-wok languages (Bishop 2003), where a low tone (L_p) marks Phonological Phrase-final boundaries.

[18] Iwaidja has a triangular three-vowel system (a, i, u) (see Appendix 2).

[19] This study found no 'across the board' correspondence between metrical strength and vowel quality, but found that when frequency of occurrence was factored in, vowels in metrically weak syllables showed a greater tendency to centralize than their counterparts in metrically strong syllables.

[20] Lots of languages do this. For example, in Italian *ci* and *vi* started out meaning 'here' and 'there' but can now mean 'us' and 'you (mob)' as well.

[21] Derived from an 'underlying' form *yungkurrun-*, with the n assimilating to the following b.

[22] The verb *miyardmang* covers the range 'want, like, love, go near to (because you like someone)'.