

## Chapter 4. Methodology

This chapter outlines the methodological approaches employed for the surveying, recording and analysis of data used within this research. A detailed discussion on the various survey methods and recording techniques applied during data collection i.e. field survey methods, site recording, and rock art recording techniques is provided. As a contextual approach has been adopted for this research (outlined in Chapter 1), there was a need to investigate both the geographic and social context in which the rock art was produced. For this reason, a range of geographic, locational and art related variables were included in the database. In addition, analytical methods used as a framework for analysis will be outlined and discussed. Finally, a summary and conclusion is provided, which reflects on the information presented in this chapter.

### 4.1. Permits and formal research agreements

This research has been undertaken with agreement and participation of the Wunambal Gaambera people, who are the recently determined Unguu native title holders for Wunambal Gaambera Country; their *Wanjina Wunggurr* culture was also recently listed in the West Kimberley place on the National Heritage List. All research for the *Change and Continuity* was undertaken under the valid permits authorised by the relevant bodies.

#### 4.1.1. Indigenous consultation and involvement

Formal processes of Indigenous consultation were undertaken by Chief Investigators of the *Change and Continuity* project. Indigenous consultation was undertaken at a number of levels with Traditional Owners from the Kandiwal Aboriginal Corporation, the Native Title Group at Kalumburu, Wunambal Gaambera Aboriginal Corporation, and the Kimberley Land Council in Broome (Ross *et al.* 2011:1).

Throughout each field season, numerous Kandiwal and Kalumburu community members actively participated within all aspects of the research, while others were provided the opportunity to visit and comment on the research program. Such comments and related stories were documented throughout the process (Ross *et al.* 2011:1).

#### **4.1.2. Registration of sites with the Western Australian Department of Aboriginal Affairs**

All sites have been lodged with the Western Australian Department of Aboriginal Affairs. Information on the location of sites has been withheld as requested by the Traditional Owners (Ross *et al.* 2011:2).

### **4.2. Survey and recording techniques**

The primary aims of the field program were to identify site complexes and undertake detailed recording of the rock art sites within each site complex to establish the composition, spatial distribution and chronology of art styles in the northwest Kimberley. Additional objectives were to collect ethnographic information on the social significance of specific rock art sites and the totemic landscape, and to establish an electronic archive of recorded sites. Fieldwork was undertaken by the ‘Rock Art Recording Team’, which involved four core members, and additional support personnel when required.

#### **4.2.1. The site complexes**

As defined within this research, a site complex includes all individual rock art sites and associated archaeological material clustered around one ‘large’ rock art site. Within each complex, individual rock art sites are defined as any discrete topographical entity where rock art is found (Morwood 1979:268). This includes a rock shelter, a rocky outlier, an escarpment face or exposed boulder.

Site complexes that were the target of this research were selected by the Chief Investigators of the *Change and Continuity* project based on their potential for archaeological excavations and determining the age of distinctive Kimberley rock art styles (Morwood *et al.* 2008:3). Each site complex was given a geographical name and allocated an abbreviated code (e.g. Lower Mitchell River [LMR]). In one instance, initials of one of the project leaders were used instead of a geographical name (i.e. Michael Morwood [MM]). Each rock art site was linked to a complex and given a unique identification number (e.g. LMR01, LMR02). Over the course of three field seasons during 2010 (three weeks), 2011 (six weeks), and 2012 (five weeks) fieldwork was undertaken at fifteen site complexes within Wunambal Gaambera country (Table 4.1, Figure 4.1).

**Table 4.1** Recorded Site Complexes

Site Complex	Acronym
Lower Mitchell River	LMR
Mitchell Billabong	MB
Michael Morwood	MM
Bush Spirit Camp	BSC
Camp Creek	CC
Lawley River	LR
Lawley River Wanjina	LRW
Upper Bush Spirit Camp	UBSC
Upper Lawley	UL
Mitchell Plateau	MP
Upper Mitchell River	UMR
Kimberley Coastal Camp	KCC
One Tree Beach	OTB
Stone Bone Yard	SBY
King Edward River Crossing	KERC

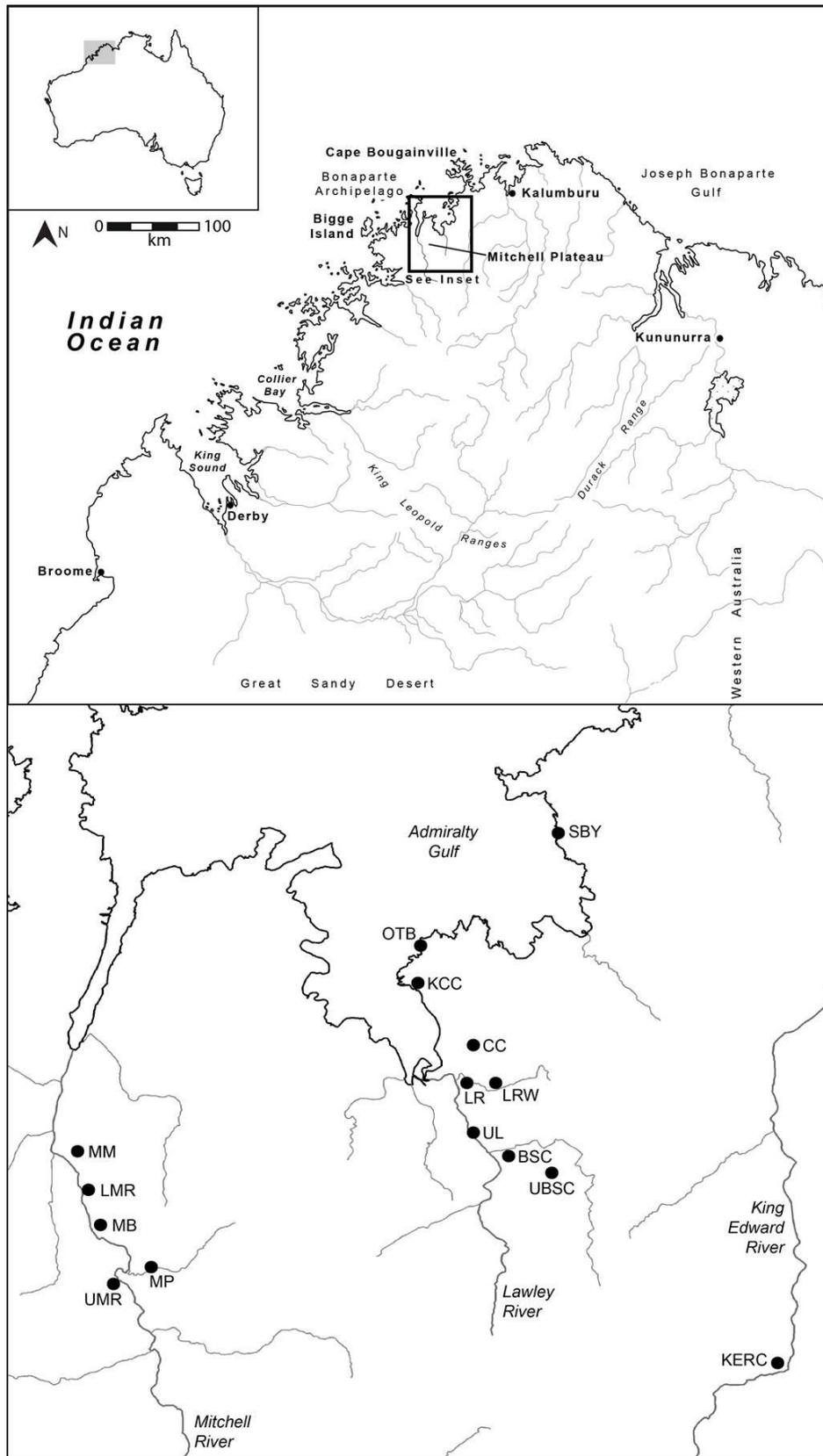


Figure 4.1 Location of recorded site complexes<sup>10</sup>

<sup>10</sup> The scale of this map precludes all individual rock art sites been shown. Therefore, the dots indicate the general location of each site complex.

### 4.2.2. Field survey methods

Fieldwork involved extensive surveys in the fifteen site complexes. This section outlines the method employed. Within each site complex, a foot survey was undertaken to identify sites within the vicinity. As each site complex was identified by the presence of at least one ‘large’ rock art site (>50 motifs)<sup>11</sup>, the foot survey was conducted within a 1 km radius of the main ‘large’ rock art site. Outside of this vicinity, sites were identified in an opportunistic manner. The objectives of the surveys were to assess the potential of:

- Rock art assemblages to document spatial and chronological variation in the art, materials and in art production and/or behavioural, ideological and environmental contexts of production.
- Stratified deposits for documenting the age, characteristics and behavioural implications of archaeological evidence.

And to document:

- Other archaeological and environmental evidence with a view to increasing understanding of the rock art and stratified deposits.
- Other cultural sites in the vicinity of rock art assemblages deemed relevant to the function of the art sites (Morwood *et al.* 2008:7).

On completion, the survey program resulted in the recording of 215 sites, 204 of which were rock art sites. All rock art sites identified during the foot survey were recorded in detail, no matter how little art was preserved. Details were recorded at each of the 204 rock art sites at three distinct levels: the site, panel, and individual motif. The methodologies used for recording each of these three levels are discussed later in this chapter.

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<sup>11</sup> The only site complex that did not contain a ‘large’ rock art site was UBSC. This complex, which consists of one small rock art site, was opportunistically recorded – it was not identified as part of the foot survey program.

### **Working with a sample**

An inherent aspect of this field survey program is that it results in a sample. Due to time constraints, and the immense size and remoteness of Wunambal Gaambera country, it was inevitable that the recorded rock art sites would just be a sample of what actually exists. This is considered reasonable as archaeologists work with samples, because they must. It is not considered possible to obtain the complete population of any archaeological entity; some examples are destroyed, and some unfound (Barry and White 2004:43). In relation to rock art, there are no means available for archaeologists to access how representative the present rock art body is of all art producing events at any location through time (Ross 2003:105). At least some of the rock art is likely to have deteriorated so that it is no longer visible; other art is obscured by more recent motifs. Archaeologists can rarely presume that the sample they are working with represents the complete population.

#### **4.2.3. Site recording**

This section outlines the methods applied to recording each identified rock art site. Specific details of recording the rock art within each site are not included here as they are discussed in Section 4.2.4.

For each site, a hand sketched floor plan and cross section was produced and the individual rock art panels were numbered and located on the plan. For the sites where excavations were undertaken, a scaled floor plan and cross section were produced. The location of each site was recorded using a hand held Global Positioning System using Datum WGS 84 (Zones 51L, 52L). Location information for each site is not provided in this thesis at the request of the traditional owners to ensure the sites cannot be relocated and accessed without consent. The recorder/s name and the date of recording were documented. Known site restrictions were recorded; these were recorded as male, female and/or unknown. Specific details on such restrictions were kept in field notes and appropriate protocol was followed where necessary. Where possible, ethnographic information on the social significance of specific rock art sites was recorded and incorporated into field notes (Ross *et al.* 2011:6). Other site

information recorded included: site access, relating to the ease of physical access to the site in the field (i.e. easy, moderate, and difficult<sup>12</sup>); and a site description (e.g. aspect, floor description, and site measurements). In relation to photography, an in shot and an out shot was taken at each site.

Additionally, for each site, a number of geographic and art related features were systematically recorded, including: the site type, the physical geography of the site and its setting (e.g. topography, vegetation, and associated water source), associated archaeology, associated rock art traditions, conservation issues, and dating prospects. Such site information is important for the archaeological understanding of rock art production, as artists did not only choose *what* to produce, or *how* to produce it, they also choose *where* to produce it. As Bradley (2000:39) has established, the analysis of the relationship between the landscapes, topographical features and rock art assemblages can potentially inform us of the function of the art and the size or composition of the viewing audience. The details of these recorded features are outlined below.

### Site Type

Sites were identified by the presence of rock art motifs and/or associated archaeology and were classified as one of the following types: deep cavern, escarpment face, exposed boulder, overhang, rock shelf, and rock shelter (Table 4.2, Figure 4.2).

**Table 4.2** Description of site types

Site Type	Description
Deep cavern	A deep cavern is a very deep cave.
Escarpment face	The vertical (or just off vertical) face of an escarpment (see <i>Topography</i> below for a description of <i>escarpment</i> ).
Exposed boulder	A boulder is defined as a large rounded piece of rock (larger than 250 mm in diameter) (Bednarik 2007:202).
Overhang	An overhang is a rock face that has a slope of more than ninety degrees, i.e. the face slopes beyond the vertical.

<sup>12</sup> Easy accessibility refers to sites produced in easy-to-reach locations, typically located in the line of sight of passers-by. Moderate accessibility requires a modest amount of physical activity to reach the site. Difficult accessibility refers to sites located in hard to reach locations among complex escarpments.

Site Type	Description
Rock shelf	A projecting ledge of rock.
Rock shelter	Shallow cave.



**Figure 4.2** Examples of site types

- a) Deep cavern
- b) Escarpment face
- c) Exposed boulder
- d) Overhang
- e) Rock shelf
- f) Rock shelter

## Topography

For the purposes of this study, topography was classified into five physical categories (see Table 4.3). These categories are intended to represent the overall characteristics features of the northern Kimberley landscape.

**Table 4.3** Description of topographical categories

Topography	Description
Broad valley	A broad low area of land lying between ranges of mountains, hills, or other uplands.
Escarpment	A steep slope or cliff that is a result of erosion or faulting, which separates two comparatively level surfaces at different elevations.
Plateau	An elevated, relatively level area of ground.
Sandstone outcrop	A visible exposure of sandstone at the surface.
Swamp	A low-lying area of ground which is generally saturated with water.

## Vegetation

Present vegetation was classified into six categories (see Table 4.4). These categories were developed based on an understanding of the northwest Kimberley environment and its main ecological communities. Each of the vegetation categories would have provided a range of food and economic resources, and would have played a significant role in the movements and decisions made by past human populations.

**Table 4.4** Description of vegetation categories

Vegetation	Description
No vegetation	An area where little to no vegetation is present.
Open forest	An open forest has >50-80 per cent crown cover (30-70 per cent projective foliage cover) (MPIGANFISC 2013:61). An open forest is denser than woodland.
Rainforest	A rainforest is a dense, closed canopy forest, which grows in regions of high rainfall (Collin 1992:92; Webb and Tracey 1981:68). In the northern Kimberley, semi-deciduous vine thickets (known as dry monsoonal rainforest) occur in small pockets of wetter areas (Wheeler <i>et al.</i> 1992:xiv).
Savanna	Savanna is defined as a plant community in which the dominant species are perennial (native) grasses, there are few or no shrubs, and large trees are absent. In the northern Kimberley region, areas with a mean annual rainfall below 400 mm have savanna vegetation (Wheeler <i>et al.</i> 1992:xiv).
Scrubland	Scrubland (also known as shrubland) is considered 'land covered with small trees and bushes' (Collin 1992:192). In the Kimberley region, scrubland includes the often extensive mangrove communities of tidal mudflats (Wheeler <i>et al.</i> 1992:xiv).
Woodland	Woodland is an area of land dominated by perennial woody plants which do not have their crowns touching (Gillison and Walker 1981:177). Woodland has 20-50 per cent crown cover

Vegetation	Description
	(equivalent to 10-30 per cent projective foliage cover) (MPIGANFISC 2013:61). The northern Kimberley region consists primarily of woodland communities.

## Water Source

The following features were recorded in relation to water sources: distance to nearest water in metres, water availability (i.e. reliable and ephemeral), and water type (i.e. billabong, creek, river, and rock hole) (Table 4.5). The term reliable was chosen over permanent as it suggests a dependable source rather than claiming a continuing or enduring source. An ephemeral water source refers to a body of water which is transitional, filling up only after rain and drying up quickly.

**Table 4.5** Description of water source

Water source	Description
Billabong	A small area of still water located adjacent to a river, cut off by a change in the watercourse.
Creek	A narrow channel of water, smaller than a river.
River	A river is defined as a 'large flow of water, running from mountains or hills down to the sea' (Collin 1992:187).
Rock Hole	A rock hole is 'an unmodified depression in bedrock where rainwater collects' (Bednarik 2007:209).

## Associated Archaeology

The associated archaeology found at each site was recorded along with a description of the deposit within shelter sites. This information was recorded as other archaeological evidence found at a site may provide indications of the ways in which the site was used in the past. Seventeen categories were recognised (see Table 4.6).

**Table 4.6** Description of Associated Archaeology

Associated Archaeology	Description
Artefact	'Any portable object made or modified by human agency' (Flood 1997:350).
Boonjgul Stones	Transported and deposited rounded river stones.
Contact items	Physical items which are an indication of historical associations between the traditional owners and 'outside' cultures.

Associated Archaeology	Description
Grinding Groove	A grinding groove as 'A tool-sharpening groove produced by manual rubbing of an artefact such as an axe to and fro on rock, particularly sandstone, to grind or re-sharpen its surface' (Flood 1997:353).
Grinding Hollow	Same as a grinding groove, except the result is a hollow rather than a linear groove.
Hearth	A hearth is considered the 'remains of a camp fire represented by ash, charcoal, discolouration, and possibly hearth stones around it' (Flood 1997:354).
Human skeletal remains	The presence of Aboriginal skeletal material. This may occur in association with mortuary/burial markers.
Non-human bone	Bone of non-human origin (i.e. animal skeletal material).
Ochre fragment	An ochre fragment refers to a 'clay deeply coloured by red, brown or yellow oxides' (Flood 1997:355).
Organic material culture	Organic remains (e.g. a source of plant material) of human activities recovered by archaeology (Bednarik 2007:206).
Potential Archaeological Deposit (PAD)	A PAD refers to an area with the potential to contain an accumulation of cultural material and sediment deposited over time.
Scarred Tree	A tree that has been deliberately 'scarred by Aboriginal people through the delicate removal of bark or wood' (Long 2005:6).
Shell	A piece of shell material, appearing as a surface scatter or an isolated find.
Stone arrangement	An artificial alignment of stones, consisting of circles, lines, piles of standing stones or other designs, used for ritual, burial or ceremonial purposes (Flood 1997:358).
Stone cairn	A mound of transported stones.
Stone quarry	A place where stone has been exploited (Flood 1997:356). To identify a site as a stone quarry, at least two of the following pieces of evidence are required: <ul style="list-style-type: none"> <li>• Evidence for the removal of material/modified surfaces in the form of negative scarring, crushing, areas of excavation etc.,</li> <li>• Presence of implements used during extraction at the source,</li> <li>• Evidence of flaking and reduction of the stone material at the source,</li> <li>• Presence of partially-worked material at the source,</li> <li>• Ethnographic evidence relating to the extraction of raw material at the source (DAA 2013).</li> </ul>
Surface scatter	A group of artefacts located on the ground surface.

### Associated Rock Art Traditions

Associated rock art traditions (ARAT) were recorded on a present/absent basis.

ARAT were identified as: abraded grooves, abraded or defaced areas, battered edges, cone fractures, flaked edges, pecked cupules, and random pecking (Table 4.7).

**Table 4.7** Description of Associated Rock Art Traditions

Associated Rock Art Traditions	Description
Abraded Grooves	Abraded grooves (otherwise known as incised grooves, straight line markings, or sharpening marks) are produced by repeated rubbing to and fro on a soft rock surface with a harder implement to create a series of linear marks with semicircular or V shaped profiles which taper off at each end (Ross 2003:91).
Abraded or Defaced Areas	Abraded areas were recorded 'where the surface of boulders or base rock has been rubbed smooth' (Ross 2003:93).
Battered Edges	Battered edges were recorded when the edges of a rock surface were removed by pounding (Ross 2003:93).
Cone fractures	Conical shaped fractures to a rock surface.
Flaked Edges	Flaked edges were recorded when the edges of a rock surface were removed by flaking (Ross 2003:93).
Pecked Cupules	'These are pecked and/or abraded circular hollows, (often called by the French term, cupule) which commonly occur in dense groups on horizontal, sloping or vertical surfaces' (Ross 2003:92).
Random Pecking	Random pecking/pounding refers to areas of a rock surface that have 'numerous single pecked or pounded marks that do not form a classifiable shape' (Ross 2003:93).

### Conservation Issues

Conservation issues were also identified. The following categories were assigned, which identify the key conservation threats occurring within the study area: animal rubbing, bird nest, cracking, dust, exfoliation, fire damage, human disturbance, insect nest (e.g. mud wasp nest/s, termites), mineral deposit, moss/lichen, unstable structure, vegetation, and water erosion. These results are included in Travers (*in prep.*), Ross *et al.* (2010), Ross *et al.* (2011), and Ross *et al.* (2012) and are not discussed further within this thesis.

### Dating Prospects

Opportunities for dating the relative rock art sequence were identified. The actual dating of motifs was undertaken by different members of the research team, i.e. Kira Westaway and Maxime Aubert. Dating prospects were categorised as follows: organic materials (e.g. charcoal and beeswax), datable micro-deposits (e.g. calcium carbonate, gypsum, mud wasp nest, oxalate crust, salts, and silica skin), subject depicted in motifs, extinct species, introduced subject matter, presence of Kimberley points, motif/deposit relationship, and superimposition (Table 4.8).

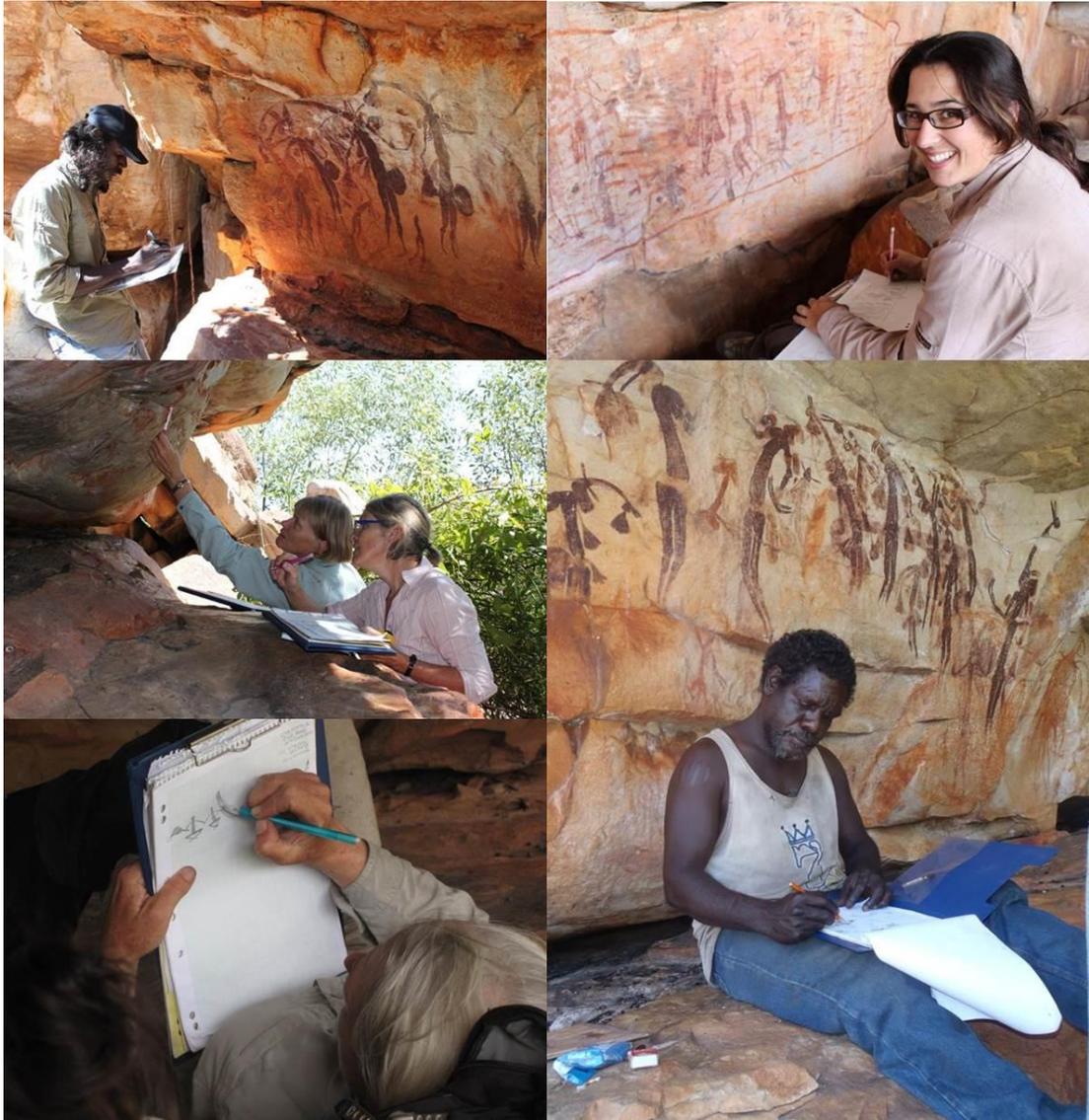
**Table 4.8** Description of dating prospects

Dating prospects	Description
Beeswax	Beeswax figure can be directly dated using accelerator mass spectrometry (AMS) <sup>14</sup> C dating.
Calcium carbonate	Calcium carbonate is 'a white mineral found widely in many parts of the world, formed from animal organisms' (Collin 1992:31-2)
Charcoal	Charcoal can be radio-carbon dated 'using the relative proportion of an unstable (radioactive) isotope of carbon, (carbon 14), to estimate the age of organic materials. It utilises the fact carbon-14 in the organic component of life diminishes at a fixed rate after the animal or plant dies' (Morwood 2002:316).
Extinct species	Paintings of extinct species (e.g. the thylacine) provide a relative estimate for the minimum age of rock art production within a site.
Gypsum	According to Morwood (2002:313) gypsum or gypseous crust is a 'mineral layer containing calcium sulfate'.
Introduced subject matter	The appearance of introduced subject matter can provide maximum ages of rock art production within a site. Introduced subject matter refers to items associated with 'outside' culture e.g. Macassans and Europeans.
Motif/deposit relationship	The motif/deposit relationship can provide dating opportunities in three main ways. First, where a rock art panel has been subsequently covered by the associated deposit, a minimum age can potentially be determined. Second, where a fragment of the rock art has become incorporated into the associated deposit, a maximum age can potentially be determined. Third, when specific types of art consistently occur with occupation deposits, or implements, of a certain age range, or with occupation of limited duration, it is often assumed that the art and the occupation are contemporary.
Mud wasp nest	Mud wasp nests often 'overlie, and occasionally underlie, prehistoric rock paintings' and can be dated through an application of optical dating, which 'provides a measure of the time since minerals, such as quartz, were last exposed to sunlight' (Roberts <i>et al.</i> 1997:697). Using 'optically stimulated luminescence (OSL), and accelerator mass spectrometry (AMS) <sup>14</sup> C dating of pollen' the ages of mud-wasp nests can be determined (Roberts <i>et al.</i> 1997:697).
Oxalate crust	An oxalate crust is 'a geological deposit containing oxalic acid' (Morwood 2002:315). It is mostly 'calcium oxalate and silica with variable concentrates of magnesium, aluminium, potassium, phosphorus, sulphur, barium, and manganese' (Callaghan 2007:122). According to Bednarik (2007:65) they are 'generally darker than silica skins (dusty-brown to black) as well as thicker (>1 mm). They may occur in laminated deposits that include not only a variety of other minerals (e.g. gypsum) but also thin bands of pigment residues, such as ochres, which may have been applied as rock paintings'. Oxalate crusts, which have formed over a painting, 'must post-date the production of the figures so that the dating of the crust would establish a minimum date for the painting (Morwood <i>et al.</i> 2008:50). They can be dated using AMS <sup>14</sup> C dating, a technique which 'assumes that the carbon mobilized in the mineral skin coating is contemporaneous with that coating; that is, that it does not incorporate older carbon than the coating itself' (Whitley 2005: 68; see also Watchman 2000b:269-70). 'Oxalates are not only datable through the organic inclusions they may contain, but the oxalate itself is datable by virtue of being a salt of oxalic acid, a crystalline organic acid containing ultimately atmospheric carbon and therefore <sup>14</sup> C...' (Bednarik 2007:65).
Silica skin	Silica skins are thin layers (mostly <0.4 mm) of silicates in which organic matter may be trapped, they are hard, relatively impervious and chemically stable (Bednarik 2007:65; Morwood 2002:296, 317). They are usually 'clear white to orange shiny luster, but can be darker in appearance, composed primarily of amorphous silica and aluminium, but often with iron' (Callaghan 2007:123). Silica

Dating prospects	Description
	skins 'contain a great variety of inclusions, including bacteria, pollen, fungi and algae, which may yield AMS dates' (Bednarik 2007:65).
Subject depicted in motifs	Particular subjects depicted in rock art can provide an estimate of the maximum or minimum age for the rock art production. Dateable subject matter 'may include animal species that either went extinct or were introduced into a region at a particular time; and weapons, tools, and technologies with independently defined chronological ranges' (Whitley 2005:54). Additionally, in some instances, changes in the faunal species depicted in the rock art assemblage over time can be related to datable environmental, economic and or social changes. Extinct species and introduced subject matter are each discussed in more detail below as they have been identified as their own dating prospect category.
Superimposition	Superimposition refers to the stratification of art layers in a relative dateable context, providing internal site chronologies. It is based on the knowledge that a painting occurring over, or through, another was executed later in time. Particular attention during rock art recording was focussed on identifying superimposition of motif form, colour and technique to assist in refining the Kimberley rock art sequence.

#### 4.2.4. Rock art recording techniques

Detailed recording of the rock art within identified sites was undertaken to establish the composition and spatial distribution of art styles (Figure 4.3). Complete and accurate documentation of each site was considered a 'prerequisite for any kind of interpretation' (Lewis-Williams 2006:362). Every identified rock art site was recorded, irrespective of the number of motifs present. The detailed recording process involved a series of activities that were repeated at each site.



**Figure 4.3** Rock art recording in progress

Clockwise from top left: Terrence Marnga (OTB02), Meg Travers (LR03C), Joseph Karadada (LMR02B), June Ross (LMRNOR2), Di England and Deb Holt (LMRN02K)

A detailed description of each site was recorded, including: a description of the physical setting of the site. A full rock art inventory was completed for each site. This included: drawing and measuring each motif (height and width in mm) and making notations relating to technique used, pigment colour, condition of each motif, dating potential, its location on the panel, superimpositions, subject matter of scenes and visibility. Each of these processes will now be discussed in more detail. Sketching formed the primary basis of rock art recording for this project. All panels were drawn onto graph paper, with individual motifs measured and annotated with

details required for the database. As outlined by Clegg (1978:40) '[t]he whole sketching procedure is essential; through it the recorders are enabled to see the prehistoric picture', thus providing an efficient method of recording in the field and reducing 'the possibility of inaccurate transferring of data into the computer for analysis caused by ambiguous or inadequately written field descriptions' (Ross 1997:42).

A comprehensive photographic record of the rock art site was compiled using a *Canon EOS 500D*. This was undertaken to support the sketching process, but not to take precedence over it. At each rock art site, the following photos were taken to provide a detailed visual record of the site and its context: site context photos (e.g. a shot looking towards the site, an internal view of the site, and a shot looking outwards from the site showing its environmental context); an overall view of the site and its rock art panels; each rock art panel; each motif left to right (time permitting<sup>13</sup>); superimpositions; potential dating prospects; and associated archaeological features. Photographs of individual rock art motifs were taken with and without a standard 10 cm black and white scale. To avoid the distortion which can occur when photographing rock art, photographs were taken (where possible) on the same plane as the rock surface. Where this was not possible, some degree of distortion did occur. The sketches which were prepared provide an accurate drawing of the motif (without distortion occurring). The number and details of each photograph taken was recorded within a dedicated notebook.

### **Recording of rock art panels**

For recording purposes, rock art sites were divided into panels or arbitrary sections, directed by the natural topography of the rock face, or by the clustering of the rock art. Panels were numbered from left to right when facing into the site. The location and number of each rock art panel was recorded on the floor plan. The orientation of each panel was recorded as vertical, horizontal, sloping or ceiling based on the angle of the host rock surface. Visibility, referring to the extent each panel was noticeable

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<sup>13</sup> In some instances, time restrictions meant that a comprehensive photographic record of the motifs could not be undertaken. In these rare instances (n=3), photographs of the site, panels and dominant motifs were taken.

was also recorded, and was classified as good, moderate or poor (not related to the weathering of motifs).

### Recording of rock art motifs

Each motif was allocated an individual number and the following information was recorded: subject matter, technique, outline and infill, motif size, colour, visual dominance, location on panel, superimposition, condition, and subject matter of scenes. These categories provide a practical means to identify variations in motif use that can be examined temporally and spatially.

#### **Subject Matter**

Subject matter refers to the classification of motif content. For the purposes of this study, subject matter was classified into the following categories, based on the terminology used by Walsh (2000): anthropomorphic motif, artefacts, grass prints, hand prints and stencils, non-figurative, other, string prints, trail, unidentified, watercraft, yams/plants, and zoomorph (Table 4.9). See Appendix 1 for list of categories and example illustrations. It is important to note that subject matter is considered as a label only. Consideration of the subject as a label means that there is no suggestion that the label implies that the subject is actually represented (Clegg 1978:42). These categories have been defined by the researchers, rather than the original artists (Taçon 2001:113).

**Table 4.9** Description of subject matter

Subject matter	Description
Anthropomorphic motifs	Motifs that appear in human form.
Artefacts	Artefacts were recorded using the categories: Angular Boomerang, Crescent Boomerang, No.7 Boomerang, Spearthrower/Hooked Stick, Spatula Handle Spearthrower, Spear no barb, Multi-Barb Spear, Catscradle String, Dilly Bag, Whisk, and Unidentified.
Grass Prints	Grass prints were recorded on a numerical basis, either as less than ten (<10), between ten and twenty (10<20), and greater than twenty (>20).
Hand Prints and Stencils	Left or right hand, or a pair, whether it included finger signs and/or was decorated.

Subject matter	Description
Non-figurative	Motifs that do not appear to represent an object of nature.
Other	Refers to amorphous motifs that are abraded, pecked, or scratched.
String Prints	As with grass prints, string prints were recorded on a numerical basis, either as less than ten (<10), between ten and twenty (10<20), and greater than twenty (>20).
Trail	Trail length was recorded in millimetres as either less than five hundred (<500), between five hundred and one thousand (500<1,000), or greater than one thousand (>1,000). Trail direction was recorded as vertical, horizontal or sloping.
Unidentified	Motifs were classified as unidentified if subject matter could not be identified, or the motif was indistinct or partially obliterated due to exfoliation, weathering or superimposition.
Watercraft	Watercraft were recorded as either: canoe, European sailing vessel, prau or raft. Where anthropomorphic figures were depicted within the boat, the number depicted was recorded. This was recorded as either less than two (<2), between two and four (2<4), between four and six (4<6), or greater than six (>6).
Yams/Plants	Yam/Plants were recorded using the following categories (defined by Walsh): Bomb Yam, Cheeky Yam, Egg Yam, Ginger Yam, Grass Tree Yam, Sausage-String Yam, Sprig of Fruit, and Wandjina Yam.
Zoomorphs	Motifs that appear in animal form.

Where motifs were identified as anthropomorphic motifs, additional details were recorded on the presence of stylistic attributes. Stylistic attributes relate specifically to the anthropomorphic form, e.g. leg placement or headdress type. The stylistic attribute classification system applied in this research is based on that designed by Walsh (1994, 2000). Throughout Walsh's career, attempts to maximise documented detail within the short time available at each gallery led to a comprehensive classification system, which used terms based on simple visual codes for image elements, e.g. round head, dot eyes, triple tassel (Walsh 2000:x). This classification system does not impute any meanings to anthropomorphic motifs, and classifies them simply according to their shape. Within this research ten broad categories have been used to classify stylistic attributes: Body Position, Body Detail, Sexual Detail, Head Detail, Face Detail, Limb Detail, Headdress, Dress Decoration, Body Decoration, and Artefact. A fully illustrated list is included in Appendix 1 and therefore will not be discussed in detail here.

By using Walsh's stylistic attributes, I seek to maximise the variation between anthropomorphic figures in order to examine variability and change between the

main stylistic periods through time. I found Walsh's system appropriate for the purpose of this research, because of its fine-grained classifications, which allowed for a level of scientific comparability. However, during the process of recording anthropomorphic figures, it became clear that there was greater variability in the attributes of the study area than was accounted for in Walsh's system. Therefore, a total of thirty-nine attributes were added to Walsh's classifications, which are illustrated in Appendix 1.

### **Technique**

Technique refers to the manner in which the motif has been prepared, and has been defined by the following categories: abraded, beeswax, drawn, painted, pecked, printed, scratched and stencilled (Table 4.10).

**Table 4.10** Description of technique

<b>Technique</b>	<b>Description</b>
Abraded	'A groove in, or area of, a rock surface made by simple manual abrasion or rubbing with a stone, wooden or other implement' (Maynard 1977:390).
Beeswax	Beeswax rock art is the application of native Australian beeswax onto a rock surface to form a design.
Drawn	Drawings on rock are made by rubbing dry pigments against the rock surface.
Painted	Paintings (pictographs) are commonly made using natural materials such as ochre (haematite [red and yellow]), pipe clay (white), or charcoal (black). These pigments are usually ground, mixed with liquid and other substances (such as natural fixatives), and then applied to the surface of the rock using a brush (often made from twigs, reeds, bark, or tails of small animals) or the artists fingers.
Pecked	A groove is an area of a rock surface formed of pits, cuts or gashes, or formed by pounding or battering with a stone or other implement (Maynard 1977:390).
Printed	Prints are produced by dipping a material in wet pigment and applying to the rock surface.
Scratched	Scratched refers to an engraving produced by 'scoring a rock surface with a stone or other implement' (Maynard 1977:390).
Stencilled	Stencils are made by mixing dry pigments (such as ochre, clay and charcoal) with water and/or saliva in the mouth and spitting or blowing the mixture onto the surface of the rock to create a negative image or outline of an object or body part.

### **Outline and Infill**

Outline refers to the whether or not the motif was depicted using an outline without substantive infill applied, and was recorded on a present/absent basis. The form of infill was recorded using the following categories: solid, outline with solid infill, outline with decorative infill. Multiple infill methods were recorded for each motif.

### **Motif Size (mm)**

Motif size was consistently recorded in millimetres by height and width. The height was measured from the highest to lowest point of the motif, and the width was measured from the farthest left to farthest right point of the motif. The size of motifs was recorded to assess whether change in the size of motifs was integral to stylistic variation and if there were any definable links between size, position and relative importance (Ross 2003:80). Clegg (1981:326-9) suggested that important figures in rock art panels are large, ornate and centrally positioned. He tested this hypothesis by comparing the composition of art panels at two sites at Bare Hill in Queensland.

### **Colour**

In the field, pigment colours were recorded as: black, brown, dark red, grey, light red, mauve, mulberry, orange, red, pink, white, and yellow.

### **Visual dominance**

Visual dominance (where a subjective judgement must be made) refers to:

*the degree to which one motif dominates holds the potential to inform on stylistic behaviour (Wobst 1992:237). Visual dominance can be achieved by producing a large motif, by placing the motif in a prominent position (e.g. Loubser 2001:97), by the use of an unusual form, by selection of a dark rock substrate where an engraved motif will contrast markedly from the background, or by the use of colour so that one or more motifs stand out from the rest of the assemblage (Bradley 2000:66). Although the attribution of visual dominance is subjective, the same criteria were used across the assemblage and recorded in a present/absent class (Ross 2003:81).*

**Location on panel**

Location was recorded as: upper left, middle left, lower left, upper centre, middle centre, lower centre, upper right, middle right, or lower right.

**Superimposition**

Superimposition was recorded as either present or absent. Where superimposition was present and discernible, its occurrence over and/or under the associated motif was also recorded. If the superimposition relationship was at all unclear, it was noted as such. Even if a superimposition relationship was identified, the timing between the production of the superimposed motifs cannot be established.

**Condition**

Motif condition was defined as: abraded, battered, deteriorated, missing parts, obliterated, and/or well preserved.

**Subject matter of scenes**

For the purposes of this research, subject matter of scenes refers to the actions performed by the figures included in a scene and has been defined into the following categories: attached to line, birthing scene, clustered, enclosed line, face-to-face pairs, potential fighting scene, figures in horizontal row (frieze), potential hunting scene, large and small pairs, pairs, prepared background, scene<sup>14</sup>, and sex scene. Multiple categories of subject matter were able to be recorded for motifs.

**4.2.5. Storage of Data**

It was a specific aim of the *Change and Continuity* to establish an electronic archive of recorded sites, to serve as an archive for strategic heritage management, as well as research (Morwood *et al.* 2008:7). This has occurred through the development of a custom-built *Microsoft Access* database. The database, which was designed and

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<sup>14</sup> The activities occurring in recorded 'scenes' are unclear.

produced by Brent James of *Handmade Pictures* in consultation with June Ross and I, was developed as a means of storing all data recorded within the field. In addition, the database has the capacity to effectively analyse the data.

Information from 15 site complexes, including 215 archaeological sites was entered into the database. Within the 204 rock art sites a total of 7,579 motifs were recorded. Information that was recorded and entered into the database helped address the overall aims of this research, and was considered relevant to the questions being asked. The database was designed in such a way that allowed all entered information to be linked for analytical purposes. This means that queries can be set up using a series of filters where any category or class of the database can be compared to any other category or class of the database in any tier across the entire database. Queries were set up to explore the data and to address questions relevant to the aims of this research. Additionally, the design of the *Microsoft Access* database enabled easy transfer of information to *Microsoft Excel*, where numerical data was able to be produced and nominal counts were used to characterise the assemblage. The analytical methods employed in this research are outlined in the following section.

### **4.3. Analytical methods**

As the questions addressed in this thesis call for the identification of change and continuity through time and the reasons that may have been factors in promoting change, it was necessary to devise an analytical approach that would identify and isolate changes in the motif ‘vocabulary’ and structure of the art assemblage as well as in the context of its production and distribution. A combination of descriptive and multivariate analyses was selected for the task.

#### **4.3.1. Descriptive analysis**

Basic descriptive statistics, such as nominal counts and percentage of occurrence were used to characterise the art assemblage. This was done at three levels: site, motif, and anthropomorphic figure. Data is presented in the following chapter using

numerically based comparisons via bar graphs and data tables. The aim of these analyses was to establish the interrelationships between all aspects of the art assemblage in order to address questions concerning stylistic variation over time, in the selection of attributes and spatial patterning, to show how the inhabitants of the Kimberley inscribed the land with rock art at different times for different purposes.

First, frequency analyses were undertaken on the site data recorded. This was done to provide details of the geographic and archaeological context of the arts sites. Second, frequency analyses were undertaken on motif data (e.g. motif frequency, assemblage size, subject matter and technique). This was done in order to present a detailed and systematic description of the art body. Third, frequency analyses were undertaken on the data recorded for anthropomorphic figures. Nominal counts and percentage of occurrence were undertaken on all recorded information, including use of colour, infill, size, subject matter of scenes, visual dominance, sexual characteristics, and associated artefacts.

To further decipher patterns in the anthropomorphic figure analysis, the data was classified into stylistic periods. Each anthropomorphic figure was assigned to a stylistic period, based on Walsh's classification system, i.e. Irregular Infill Animal Period, Gwion Period, Wararrajai Gwion Period, Painted Hand Period, and Wanjina Period. In the event that an anthropomorphic figure did not easily fit into one of Walsh's stylistic periods, it was classified as unclear. This enabled changes in stylistic choices to be identified and examined. Finally, the core characteristics of each stylistic period were identified. Core characteristics have been classified as attributes within a stylistic period that occur at a rate of 70% or greater. Core characteristics were identified to facilitate a clear definition of each style, and to the understand changes in attribute preference through time.

### **4.3.2. Multivariate analysis**

Multivariate techniques are useful for the analysis of large datasets for a number of reasons. First, they clearly define what is being compared, through the use of a

contingency table. Second, they allow for the simultaneous analysis of numerous objects (in this case, anthropomorphic figures) and variables (attributes). Third, the simultaneous interaction of a number of variables can be examined, in contrast with univariate or bivariate analysis, where at most two variables can be analysed at a time. Finally, multivariate analyses provide simplified representations of the relationships between objects and variables (Franklin 2004:33).

### **Correspondence Analysis**

The multivariate statistical technique of correspondence analysis (CA) was selected as the most suitable to explore similarities and differences within the dataset. The correspondence algorithm measures the chi-squared relationship between the objects anthropomorphic figures and variables stylistic attributes. The generated scores are represented as scattergrams, one for the anthropomorphic figures and one for the attributes, with relative distances between points marking a measure of similarity. Basically, CA takes the frequency of co-occurring 'features' and converts them to distances, which are then plotted, revealing how things are related by how close to or far from each other they are in two-dimensional visualisation.

This analysis was restricted to anthropomorphic figures as they provide the most comprehensive information available on stylistic content. As the questions addressed in this thesis call for the identification of stylistic change through time, and the identifiable reasons that such changes might have occurred, attributes selected for the CA relate specifically to the anthropomorphic form only (e.g. Body Position, Body Detail, Limb Detail, Sexual Detail, Dress Decoration, Body Decoration, Headdress, Head Details, Face Detail and Artefacts). This decision was made as this suite of attributes would best identify changes in the motif vocabulary and structure of the art assemblage through time. Size and colour were not included in the CA as this information was not available for all anthropomorphic figures<sup>15</sup>, but are analysed in Chapter 5, Section 5.3. A full list of the attributes used within the CA is outlined

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<sup>15</sup> Unfortunately, measurements could not be taken on some motifs. This was restricted by the absence of a complete figure, while other motifs were inaccessible (e.g. too high to measure). Additionally, the colour of thirteen motifs is unknown. No photographs were taken of these motifs, and the colour was not recorded in the field.

Appendix 2. The attribute classification system applied in this thesis is based on that designed by Walsh (see Walsh 2000:93-6 for an abbreviated visual guide).

In order to undertake the CA, the original dataset exported from the *Microsoft Access* database into *Microsoft Excel*, needed to be converted to binary data. Each anthropomorphic figure became a row and each attribute became a column.

Converting each anthropomorphic figure to binary data was a simple process of using the presence and absence of attributes: if the attribute was present it was given a 1 value, and if the attribute was absent it was given a 0 value. Generally speaking, the attributes occurred in low frequencies. The binary data is not presented in this thesis as an Appendix as the file is simply too large, containing hundreds of pages of information (but see Table 4.11 for an example).

**Table 4.11** Example binary dataset

		Variables (Attributes)		
		Standing Plan	Sloping Arms	Solid Round Head
Objects (Anthropomorphic figures)	BSC01-1-1	1	1	0
	BSC01-1-2	1	0	0
	BSC01-1-3	0	0	1
	BSC01-2-4	0	1	0
	BSC01-2-5	1	1	1
	BSC01-3-6	1	0	0
	BSC01-4-7	1	1	0

One criterion of the binary dataset was that attributes had to occur two or more times in order to remain in the dataset. A total of fifty-one attributes were removed before the CA commenced<sup>16</sup>, leaving 3,685 anthropomorphic figures and 349 attributes. The binary dataset was put through a *PAST* Correspondence Analysis (version 3<sup>17</sup>). The

<sup>16</sup> For a list of the fifty-one attributes that were removed from the analysis, see Appendix 2.

<sup>17</sup> *PAST* v3 is free software for scientific analysis (Hammer 2013). Following this, the dataset was put through a *CAPCA* correspondence analysis (version 2.2) to ensure the initial analysis was accurate. *CAPCA* v2.2 is an add-in to *Microsoft Excel*. The results were identical and so I continued with the use of *PAST* v3.

correspondence algorithm measures the chi-squared relationship between the objects (anthropomorphic figures) and variables (attributes). The generated scores are represented as two-axis plots (or scattergrams), one plot for the anthropomorphic figures and one plot for the attributes, with relative distances between points marking a measure of similarity (Wilson 1998:168-9).

In the first plot, points correspond to the rows of the Table (anthropomorphic figures)<sup>18</sup>. Points that are close to each other can be identified with anthropomorphic figures that have a similar profile; points which are very distant correspond to figures which have very different profiles. The crossing point of the two axes (0,0) represents the average profile or centroid, so points located away from this centroid represent departures from the average. In the second map, points correspond to the columns of the table (attributes), and points which are close together identify attributes which have a similar distribution across anthropomorphic figures.

It is routine practice to “superimpose” the two plots; as viewed together, they allow the similarities and differences between contexts to be assessed (Baxter and Cool 2010:212). Overlain, the position of the anthropomorphic figures and the position of the attributes can be analysed simultaneously. However, it is important to note that in such plots, one can only interpret the distances between row points, and the distances between column points, but not the distances between row points and column points. The joint display of row and column points shows the relation between a point from one set and all points of another set, not between individual points between each set.

The horizontal and vertical axes within the plot are not like axes in standard graphs (e.g. date and total). For every CA undertaken, the total number of principal axes generated is the total of the column variables minus 1. Within each plot the researcher can use any pair of the CA principal axes generated, although usually it is the first two that are of interest as a combination of the first two dimensions offers

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<sup>18</sup> It should be noted that points on a plot may represent one or more anthropomorphic figures, as identical anthropomorphic figures share the same CA scores.

the most accurate and interpretable visualisation of the variation and association in the data (Shennan 1997:320). However, sometimes the third principal axis is plotted if it provides further insight into the data. Here a note should be made about the scales printed on the axes. Just as Glynn (2014:147) pointed out:

*They are not informative on their own, but help one to gauge relative distance. This is especially important when plots are not square, but are elongated or stretched to permit the representation of all the data points.*

What this means is that the numbers on the axes relate to the generated CA scores from the distance matrix. They help visualise relationships spatially on dimensional axes, but offer no other specific information.

Overall, three correspondence analyses were undertaken on the dataset of anthropomorphic figures.

**Analysis 1** Analysis 1 commenced with the entire dataset. This CA measured the correspondence between 3,685 anthropomorphic figures and 349 attributes.

**Analysis 2** The aim of this analysis was to determine whether there were discernible differences between stylistic periods, and if they could be clearly distinguished from one another. This analysis was undertaken on the dataset, minus the six extreme outliers identified in Analysis 1. This CA measured the correspondence between 3,680 anthropomorphic figures and 348 attributes.

**Analysis 3** The final analysis was undertaken on the dataset without the six identified extreme outliers, and without the attributes relating to Body Position<sup>19</sup>. The aim of this analysis was to determine if attributes associated with Body Position were influencing the results of the Analysis 2. By removing the Body Position attributes, the remaining attributes, e.g. those associated with Body Decoration and Headdress, were driving the results. This CA measured the correspondence

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<sup>19</sup> For a list of the attributes that were removed from this analysis, see Appendix 2, which lists the 40 individual Body Position attributes.

between 3,680 anthropomorphic figures and 308 attributes.

#### 4.4. Summary

This chapter has outlined the methods used for the collection, storage, and analysis of data used within this research. The rationale for the selection of recording categories has been outlined, along with the inherent limitations of the methods, e.g. the inherent issues with the survey strategy and working with a sample. The categories chosen for the recordings included aspects relating to the geographic context of the art, other activities occurring within the vicinity of rock art production, how and where the art was produced, and what form it takes. This information was entered into a purpose built *Microsoft Access* database. The database was designed to be fine-grained, inclusive and contextual, thus providing a means to identify the structure and variation of the art assemblage. The information recorded in the database was put through a series of analytical methods integral to elucidating the patterns of change and stability in rock art production through time. The overall aim of these approaches were to examine the form and pace of stylistic change in the rock art assemblage, in order to further investigate what it contributes to our understanding of past shifts in cultural, technological, social and economic activities throughout the northwest Kimberley. The results of these analyses are presented in the following chapter.

## Chapter 5. Analyses and Results

This chapter presents results of the analyses undertaken on data collected at rock art sites in the site complexes identified in Chapter 4. This is been done with the aims of describing observable patterns in the motif vocabulary and examining evidence of continuity in the anthropomorphic figures of the art assemblage. Specifically, I wished to investigate whether there is any evidence in the art assemblage to support notions of an abrupt discontinuity in the art between the Wararrajai Gwion and Painted Hand Periods.

This chapter is divided into five sections:

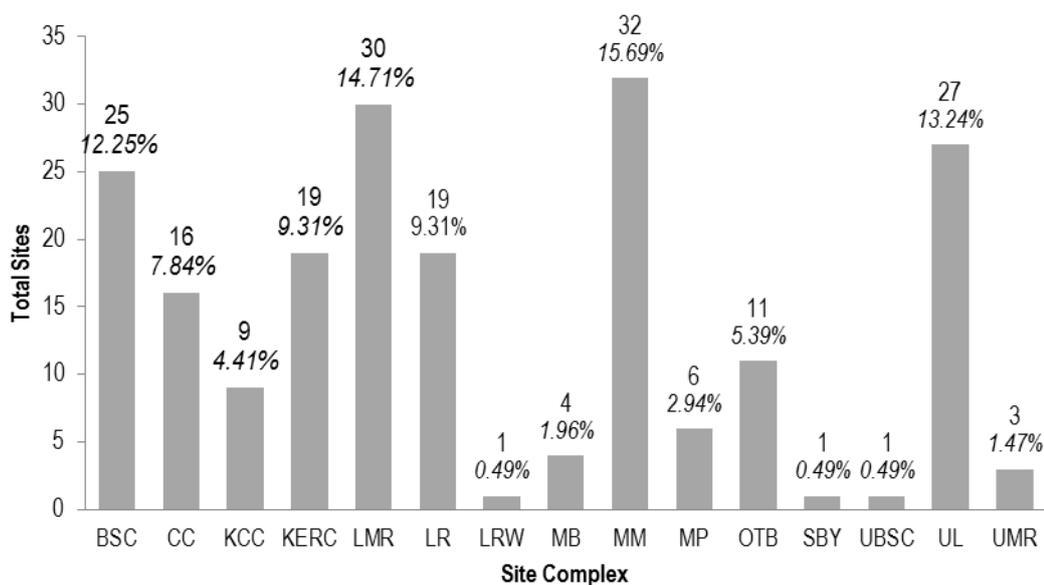
1. Site Analysis
2. Motif Analysis
3. Anthropomorphic Figure Analysis
4. Correspondence Analysis
5. Summary and Conclusions

In the first section the results of a series of frequency analyses on site data are presented. These results situate the art assemblage in a geographic context, identifying the places the past occupants of the northwest Kimberley chose to live and paint. In the second section, the results of a series of frequency analyses on motif data (e.g. motif frequency, assemblage size, subject matter and technique) are presented, providing a characterisation of the rock art. In the third section, the results of a series of frequency analyses on anthropomorphic figures are presented, such as the proportions of depicted stylistic periods, use of colour, size, subject matter of scenes, visual dominance, analysis of associated artefacts adding to the characterisation of the assemblage. In the fourth section, the results of the correspondence analysis on anthropomorphic figures are presented and described. The final section summarises the trends evident in the assemblage and frames these trends in relation to the questions asked within this thesis.

These analyses were undertaken on data collected from rock art sites from within Wunambal Gaambera boundaries, and any conclusions drawn from this data relate only to this area. No assumptions are made outside this area, and the data is not intended nor inferred to relate to areas outside the bounds of the study area.

## 5.1. Site Analysis

A total of 204 rock art sites were recorded in detail, including five where excavations were undertaken. An additional 11 sites were recorded where no rock art was evident. These included stone arrangements, primary burials, and a site that contained post-contact items (i.e. metal tins). As outlined in the previous chapter, sites were recorded in 15 localities, referred to as site complexes. The names and abbreviations of these site complexes were outlined in Chapter 4. The number of rock art sites recorded per complex ranges from one to 32 (Figure 5.1). Complexes with multiple sites containing rock art are characteristic of this region; however, three localities where only one site was recorded: LRW, SBY, and UBSC. This may reflect time constraints associated with recording, rather than an absence of other art sites within the immediate locality.



**Figure 5.1** Rock art sites recorded by site complex (n=204)

### 5.1.1. Site Type

Rock art was produced in a range of locations, such as rock shelters, overhangs, and exposed boulders, where groups of people could congregate and participate in the activities associated with the production of rock art (Table 5.1). Within the study area, the majority of sites are found in overhangs (50.49%, n=103). Site types with limited workable space, such as escarpments, rock shelves, and deep caverns, are the least common site types to occur within the study area.

**Table 5.1** Rock art sites by type

Site type	n	%
Deep cavern	8	3.92
Escarpment face	4	1.96
Exposed boulder	41	20.10
Overhang	103	50.49
Rock shelf	5	2.45
Rock shelter	43	21.08
<b>Total</b>	<b>204</b>	<b>100</b>

### 5.1.2. Topography

Rock art sites are found in a variety of topographic locations (Table 5.2). The majority are located within a sandstone outcrop, reflecting the nature of the Kimberley landscape and the locations in which we surveyed.

**Table 5.2** Rock art sites by topography

Topography	n	%
Broad Valley	29	14.22
Escarpment	75	36.76
Plateau	3	1.47
Sandstone outcrop	96	47.06

Typography	n	%
Swamp	1	0.49
<b>Total</b>	<b>204</b>	<b>100</b>

### 5.1.3. Vegetation

The majority of rock art sites are recorded within woodland areas, which dominate the Gardiner Botanical District while others are found in areas classified as savannah and scrubland (Table 5.3). Very few sites are found in areas where there is little or no vegetation, or in rainforest (*wulo*) areas.

**Table 5.3** Rock art sites by vegetation

Vegetation	n	%
No vegetation	4	1.96
Open forest	22	10.78
Rainforest	2	0.98
Savannah	44	21.57
Scrubland	39	19.12
Woodland	93	45.59
<b>Total</b>	<b>204</b>	<b>100</b>

### 5.1.4. Water Sources

The majority of the rock art sites recorded within the study area are located in areas close to reliable water sources, e.g. reliable creek lines (Table 5.4). Reliable water sources would have been crucial to the pattern of past human land-use of the region, particularly during the prolonged ‘dry’ season that lasts up to seven months of the year. Less common water sources included billabongs and rock holes. The sites located near ephemeral water sources are close to creeks, and rivers.

**Table 5.4** Rock art sites by water source and reliability

Water source	Total		Reliable	Ephemeral
	n	%	n	n
Billabong	3	1.47	3	-
Creek	92	45.10	85	7
River	30	14.71	27	3
Rock Hole	1	0.49	1	-
Unknown <sup>20</sup>	78	38.24	-	-
<b>Total</b>	<b>204</b>	<b>100</b>	<b>117</b>	<b>87</b>

Distance to reliable water varies within the study area from less than ten metres, up to one kilometre (Table 5.5). The majority of rock art sites are located between 100 and 500 m from a water source.

**Table 5.5** Rock art sites by distance to water

Distance to water (m)	n	%
<10	21	10.29
10 < 50	30	14.71
50 < 100	7	3.43
100 < 500	44	21.57
500 < 1,000	20	9.80
> 1,000	7	3.43
Unknown <sup>21</sup>	75	36.76
<b>Total</b>	<b>204</b>	<b>100</b>

### 5.1.5. Accessibility

Rock art was produced in easy-to-reach sites, typically located in the line of sight of passers-by (Table 5.6). Difficult accessibility was not used as a means to restrict access to any groups of people or potential audience. Only 1.47% of the sites are

<sup>20</sup> No reliable or ephemeral water source in immediate vicinity.

<sup>21</sup> No reliable or ephemeral water source in immediate vicinity.

classified as difficult to access, and this relates directly to their topographic location, in hard to reach locations among complex escarpments.

**Table 5.6** Rock art sites by accessibility

Accessibility	n	%
Easy	185	90.69
Moderate	16	7.84
Difficult	3	1.47
<b>Total</b>	<b>204</b>	<b>100</b>

### 5.1.6. Associated Archaeology

The production of rock art took place in the same vicinity as a number of varied subsistence activities. Evidence for the occupation of sites comes from the presence of hearths, stone artefact scatters, shell, and historical items (e.g. metal tins) (see Table 5.7). This shows that the production of rock art was only one of the activities undertaken at any site. Of the 95 sites with associated archaeology, the majority had a surface scatter of stone artefacts (27.94%, n=57). Grinding hollows occurred at 25 sites (12.25%), and marine shell was recorded at 24 sites (11.76%). Human skeletal remains were recorded at 12 sites. Only one scarred tree and one piece of organic material culture was recorded. One hundred and nine sites do not have associated archaeological remains.

**Table 5.7** Rock art sites and Associated Archaeology

Associated Archaeology	n	%
Artefact	20	9.80
Boonjgul Stones	3	1.47
Contact items	6	2.94
Grinding Groove	6	2.94
Grinding Hollow	25	12.25

Associated Archaeology	n	%
Hearth <sup>22</sup>	27	13.24
Human skeletal remains	12	5.88
Non-human bone	3	1.47
Ochre fragment	6	2.94
Organic material culture	1	0.49
Potential Archaeological Deposit (PAD)	7	3.43
Scarred Tree	1	0.49
Shell	24	11.76
Stone arrangement	2	0.98
Stone cairn	2	0.98
Stone quarry	7	3.43
Surface scatter	57	27.94
No AA recorded	109	53.43
<b>Total</b>	<b>318<sup>23</sup></b>	

### 5.1.7. Associated Rock Art Traditions

As well as the production of rock art, eight different associated rock art traditions (ARAT) were also undertaken in the northwest Kimberley (Table 5.8). Each tradition involves the repetition of the same form on a rock face or panel with similar morphology, demonstrating that these are not haphazard or undirected marks *but are intentionally constructed repeated marks placed in similar locations* within site complexes (Ross 2002:169). ARAT are present within 76 (37.25%) of the rock art sites. Of the sites, fifty-seven were recorded with flaked edges. Thirteen sites have abraded or defaced areas, and nine have abraded grooves. The number of abraded grooves varies between sites, from five to 76. All nine sites that include abraded grooves also have at least one form of associated archaeology (e.g. single artefacts,

<sup>22</sup> Hearth identified by presence of surface charcoal. Some identified hearths may be natural occurrences of charcoal from bushfire.

<sup>23</sup> This total is more than the total number of sites (n=204) as multiple sites have multiple categories of associated archaeology e.g. artefact and shell. Percentages were determined from the totals written within the table.

grinding hollow, surface scatters, human skeletal remains, shell, and/or Boonjgul stones). Four of these sites have very large assemblage sizes (>100 motifs).

**Table 5.8** Rock art sites and Associated Rock Art Traditions (ARAT)

ARAT	n	%
Abraded Grooves	9	4.41
Abraded or Defaced Areas	13	6.37
Battered Edges	6	2.94
Cone fractures	7	3.43
Flaked Edges	57	27.94
Pecked Cupules	4	1.96
Random Pecking	2	0.98
No ARAT recorded	128	62.75
<b>Total</b>	<b>226<sup>24</sup></b>	

### 5.1.8. Summary of site analysis

Analysis of the art assemblage has shown that rock art sites in the northwest Kimberley have a relationship with the landscape in which they are placed: with the topography of the site complex, accessibility to reliable water sources, ability for it to be seen by passer-by, and with additional evidence of human occupation. Most particularly, rock art sites were used for additional purposes as demonstrated by the association with other archaeological materials and associated rock art traditions. Sites are spread throughout the region, and are located in a variety of topographical and vegetative zones associated with varying economic resources.

## 5.2. Motif Analysis

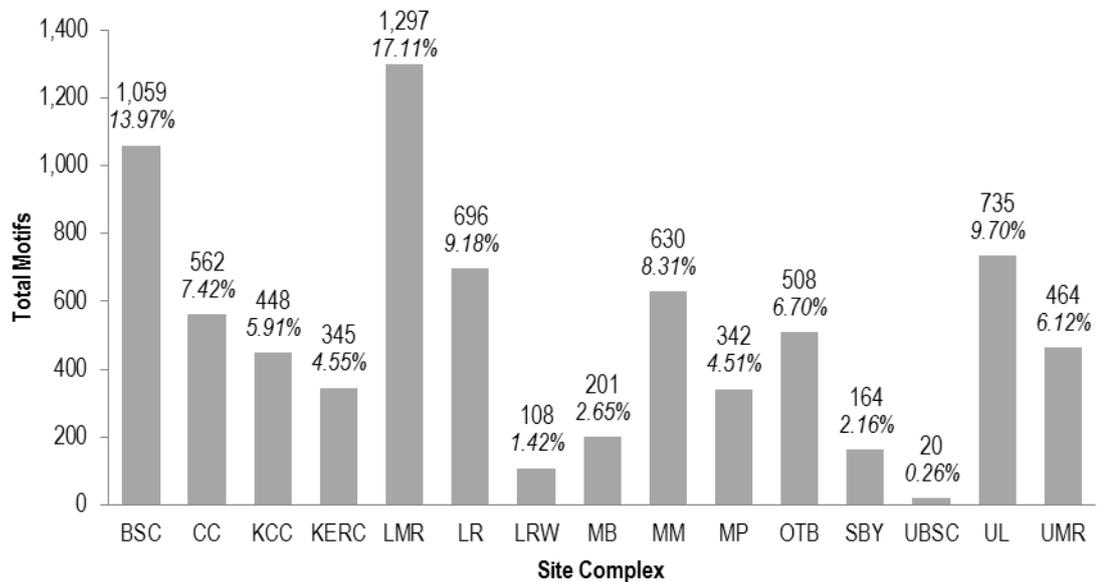
The following section presents the results of the analysis on motifs recorded within the assemblage. Information about how motifs were produced (e.g. motif

<sup>24</sup> This total is more than the total number of sites (n=204) as multiple sites have multiple categories of ARAT e.g. abraded grooves and flaked edges. Percentages were determined from the totals written within the table.

frequencies, assemblage size, colour usage etc.) are presented. The aim of this section is to provide a description of the art assemblage.

### 5.2.1. Motif Frequency

A total of 7,579 motifs were recorded within the rock art sites. There is wide variation in the number of motifs within each site complex, with a range from 20 to 1,297 motifs (Figure 5.2). There is no clear relationship between the number of sites in a complex and the number of motifs (Table 5.9).



**Figure 5.2** Motifs recorded by site complex (n=7,579)

**Table 5.9** Rock art sites at each site complex and the total number of motifs recorded at each

Site complex	Site (n)	Motif (n)
BSC	25	1,059
CC	16	562
KCC	9	448
KERC	19	345
LMR	30	1,297

Site complex	Site (n)	Motif (n)
LR	19	696
LRW	1	108
MB	4	201
MM	32	630
MP	6	342
OTB	11	508
SBY	1	164
UBSC	1	20
UL	27	735
UMR	3	464
<b>Total</b>	<b>204</b>	<b>7,579</b>

### 5.2.2. Assemblage Size

In order to define the distribution of motifs at rock art sites, assemblage size was grouped into arbitrary selected numerical ranges (Table 5.10). Motif distribution is uneven. The most common assemblage size is small, over 50% (n=103) of the sites contain fewer than 20 motifs. Very large sites containing more than 100 motifs are uncommon. The average size of rock art sites is 37 motifs, fitting into the medium category, and the median is 19, fitting into the small category. Ten sites are comprised of only one motif. A breakdown of individual sites and motif numbers is provided in Appendix 3.

**Table 5.10** Assemblage sizes

Assemblage sizes	n	%
Small (<20 motifs)	103	50.50
Medium (20 - <50 motifs)	58	28.43
Large (50 - <100 motifs)	25	12.25
Very Large (>100 motifs)	18	8.82
<b>Total</b>	<b>204</b>	<b>100</b>

### 5.2.3. Panel Orientation

When an artist chooses to paint a motif, they also choose where to place it. Within the study area, most motifs have been placed on vertical shelter walls, which are usually the most visually dominant (Table 5.11). Ceilings and sloping surfaces were selected less often. Horizontal surfaces were selected infrequently and relate mostly to archaeological activities and associated rock art traditions, e.g. abraded grooves, grinding hollows, and pecked pits. Rock art that is visible on horizontal surfaces are indeterminate motifs. The sites that recorded the highest numbers of rock art panels are OTB01 (n=48) and LMR02C (n=47).

**Table 5.11** Rock art sites and panel type

Panel type	n	%
Ceilings	311	29.37
Horizontal	10	0.94
Sloping	156	14.73
Vertical	582	54.96
<b>Total</b>	<b>1,059</b>	<b>100</b>

### 5.2.4. Subject Matter

As Smith (1992a:29) has pointed out, ‘in theory, artists can depict anything they wish, but they don’t’. This is an important statement, as the stylistic behaviour of a population is encoded in the intentional choices artists make. In the northwest Kimberley a variety of subject matter is depicted within the art assemblage, including a range of figurative, track and non-figurative designs (Table 5.12). The motifs recorded have been classified into 11 identifiable subject matter categories, geared toward a broad characterisation of motif forms. As a large proportion of the motifs were unable to be classified into one of these categories, an additional two categories were adopted: ‘unidentified’ and ‘other’. ‘Unidentified’ motifs are those that cannot be classified, e.g. indistinct markings, peculiar shapes and/or displaying unusual characteristics, or heavily deteriorated motifs. ‘Other’ motifs refer to non-figurative forms that were abraded, pecked, or scratched. The totals are considered a minimum

number, as recording was restricted to visible motifs. Additional motifs may have been present within the site in the past and are no longer visible.

**Table 5.12** Motifs recorded by subject

Motif category	n	%
Anthropomorphic motif	3,148 <sup>25</sup>	41.54
Zoomorphs	729	9.62
Yams/Plants	125	1.65
Artefacts	134	1.77
Watercraft	14	0.18
Trails and Tracks	48	0.63
Non-figurative	222	2.93
Hand Prints and Stencils	456	6.01
Grass Prints	6 clusters	0.08
String Prints	7 clusters	0.09
Other	25	0.33
Unidentified	2,694	35.55
<b>Total</b>	<b>7,608<sup>26</sup></b>	<b>100</b>

The artists of the northwest Kimberley predominately painted figurative motifs, with a strong preference for anthropomorphic motifs (41.54%, n=3,148). These motifs were analysed in detail and the results are presented in the Section 5.3. Depictions of zoomorphs also account for a large proportion of the assemblage. Of these, just over forty-six percent are terrestrial zoomorphs (46.64%, n= 340), and just over twenty-six percent are aquatic zoomorphs (26.89%, n=196), the remainder are indeterminate (26.47%, n=193). The remaining subject matter categories (e.g. hand prints and stencils) make up less than fifteen percent (14.67%) of the total motif count.

<sup>25</sup> This count is for the number of motifs that depict anthropomorphic figures either painted alone or as part of a scene. A scene has been defined as: a number of motifs taking part in the same or similar event (Domingo Sanz 2008:107). The total number of individual anthropomorphic figures (counting each anthropomorph within a scene individually) is 3,685.

<sup>26</sup> This total is more than the total number of motifs (n=7,579) as 29 motifs are identified as having multiple categories e.g. zoomorph and anthropomorphic figures. Percentages were determined from the totals written within the table.

Fourteen depictions of watercraft were recorded within the study area. The types of vessels most commonly represented are canoes and twin masted sailing ships, probably sloops or schooners typical of the European-style trading, pearling or fishing vessels that operated along the northern coastlines from the 1870s (see, for example, Figure 5.3) (Ross and Travers 2013:59). These depictions of watercraft are important as they are the *only* motifs in the northwest Kimberley rock art assemblage identifiable as depictions of outsiders. Seven paintings of canoes with crew members were recorded in the Lower Mitchell Falls area (Figure 5.4). Characteristic features, typical of anthropomorphic figures in the Wararrajai Gwion Period assemblage were documented on crew members suggesting that they may represent local inhabitants rather than outsiders (Ross and Travers 2013:76).



**Figure 5.3** Sailing vessel (CC04-6-3566) (from Ross and Travers 2013:67)



**Figure 5.4** Example of a canoe with crew members (LMRNOR2-2-6942), scale is 10 cm

Grass and string prints comprise clusters of pigment soaked grass or fibres that have been deliberately placed on a surface to create a print. They are generally located in hard to reach locations within the sites, e.g. high on a vertical shelter wall, near the ceiling, and are fairly evenly spaced over a panel (Figure 5.5). They range in colours from red, dark red, orange, and mulberry. Grass prints ranged from clusters of 10 up to 70. String prints range up to clusters of 55. The function of these motifs is unknown.



**Figure 5.5** Example of a cluster of grass prints (CC03B-9-3438)

### 5.2.5. Technique

The rock art of the northwest Kimberley can be divided into eight types by technique (Table 5.13). Of the recorded rock art motifs, over ninety percent (92.27%) are painted. This is an overwhelming majority. Of the 411 stencilled motifs, 392 are hand stencils, five are foot stencils, six are artefacts, and eight are unidentified. Of the 79 printed motifs, 64 are printed hands, seven are clusters of string prints, six are clusters of grass prints, and two are unidentified motifs. Of the eight beeswax motifs, four are unidentified, three are anthropomorphic figures and one is a cluster of dots. Of the 63 drawn figures, 45 are unidentified, five are unclear zoomorphs, one is a depiction of a fish, one is a meandering line, seven are anthropomorphic figures, one is a canoe which contains anthropomorphic figures, and four are sailing vessels, probably related to pearling or fishing activities undertaken along this area of coast line during the last two centuries. The anthropomorphic figures will be discussed in more detail in Section 5.3.

**Table 5.13** Motifs recorded by technique

Technique	n	%
Abraded	17	0.22
Beeswax	8	0.11
Drawn	63	0.83
Painted	6,993	92.27
Pecked	3	0.04
Printed	79	1.04
Scratched	5	0.07
Stencilled	411	5.42
<b>Total</b>	<b>7,579</b>	<b>100</b>

### 5.2.6. Summary of motif analysis

The art assemblage of the northwest Kimberley is predominately figurative art with an emphasis on anthropomorphic motifs (41.54 %). Motif technique varies, although the assemblage is dominated by painted motifs. Other techniques include the use of beeswax, drawing, stencilling and printing. Vertical surface walls are favoured for the placement of motifs, which are usually the most visually dominant. Assemblage size varies throughout the site complexes, although small assemblages of less than 20 motifs are most common. As in this thesis I seek to identify the form and pace of stylistic change in anthropomorphic figures in the rock art assemblage, the remainder of this chapter discusses the recorded anthropomorphic figures.

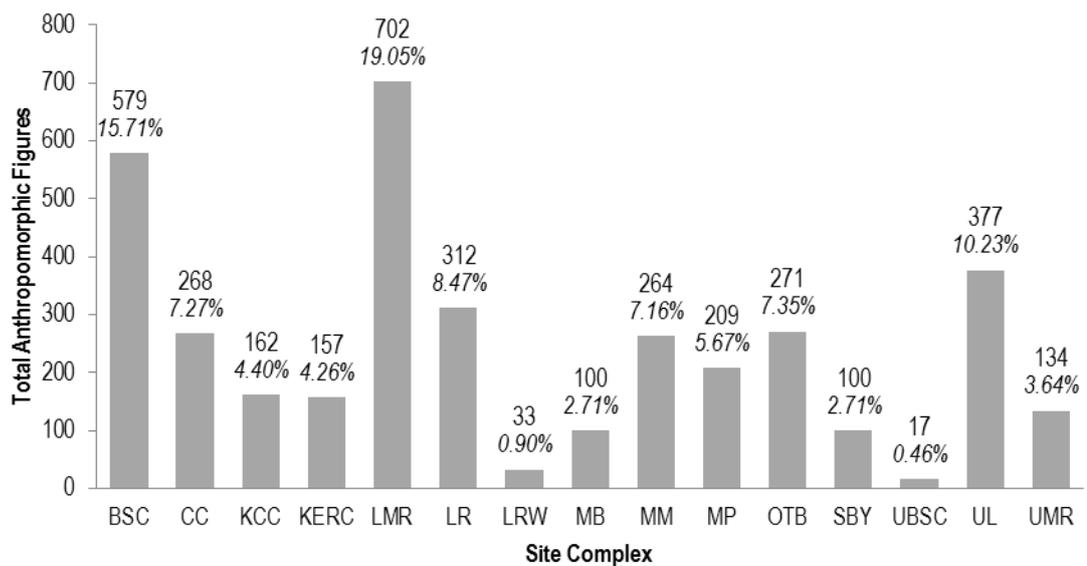
## 5.3. Anthropomorphic Figure Analysis

The following results are based on recordings of identifiable anthropomorphic figures. Here, each anthropomorphic figure within a motif ('scene') is classed as an individual anthropomorphic figure. As a result, the total number of individual anthropomorphic figures is 3,685, while the number of anthropomorphic motifs is 3,148. Any ambiguous anthropomorphic figures were recorded as unidentified. Therefore the total number recorded in this dataset can be considered as a minimum.

Within the northwest Kimberley the vast majority of sites include at least one depiction of an anthropomorphic figure (91.18%, n=186). The number of anthropomorphic figures within site complexes ranges from 17 to 702 (Table 5.14, Figure 5.6). This range is largely due to the varying size of the assemblages, as on average they represent 48.62% of site complexes. Exceptions to this are site complexes such as UBSC, where anthropomorphic figures make up 85% of the art, and on the other end of the spectrum, the UMR complex, which has the lowest percentage of anthropomorphic figures (28.88%, n=134).

**Table 5.14** Percentage of anthropomorphic figures to motifs within each site complex

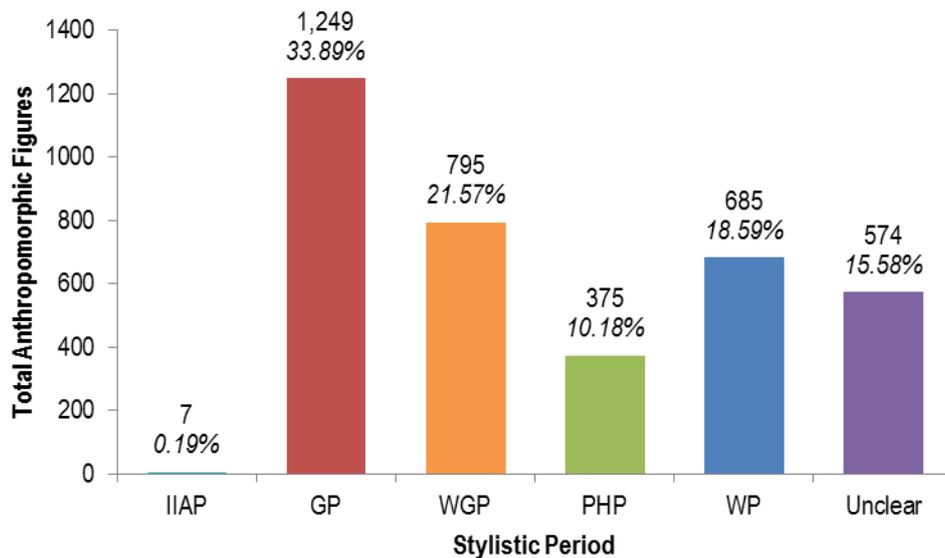
Site complex	Motif (n)	Anthropomorphic figure (n)	%
BSC	1,059	579	54.67
CC	562	268	47.69
KCC	448	162	36.16
KERC	345	157	45.51
LMR	1,297	702	54.12
LR	696	312	44.83
LRW	108	33	30.56
MB	201	100	49.75
MM	630	264	41.90
MP	342	209	61.11
OTB	508	271	53.35
SBY	164	100	60.98
UBSC	20	17	85.00
UL	735	377	51.29
UMR	464	134	28.88
<b>Total</b>	<b>7,579</b>	<b>3,685</b>	<b>48.62</b>



**Figure 5.6** Anthropomorphic figures recorded by site complex (n=3,685)

### 5.3.1. Stylistic Periods

Where possible, each anthropomorphic figure was assigned to a stylistic period based on Walsh's classification system (Figure 5.7, see also Table 5.15). This enabled changes in stylistic choices to be identified and examined. In the event that an anthropomorphic figure did not easily fit into one of Walsh's stylistic periods, it was classified as unclear. Significantly, a large proportion of the anthropomorphic figures did not easily fit into the current schema (15.58%, n= 574). This highlights the stylistic variation in the art assemblage and more importantly, the limitations of Walsh's classification system. While it is a comprehensive system, it does not allow for the variation in the assemblage. Particularly, when anthropomorphic figures contain stylistic attributes common to a number of stylistic periods, it is difficult to accurately fit the figure into the current schema. This in itself provides provisional evidence of continuity in the art assemblage; however such evidence will be further examined in Section 5.4.



**Figure 5.7** Anthropomorphic figures recorded by stylistic period (n=3,685)

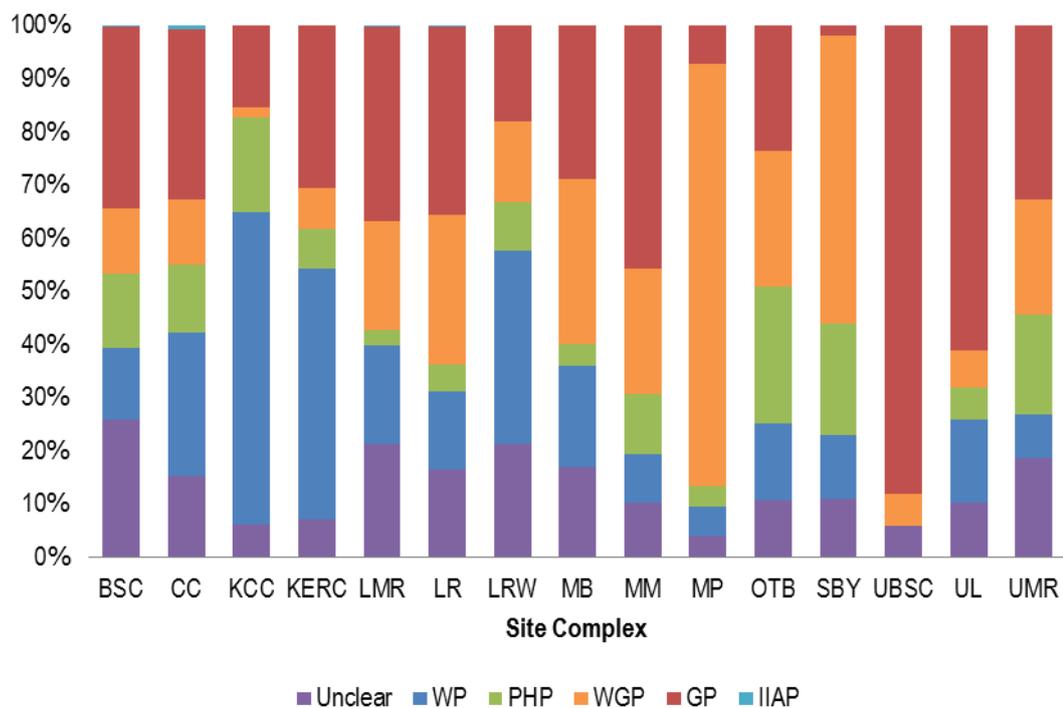
**Table 5.15** Stylistic Periods by site complex

Site complex	Anthropomorphic figure (n)	IIAP (n)	GP (n)	WGP (n)	PHP (n)	WP (n)	Unclear (n)
BSC	579	2	197	71	81	79	149
CC	268	2	86	33	34	72	41
KCC	162	-	25	3	29	95	10
KERC	157	-	48	12	12	74	11
LMR	702	2	256	145	19	131	149
LR	312	1	110	88	16	46	51
LRW	33	-	6	5	3	12	7
MB	100	-	29	31	4	19	17
MM	264	-	121	62	30	24	27
MP	209	-	15	166	8	12	8
OTB	271	-	64	69	70	39	29
SBY	100	-	2	54	21	12	11
UBSC	17	-	15	1	-	-	1
UL	377	-	231	26	23	59	38
UMR	134	-	44	29	25	11	25
<b>Total</b>	<b>3,685</b>	<b>7</b>	<b>1,249</b>	<b>795</b>	<b>375</b>	<b>685</b>	<b>574</b>

While the production of anthropomorphic figures varies through time, they are a relatively stable component of the stylistic sequence, particularly in the four main stylistic periods (Gwion, Wararrajai Gwion, Painted Hand and Wanjina Periods), and can be used to examine stylistic change and the context of production through time. Production was at its greatest number in the Gwion Period with 1,249 anthropomorphic figures attributed to this period. Following this, a decline in frequency occurs in the Painted Hand Period, which has the least number of anthropomorphic figures (n=375). The Wanjina Period marks a final boost in anthropomorphic figure numbers (n=685). Almost absent from the northwest Kimberley are Irregular Infill Animal Period anthropomorphic figures (n=7). This may indicate a preference for depicting zoomorphs within this period, as well as a lower production rate. Due to the low frequency, they have been omitted from the

remaining results as there was an insufficient sample to draw meaningful conclusions.

The four main stylistic periods are represented in all but one of the site complexes (UBSC). As UBSC contains only one rock art site, this is likely to be a result of sampling limitations. Besides this site, the four main stylistic periods are spread throughout the northwest Kimberley, suggesting that the same site complexes, and particular rock art sites, were repeatedly used for the production of rock art through time. That being said, the relative proportion of each stylistic period recorded at site complexes is variable (Figure 5.8). Site complexes with larger assemblages contain greater numbers of Gwion Period anthropomorphic figures, e.g. BSC, LMR and UL (see Appendix 3). The Wararrajai Gwion Period dominates the MP and SBY site complexes, and KCC and KERC are dominated by the Wanjinia Period. The Painted Hand Period is generally the least represented stylistic period within each site complex in the study area.



**Figure 5.8** Proportions of stylistic periods at each site complex

Of the 186 sites depicting anthropomorphic figures, just under fourteen percent depict anthropomorphic figures in the four main stylistic periods, excluding the Irregular Infill Animal Period (13.98%, n=26). No rock art sites within the study area depict anthropomorphic figures in all five stylistic periods. The majority of sites depict two or three of the stylistic periods (51.61%, n=96). Around a third of sites contain just one stylistic period (34.41%, n=64), i.e. Irregular Infill Animal Period (1.08%, n=2), Gwion Period (20.97%, n=39), Wararrajai Gwion Period (3.23%, n=6), Painted Hand Period (2.69%, n=5), and Wanjina Period (6.45%, n=12). The Gwion Period is the main stylistic period depicted alone. Sites comprising a single stylistic period are often also of a smaller assemblage size.

The following results are indicative of changes in the spatial patterning of the art assemblage through time, including changes in site preferences and motif placement. These results are discussed in detail in Chapter 8. The percentages provided in Table 5.16 through to Table 5.29 represent the proportion of anthropomorphic figures in each *stylistic period* that contain each category type.

### 5.3.2. Site Type

Noticeable changes in relation to site preferences through time are evident in the northwest Kimberley (Table 5.16). In particular, there is a clear shift from overhangs to rock shelters. Nearly sixty percent (58.13%, n=726) of Gwion Period anthropomorphic figures are located in overhangs, while less than one quarter (24.18%, n=302) are located within rock shelters. This is in accordance with Walsh's observation that '[m]any of these finely detailed figures survive on exposed boulder faces, which are totally unsuited for any form of habitation or shelter' (Walsh 2000:173). Over fifty percent of both Painted Hand and Wanjina Period anthropomorphic figures are located in rock shelters, sites that have a reasonable area in which to shelter.

**Table 5.16** Site type by stylistic period

Site Type	Total		GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%	n	%
Deep cavern	274	7.44	38	3.04	78	9.81	28	7.47	97	14.16	33	5.75
Escarpment face	24	0.65	5	0.40	14	1.76	3	0.80	1	0.15	1	0.17
Exposed boulder	466	12.65	138	11.05	102	12.83	62	16.53	109	15.91	55	9.58
Overhang	1,468	39.84	726	58.13	340	42.77	87	23.20	105	15.33	206	35.89
Rock shelf	48	1.30	40	3.20	1	0.13	1	0.27	1	0.15	5	0.87
Rock shelter	1,405	38.13	302	24.18	260	32.70	194	51.73	372	54.31	274	47.74
<b>Total</b>	<b>3,685<sup>27</sup></b>	<b>100</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>574</b>	<b>100</b>

As rock art remains where it was made, changes in site preferences provide the potentially significant information about context. As Layton (2000:52) stated:

*If rock art is transferred, over time, from open-air to cave sites; if a given motif occurs at all sites during one period, but later becomes site-specific, these changes in context may reasonably be inferred to refer to changes in cultural significance.*

This notion will be further explored in Chapter 8.

### 5.3.3. Panel Orientation

A strong preference for vertical panels is evident in the Gwion Period and panels located at the entrance to sites are frequently selected – although visual dominance does not seem to be a primary focus (see Section 5.3.10) (Table 5.17). The remaining three main stylistic periods have a more varied distribution within sites, with the Wanjinia Period equally spread across vertical surface walls and ceiling panels. While the placement of older motifs may influence the placement of more recent motifs, the frequent superimposing of motifs suggests this is unlikely to have been the case – there are 1,678 superimposition relationships associated with anthropomorphic figures.

<sup>27</sup> Total includes seven IIAP anthropomorphic figures.

**Table 5.17** Panel orientation by stylistic period

Panel Orientation	Total		GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%	n	%
Ceiling	955	25.92	140	11.21	195	24.53	183	48.80	272	39.71	160	27.87
Sloping	642	17.42	205	16.41	156	19.62	66	17.60	141	20.58	74	12.89
Vertical	2,088	56.66	904	72.38	444	55.85	126	33.60	272	39.71	340	59.23
<b>Total</b>	<b>3,685<sup>28</sup></b>	<b>100</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>574</b>	<b>100</b>

### 5.3.4. Motif Placement

Just like choosing a panel to produce art on, artists had the choice of where to place the art on said panel. Most anthropomorphic figures are placed in the dominant middle section of the panel (Table 5.18). This is consistent through the relative stylistic sequence. The earliest stylistic period, the Gwion Period has the highest percentage of anthropomorphic figures on the middle section of the panel as a ‘blank’ canvas’ was more likely to have been available. Once a motif had been placed in the centre, the following artists either produced their work around the original or overlaid it. The high number of recorded superimposition relationships (n=1,678), suggests the latter occurred frequently – nearly half of the anthropomorphic figure were in a superimposition relationship (45.54%).

**Table 5.18** Motif placement on panel by stylistic period

Motif placement	Total		GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%	n	%
Lower section	751	20.38	268	21.46	187	23.52	70	18.66	102	14.89	124	21.60
Middle section	1,643	44.59	624	49.95	336	42.26	144	38.4	300	43.79	233	40.59
Upper section	580	15.74	206	16.48	119	14.96	54	14.4	106	15.48	95	16.55
Blank <sup>29</sup>	711	19.29	151	12.09	153	19.25	107	28.53	177	25.84	122	21.25
<b>Total</b>	<b>3,685<sup>30</sup></b>	<b>100</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>574</b>	<b>100</b>

<sup>28</sup> Total includes seven IIAP anthropomorphic figures.

<sup>29</sup> Not recorded.

<sup>30</sup> Total includes seven IIAP anthropomorphic figures.

### 5.3.5. Technique

Of the recorded anthropomorphic figures, almost all are painted (99.62%, n=3,671) (Table 5.19). In fact, the earlier styles are all painted. Additional techniques begin to appear within the Painted Hand Period, e.g. drawing, and the use of beeswax is an even more recent phenomenon<sup>31</sup>. Specifically, of the three beeswax figures, two are from the most recent Wanjina Period, and the third is indeterminate. Of the drawn anthropomorphic figures, nine are indicative of the recent art (Wanjina Period) and two are indeterminate. That being said, painting still dominates the assemblage.

**Table 5.19** Technique associated with anthropomorphic figures by stylistic period

Technique	Total		GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%	n	%
Beeswax	3	0.08	-	-	-	-	-	-	3	0.44	-	-
Drawn	11	0.30	-	-	-	-	5	1.33	4	0.58	2	0.35
Painted	3,671	99.62	1,249	100	795	100	370	98.67	678	98.98	572	99.65
<b>Total</b>	<b>3,685<sup>32</sup></b>	<b>100</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>574</b>	<b>100</b>

### 5.3.6. Colour

Monochrome anthropomorphic figures dominate the assemblage, which is likely to be an overrepresentation (Table 5.20). In some periods, motifs may have originally been painted using more colours, but due to the effects of weathering processes, and the unstable nature of some pigments, other original pigments may no longer be visible. This is especially the case for the Wararajai Gwion Period where examples with remnant pigment and/or missing parts are relatively common.

<sup>31</sup> It is worth mentioning that the restriction of beeswax motifs to the more recent stylistic periods may reflect taphonomic processes (Bednarik 2007:137-8).

<sup>32</sup> Total includes seven IIAP anthropomorphic figures.

**Table 5.20** Colour by stylistic period

Colour	Total		GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%	n	%
Monochrome	3,257	88.39	1,236	98.96	673	84.65	348	92.80	451	65.84	544	94.77
Bichrome	329	8.93	13	1.04	107	13.46	23	6.13	165	24.09	19	3.31
Polychrome	86	2.33	-	-	12	1.51	2	0.53	69	10.07	4	0.70
Unknown <sup>33</sup>	13	0.35	-	-	3	0.38	2	0.53	-	-	7	1.22
<b>Total</b>	<b>3,685<sup>34</sup></b>	<b>100</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>574</b>	<b>100</b>

Red pigment is the clear monochrome colour preference for the production of anthropomorphic figures in the study area (36.87%, n=1,201), followed by dark red (27.39%, n=892) (Table 5.21). The bichrome and polychrome combinations are tabulated in Appendix 3. They indicate that the most common bichrome combinations are: red and white (33.43%, n=110), and red and yellow (13.98%, n=46). The most common polychrome combinations are: black, red and white (16.28%, n=14); mulberry hue, white and yellow (11.63%, n=10); and red, white and yellow (11.63%, n=10).

**Table 5.21** Monochrome anthropomorphic figures recorded by colour

Colour	Total	%
Black	5	0.15
Brown	41	1.26
Dark red	892	27.39
Grey	1	0.03
Light red	303	9.30
Mulberry	384	11.79
Orange	250	7.68
Red	1,201	36.87
Pink	6	0.18

<sup>33</sup> The colour of these 13 motifs is unknown. No photographs were taken of these motifs, and the colour was not recorded in the field.

<sup>34</sup> Total includes seven IIAP anthropomorphic figures.

Colour	Total	%
White	65	2.00
Yellow	109	3.35
<b>Total</b>	<b>3,257</b>	<b>100</b>

### 5.3.7. Infill

Most anthropomorphic figures are painted with ‘solid’ infill (Table 5.22). Such a high frequency in relation to the other infill forms may be associated with the preservation of pigments. External factors (e.g. age of motif, age, stability of pigment) may have contributed to pigment loss and therefore addition infill loss. ‘Outline with decorative infill’ anthropomorphic figures are more common than ‘outline with solid infill’ anthropomorphic figures. ‘Outline with decorative infill’ includes a variety of patterns, including: cross-hatched, fine transverse line, irregular longitudinal line, ordered dot line, ordered short line, random fine dot, and random short line. These patterns are most commonly associated with the Wanjina Period anthropomorphic figures that have large upper bodies that are patterned.

**Table 5.22** Infill by stylistic period

Infill	Total		GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%	n	%
Outline	190	5.17	1	0.08	19	2.39	39	10.40	82	11.97	48	8.36
Solid	2,206	59.86	1,136	90.95	449	56.48	68	18.13	136	19.85	394	68.64
Outline with Solid Infill	421	11.42	26	2.08	132	16.60	91	24.27	135	19.71	60	10.45
Outline with Decorative Infill	868	23.55	86	6.89	195	24.53	177	47.20	332	48.47	72	12.54
<b>Total</b>	<b>3,685<sup>35</sup></b>	<b>100</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>574</b>	<b>100</b>

<sup>35</sup> Total includes seven IIAP anthropomorphic figures.

### 5.3.8. Size

Measurements were recorded for 63.20% of anthropomorphic figures. Unfortunately, on some motifs, this feature was limited by the absence of a complete figure, while other motifs were inaccessible (e.g. too high to measure). Measurements have been grouped into four arbitrary height categories (Table 5.23). The average height is 443 mm. The majority of anthropomorphic figures fall into the medium size category (37.12%, n=1,368). A number of the anthropomorphic figures in the small size category are horizontal figures; therefore, their width is larger. Few anthropomorphic figures are very large, or greater than one metre in height, these are mostly Wanjina Period figures. The largest is a Wanjina Period figure (5,000 mm x 1,500 mm [HxW], OTB01-1-1881). The largest Gwion figure is 2,400 mm in height (MM20-1-7366). No doubt the associated panel dimensions influenced the size of the anthropomorphic figures as very few are painted over more than one panel.

**Table 5.23** Anthropomorphic figure size (height) by stylistic period

Motif Size (Height)	Total		GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%	n	%
Small <150mm	266	7.22	41	3.28	66	8.18	18	4.80	15	2.19	127	22.13
Medium 150-<500mm	1,368	37.12	508	40.67	343	43.27	97	25.87	239	34.89	180	31.36
Large 500-<1,000mm	549	14.90	194	15.53	100	12.58	54	14.40	148	21.61	52	9.06
Very Large >1,000mm	146	3.96	30	2.40	8	1.01	15	4.00	79	11.53	12	2.09
Unknown <sup>36</sup>	1,356	36.80	476	38.11	278	34.97	191	50.93	204	29.78	203	35.37
<b>Total</b>	<b>3,685<sup>37</sup></b>	<b>100</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>574</b>	<b>100</b>

<sup>36</sup> Refers to the anthropomorphic figures that were not measured due to the following factors: difficulty of access, condition of the motif (e.g. too deteriorated to measure), and occasionally time restrictions.

<sup>37</sup> Total includes seven IIAP anthropomorphic figures.

### 5.3.9. Subject matter of scenes

The subject matter of scenes involving anthropomorphic figures varied through time (Table 5.24, Table 5.25). Both anthropomorphic motifs and anthropomorphic figures are presented to clearly illustrate that the number of individual figures within a scene (for example, one ‘Birthing Scene’ motif contains two individual anthropomorphic figures). A breakdown of the relationship between the subject matter of scenes and stylistic period is presented in Table 5.25. Scenes rare among anthropomorphic motifs at 6.27% (n=198). Of these, figures in a horizontal row occurs the most frequently (2.38%, n=75). Most of these motifs are friezes of anthropomorphic stick figures, un-attributable to any of Walsh’s stylistic periods.

**Table 5.24** Subject matter of anthropomorphic motif (n=3,148) and anthropomorphic figure (n=3,685) scenes

Subject matter of scene	Anthropomorphic motifs		Anthropomorphic figures	
	n	%	n	%
Attached to Line	2	0.06	71	1.93
Birthing Scene	1	0.03	2	0.05
Clustered	4	0.13	111	3.01
Enclosed Line	2	0.06	3	0.08
Face-To-Face Pairs	1	0.03	2	0.05
Potential Fighting Scene	4	0.13	19	0.52
Figures in Horizontal Row (Frieze)	75	2.38	389	10.56
Potential Hunting Scene	4	0.13	6	0.16
Large and Small Pairs	19	0.60	41	1.11
Pairs	36	1.14	68	1.85
Prepared Background	46	1.46	46	1.25
Scene <sup>38</sup>	1	0.03	3	0.08
Sex Scene	3	0.09	10	0.27
<b>Total</b>	<b>198</b>	<b>6.27</b>	<b>771</b>	<b>20.92</b>

<sup>38</sup> The activities occurring in recorded ‘scenes’ are unclear.

**Table 5.25** Subject matter of anthropomorphic figure scenes by stylistic period

Subject matter of scene	GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%
Attached to Line	-	-	-	-	-	-	-	-	71	12.37
Birthing Scene	-	-	-	-	-	-	2	0.29	-	-
Clustered	4	0.32	1	0.13	30	8.00	-	-	76	13.24
Enclosed Line	-	-	1	0.13	2	0.53	-	-	-	-
Face-To-Face Pairs	-	-	2	0.25	-	-	-	-	-	-
Potential Fighting Scene	-	-	19	2.39	-	-	-	-	-	-
Figures in Horizontal Row (Frieze)	115	9.21	115	14.47	45	12.00	48	7.01	136	23.69
Potential Hunting Scene	4	0.32	2	0.25	-	-	-	-	-	-
Large and Small Pairs	6	0.48	21	2.64	6	1.60	2	0.29	4	0.70
Pairs	34	2.72	20	2.52	10	2.67	2	0.29	4	0.70
Prepared Background	-	-	-	-	-	-	45	6.57	1	0.17
Scene <sup>39</sup>	3	0.24	-	-	-	-	-	-	-	-
Sex Scene	-	-	-	-	-	-	9	1.32	1	0.17
<i>n/a</i>	1,083	86.71	614	77.23	282	75.20	577	84.23	281	48.95
<b>Total</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>574</b>	<b>100</b>

### 5.3.10. Visual Dominance

Ninety-four of the anthropomorphic figures recorded are considered to be visually dominant (Table 5.26). The percentage of visually dominant anthropomorphic figures within each stylistic period is fairly evenly distributed between with Gwion Period and Wararajai Gwion Period. Few visually dominant motifs are associated with the Painted Hand Period. The Wanjina Period contained the highest percentage of visually dominant anthropomorphic figures (4.96%, n=34), indicating that dramatic visual impact becomes more significant within this period.

<sup>39</sup> The activities occurring in recorded 'scenes' are unclear.

**Table 5.26** Visual dominance by stylistic period

Visual Dominance	Total		GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%	n	%
Yes	94	2.55	35	2.80	17	2.14	7	1.87	34	4.96	1	0.17
No	3,591	97.45	1,214	97.20	778	97.86	368	98.13	651	95.04	573	99.83
<b>Total</b>	<b>3,685<sup>40</sup></b>	<b>100</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>574</b>	<b>100</b>

### 5.3.11. Sexual Characteristics

Where sex could be determined by the marked and indisputable presence of genitalia (e.g. breasts, penis), it was recorded. Within the study area, just 6.65% (n=245) of the anthropomorphic figures are depicted with sexual characteristics. Of these, males predominated (54.69%, n= 134) over females (44.08%, n=108). Figures with both male and female genitalia together on the same figure represented just 1.22% (n=3) (Table 5.27). Sexual characteristics are rarely depicted within the Gwion and Wararrajai Gwion periods, however, when sex is depicted, females are recorded in higher frequencies. There is an abrupt change within the Painted Hand Period in which depiction of sexual characteristics becomes more frequent. In contrast to the Gwion and Wararrajai Gwion periods, males predominate within the Painted Hand Period. While identifiable genitalia is represented within the Wanjinna Period the frequency is lower, and males still predominate.

**Table 5.27** Sex of anthropomorphic figures by stylistic period

Identifiable Genitalia	Total		GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%	n	%
Male	134	3.64	7	0.56	1	0.13	89	12.99	17	4.53	18	3.14
Female	108	2.93	9	0.72	17	2.14	60	8.76	11	2.93	11	1.92
Both	3	0.08	-	-	-	-	2	0.29	1	0.27	-	-
None	3,440	93.35	1,233	98.72	777	97.74	534	77.96	346	92.27	545	94.95
<b>Total</b>	<b>3,685<sup>41</sup></b>	<b>100</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>574</b>	<b>100</b>

<sup>40</sup> Total includes seven IIAP anthropomorphic figures.

<sup>41</sup> Total includes seven IIAP anthropomorphic figures.

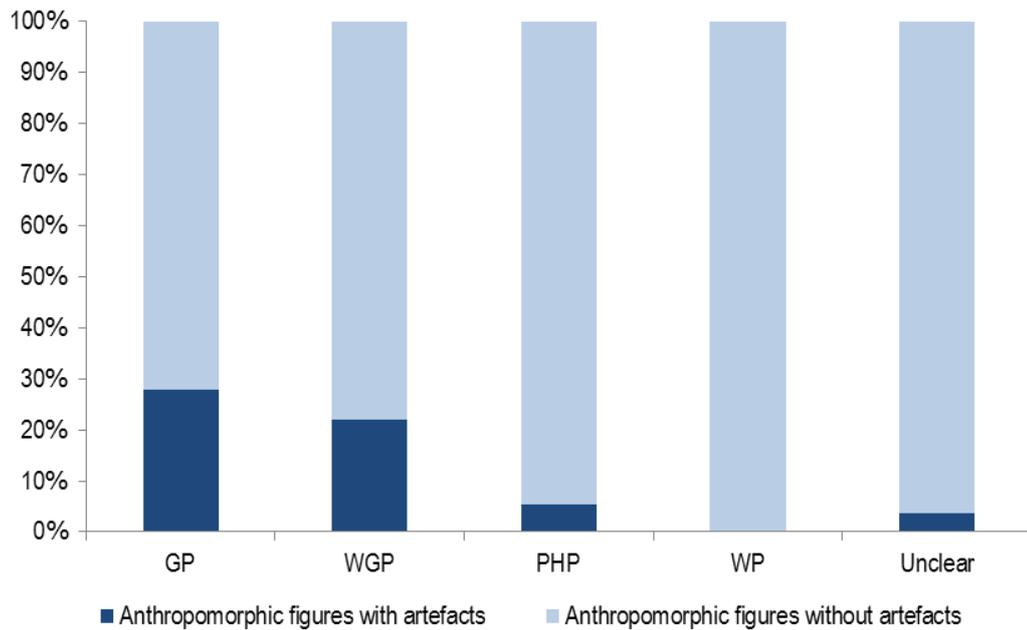
### 5.3.12. Analysis of artefacts associated with anthropomorphic figures

The depictions of artefacts play an important role in our understanding of northwest Kimberley prehistory. According to Walsh (2000), the intent of human figures depicted holding artefacts can be defined by the alignment of the body and the type of artefacts they hold. If we are to understand the nature of stylistic change in the art assemblage, particularly the transition between the Wararrajai Gwion and the Painted Hand Periods, which Walsh considered were separated by a period of discontinuity caused by the LGM (see Chapter 3), an examination of the artefacts and a re-evaluation of his hypothesis, is necessary. This is explored in Chapter 9.

First, results of the analysis of artefacts associated with anthropomorphic figures are presented. Within the northwest Kimberley, the majority of anthropomorphic figures are not associated with artefacts (84.67%, n=3,120) (Table 5.28). What is also clear is that there is a marked reduction in the number of anthropomorphic figures associated with artefacts from the Gwion Period onwards (Figure 5.9). In fact, they are almost absent from the Wanjina Period anthropomorphic figures altogether (n=3). This is mostly due to the fact that artefacts produced during the Wanjina Period are not usually associated with an anthropomorphic figure; they are mostly separate motifs. The number of artefacts associated with anthropomorphic figures is 918; 720 of which are attached to the figure, either in the hand or the waist. The remaining 198 artefacts are in close association with the anthropomorphic figure, but not visibly attached. The number of artefacts associated with anthropomorphic figures varies significantly between stylistic periods (Figure 5.10). The Gwion Period contains the highest percentage of artefacts (63.40%, n=582).

**Table 5.28** Anthropomorphic figures associated with and without artefacts by stylistic period<sup>42</sup>

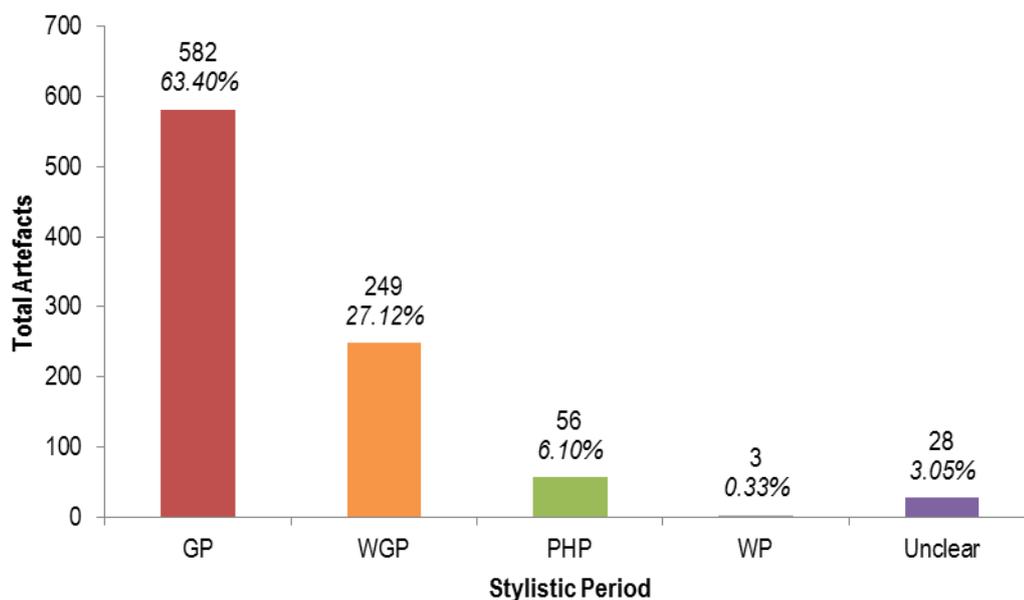
	Total		GP		WGP		PHP		WP		Unclear	
	n	%	n	%	n	%	n	%	n	%	n	%
<b>With artefacts</b>	565	15.33	347	27.78	175	22.01	20	5.33	2	0.29	21	3.66
<b>Without artefacts</b>	3,120	84.67	902	72.22	620	77.99	355	94.67	683	99.71	553	96.34
<b>Total</b>	<b>3,685<sup>43</sup></b>	<b>100</b>	<b>1,249</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>685</b>	<b>100</b>	<b>375</b>	<b>100</b>	<b>574</b>	<b>100</b>



**Figure 5.9** Proportions of anthropomorphic figures with and without artefacts, by stylistic period

<sup>42</sup> No Irregular Infill Animal Period anthropomorphic figures are associated with artefacts therefore they were left out of this table.

<sup>43</sup> Total includes seven IIAP anthropomorphic figures.



**Figure 5.10** Number of individual artefacts associated with anthropomorphic figures by stylistic period (n=918)

Change in artefact typology throughout the sequence is also evident (see Appendix 1 for a typology of artefact types). There is a notable change in artefact preferences from the Gwion to the Wararrajai Gwion Periods (e.g. boomerangs to multi-barb spears), followed by a notable lack of representation in the Painted Hand and Wanjina Periods (Table 5.29).

**Table 5.29** Artefacts associated with anthropomorphic figures by type and stylistic period

Artefact Type	Total	GP		WGP		PHP		WP		Unclear	
		n	% <sup>44</sup>	n	%	n	%	n	%	n	%
<b>Boomerangs</b>											
Angular Boomerang	68	58	85.29	6	8.82	-	-	-	-	4	5.88
Crescent Boomerang	150	116	77.33	18	12.00	7	4.67	-	-	10	6.67
Double Boomerangs <i>Angular and Crescent</i>	2	1	50.00	1	50.00	-	-	-	-	-	-
Double Boomerangs <i>Angular</i>	39	38	97.44	1	2.56	-	-	-	-	-	-
Double Boomerangs <i>Crescent</i>	114	105	92.11	7	6.14	2	1.75	-	-	-	-

<sup>44</sup> Percentages relate to the frequency of individual artefact types by stylistic period, therefore figures are to be read across the table (not down). This ensures that artefacts can be associated with stylistic period/s.

Artefact Type	Total	GP		WGP		PHP		WP		Unclear	
		n	% <sup>44</sup>	n	%	n	%	n	%	n	%
Double Boomerangs <i>No7 Boomerang</i>	1	1	100.00	-	-	-	-	-	-	-	-
Triple Boomerangs <i>Angular</i>	1	1	100.00	-	-	-	-	-	-	-	-
Triple Boomerangs <i>Crescent</i>	12	10	83.33	1	8.33	-	-	-	-	1	8.33
Quadruple Boomerangs <i>Crescent</i>	1	1	100.00	-	-	-	-	-	-	-	-
<b>Spearthrowers<sup>45</sup></b>											
Hooked Stick	104	4	3.85	56	53.85	44	42.31	-	-	-	-
Spatula Handle Spearthrower	16	-	-	16	100.00	-	-	-	-	-	-
<b>Spears</b>											
Multi-Barb Spear <i>Down facing</i>	41	7	17.07	32	78.05	-	-	-	-	2	4.88
Multi-Barb Spear <i>Upright</i>	12	2	16.67	9	75.00	-	-	-	-	1	8.33
Multi-Barb Spear <i>Sloping</i>	4	-	-	3	75.00	-	-	-	-	-	-
Multi-Barb Spear <i>Horizontal</i>	4	1	25.00	3	75.00	-	-	-	-	-	-
Multi-Barb Spear Pairs <i>Down facing</i>	15	3	20.00	12	80.00	-	-	-	-	-	-
Multi-Barb Spear Pairs <i>Upright</i>	10	2	20.00	8	80.00	-	-	-	-	-	-
Multi-Barb Spear Pairs <i>Sloping</i>	1	-	-	1	100.00	-	-	-	-	-	-
Multi-Barb Spear Pairs <i>Horizontal</i>	1	-	-	1	100.00	-	-	-	-	-	-
Multi-Barb Spear Group <i>Down facing</i>	27	4	14.81	22	81.48	-	-	-	-	1	3.70
Multi-Barb Spear Group <i>Upright</i>	8	1	12.50	7	87.50	-	-	-	-	-	-
?Spear <i>no barbs</i>	9	5	55.56	4	44.44	-	-	-	-	-	-
<b>Other</b>											
Catscradle String	1	1	100.00			-	-	-	-	-	-
Dilly Bag	16	14	87.50	2	12.50	-	-	-	-	-	-
Whisk	111	108	97.30	2	1.80	-	-	-	-	1	0.90
Unidentified <sup>46</sup>	150	99	66.00	37	24.67	3	2.00	3	2.00	8	5.33
<b>Total</b>	<b>918</b>	<b>582</b>		<b>249</b>		<b>56</b>		<b>3</b>		<b>28</b>	

Almost three quarters of the Gwion Period anthropomorphic figures are not associated with artefacts (72.22%). Of the 27.78% (n=347) that are associated with artefacts, the most common artefact is the boomerang. Similarly, the majority of Wararrajai Gwion Period anthropomorphic figures are not associated with artefacts

<sup>45</sup> I use the term spearthrower to describe this artefact type in general. However, when referring to a particular depicted attribute, I will use the term 'Hooked Stick' or 'Spatula Handle Spearthrower'.

<sup>46</sup> Unidentified artefacts refer to objects associated with anthropomorphic figures that are not considered to be body or dress decoration, but are unable to be labelled as a specific artefact type.

(77.99%, n=620). Artefacts most commonly associated with this period include multi-barb spears (singularly, in pairs or in groups/parallel clusters), the 'Hooked Stick' and the 'Spatula Handle Spearthrower'. Of the 77 Wararrajai Gwion Period anthropomorphic figures associated with multiple artefacts:

- Thirty-seven are associated with two artefacts types, the most common combination being the down-facing multi-barb spear and spearthrower (n=7),
- Eleven are associated with three artefacts types, the only repeated combination is the down-facing multi-barb spear, spearthrower and upright multi-barb spear group, and
- One is associated with four artefact types: down-facing multi-barb spear, down-facing multi-barb spear pair, spearthrower and whisk.

The 'Hooked Stick' continues to be the dominant artefact type within the Painted Hand Period (n=44). Within this period fewer anthropomorphic figures are associated with artefacts (only 5.33%, n=20). Only two anthropomorphic figures within the Wanjina Period are associated with artefacts. The three artefacts associated with these figures are unidentifiable.

### **5.3.13. Summary of anthropomorphic figure analysis**

Overall, the anthropomorphic figures of the northwest Kimberley are a dominant component of the art assemblage and are ideal indications of changing stylistic behaviour through both time and space. Anthropomorphic motifs vary greatly, not only in the site types in which they are produced; there is a clear shift from overhangs to rock shelters, and also in panel and motif placement selection.

Changes are also evident in the ways anthropomorphic figures were produced. For example, additional techniques were added to the assemblage in the more recent stylistic periods, e.g. the use of beeswax and drawing. In relation to colour, anthropomorphic figures are dominantly monochrome, however, bichrome and polychrome examples existed. Bichrome examples existed in the earlier Gwion and

Wararrajai Gwion Periods, and the use of three or more colours came into use in the Painted Hand Period. Infill became more complex as the relative stylistic sequence changed. Specifically, most early figures are painted with 'solid' infill, and 'Outline with decorative infill' was most commonly associated with the Wanjina Period anthropomorphic figures, which have large upper bodies that are patterned. The majority of anthropomorphic figures fall into the medium size category. Very few anthropomorphic figures are very large, or greater than one metre in height, these are mostly Wanjina Period figures.

Shifts in the type and frequency of associated artefacts are also an important aspect of the changes in anthropomorphic figures. These changes point to technological developments, but also to shifts in the role of rock art production to the past occupants of the northwest Kimberley region. These shifts and their implications are explored in Chapter 9.

An important outcome of these analyses is the observation that while many of the anthropomorphic figures fitted Walsh's classification system, a large number did not (15.58%,  $n = 574$ ). This not only suggests that this system needs refining and should be the focus of future research, but that the structure of the Kimberley rock art sequence is more complex than identified by Walsh in his schema. Many motifs contain stylistic attributes common to a number of stylistic periods. The extent of the variability within the art assemblage of the northwest Kimberley is not yet fully realised.

## **5.4. Correspondence Analysis**

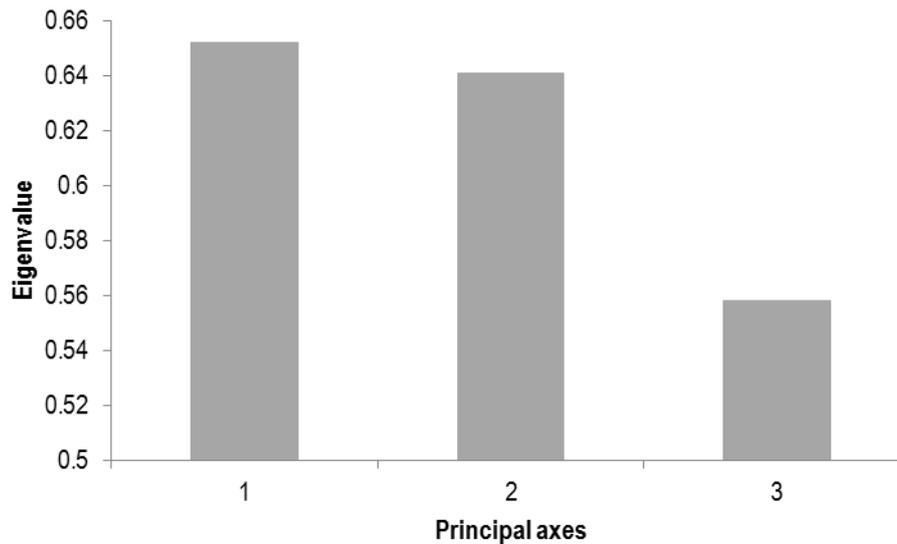
The following section presents results from the multivariate statistical analyses undertaken on the dataset of anthropomorphic figures. Correspondence analysis was used to investigate whether or not there is evidence for gradual stylistic change within the art assemblage. This is being done to test Walsh's hypothesis that there was an abrupt discontinuity of art between the Wararrajai Gwion and Painted Hand Periods.

### 5.4.1. Analysis 1: CA of the complete dataset

Analysis commenced with the entire dataset. This CA measured the correspondence between 3,685 anthropomorphic figures and 349 attributes. This analysis generated 348 principal axes. In order to determine which two principal axes accounted for the highest degree of variation in the dataset, the eigenvalues for each principal axis were plotted in a column graph (see Appendix 3). An eigenvalue is associated with each principal axis. In CA, the total sum of eigenvalues is called the inertia of the dataset. The amount of inertia represented by the eigenvalues of each principal axes shows the amount of the total variation covered by the individual axis (Madsen 2007:19). This graph indicated that the first three principal axes accounted for the highest degree of variation in the data, which have been plotted in Figure 5.11. Principal axis 1 accounts for 1.27%, principal axis 2 accounts for 1.25%, and principal axis 3 accounts for 1.08%. So between them they represent 3.60% of the total variance (inertia), which is very little. The higher the inertia obtained the better.

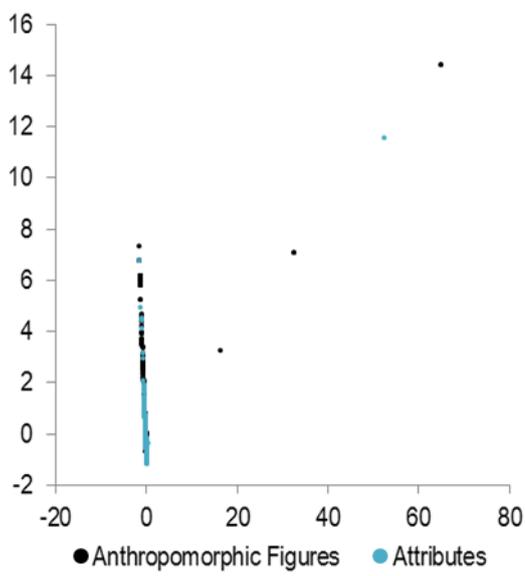
*Inertia is the term used in correspondence analysis to talk about the degree of variation. The inertia is calculated on observed and expected frequencies of co-occurrence. Inertia is high when column and row profiles have large deviations from their averages (Glynn 2014:136).*

Points, which do not contribute essentially to the inertia of each axis, are virtually identical to the average profile (centroid). CA determines the principal axes of inertia, and for each axis the corresponding eigenvalue. ‘The total sum of eigenvalues, which in CA is called the inertia of the data set, is not equal to the number of variables, but usually much smaller due to scaling’ (Madsen 2007:19). Low inertia then suggests relatively low variability within the dataset, supporting this theses aim to investigate stylistic similarities in the art assemblage.

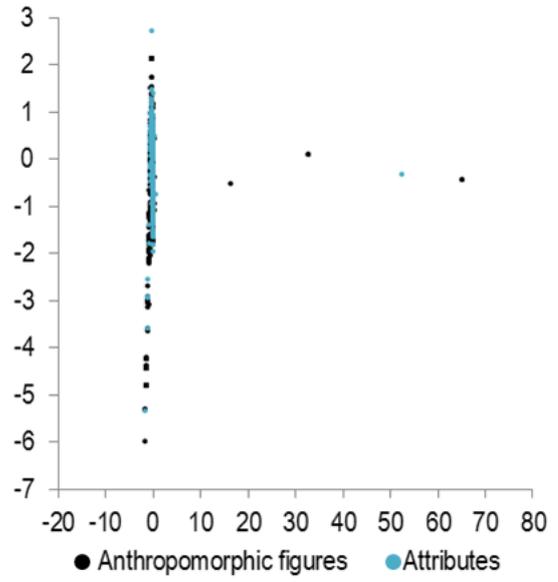


**Figure 5.11** Eigenvalues of the first three principal axes

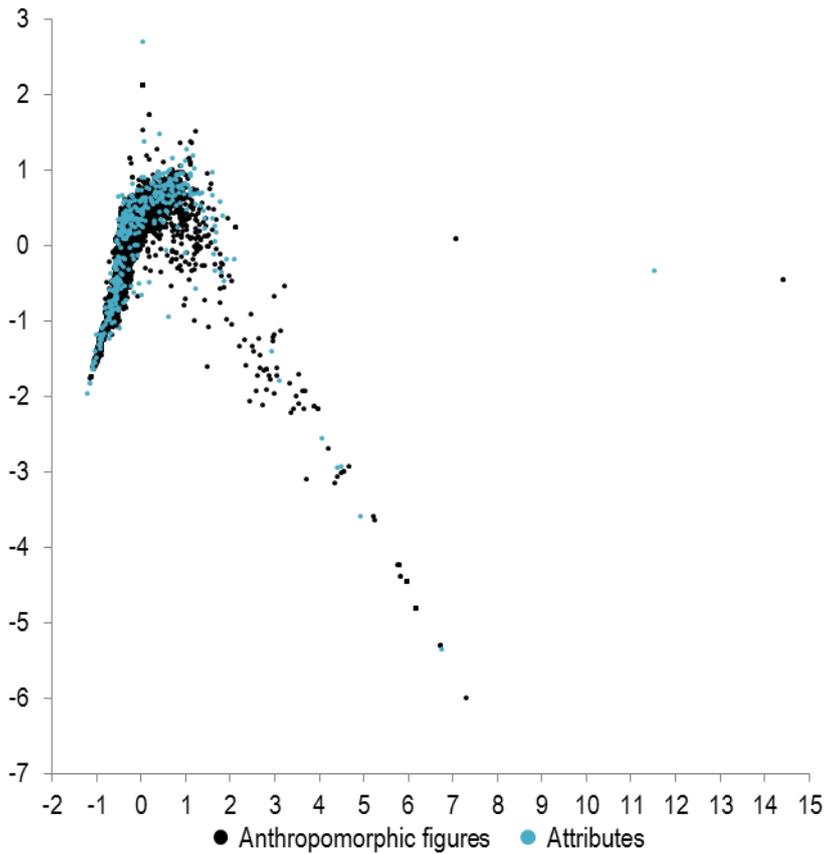
Figure 5.12, Figure 5.13, and Figure 5.14 present the plots of correspondence scores for combinations of the first three principal axes. When the first and second principal axes, accounting for 2.52% of the inertia are plotted (Figure 5.12), a contrast between the spread on principal axis 1 and 2 is clear. Variation is poorly discriminated on principal axis 1 and the generated pattern is skewed by a few extreme outliers. When the first and third principal axes, accounting for 2.35% of the variation, are plotted (Figure 5.13), a similar pattern emerges as in Figure 5.12. Greater spread is represented on the third principal axis than the first, and the plot is impacted by the presence of extreme outliers. When the second and third principal axes, accounting for 2.33% of the variation are plotted, we get a better sense of variation in the dataset (Figure 5.14).



**Figure 5.12** CA plot of anthropomorphic figures and attributes (principal axes 1 and 2)



**Figure 5.13** CA plot of anthropomorphic figures and attributes (principal axes 1 and 3)



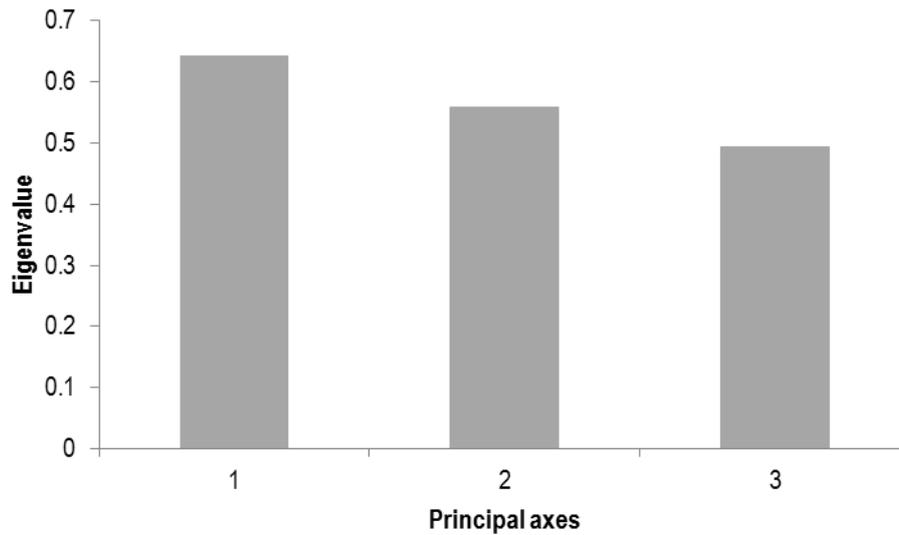
**Figure 5.14** CA plot of anthropomorphic figures and attributes (principal axes 2 and 3)

Within these CA plots, the pattern of distribution, both for anthropomorphic figures and attributes was affected by the presence of a small number of extreme outliers. This was especially the case when the first and second, and the first and third axes were plotted (Figure 5.12 and Figure 5.13 respectively). CA is sensitive to outliers, and this kind of outlier response, in which the algorithm emphasises ‘rare attributes that occur with objects that are otherwise bare of attributes’ is considered common (Wright 1992:31). The six identified extreme outliers are anthropomorphic figures (LMR02C-37-6144-2954, LMR02C-37-6145-2955, LMR02C-42-6189-2982, LMR02K-3-6423-3132, LMR02K-3-6424-3133), and the attribute is the headdress type ‘Mop’. Each of the five anthropomorphic figures has the ‘Mop’ headdress. These six outliers were removed from the dataset as they overshadowed the overall pattern. The analysis was re-run after removing these outliers, in an effort to seek the underlying patterns within the data set.

#### **5.4.2. Analysis 2: CA of dataset minus extreme outliers**

The second analysis was undertaken on the dataset minus the six identified extreme outliers. This CA measured the correspondence between 3,680 anthropomorphic figures and 348 attributes. The aim of this analysis was to determine whether there were discernible differences between stylistic periods, and if they could be clearly distinguished from one another.

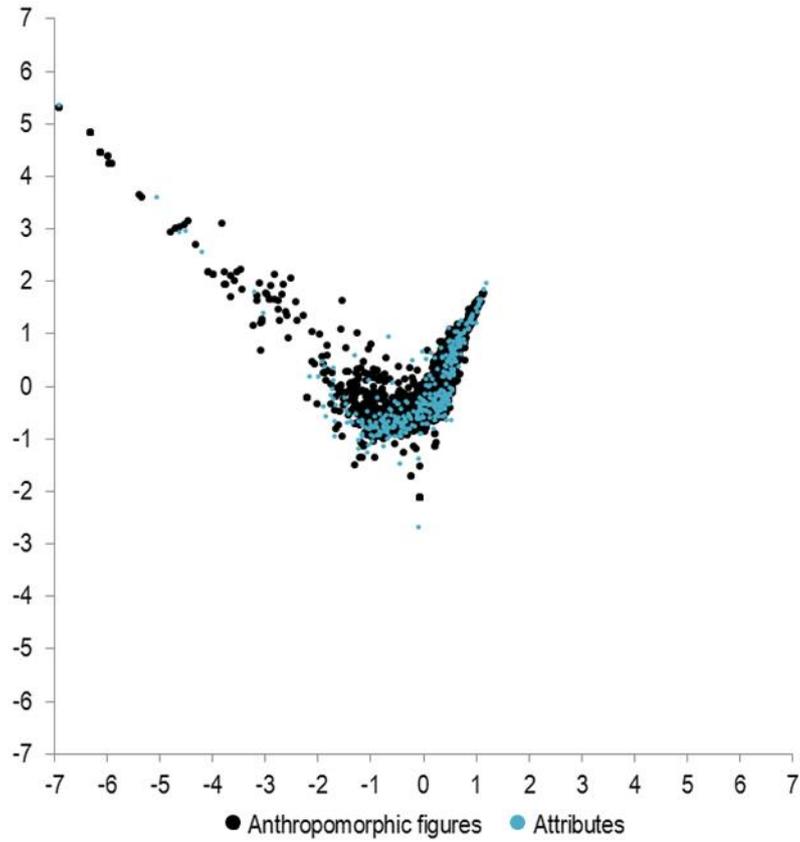
This analysis generated 347 principal axes. As with the previous CA, in order to determine which two principal axes accounted for the highest degree of variation in the dataset, the principal axes were plotted in a column graph (see Appendix 3). This graph indicated that the first three principal axes accounted for the highest degree of variation in the data, which have been plotted in Figure 5.15. Principal axis 1 accounts for 1.26%, principal axis 2 accounts for 1.10%, and principal axis 3 accounts for 0.97%. So between them they represent 3.33% of the total variance, which again is very little.



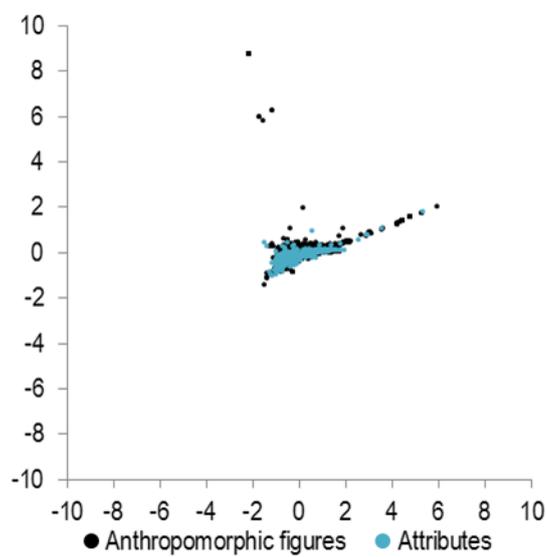
**Figure 5.15** Eigenvalues of the first three principal axes

Figure 5.16, Figure 5.17, and Figure 5.18 present the plots of correspondence scores for combinations of the first three principal axes. These plots were manually changed in *Microsoft Excel* in order to match the scales on the principal axes. This procedure does in no way alter the positioning of the data in the plots; it just makes the relationships easier to interpret.

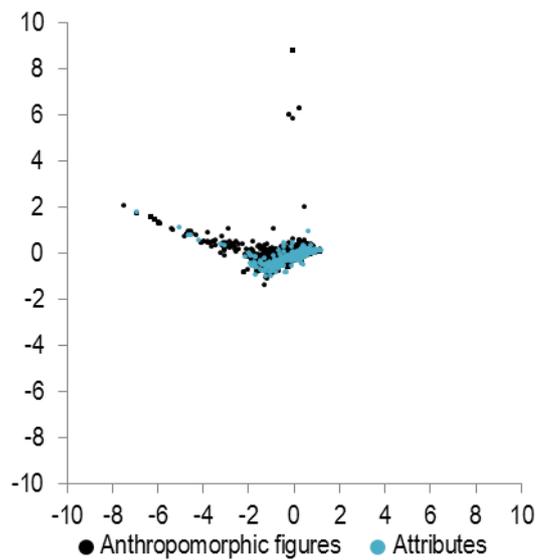
When the first two principal axes from the CA, accounting for 2.36% of the total variation are plotted (Figure 5.16), a clear pattern emerges. The overall distribution displays a dense cluster near the centroid, and two distinct ‘tails’ point out to the upper left and upper right. The spread displayed in the left tail implies higher rates of variation within these anthropomorphic figures. Whilst the upper right tail is visible, there is less spread, and thus less variation. The attributes and stylistic periods contributing to this variation will be discussed below in detail. When the second and third axes, accounting for 2.07% of the variation, and the first and third axes, accounting for 2.23% of the variation, are plotted (Figure 5.17 and Figure 5.18 respectively) the pattern is less distinct. Inertia is best represented by principal axes 1 and 2 (Figure 5.16). As this is considered the best representation of variance, I focus on this CA plot for the remainder of this analysis. The CA plots for anthropomorphic figures and attributes will now be discussed, both individually and in association.



**Figure 5.16** CA plot of anthropomorphic figures and attributes (principal axes 1 and 2)



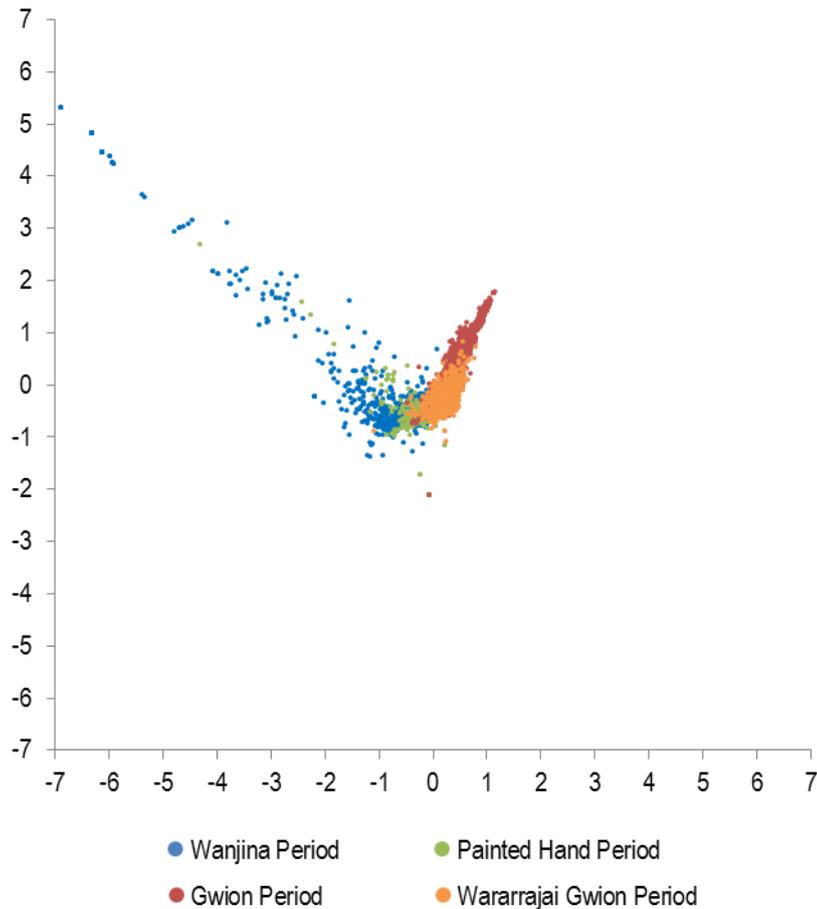
**Figure 5.17** CA plot of anthropomorphic figures and attributes (principal axes 2 and 3)



**Figure 5.18** CA plot of anthropomorphic figures and attributes (principal axes 1 and 3)

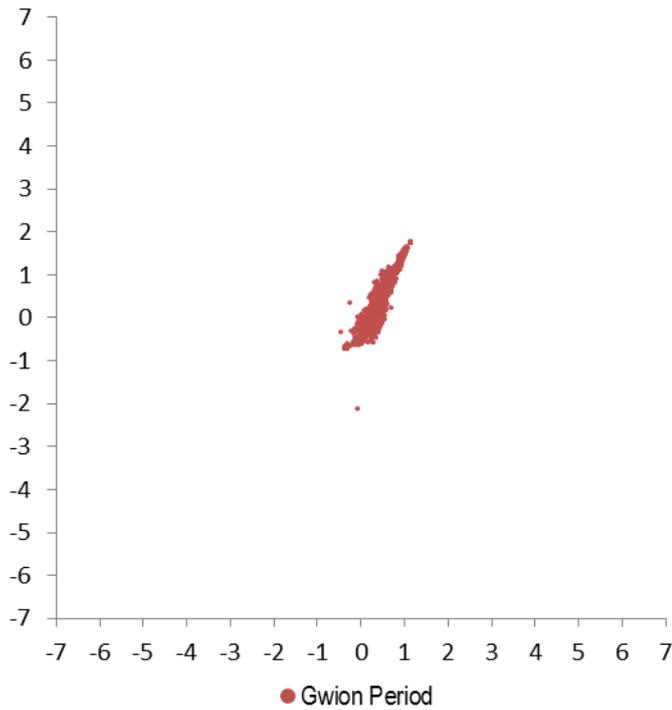
## The Objects

Figure 5.19 displays the anthropomorphic figures (objects) plotted by stylistic period. Each stylistic period is defined by a designated colour. Anthropomorphic figures that are classified as Irregular Infill Animal Period or Unclear have not been plotted as they are not considered relevant to the current analysis.

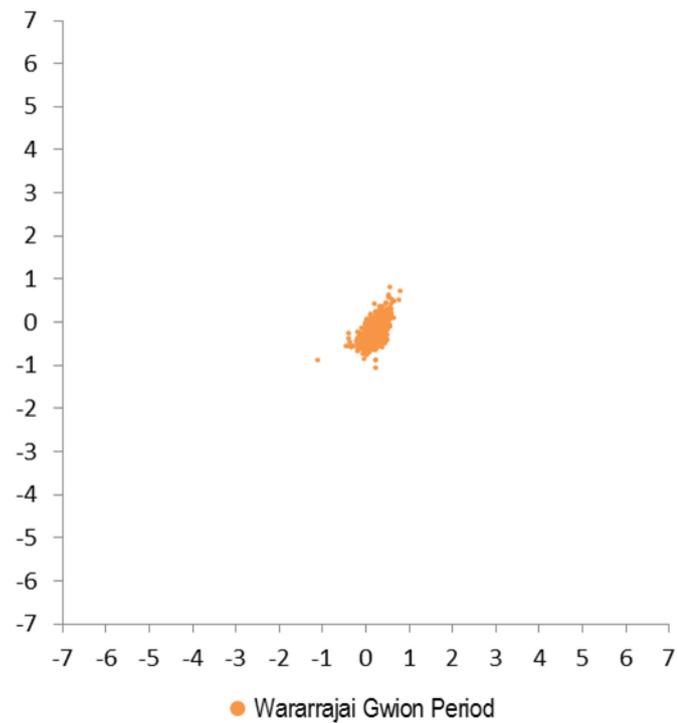


**Figure 5.19** CA plot of anthropomorphic figures by stylistic period (principal axes 1 and 2)

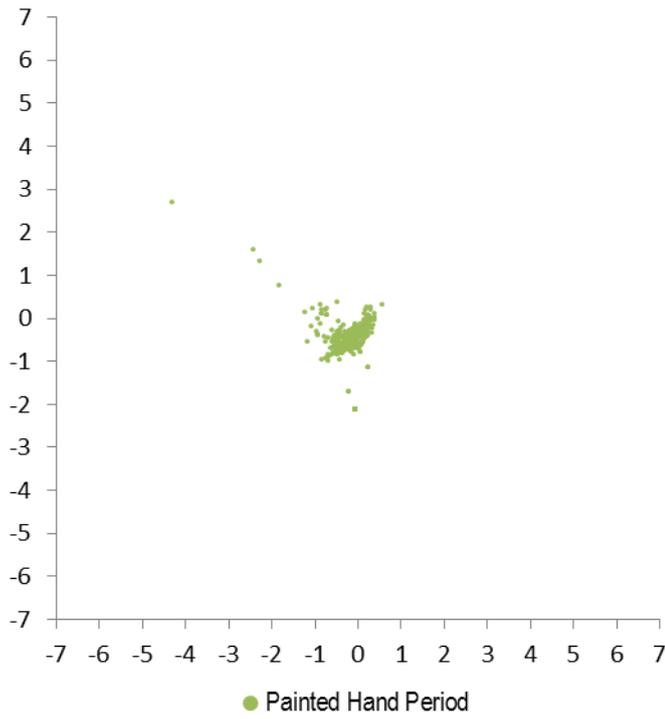
Given the large size of the dataset, the usefulness for detailed interpretation of this plot is considered limited. For this reason, the results have been re-plotted by stylistic period. All sub-plots are based on the same results, and are presented in Figure 5.20 through to Figure 5.24. These sub-plots show the complete distribution of points within each stylistic period and are indicative of gradual rather than marked stylistic changes in the art assemblage.



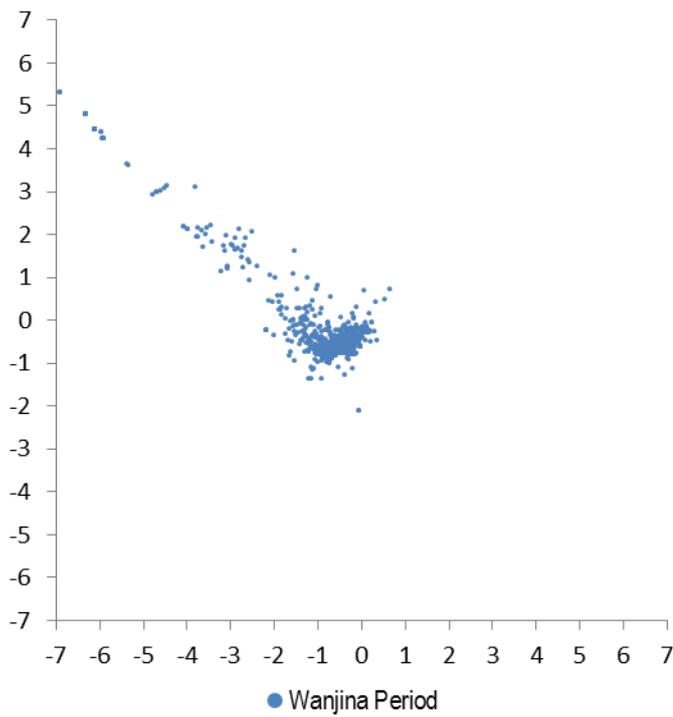
**Figure 5.20** CA sub-plot of anthropomorphic figures classified as Gwion Period (principal axes 1 and 2)



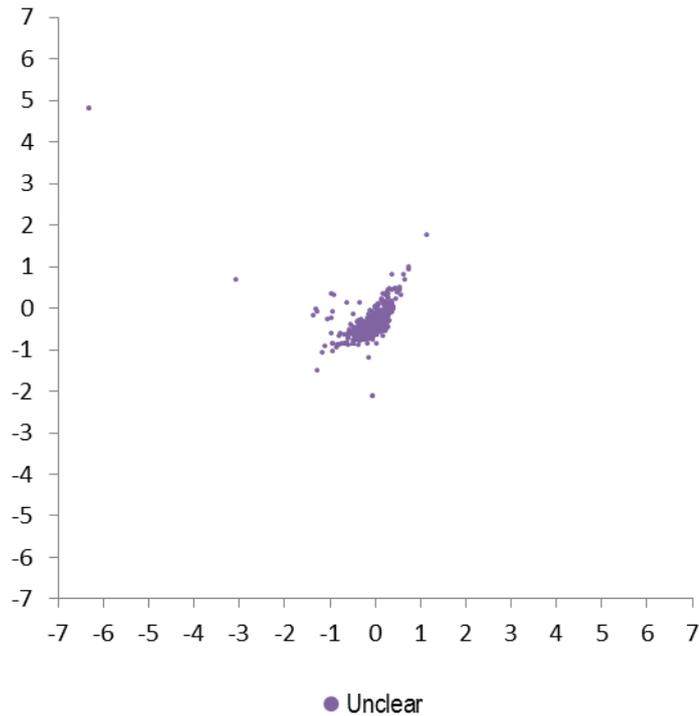
**Figure 5.21** CA sub-plot of anthropomorphic figures classified as Wararraji Gwion Period (principal axes 1 and 2)



**Figure 5.22** CA sub-plot of anthropomorphic figures classified as Painted Hand Period (principal axes 1 and 2)



**Figure 5.23** CA sub-plot of anthropomorphic figures classified as Wanjina Period (principal axes 1 and 2)



**Figure 5.24** CA sub-plot of anthropomorphic figures classified as Unclear (principal axes 1 and 2)

### ***The Gwion Period***

The upper right tail is largely made up of anthropomorphic figures from the Gwion Period (Figure 5.20). The points in this period are clustered together suggesting a rather homogeneous period of stylistic choices.

### ***The Wararrajai Gwion Period***

The Wararrajai Gwion Period is located just to the right of the centroid (Figure 5.21). It displays a high degree of clustering, indicating that anthropomorphic figures within this period repeat a typical range of attributes. This period *clearly overlaps* with both the Gwion Period and the Painted Hand Period. The main overlap occurs with the Gwion Period, suggesting a close relationship to the range of attributes occurring within this period.

***The Painted Hand Period***

The Painted Hand Period is located over the centroid region, overlapping with all of the stylistic periods (Figure 5.22).

***The Wanjina Period***

The upper left tail is representative of anthropomorphic figures classified as Wanjina Period (Figure 5.23). The relatively dispersed nature of points within the Wanjina Period indicates a high degree of variation within anthropomorphic figures from this period. This high degree of dispersion relative to other stylistic periods indicates that the range of attributes present within this period is greater, and there is more variation in their associations.

***Unclear***

I have also plotted the unclear anthropomorphic figures in a separate CA plot (Figure 5.24). Unclear refers to anthropomorphic figures that do not easily fit into the current schema. This CA plot shows that these motifs concentrate around the centroid region, indicating that unclear anthropomorphic figures may be difficult to discern as they share attributes from multiple stylistic periods. This highlights the stylistic variability in the art assemblage and the limitations of Walsh's classification system. The points do not overlap with the upper left tail of the Wanjina Period, as these attributes are most frequently found in identifiable Wanjina Period anthropomorphic figures.

***Summary of the Objects***

Overall, the CA plot indicates that there are no separate groupings of stylistic periods; rather there is a large degree of overlap between the periods, each of the periods overlap with at least one other. This pattern is suggestive of gradual rather than a marked or sudden change in the art assemblage. The tails associated with the Gwion and Wanjina Periods indicate that these stylistic periods have the most internal variation; however, they still overlap with the other periods. The patterns

that emerge in Figure 5.19 also indicate dissimilarity in the level stylistic variability within each stylistic period. For example, the Gwion Period displays more homogeneity than the Wanjina Period. Table 5.30 provides a weighting from low to very high of overall stylistic variability, based on overall dispersion within the CA plot. Overall, this points to an increase in stylistic variation within the identified stylistic periods over time. The implications of this result and what it reveals about the context of the rock art production will be addressed in Chapters 8 and 9.

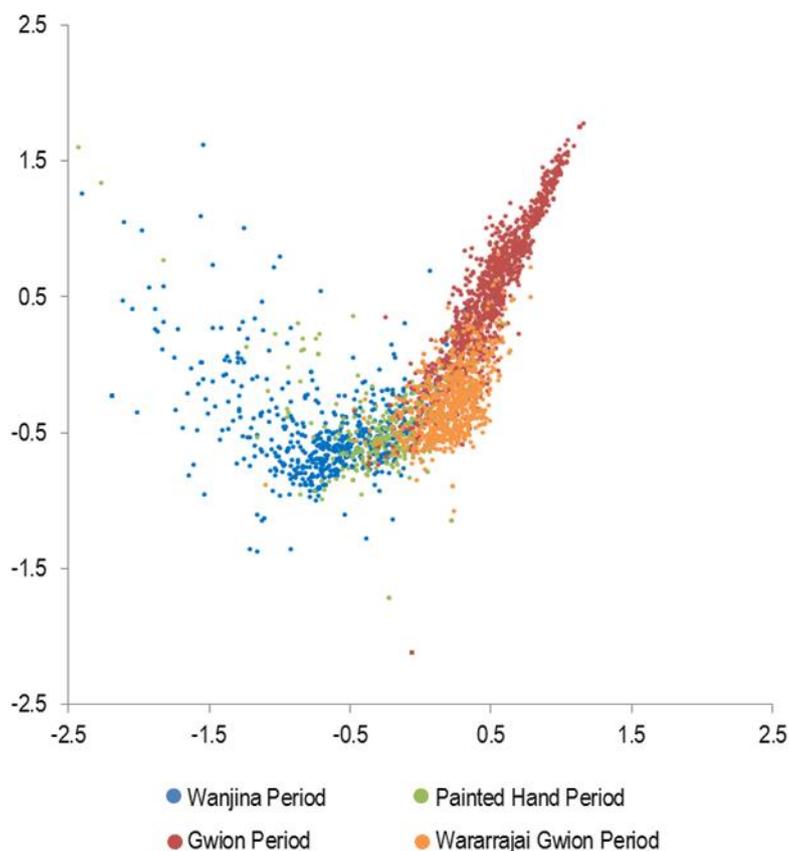
**Table 5.30** Weighting of variability within stylistic periods

Weighting of stylistic variability	Stylistic Period
Low	Wararrajai Gwion Period
Medium	Gwion Period
High	Painted Hand Period
Very High	Wanjina Period

The curved or horseshoe pattern of the plot (also known as the ‘arch’ or ‘Guttman’ effect) is characteristic of *seriation* (Baxter 1994:119). The seriation of the plot, placing the anthropomorphic figures in a relative chronological order, parallels the established relative rock art sequence proposed by Walsh (1994, 2000) when viewed from right to left. What this seriation also indicates is that anthropomorphic figures at either end of the spectrum ‘will have nothing in common and will be “forced” to be approximately equidistant on the usual correspondence analysis plot’ (Baxter 1994:120). This would be expected due to the time depth of the relative rock art sequence (to be discussed in Chapter 7). This result reaffirms the overall order of the current schema; however, it also sheds lights on the development of the sequence, signifying *gradual* rather than marked changes in the art assemblage.

A practical concern with large datasets is that points can be ‘squeezed together’ so that detail can be difficult to discern (Baxter 1994:120). For this reason, all CA scores between -2.5 and 2.5 on principal axes 1 and 2 are plotted in Figure 5.25. This was done in order to better visualise the patterns of the stylistic periods with the original CA plot for Analysis 2. This area was chosen as it is the 95% concentration

ellipse, the area identified in the *PAST* program ‘where 95% of population points are expected to fall’ (Hammer 2013:25). This plot is based on exactly the same results as the previous plots; it is merely a ‘zoomed-in’ version of the majority of the data. As can be seen, the CA results indicate no evidence for distinctive clustering throughout the rock art sequence, suggestive of an overall stylistic cline within the art assemblage. There are phases of efflorescence of a stylistic period, which then wanes and gradually changes into another stylistic period, which in turn has a phase of efflorescence and so on.

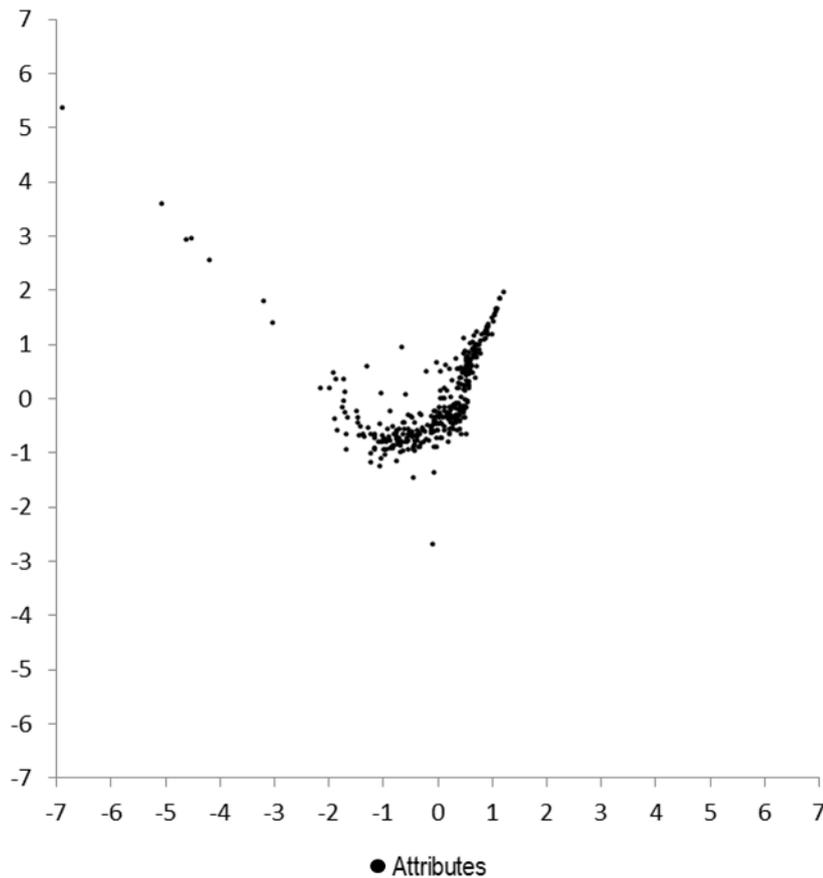


**Figure 5.25** Reduced CA plot of anthropomorphic figures by stylistic period (principal axes 1 and 2)

### The Variables

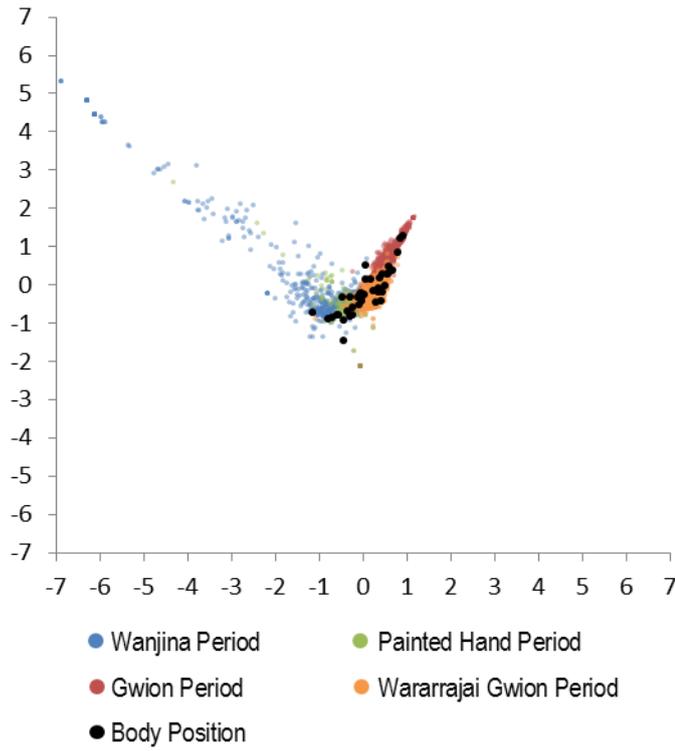
Figure 5.26 presents the CA plot of the variables within the dataset. Points correspond to the columns of the table (attributes). Points that are close together identify attributes which have a similar distribution across anthropomorphic figures. I

acknowledge that the system used to classify anthropomorphic figures has its limitations. The fact that anthropomorphic figures can only be depicted in a certain number of positions means that Body Position attributes are common to a large amount of motifs. This is dealt with further in Analysis 3.

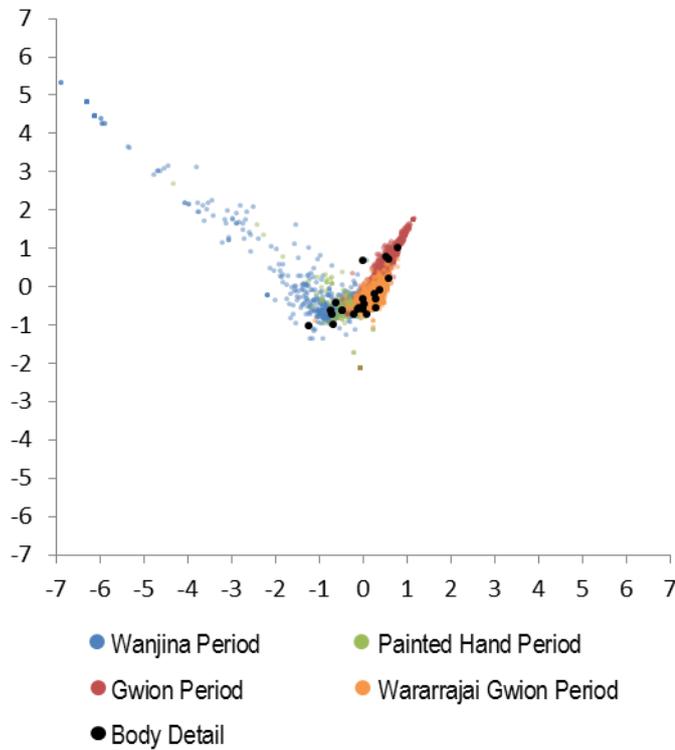


**Figure 5.26** CA plot of attributes (principal axes 1 and 2)

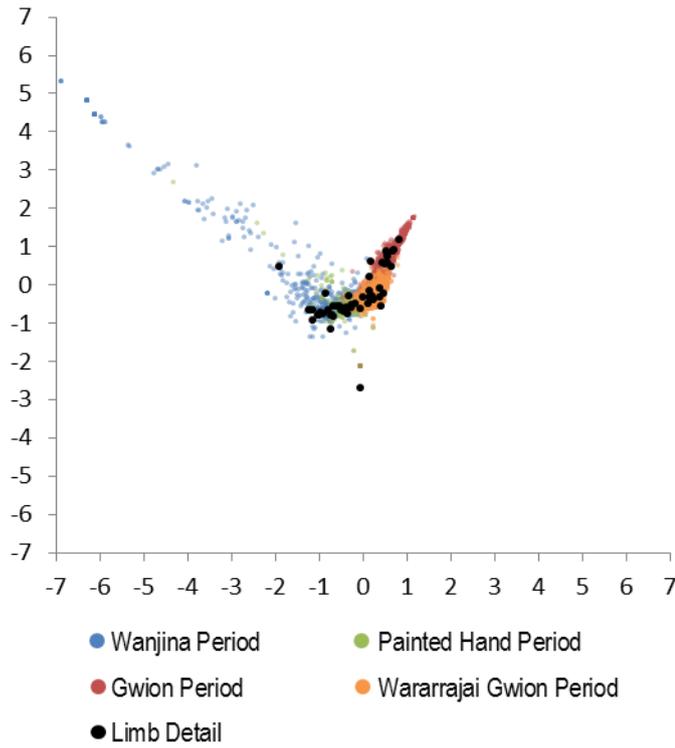
An overlay of the object and variable plots helps to identify which attributes are particularly characteristic of different parts of the seriation (Baxter 1994:3). Figure 5.27 through to Figure 5.36 provides sub-plots of the data, so that overlain the position of the anthropomorphic figures and the position of the attributes can be analysed simultaneously. The sub-plots have been divided by the attribute groupings defined by Walsh as previously mentioned. A list of the individual attributes within each group can be found in Appendix 4.



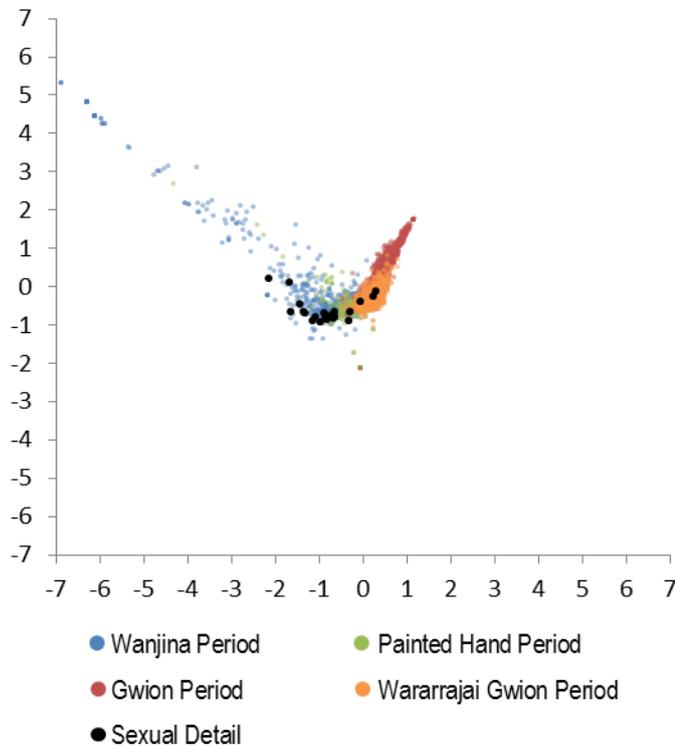
**Figure 5.27** CA sub-plot of anthropomorphic figures by stylistic period overlain by Body Position attributes (principal axes 1 and 2)



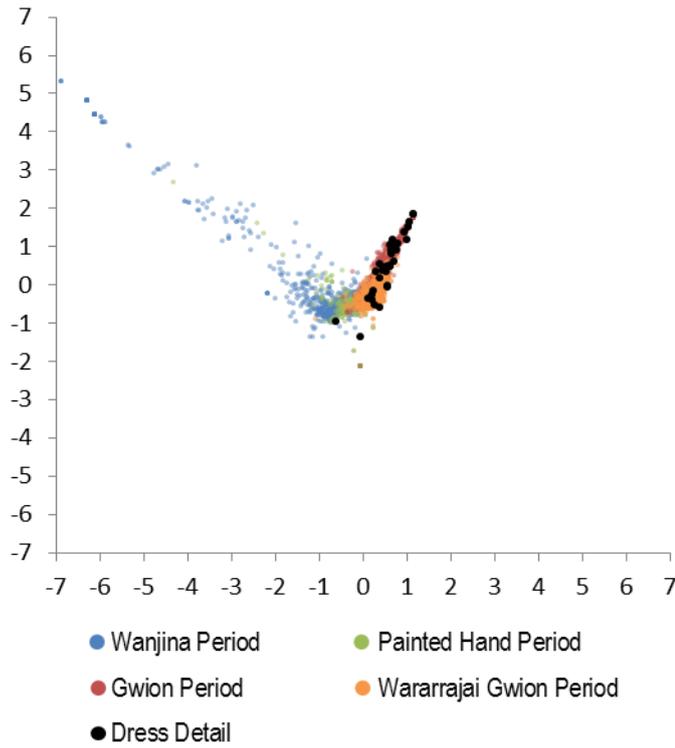
**Figure 5.28** CA sub-plot of anthropomorphic figures by stylistic period overlain by Body Detail attributes (principal axes 1 and 2)



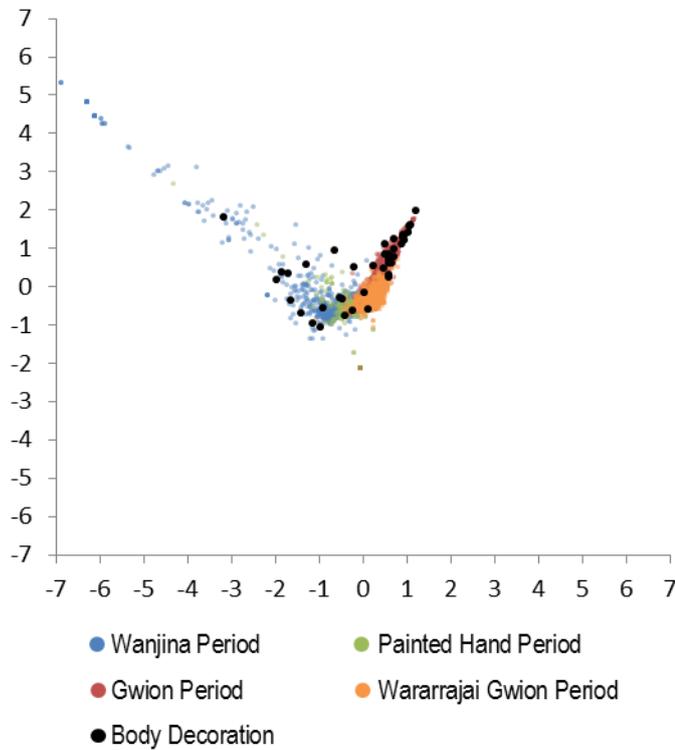
**Figure 5.29** CA sub-plot of anthropomorphic figures by stylistic period overlain by Limb Detail attributes (principal axes 1 and 2)



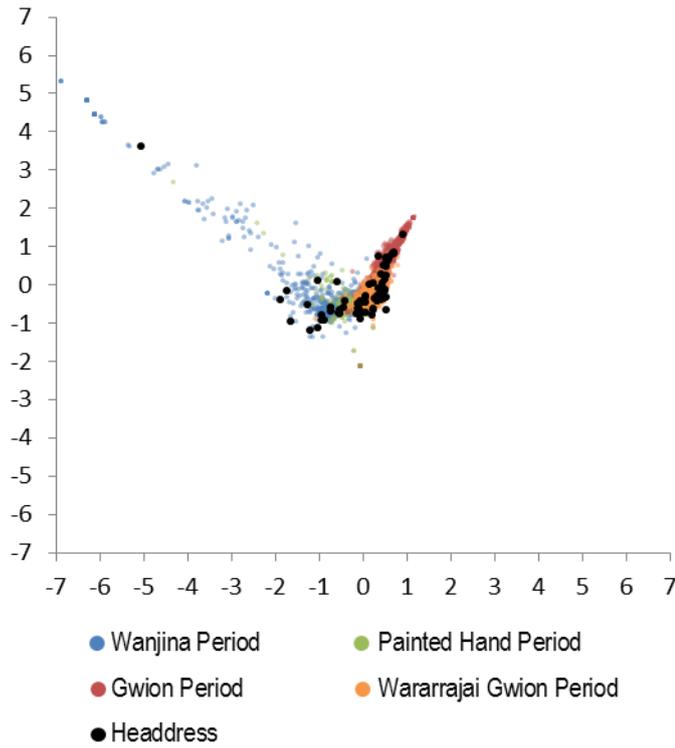
**Figure 5.30** CA sub-plot of anthropomorphic figures by stylistic period overlain by Sexual Detail attributes (principal axes 1 and 2)



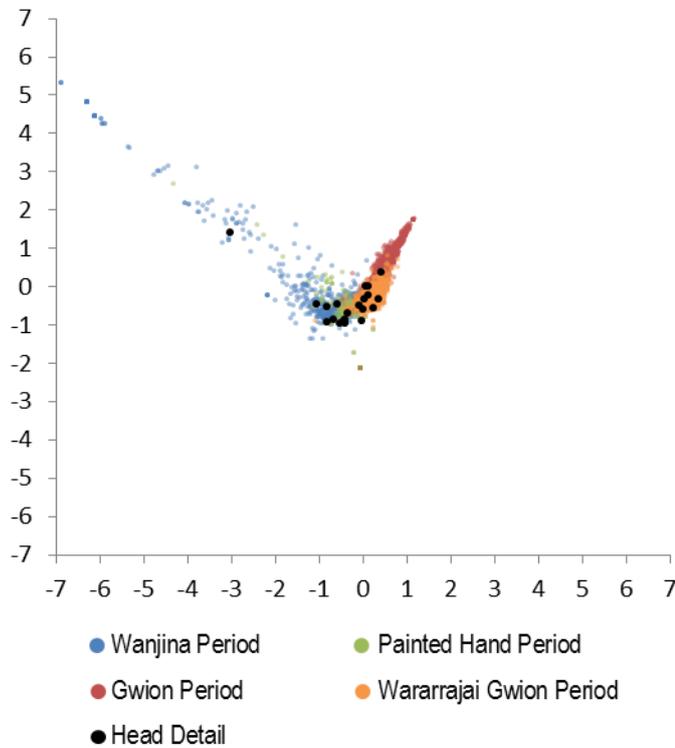
**Figure 5.31** CA sub-plot of anthropomorphic figures by stylistic period overlain by Dress Detail attributes (principal axes 1 and 2)



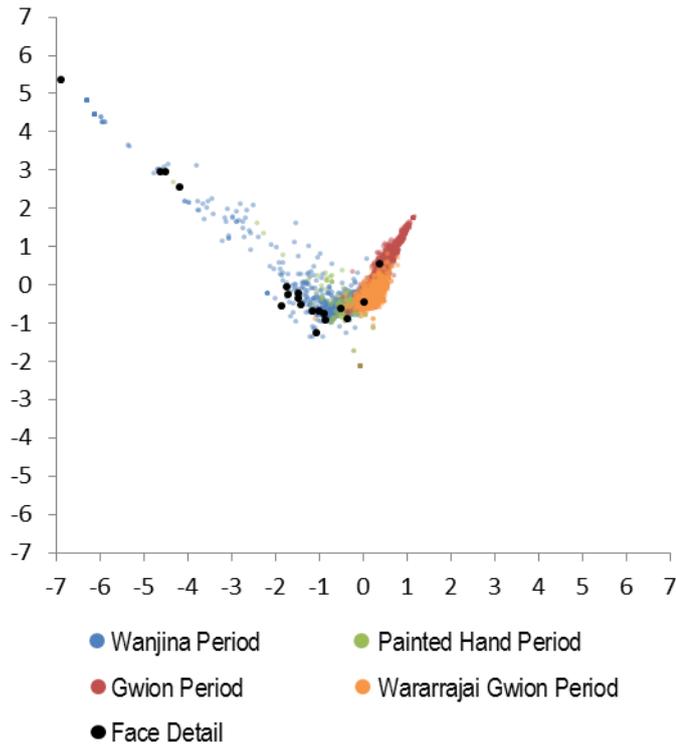
**Figure 5.32** CA sub-plot of anthropomorphic figures by stylistic period overlain by Body Decoration attributes (principal axes 1 and 2)



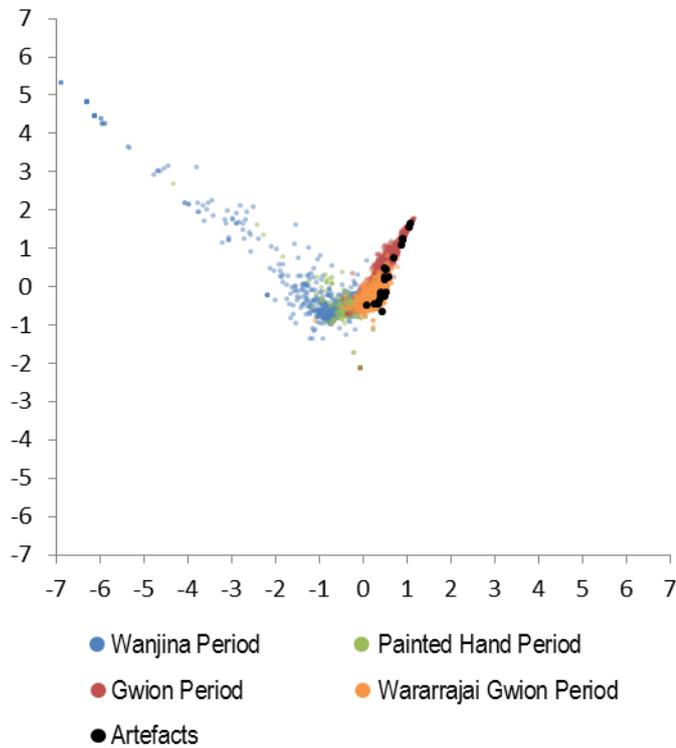
**Figure 5.33** CA sub-plot of anthropomorphic figures by stylistic period overlain by Headdress attributes (principal axes 1 and 2)



**Figure 5.34** CA sub-plot of anthropomorphic figures by stylistic period overlain by Head Detail attributes (principal axes 1 and 2)



**Figure 5.35** CA sub-plot of anthropomorphic figures by stylistic period overlain by Face Detail attributes (principal axes 1 and 2)



**Figure 5.36** CA sub-plot of anthropomorphic figures by stylistic period overlain by Artefact attributes (principal axes 1 and 2)

Overall, anthropomorphic figures located furthest from the central origin manifest attributes unique to their stylistic period; anthropomorphic figures close to the central origin embody attributes generally shared by more than one stylistic period.

### **Body Position**

Body Position attributes relate to the typical ways of portraying figures, for example, the placement of arms (e.g. Hanging Arms, Sloping Arms), and the placement of legs (e.g. Closed Leg Plan, Standing Plan). The lack of Body Position attributes in the upper left tail corresponds with Wanjina Period anthropomorphic figures that are representations of the head or the head with upper body only (Figure 5.27). Such representations are common with the Wanjina Period. In fact, they are one of the three main Wanjina forms.

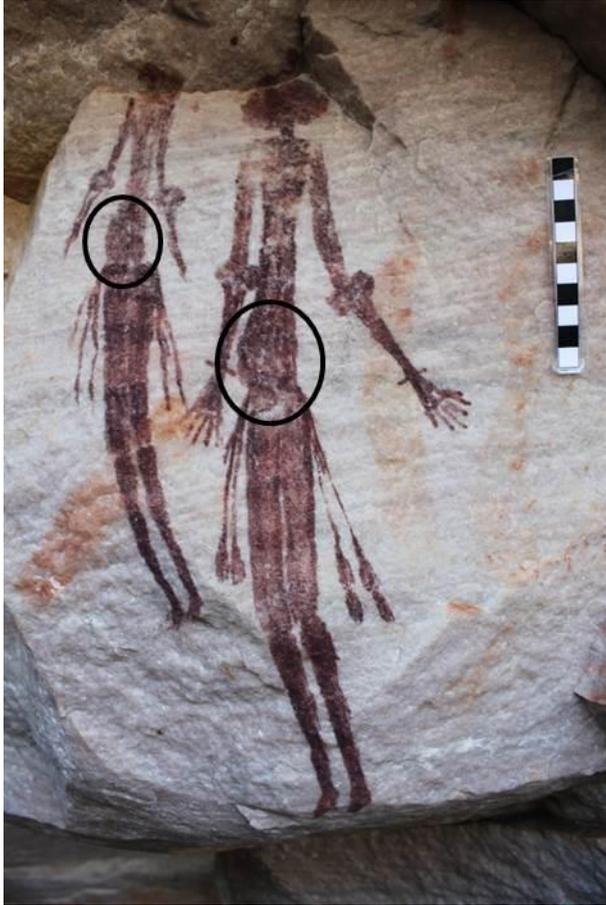
*One is as a simple Face held within a simple arced or horseshoe-form head. Another is as head and shoulders with a breastbone/heart/pearl shell indicated. A third form is as a complete Being with the torso, arms legs, fingers and toes delineated (Akerman 2014:2).*

Within the other main stylistic periods, the attributes vary. Distinctive within the Gwion Period is the 'Plan Bending' attribute. This is the dot plotted in the upper right of the graph (0.91371, 1.2616). The 'Standing Plan' attribute is located near the centroid (-0.02755, -0.43154) indicating that it is an attribute common throughout the stylistic periods.

### **Body Detail**

Body Detail is more commonly depicted within the earlier stylistic periods, rather than the Wanjina Period (Figure 5.28). Like Body Position, this corresponds with frequency of Wanjina Period anthropomorphic figures that are representations of the head or the head with upper body only. Located close to the centroid, and therefore indicating commonality between periods is the 'Elongated Body' attribute (0.004856, -0.33976). Distinctive within the Gwion Period was the 'Paunch Detail' attribute

(Figure 5.37). This is the dot plotted in the upper right of the graph (0.77568, 0.99879).



**Figure 5.37** A pair of Gwion Period anthropomorphic figures with the 'Paunch Detail' attribute (OTB01-37), scale is 10 cm

### ***Limb Detail***

Limb Detail is spread throughout the CA plot, making it a good indicator of style (Figure 5.29). There is a small cluster of attributes associated with the Gwion Period, which focuses on hand detail e.g. 'Oval Hands' (0.81334, 1.169), 'Triangle Hands' (0.71019, 0.89384) and 'Fine Fingered Hands' (0.51447, 0.86904). 'Boot Feet' are unique to the Wanjin Period (-1.9158, 0.47557).

**Sexual Detail**

Sexual Detail becomes common later in the relative sequence, and is rarely depicted within the Gwion and Wararrajai Gwion Periods (Figure 5.30). This is supported by the data presented in Section 5.3.11(see Table 5.27).

**Dress Detail**

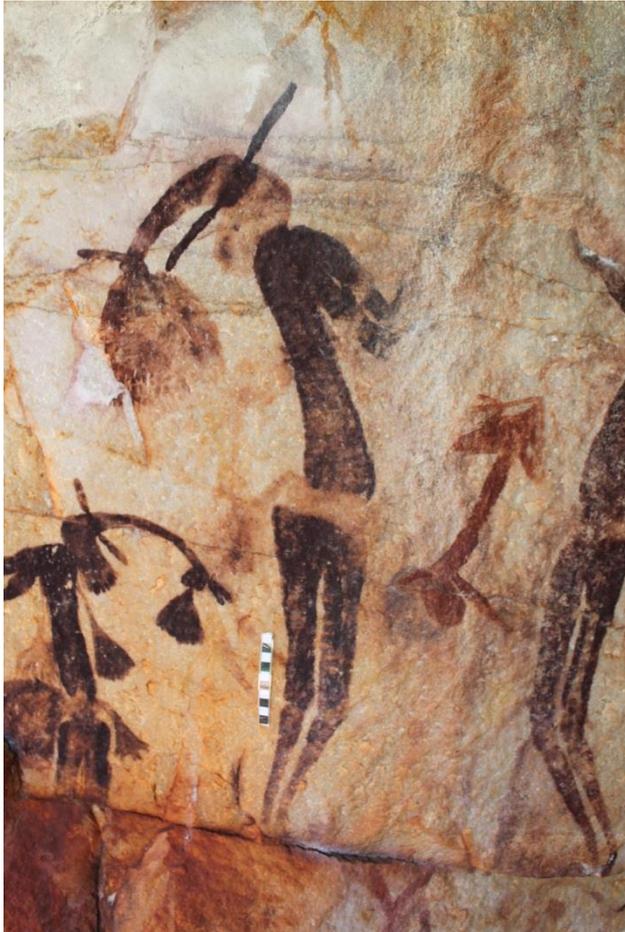
Dress Decoration attributes are mostly associated with anthropomorphic figures in the Gwion and Wararrajai Gwion Periods (Figure 5.31). Few Dress Decoration attributes are present in the later stylistic periods.

**Body Decoration**

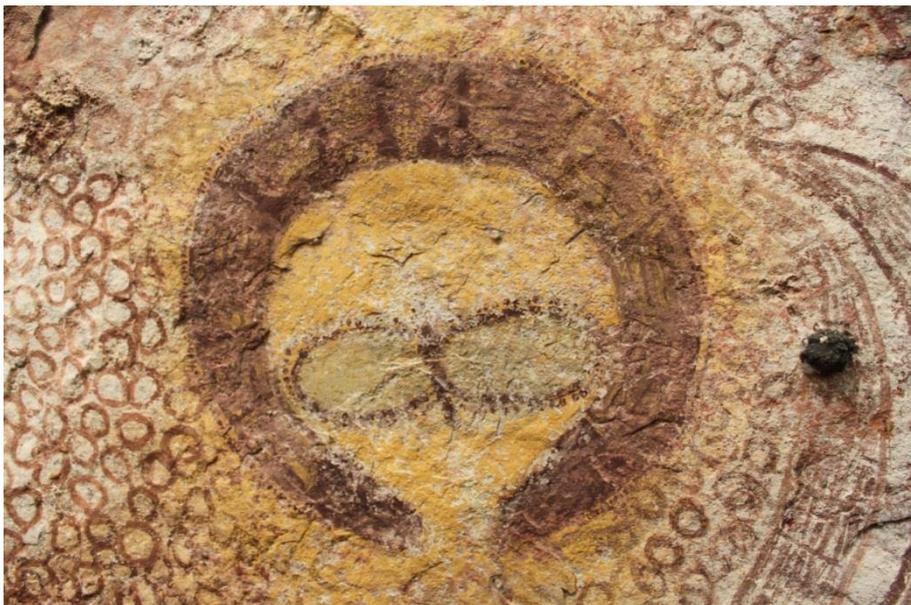
There is an emphasis on Body Decoration within the Gwion Period. A clear cluster occurs in association with the anthropomorphic figures of this style (Figure 5.32). As the relative stylistic sequence developed, Body Decoration is depicted less often. Separating the Wanjina Period is the 'Chest Plate' attribute (-3.1928, 1.8034), indicating that this attribute is unique to this period.

**Headdress**

There is generous spread within the CA sub-plot of Headdress attributes (Figure 5.33). This suggests that headdress types are a good indicator of stylistic periods, as many forms are unique to one period. Distinctive within the Gwion Period is the 'Droop Dunce cap with Pom Pom' headdress (Figure 5.38). This is the dot plotted in the upper right of the graph (0.90844, 1.3051). Distinctive within the Wanjina Period is the 'Halo' headdress (Figure 5.39). This is the dot plotted on the upper left section of the graph, well removed from the other headdress types (-5.0522, 3.5976).



**Figure 5.38** Example of Gwion Period anthropomorphic figure with 'Droop duncce cap with Pom Pom' headdress (LMR02B-1-5861), scale is 10 cm



**Figure 5.39** Example of Wanjina Period anthropomorphic figure with 'Halo' headdress (KCC01B-10-2681), motif height is 495 mm

### **Head Detail**

Attributes such as the ‘Small Round Head’ (0.12716, 0.23388) and the ‘Oval Head’ (0.059213, 0.005748) are located near the centroid (Figure 5.34). This suggests that they are common to multiple stylistic periods. The ‘Rounded Head’ attribute is unique to the Wanjina Period as it is plotted within the midst of the upper left tail (-3.0314, 1.4004). Separating the Gwion Period is the ‘Solid Round Head’ (0.41548, 0.38239).

### **Face Detail**

The Wanjina Period has a marked emphasis on Face Detail attributes (Figure 5.35). The Wanjina Period anthropomorphic figures located to the far left of the tail are separated from the remainder of the figures by the presence of the attribute ‘Outlined Solid Eyes’ (-6.8995, 5.359) (Figure 5.40). This attribute is restricted to the Wanjina Period (Appendix 4). Another attribute contributing to the spread of the Wanjina Period is ‘Oval Eyes’ (-4.5083, 2.9536). Face Detail is not influencing the spread of the earlier Gwion and Wararrajai Gwion Periods.



**Figure 5.40** Example of Wanjina Period anthropomorphic figure with ‘Outlined Solid Eyes’ (KERC06-3-4036), scale is 10 cm

### **Artefacts**

The trend shown in the CA sub-plot for Artefacts indicates that artefacts types cluster on the upper right tail (Figure 5.36). This is due to the fact that artefacts predominate in the Gwion and Wararrajai Gwion Periods, as identified in section 5.3.12 of this chapter.

### **Summary of the Variables**

Analysis 2 demonstrates that some attributes are more dominant in particular stylistic periods, for example, Dress Detail in the Gwion Period, and Face Detail in the Wanjina Period. Other attributes, located around the centroid are common throughout the sequence, for example, the ‘Standing Plan’ Body Position attribute. As outlined by Wilson (1998:178):

*Some attributes are common to a large portion of the sample, either because they are real to the subject (for example, legs are present on anthropomorphs) or they are markers of the modification which occurs when a three-dimensional image is transformed into two dimensions (for example, profile in anthropomorphs). Commonality can cause objects to gravitate towards the central origin...*

For this reason, this analysis was re-run after removing the Body Position attributes, in an effort to seek the underlying patterns within the data set, without the influence of attributes most common throughout the sequence (e.g. Sloping Arms, Standing Plan).

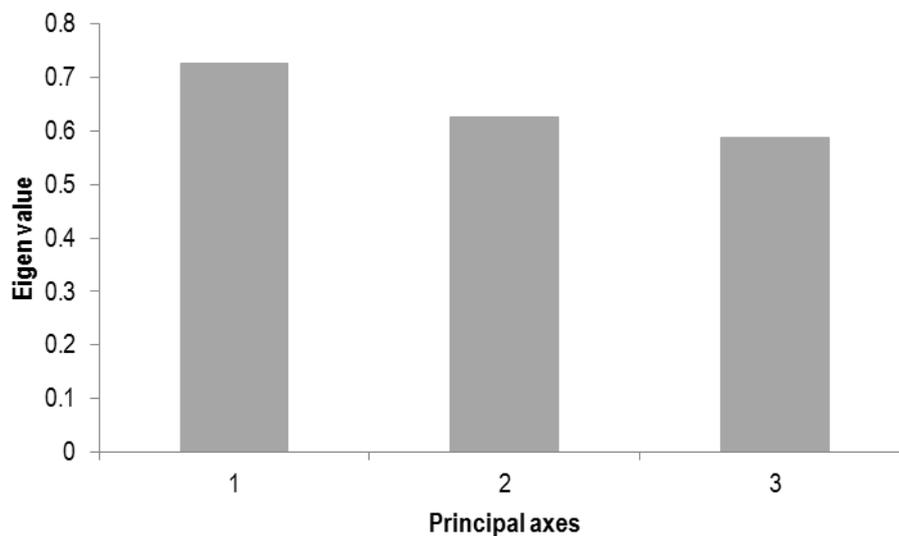
### **5.4.3. Analysis 3: CA of dataset minus extreme outliers and Body Position attributes**

The following CA was undertaken on the dataset without the six identified extreme outliers, and without the attributes relating to Body Position. This CA measured the correspondence between 3,680 anthropomorphic figures and 308 attributes<sup>47</sup>. The aim of this analysis was to determine if attributes associated with Body Position were influencing the results of the Analysis 2.

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<sup>47</sup> For a list of the attributes that were removed from the analysis, see Appendix 2, which lists the 40 individual Body Position attributes.

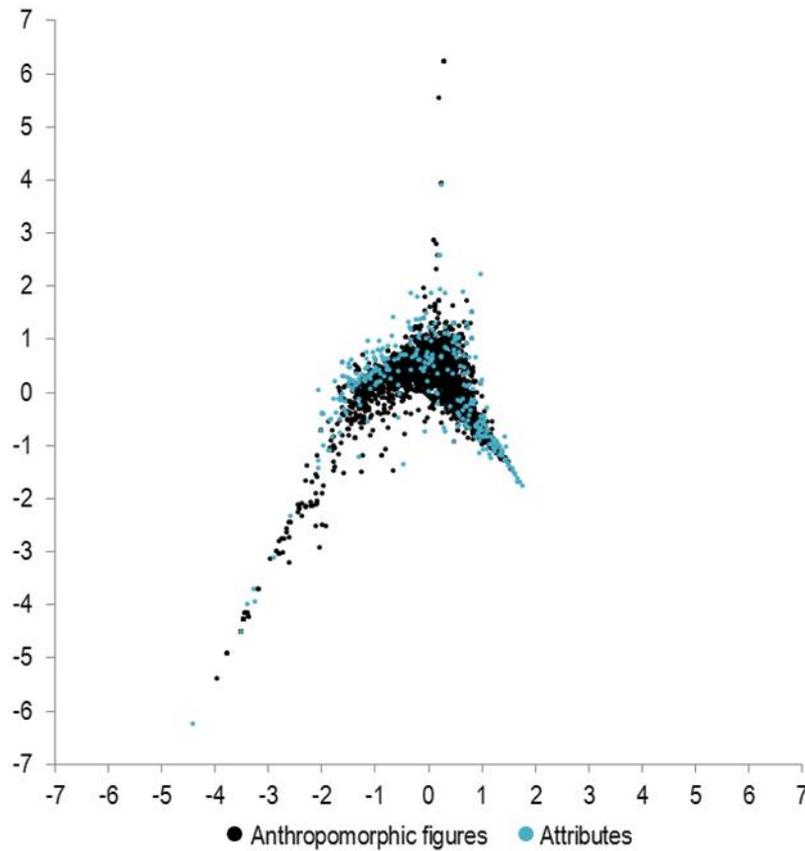
This analysis generated 307 principal axes. As with the previous CA's, in order to determine which two principal axes accounted for the highest degree of variation in the dataset, the principal axes were plotted in a column graph (see Appendix 3). This graph indicated that the first three principal axes accounted for the highest degree of variation in the data, which have been plotted in Figure 5.41. Principal axis 1 accounts for 1.19%, principal axis 2 accounts for 1.02%, and principal axis 3 accounts for 0.96%. So between them they represent 3.17% of the total variance, which as with the previous two analyses, is very little.



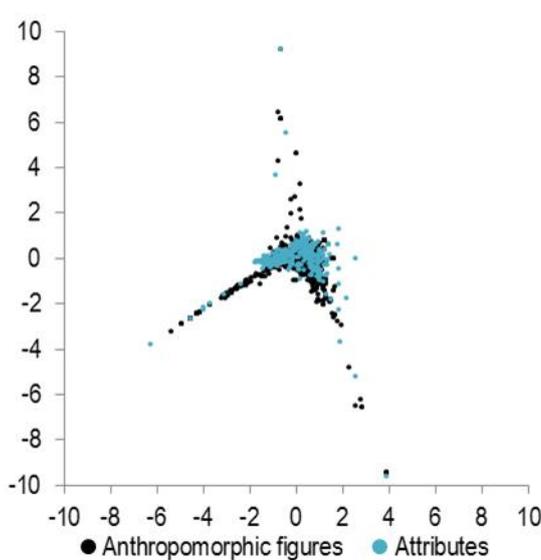
**Figure 5.41** Eigenvalues of the first three principal axes

Figure 5.42, Figure 5.43, and Figure 5.44 present the plots of correspondence scores for combinations of the first three principal axes. As with Analysis 2, these plots were manually changed in *Microsoft Excel* in order to match the scales on the principal axes. When the first two principal axes from the CA, accounting for 2.21% of the total variation are plotted (Figure 5.42), a clear pattern emerges. The overall distribution displays a dense cluster near the centroid, and two distinct 'tails' point out to the lower left and lower right, with a less distinct tail pointing upwards from the centroid. When the second and third axes, accounting for 1.98% of the variation, and the first and third axes, accounting for 2.15% of the variation, are plotted (Figure 5.43 and Figure 5.44 respectively), the patterns are similar but with slight differences

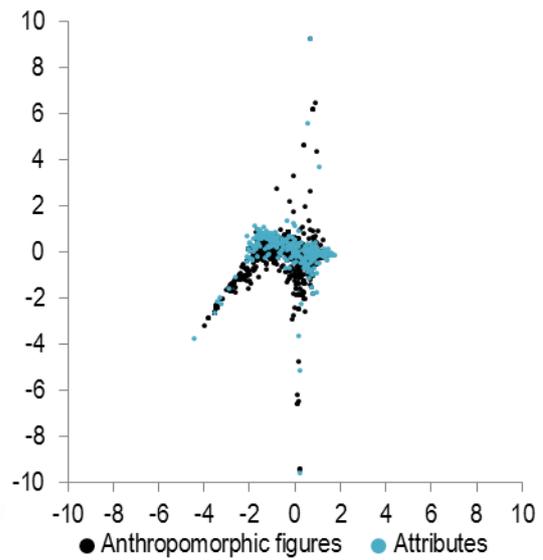
in the direction and density of the tails. Inertia is best represented by principal axes 1 and 2 (Figure 5.42). As this is considered the best representation of variance, I focus on this CA plot for the remainder of this analysis.



**Figure 5.42** CA plot of anthropomorphic figures and attributes (principal axes 1 and 2)

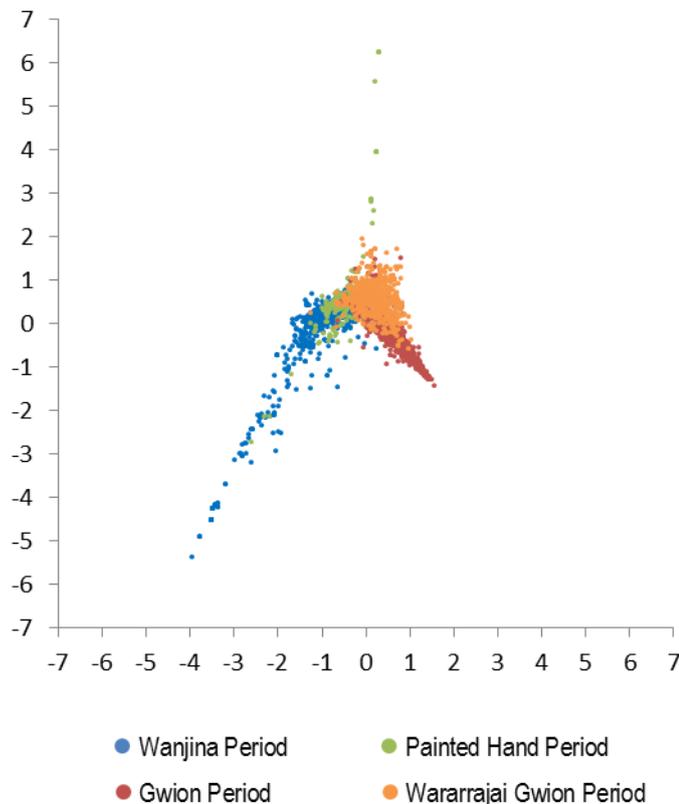


**Figure 5.43** CA plot of anthropomorphic figures and attributes (principal axes 2 and 3)

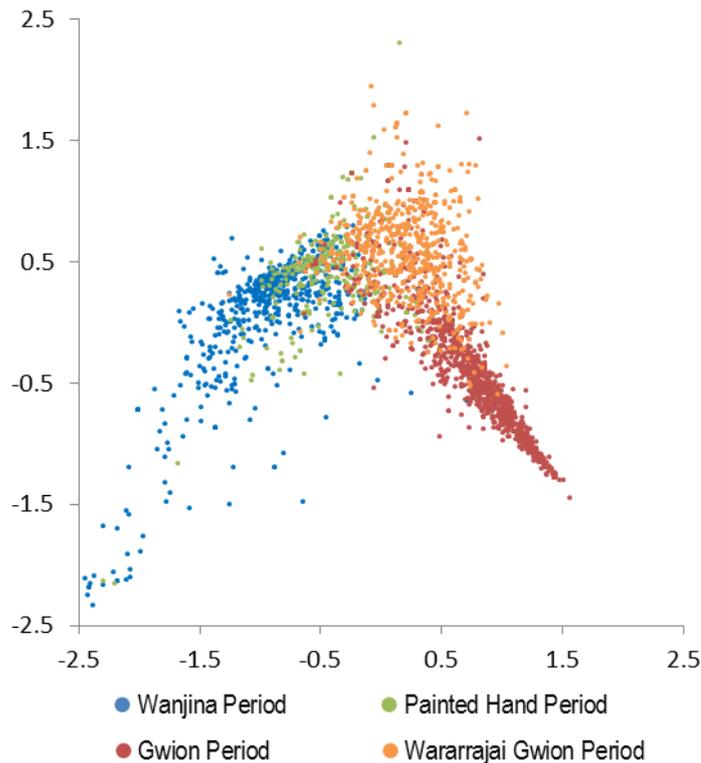


**Figure 5.44** CA plot of anthropomorphic figures and attributes (principal axes 1 and 3)

Figure 5.45 displays the anthropomorphic figures (objects) plotted by stylistic period. The overall pattern that emerges within this plot is comparable to Figure 5.19 from Analysis 2. Both plots, with and without the influence of Body Position attributes, are suggestive of an overall stylistic cline within the art assemblage, from right to left. This is also shown in Figure 5.46, the 95% concentration ellipse, where all CA scores between -2.5 and 2.5 on principal axes 1 and 2 are plotted. Within Figure 5.45, the lower left tail is comprised of Wanjina Period anthropomorphic figures. The spread displayed over both axes indicates high variation within the period. The lower right tail, comprised of Gwion Period anthropomorphic figures, is more constricted, suggestive of higher homogeneity within the period. The upward tail consists entirely of anthropomorphic figures from the Painted Hand Period. This tail is very scattered, containing fewer anthropomorphic figures, with spread shown greater on axis 2. The Wararrajai Gwion period is clustered around the centroid and overlaps both the Gwion and Painted Hand Periods.



**Figure 5.45** CA plot of anthropomorphic figures by stylistic period (principal axes 1 and 2)



**Figure 5.46** Reduced CA plot of anthropomorphic figures by stylistic period (principal axes 1 and 2)

#### 5.4.4. Summary of correspondence analysis

The CA results indicate that there is *no* evidence in the rock art assemblage to support notions of an abrupt discontinuity of art between the Wararrajai Gwion and Painted Hand Periods. Rather, the most important finding from the analyses is that there is *minimal separation* within the art assemblage in terms of stylistic periods. As can be expected, there is separation between the Gwion and Wanjina Periods, however, overlap between the intervening periods. To ensure that these results were not biased by the presence of Body Position attributes, they were removed from the dataset for Analysis 3. Even with the Body Position attributes removed from the dataset, there is still evidence for gradual changes within the art assemblage.

It is also clear that attribute preferences changed through time, with Dress Detail significant in the Gwion Period, and Face Detail significant in the Wanjina Period. This coincides with the reduction in the naturalistic representation of human form

from the Gwion of anthropomorphic figures to the more schematic representations within the Wanjinia Period. Finally, the CA results also indicated that there was a general increase in stylistic variation within the identified stylistic periods over time.

## 5.5. Summary and Conclusions

This chapter set out to describe the observable patterns in the motif vocabulary and examine evidence of continuity in the anthropomorphic figures of the art assemblage. Section 5.1 set out to provide a geographic description of the art assemblage, identifying the places the past occupants of the northwest Kimberley chose to live and paint. Results indicated that the rock art sites in the northwest Kimberley are not used in isolation, and are often associated with other archaeological materials and associated rock art traditions. Sites are spread throughout the region, and are located in a variety of topographical and vegetation zones associated with a wide range of economic resources.

Section 5.2 set out to provide a description of the art assemblage. This section established that anthropomorphic motifs are an important component of the art assemblage and that vertical surface walls were favoured for the placement of motifs, which are usually the most visually dominant. Painting is the dominant technique used in the assemblage, however, other techniques used include the use of beeswax, drawing, stencilling and printing.

Section 5.3 set out to characterise the anthropomorphic figures of the northwest Kimberley. An important outcome of this section is the observation that while many of the anthropomorphic figures fitted into Walsh's classification system, many did not. Anthropomorphic motifs varied greatly through time, not only in the site types in which they were produced; there is a clear shift from overhangs to rock shelters, but also in the selection of panel and motif placement. New techniques were added to the assemblage in the more recent stylistic periods, as were the addition of the use of three or more colours. Infill becomes more complex as the relative stylistic sequence developed. Shifts in the type and frequency of associated artefacts are also an

important aspect of the changes in anthropomorphic figures. These changes point to technological developments, but also to shifts in the role of rock art production to the past occupants of the northwest Kimberley region.

Section 5.4 set out to test Walsh's hypothesis that there was an abrupt discontinuity of art between the Wararrajai Gwion and Painted Hand Periods. The multivariate technique, correspondence analysis, was run on the dataset of anthropomorphic figures in order to investigate whether or not there is evidence for gradual stylistic change within the art assemblage. Three analyses were undertaken. The first analysis commenced with the entire dataset. A few extreme outliers skewed the results of this analysis and therefore they were removed from the dataset. The second analysis was undertaken on the dataset, minus the extreme outliers. The results of this analysis showed that there is no evidence in the rock art assemblage to support notions of an abrupt discontinuity of the art. Body Position attributes were removed from the dataset in the third analysis to ensure that they were not influencing the results. Overall, continuity between the stylistic periods is still evident.

The following chapter identifies the core characteristics of each stylistic period. A summary of the ways in which the rock art sequence changed through time is outlined, and stylistic evidence that supports the notion of gradual change is provided. In Chapters 8 and 9, these observed patterns are analysed in conjunction with other contextual evidence to formulate hypotheses about the *actions* of the artists and the reasons such patterns were produced in particular contexts, to show how the inhabitants of the Kimberley inscribed the land with rock art at different times for different purposes.

## Chapter 6. Continuity and Change

The aim of this chapter is to summarise the ways in which the rock art sequence changed through time, and to identify the stylistic evidence that supports the notion of gradual change. I consider this important as evidence of stylistic change is crucial for the archaeological study of rock art and our understanding of the ways people behaved in the Kimberley in the past. This is best described by David (1994:17), who stated that:

*By investigating the distribution of material forms (e.g. rock art conventions, stone artefact 'types' and technologies), we are enquiring into behavioural conventions operating within varied socio-cultural contexts. By investigating continuities and discontinuities in the spatio-temporal distribution of these conventions, we are also addressing change and continuity in those contexts.*

First, I test Walsh's relative stylistic sequence, to ensure that the superimpositions recorded in the northwest Kimberley match those proposed. Second, I identify the core characteristics of each stylistic period, in order to ascertain what attributes define each period. This has been done in order to identify which stylistic attributes changed in the rock art sequence between stylistic periods. From this, I provide a summary of the marked changes that occur throughout the rock art sequence. Finally, I outline the ways in which the rock art sequence changes. I offer evidence for gradual changes, providing evidence of the links between each stylistic period. Here, I think it is important to emphasise that this research is focused on the depictions of anthropomorphic figures only, and thus does not discuss the changes occurring in other subject matter e.g. zoomorphs.

The discussion chapters, which follow, deal with the implications of these results; the stylistics patterns observed in the data, in conjunction with other contextual evidence, are used to formulate hypotheses about the *actions* of the artists and the reasons such

patterns were produced in particular contexts. External forces, for example, environmental, economic, social, and demographic, are discussed in order to assess what may be driving the actions of the artists. The discussion of the possible drivers of change is crucial for the archaeological study of rock art; as a purely stylistic approach is insufficient to address sources of variation, rates or kinds of change, meaning and/or function (Conkey and Hastorf 1990:2); and context is a creator of style (Conkey 1990:10).

## 6.1. Testing the sequence

Walsh's relative stylistic sequence has been tested, through an analysis of observed superimpositions, to ensure that the superimpositions recorded in the northwest Kimberley match those proposed. Overall, 1,678 superimposition relationships were recorded within the art assemblage. Of these, 265 relate to relationships between anthropomorphic figures of an identified stylistic period (Table 6.1). It should be noted here that only clear superimposition relationships were analysed. If the relationship was at all unclear it was not included. The results confirm the relative stylistic sequence. It is also clear that each stylistic period developed over a period of time. This is expressed by the presence of superimposition relationships within stylistic periods.

**Table 6.1** Superimposition relationships of anthropomorphic motifs by stylistic period

		Over					
Stylistic Period		IIAP	GP	WGP	PHP	WP	Total
Under	IIAP	-	-	-	-	-	-
	GP	-	34	21	20	29	104
	WGP	-	-	49	23	21	93
	PHP	-	-	-	5	8	13
	WP	-	-	-	-	55	55
	Total	-	34	70	48	113	265

## 6.2. Core characteristics of each stylistic period

The results of the CA demonstrate that there are changes in attribute preference through time. Here, I determine exactly what these changes are. Based on frequencies observed in the *Change and Continuity* database, this section lists the core characteristics that define each stylistic period. Core characteristics are classified as attributes within a stylistic period that occur at a rate of seventy percent or greater. This was decided as attributes must be repeated frequently enough to become a convention (Ross and Davidson 2006:333). Details on the specific frequencies of each attribute are listed in Appendix 4. Each of the stylistic periods is given a general description, even though a certain amount of variation is evident.

This section provides a view of the rock art sequence at several points in time, the: Gwion, Wararrajai Gwion, Painted Hand, and the Wanjina Periods. From here I define what is changing, so that the context within which the changes took place can be established.

### 6.2.1. Gwion Period

Eighty-seven attributes define the core characteristics of the Gwion Period, 36 (41.38%) of which are unique to this stylistic period (Table 6.2). This suggests that the Gwion Period anthropomorphic figures are variable throughout the northwest Kimberley in their content and form. However, as shown by the CA (see Figure 5.20), this period is clustered together suggesting a rather homogeneous period of stylistic choices. The variation is due, in part, to the number and combination of accoutrements that adorn the bodies.

Table 6.2 indicates that the Gwion Period is largely defined by the presence of attributes in the following groups: Dress Decoration, Body Decoration, Headdress and Artefacts. There is particular variation in Dress Detail and Body Decoration categories. Of the Headdress types, many are large in size and a focal point of the motif. There is a dominance of boomerang types in Artefacts and relatively few

examples of spears. No spearthrowers are depicted with Gwion anthropomorphic figures. Notable is the rarity of Sexual Detail, Head Detail and Face Detail.

As shown in Chapter 5, the core characteristics that define the Gwion Period correlate to those spread furthest from the centroid in the CA plots, for example, ‘Plan Bending’ Body Position, ‘Paunch Detail’ Body Detail, and ‘Droop Dunce cap with Pom Pom’ Headdress (see Chapter 5, Section 5.4.2). An example of a Gwion Period anthropomorphic figure with core characteristics is provided in Figure 6.1.

**Table 6.2** Core characteristics of the Gwion Period (n=87)

	Attributes	
<b>Body Position</b>	Arms folded behind head <sup>48</sup>	Plan Bending
	Bent Elbows	Sitting Cross-legged
	Kneeling Profile*	-
<b>Body Detail</b>	Broad Shoulders	Paunch Detail
	Narrow Chest	-
<b>Limb Detail</b>	Angled Slipper	Oval Hands
	Down Facing Feet	Slim Arms
	Feet in Same Direction	Topboot Feet*
	Fine Fingered Hands	Triangle Hands
	Knock Kneed Limbs*	-
<b>Sexual Detail</b>	Low Silhouette Testicles*	Trident Penis*
<b>Dress Detail</b>	Barbed Sash*	Ribbon Chest Band*
	Barbed Star Sash*	Rounded Chest Band*
	Barbed Tassel*	Single Parallel Bar*
	Broad Tassel Elbow Band*	Single Tram Track
	Double Sloping Bar Hip Decoration	Spray*
	Four Chili Armpit*	Spray of Cords
	Fringe Chest Band*	Three Chili Armpit*
	Knobbed Three Point Sash	Three Point Sash
	Long Pubic Apron	Track Armpit*

<sup>48</sup> \* Indicates an attribute that was only present in the Gwion Period.

	Attributes	
	Neck Tussocks*	Trident Tassel
	Pendulum Waist Decoration	Trimmed Sash
	Plume Sash*	Triple Tassel
<b>Body Decoration</b>	Arm Bands	Rounded Bangles*
	Bangles	Sash Armpit
	Cummerbund Waistband	Single Broad Tassel
	Dancing Balloon	Single Willow Leaf*
	Double Tassel Elbow Band	Stylised Triple Tassel
	Double Three Point Sash*	Triple Tassel Elbow Band*
	Elbow Bands	Tuft Arm Band
	Large Pompom (on waistband)*	Waist Fan*
	Parallel Spike*	Wrist Bands
	Pubic Fringed Apron	-
<b>Headdress</b>	Acorn with Exclamation Mark	Droop Dunce Cap with Pom Pom
	Bangled Acorn with Ray Additions	Dunce Cap
	Bangled Dunce Cap*	Elongated Teardrop*
	Blunt Cone*	Extended Acorn Headdress
	Broad Teardrop*	Prong Antennae
	Droop Dunce Cap	Stovepipe
<b>Head Detail</b>	Bean Head*	-
<b>Face Detail</b>	Side Bun Feature	
<b>Artefacts</b>	Angular Boomerang	Triple Boomerangs (Crescent)
	Crescent Boomerang	Quadruple Boomerangs (Crescent)*
	Double Boomerangs (Angular)	Catscradle String*
	Double Boomerangs (Crescent)	Dilly Bag
	Double Boomerangs (No7 Boomerang)*	Whisk
	Triple Boomerangs (Angular)*	-



**Figure 6.1** Example of Gwion Period anthropomorphic figure with core characteristics (UL28B-1-4972-2462), scale is 10 cm

Core characteristics:

- a) Acorn with Exclamation Mark (Headdress)
- b) Dancing Balloon (Body Decoration)
- c) Feet in Same Direction (Limb Detail)
- d) Plan Bending (Body Position)
- e) Crescent Boomerang (Artefact)
- f) Double Boomerangs (Crescent) (Artefact)

### 6.2.2. Wararrajai Gwion Period

Thirty-seven attributes define the core characteristics of the Wararrajai Gwion Period (Table 6.3). This is noticeably less than the preceding Gwion Period (n=87) and indicates greater heterogeneity. As the Gwion Period transforms into the Wararrajai Gwion Period, a notable shift in attribute focus occurs: there is a marked decrease in the presence of Dress Detail attributes; attributes related to Body Position, Body Detail and Limb Detail not only decrease but change; a number of Headdress types

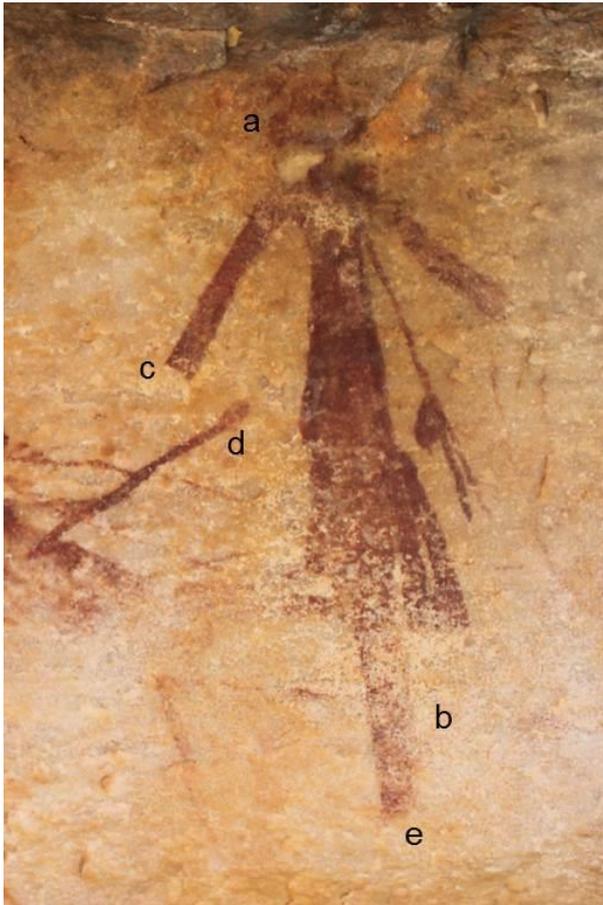
characteristic of the Wararrajai Gwion Period emerge, with five limited to this period alone, such as ‘Busby and Tussock’. There is a shift in Artefact preference, forms of multi-barb spears dominate, and the ‘Spatula Handle Spearthrower’ is exclusive to this period. Attribute groups that are poorly represented in the Wararrajai Gwion Period list of core characteristics are: Body Position, Sexual Detail, Body Decoration, Head Detail, and Face Detail. This occurs because attributes from these groups recorded within the Wararrajai Gwion Period are shared with other stylistic periods, and as a consequence are not part of the Wararrajai Gwion Period stylistic conventions. The minimal emphasis on Sexual Detail, Head Detail and Face Detail, is similar to the Gwion Period. An example of a Wararrajai Gwion Period anthropomorphic figure with core characteristics is provided in Figure 6.2.

**Table 6.3 Core characteristics of the Wararrajai Gwion Period (n=37)**

	Attributes	
<b>Body Position</b>	Closed Leg Plan	-
<b>Body Detail</b>	Tapering Elliptical Body	X-ray Spine <sup>49</sup>
<b>Limb Detail</b>	Foot Base*	Oval Feet
	Gauntlet Arms	Square-Tip Legs
	Jodhpur Legs	-
<b>Sexual Detail</b>	-	-
<b>Dress Detail</b>	Corded Tussock*	Single Sloping Bar Hip Decoration*
<b>Body Decoration</b>	Negative Centre Body Bar	
<b>Headdress</b>	Barred Acorn	Helmet
	Bob Tail	Helmet with Additions*
	Busby	Melon
	Busby and Tussock*	Multiple Drooped Arc
	Cap with Ribbons*	Multiple Drooped Bar
	Cross Hatched Busby Headdress*	Skull Cap
	Five Finger*	Trimmed Busby*
	Hat	Windmill
<b>Head Detail</b>	Rectangle Head	-
<b>Face Detail</b>	-	-

<sup>49</sup> \* Indicates an attribute that was only present in the Wararrajai Gwion Period.

	Attributes	
Artefacts	Multi-Barb Spear (Down facing)	Multi-Barb Spear Pairs (Horizontal)*
	Multi-Barb Spear (Horizontal)	Multi-Barb Spear Group (Down facing)
	Multi-Barb Spear Pairs (Down facing)	Multi-Barb Spear Group (Upright)*
	Multi-Barb Spear Pairs (Upright)	Spatula Handle Spearthrower*
	Multi-Barb Spear Pairs (Sloping)*	-



**Figure 6.2** Example of Wararrakai Gwion Period anthropomorphic figure with core characteristics (OTB04-2-2315-1159), motif height is 260 mm

Core characteristics:

- a) Cap with Ribbons (Headdress)
- b) Closed Leg Plan (Body Position)
- c) Gauntlet Arms (Limb Detail)
- d) Spatula Handle Spearthrower (Artefact)
- e) Square-Tip Legs (Limb Detail)

### 6.2.3. Painted Hand Period

Seventeen attributes define the core characteristics of the Painted Hand Period (Table 6.4). The lower amount of core characteristics correlates with this period having the fewest number of recorded anthropomorphic figures. However, few attributes that characterise the Painted Hand Period indicate that new stylistic choices appear and flourish within this period, for example, types of Body Detail, Headdress, Head Detail, Face Detail and Sex Detail. All attributes that are core characteristics within these categories are *exclusive* to this period, and not present within other stylistic periods. This period is hence a *very distinctive period*. There is, however, a large amount of variation in the attributes depicted at lesser frequencies. No Artefacts, Body Positions or Body Decorations are characteristic of the Painted Hand Period. Although, twenty anthropomorphic figures within this period are associated with a Crescent Boomerang, Double Boomerangs (Crescent), Hooked Stick, and/or a form of unidentified artefact (see Chapter 5, Section 5.3.12). An example of a Painted Hand Period anthropomorphic figure with core characteristics is provided in Figure 6.3.

**Table 6.4** Core characteristics of the Painted Hand Period (n=17)

	Attributes	
<b>Body Position</b>	-	-
<b>Body Detail</b>	Dumbbell Neck Decoration <sup>50</sup>	-
<b>Limb Detail</b>	Bag Elbows*	Stamen Fingers*
	Circle Feet	-
<b>Sexual Detail</b>	Armcurve Breasts*	On-Body Pendulous Breasts*
<b>Dress Detail</b>	Round Cumberbund	Toffee Apple Elbow Band
<b>Body Decoration</b>	-	-
<b>Headdress</b>	Horse Shoe Head*	Pumpkin*
	Kidney*	Triple Broad Fernleaf*
	Onion Headdress*	Umbrella*
<b>Head Detail</b>	Barred Yam Head with Feathers*	Extended Lips Head*
<b>Face Detail</b>	Beard*	-

<sup>50</sup> \* Indicates an attribute that was only present in the Painted Hand Period.

	Attributes	
Artefacts	-	-



**Figure 6.3** Example of Painted Hand Period anthropomorphic figure with core characteristics (MP03-1-3251), photograph digitally enhanced with D-stretch, motif height is 720 mm

Core characteristics:

- a) Circle Feet (Limb Detail)
- b) Stamen Fingers (Limb Detail)
- c) Toffee Apple Elbow Band (Dress Detail)

Of the attributes Walsh (2000:207-9) used to define the Painted Hand Period, only two ('Onion Headdress' and 'Horseshoe Head') are classified as core characteristics within this study area. Both of these are headdress types, and only occurred in association with this stylistic period. Of the remaining attributes (listed below), each are recorded in less than fifty percent of the Painted Hand Period anthropomorphic figures.

- 'Crutch line' (n=11, 15.28%)
- 'Three fingers' (n=76, 43.43%)
- 'Hanging arms' (n=25, 6.17%)

- ‘Rayed headdress’ (n=1, 2.78%)
- ‘Feet in either direction’ (n=95, 20.52%)
- ‘Compartment body’
- ‘Side penis’ (n=7, 41.18%)
- ‘Bulbed-tip penis’: n/a
- ‘Curved-tip boomerang’: n/a
- ‘Spade handled hooked stick’: n/a

#### 6.2.4. Wanjina Period

Ninety-one attributes define the core characteristics of the Wanjina Period, the highest of the periods (Table 6.5). This indicates that the Wanjina Period is a period of considerable variation. The high degree of variation is clearly expressed in the CA plot, where the relatively dispersed nature of points within the Wanjina Period indicates that the range of attributes present within this period is greater, and there is more variation in their associations (see Figure 5.23). There are also a large number of attributes that are exclusive to the period (n=50).

Table 6.5 indicates that there is great variation in Limb Detail, greater than in the earlier stylistic periods. There is an increase of attributes in Headdress, Sexual Detail and Face Detail. Face Detail is particularly rare in the earlier stylistic periods. There are also a number of Headdress types exclusive to the Wanjina Period (n=10). No Artefact types are characteristic of the Wanjina Period, as only three were recorded in association with anthropomorphic figures. When artefacts are depicted they are painted as individual motifs rather than being held by the Wanjina Period anthropomorphic figure.

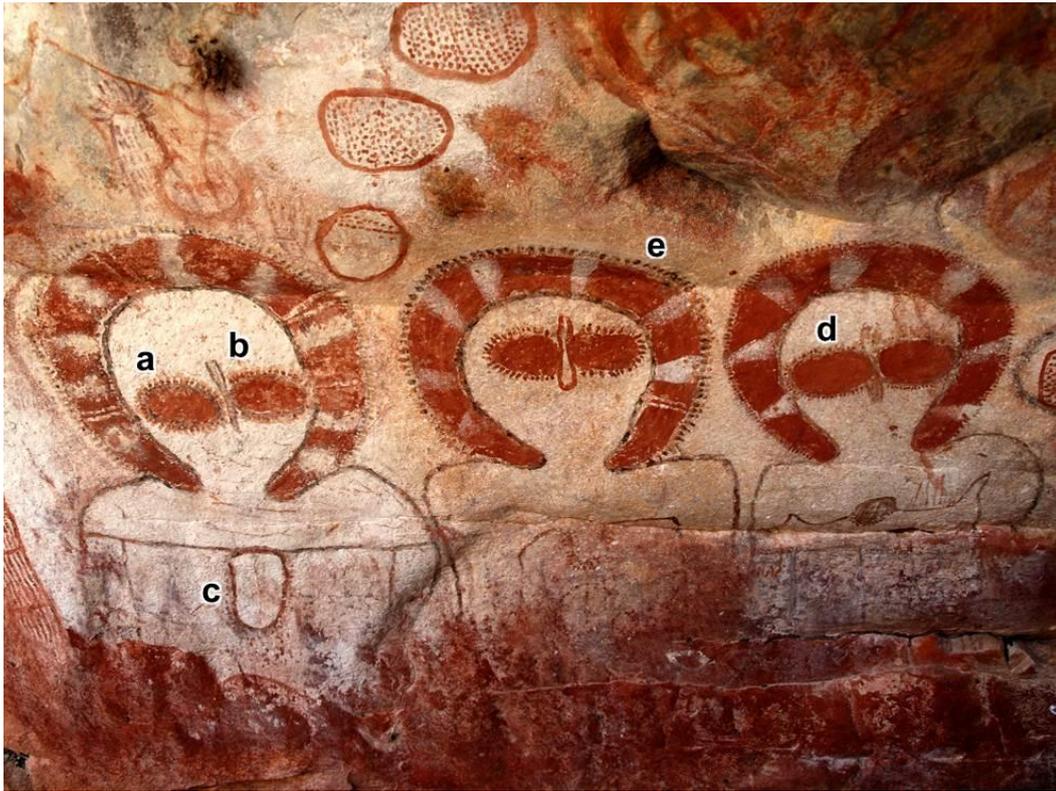
As shown in the previous chapter, the core characteristics that define the Wanjina Period correlate to those spread furthest from the centroid in the CA plots (e.g. ‘Halo’ Headdress, ‘Outlined Solid Eyes’ Face Detail, and ‘Rounded Head’ Head Detail). An example of a Wanjina Period anthropomorphic figure with core characteristics is provided in Figure 6.4.

**Table 6.5** Core characteristics of the Wanjinia Period (n=91)

	Attributes	
<b>Body Position</b>	Reverse Upswept Legs	Waving Arm <sup>*51</sup>
<b>Body Detail</b>	Bottle Tree Body	Plan Buttocks Detail
	Bump Shoulder-blades*	Sinuuous Body*
	Buns Buttocks*	-
<b>Limb Detail</b>	Boot Feet*	Large Hands
	Crab Claw Feet*	Petal Fingers
	Elegant Fluid Limbs	Petal Toes
	European Boot Feet	Sausage Upper Arms*
	Frill Elbows*	Toed Feet
	Heeled Feet	Triangle Legs
	Knobbed Elbows	Widespread Toes*
<b>Sexual Detail</b>	Bar Anus*	Reverse Curved*
	Bifurcated Penis*	Short Rounded Penis*
	Curved Paddle Penis*	Split Penis*
	Meandering Penis*	Spoon Penis*
	On-Body Vulva*	Stamen Testicles
	Oval Side Penis*	Suspended 'U' Vulva*
	Paddle Penis	Suspended Divided Vulva*
	Prominent Nipple Breasts	Suspended Vulva
	Pubic Hair	-
<b>Dress Detail</b>	-	-
<b>Body Decoration</b>	Chest Plate*	Thigh Bands*
	Foot Bands	York Line*
	Fore And Aft Bands	-
<b>Headdress</b>	Broad Fernleaf	Propeller
	Broad Plume Fan*	Rayed
	Broad Plume Fan with Perimeter*	Rayed Barrel*
	Cobweb Wandjinia*	Rayed Oval
	Elephant*	Side and Vertical Bars*

<sup>51</sup> \* Indicates an attribute that was only present in the Wanjinia Period.

	Attributes	
	Exclamation Mark*	Tap Handle*
	Halo	Tulip Ray Additions
	Pin Ray Additions	Two Finger*
	Pole*	Wandjina
<b>Head Detail</b>	Barred Circle Head	Profile Spanner Head*
	Concentric Circle Round Head	Profile Spanner Head with Beard*
	Melon Head	Rounded Head
<b>Face Detail</b>	Bar Eyelashes*	Jug Ears
	Bar Forehead Nose	Leaf Ears*
	Bar Mouth*	Mask Variation Face*
	Bar Nose*	Outlined Solid Eyes*
	Broad Beak Mouth	Oval Eyes
	Bulbous 'U' Nose*	Pin Eyelashes*
	Dot Eyes	Pointed Ears*
	Fish Mouth*	Rabbit Ears*
	Goggle Dot Eyes*	Round Outline Mouth*
	Goggle Eyes	Round Solid Eyes
	Hollow Eyes	Spectacle Eyes*
	Inverted Keyhole Nose*	Vertical Oval Eyes*
<b>Artefacts</b>	-	-



**Figure 6.4** Example of three Wanjina Period anthropomorphic figures with core characteristics (LRW01-3-1787)

Core characteristics:

- a) Bar Eyelashes (Face Detail)
- b) Bar Nose (Face Detail)
- c) Chest Plate (Body Decoration)
- d) Oval Eyes (Face Detail)
- e) Wandjina (Headdress)

### 6.2.5. Summary of marked changes

The core characteristics of each stylistic period have been identified in order to ascertain which attributes define each period, and how this changes through time. The core characteristics of each stylistic period indicate changing trends in the attribute preferences or stylistic choices of the artists throughout the rock art sequence.

The main changes that occur in the depiction of anthropomorphic figures are:

- Reduction in the naturalistic representation of human form from the Gwion to the Wararrajai Gwion Period, corresponding to changes in Body Position and Body Detail,
- A notable change in Artefact preferences from the Gwion to the Wararrajai Gwion Periods (e.g. boomerangs to multi-barb spears), followed by a notable lack of representation in the Painted Hand and Wanjina Periods.
- A marked decrease in the amount and variety of Dress Detail and Body Decoration depicted from the Gwion Period throughout the remainder of the sequence,
- An increase in the depiction of sexual characteristics from the Painted Hand Period, which continues into the Wanjina Period, and
- An increase in the depiction of Limb Detail and Face Detail in the Wanjina Period.

What is evident is that Headdress is a good indicator of stylistic period, as each period has a number of exclusive headdress types. This is not to say that incipient and residual Headdress types do not exist. The reduction of Dress Detail and Body Decoration after the Gwion Period and Artefact types from the Wararrajai Gwion Period indicates a progressive movement away from a *focus on material culture items*. The shift from naturalistic representations of the human form in the Gwion Period to the more schematic representations within the Wanjina Period is due to the fact that Wanjina figures are not considered to be human by Aboriginal people today – they are believed to be ancestral beings. These findings are consistent with the results of the CA (see Chapter 5, Section 5.4.2). Overall there is great variation in the depictions of anthropomorphic figures recorded within the northwest Kimberley; however, they provide important information on the stylistic conventions that were adhered to through time and how stylistic choices transformed.

Although on the surface, stylistic changes appear to be quite strong, there are *many threads of continuity*. The following section discusses attributes that are identified as common throughout the rock art sequence, and how the sequence changes gradually.

### 6.3. Stylistic evidence of gradual change

While there are definitely marked changes in the rock art sequence (e.g. ‘classic’ Gwion vs. ‘classic’ Wanjina Period anthropomorphic figures), there is also evidence for transitional change, where art changes gradually from one form to another. Evidence for gradual changes has been provided through the CA, which suggests seriation rather than clear separation of the stylistic periods. Overall, the results of this research indicates that stylistic continuity can be observed through the persistence of attributes over time, as well as through the slow shifting of attribute preferences. What I demonstrate here is that there is evidence for continuity in the motif vocabulary through time, with some stylistic attributes consistently recorded from the Gwion Period through to the Wanjina Period. Again I would like to highlight that these results do not include the Irregular Infill Animal Period, due to the lack of anthropomorphic figure depictions within the study area (n=7, 0.19%).

Underlying the stylistic variation in the rock art assemblage are re-occurring attributes that testify to an enduring graphic tradition. Forty-three attributes, listed in Table 6.6, articulate evidence for graduated change in the rock art sequence recorded within the study area<sup>52</sup>. Examples of this continuity are illustrated shortly. By continuity, I refer to the repeated presence of particular stylistic conventions through time (David 1994:12). Within the CA plots, these attributes are located near the centroid.

No attributes within the following categories occurred through the entire sequence: Artefacts, Dress Decoration, Face Details, and Sexual Detail. Attributes within these categories, are considered core characteristics of specific stylistic periods and define

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<sup>52</sup> This list only contains attributes that occurred more than once in each stylistic period (except for the Irregular Infill Animal Period). This was chosen as attributes that occur only once in a stylistic period could be considered incidental.

the marked changes in the art assemblage. A number of the attributes (n=14) that continue throughout the sequence relate to Body Position. These are considered the limited ways in which an anthropomorphic figure can be depicted. When a three dimensional image is transposed into two dimensions, there are only a certain amount of ways in which the outline of the figure can be depicted. This is the reason they were removed from the CA in Analysis 3. A few examples are: ‘Consistent Width Leg Spacing’, ‘Sloping Arms’ and ‘Standing Plan’.

**Table 6.6** Attributes that occur throughout the rock art sequence within the study area

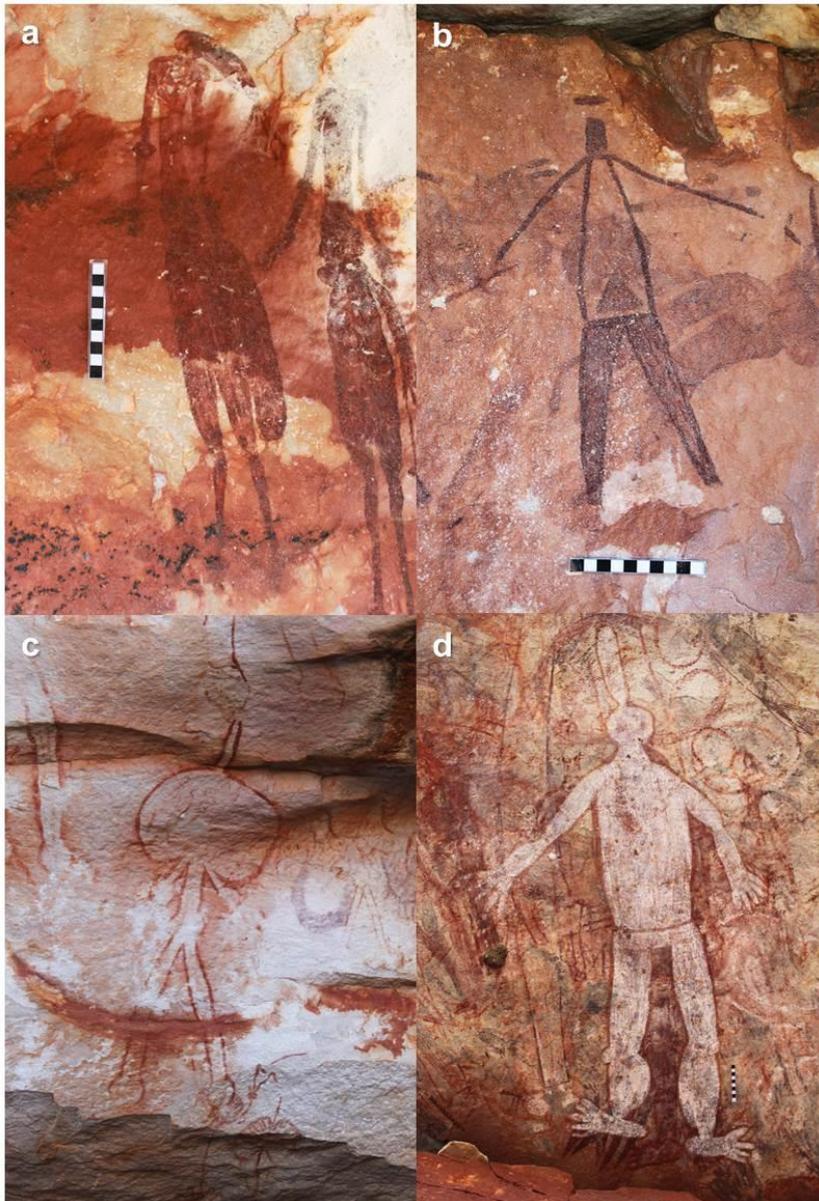
	GP		WGP		PHP		WP	
	n	%	n	%	n	%	n	%
<b>Body Position</b>								
‘E’ Angled Arms	34	38.20	8	8.99	2	2.25	30	33.71
‘M’ Angled Arms	2	13.33	3	20.00	2	13.33	5	33.33
‘W’ Angled Arms	133	43.89	26	8.58	24	7.92	83	27.39
Closed Leg Plan	56	14.66	275	71.99	15	3.93	7	1.83
Consistent Width Leg Spacing	345	47.07	119	16.23	71	9.69	132	18.01
Drooped Hanging Arms	59	32.42	19	10.44	26	14.29	49	26.92
Hanging Arms	240	59.26	43	10.62	25	6.17	68	16.79
Horizontal	15	15.46	26	26.80	8	8.25	28	28.87
Horizontal Arms	37	20.90	47	26.55	21	11.86	33	18.64
Semi-Squatting	35	38.46	17	18.68	4	4.40	13	14.29
Sloping Arms	517	32.23	535	33.35	149	9.29	155	9.66
Standing Plan	171	22.29	173	22.56	104	13.56	150	19.56
Standing Profile	88	55.35	43	27.04	7	4.40	14	8.81
Upraised Arms	52	20.47	27	10.63	31	12.20	108	42.52
<b>Body Detail</b>								
Barrel Body	35	11.25	36	11.58	43	13.83	158	50.80
Elongated Body	57	21.11	61	22.59	40	14.81	62	22.96
Fat Body	12	8.00	9	6.00	30	20.00	58	38.67
Long Neck	4	6.67	24	40.00	10	16.67	17	28.33
Shoulder Spikes	3	10.34	18	62.07	4	13.79	2	6.90
Three Line Body	3	4.76	34	53.97	15	23.81	6	9.52
<b>Limb Detail</b>								
Angled Slipper Feet	183	81.33	9	4.00	14	6.22	7	3.11
Angled Tick Feet	39	30.71	19	14.96	43	33.86	12	9.45

	GP		WGP		PHP		WP	
	n	%	n	%	n	%	n	%
Bar Fingers	23	6.17	14	3.75	109	29.22	177	47.45
Feet in Either Direction	54	11.66	27	5.83	95	20.52	217	46.87
Feet in Same Direction	183	73.79	10	4.03	14	5.65	24	9.68
Frill Toes	3	1.68	3	1.68	19	10.61	116	64.80
Heeled Feet	4	2.23	2	1.12	5	2.79	146	81.56
Round Tip Limbs	3	8.33	5	13.89	14	38.89	2	5.56
Slipper Feet	25	45.45	4	7.27	6	10.91	9	16.36
Stick Arms	387	28.86	401	29.90	190	14.17	75	5.59
Three Finger Hands	10	5.71	19	10.86	76	43.43	51	29.14
Tick Feet	14	16.67	5	5.95	34	40.48	10	11.90
Toed Feet	3	1.68	8	4.47	8	4.47	132	73.74
<b>Body Decoration</b>								
Cummerbund Waistband	175	79.55	6	2.73	26	11.82	5	2.27
Elbow Bands	170	86.73	4	2.04	11	5.61	9	4.59
<b>Headdress</b>								
Shocked	5	6.85	9	12.33	6	8.22	36	49.32
<b>Head Detail</b>								
Inverted Teardrop Head	3	7.32	13	31.71	5	12.20	15	36.59
Oval Head	45	34.09	21	15.91	10	7.58	49	37.12
Round Head	2	0.75	16	5.97	50	18.66	149	55.60
Rounded Triangle Head	2	6.67	15	50.00	6	20.00	2	6.67
Small Round Head	14	28.00	19	38.00	5	10.00	3	6.00
Solid Round Head	592	58.85	165	16.40	32	3.18	107	10.64
Vertical Oval Head	47	17.47	87	32.34	44	16.36	19	7.06

Although many attributes change from one stylistic period to another, others occur in several stylistic periods, revealing the continuity of certain artistic practices (Domingo Sanz 2008:107). Four examples of these are illustrated below.

**Example 1**

‘Standing Plan’ is a generic form of depicting anthropomorphic figures in the frontal position (Figure 6.5).



**Figure 6.5** Example illustrations of ‘Standing Plan’ throughout the rock art sequence, scale is 10 cm

- a) Gwion Period (KCC01A-1-2556)
- b) Wararrajai Gwion Period (OTB01-24-2071)
- c) Painted Hand Period (OTB05-1-2334)
- d) Wanjina Period (BSC01-11-99)

**Example 2**

The 'Feet in Either Direction' attribute occurs throughout the sequence, however, becomes most dominant in the Wanjina Period, comprising 46.87% of occurrences (Figure 6.6).

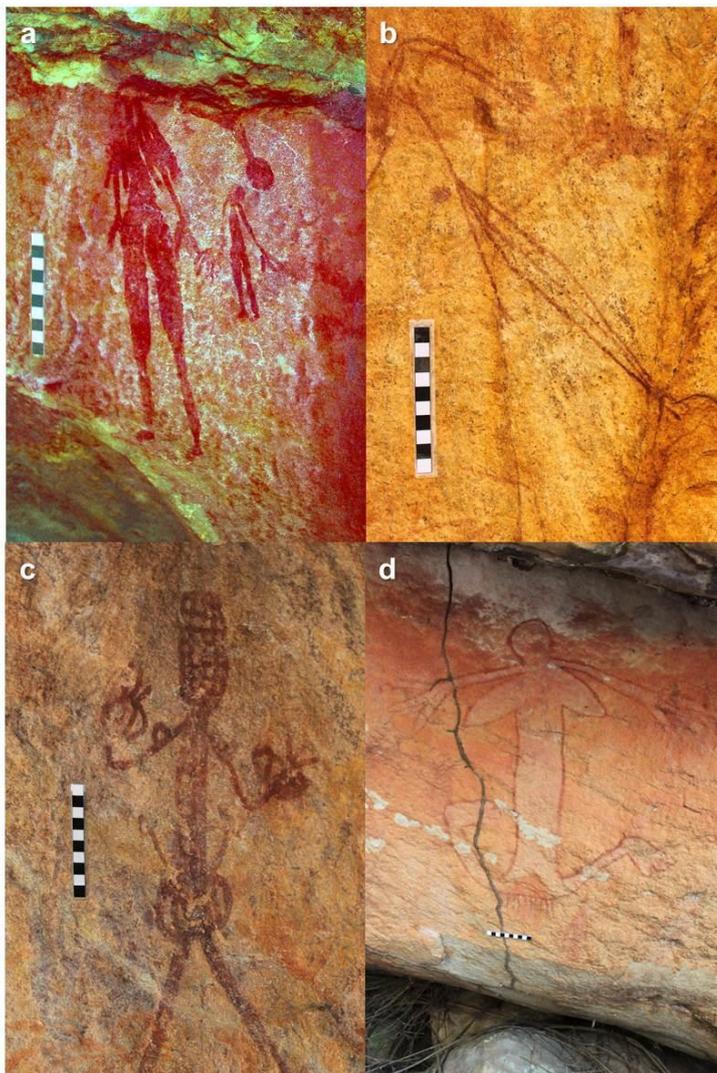


**Figure 6.6** Example illustrations of 'Feet in Either Direction' throughout the rock art sequence, scale is 10 cm

- a) Gwion Period (LMRNOR3-2-6955)
- b) Wararrajai Gwion Period (LR03C-5-1328)
- c) Painted Hand Period (KERC08-1)
- d) Wanjina Period (KERC14-2-4203)

**Example 3**

Walsh (2000:209) stated that ‘Three Finger Hands’ is an attribute commonly associated with the Painted Hand Period. The results of this research indicate that within the study area, ‘Three Finger Hands’ occur throughout the sequence, and become most common within the Painted Hand Period (43.43%) (Figure 6.7). Within the Wararrajai Gwion Period they are dominant within the ‘Simple Northern Figure’ subgroup.

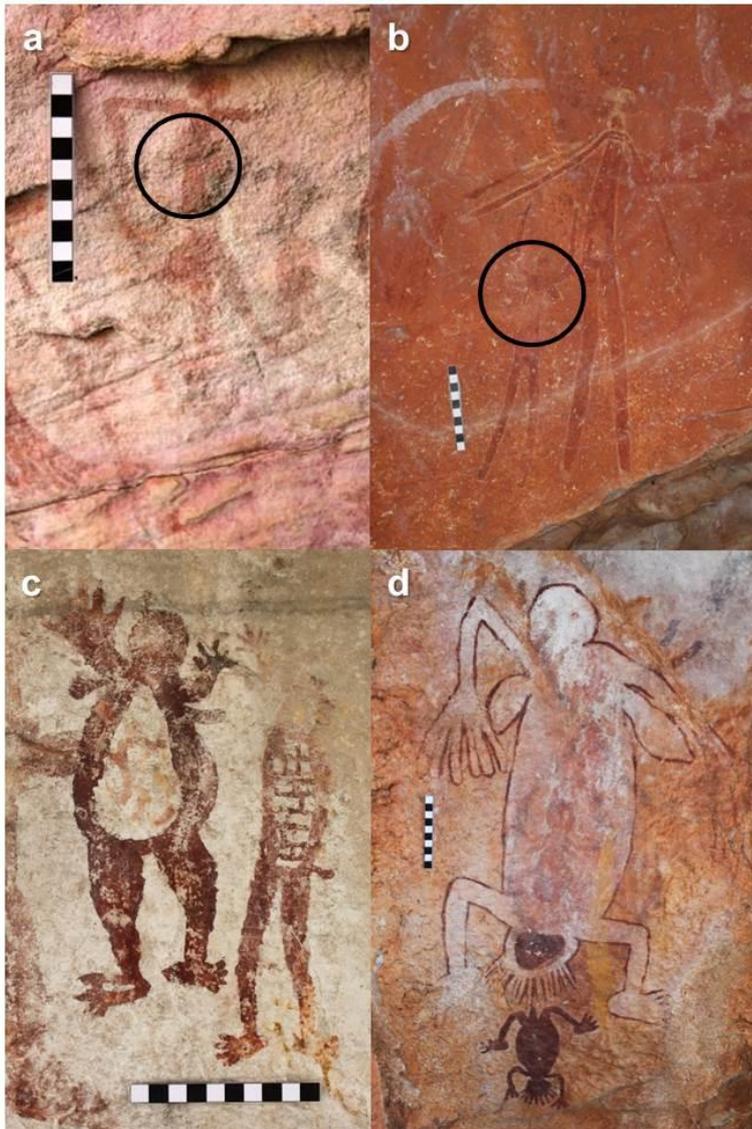


**Figure 6.7** Example illustrations of ‘Three finger Hands’ throughout the rock art sequence, scale is 10 cm

- a) Gwion Period (LMR02J-1-6344), photograph digitally enhanced using DStretch
- b) Wararrajai Gwion Period (MP03-3-3321)
- c) Painted Hand Period (BSC17-3-806)
- d) Wanjina Period (MP01-1-3005)

**Example 4**

‘Underarm Breasts’ occur throughout the sequence, although were recorded only once in the Gwion Period (Figure 6.8). As Sexual Detail is uncommon in the earlier stylistic periods, I consider this an important indication of stylistic continuity in the rock art sequence.

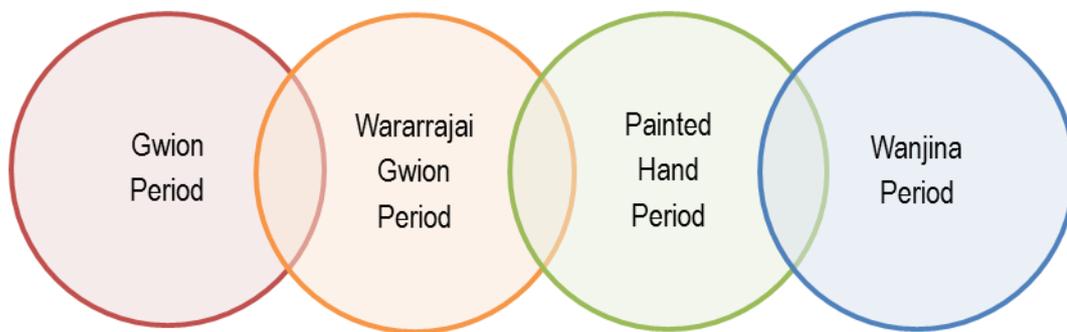


**Figure 6.8** Example illustrations of ‘Underarm Breasts’ throughout the rock art sequence, scale is 10 cm

- a) Gwion Period (LR06-1-1601)
- b) Wararrajai Gwion Period (MM21-2-7419)
- c) Painted Hand Period (UMR01B-10-5266)
- d) Wanjina Period (BSC13B-2-572)

These examples demonstrate an underlying continuity in the manner in which anthropomorphic figures were painted. This continuity combined with the dominance of the core characteristics within each stylistic period indicates that there are stylistic clines within the dataset with periods where certain attributes are preferred. This relates to the rise and fall of an attribute's popularity relative to the alternatives available. This popularity principle is sometimes called drift, participation in culture, or change in fashions (Webster 2008:18-19).

Evidence for stylistic clines within the dataset is best illustrated by a Venn diagram, which shows overlap between each successive stylistic period (Figure 6.9). This diagram illustrates that the boundaries between rock art styles appear to be clinal rather than abrupt, referring to cultural continuity throughout the sequence. Such a diagram has previously been published by Welch (1990) to illustrate his notion of gradual cultural change; the probable co-existence and overlap between what he considered at the time to be the three main periods of Kimberley rock art (see Figure 3.12, Chapter 3).



**Figure 6.9** Linear Venn diagram of proposed gradual change in the art assemblage

Examples to illustrate this gradual change are provided below. What is still uncertain is the *time span* of each stylistic period and the periods of variation and transition. I will discuss the current understanding of the temporal aspects of the sequence in the following chapter, and provide the results of the *Change and Continuity* dating program.

### 6.3.1. Attributes that link the Gwion and Wararrajai Gwion Periods

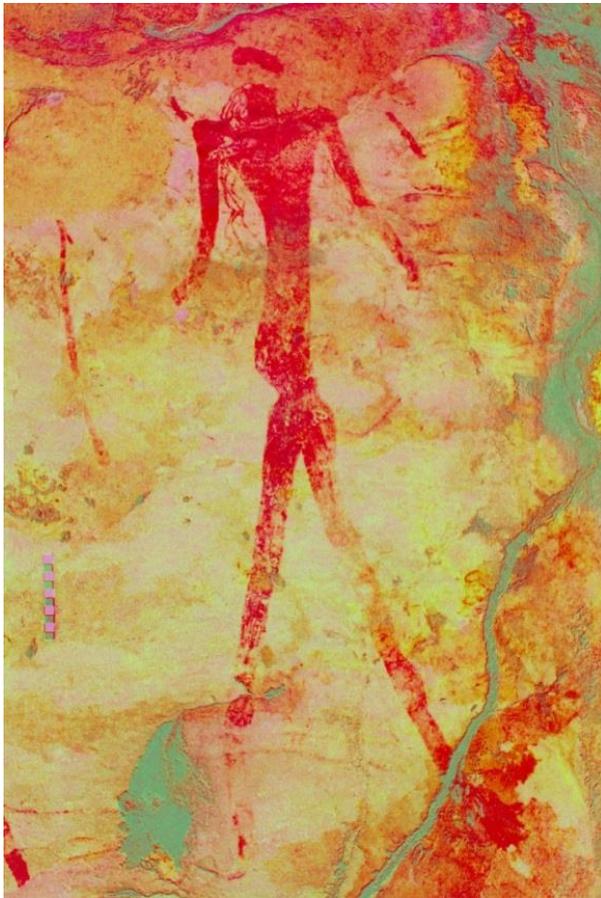
It is clear from the motifs recorded within the study area that the Gwion Period precedes the Wararrajai Gwion Period (Figure 6.10). What is also clear is that the Wararrajai Gwion Period developed out of the Gwion Period. Evidence for this is provided by the presence of both *incipient* and *residual* attributes between both stylistic periods.



**Figure 6.10** Wararrajai Gwion Period superimposing the Gwion Period (BSC03-7)

A number of attributes link the Gwion Period to the Wararrajai Gwion Period. The main evidence comes from transitional anthropomorphic figures that have both incipient and residual attributes, for example Headdress and Dress Detail (e.g. ‘Three Point Sash’). One example of this is the ‘Paunch Detail’ (Figure 6.11). The ‘Paunch Detail’ attribute continues into the Wararrajai Gwion Period, but no further into the sequence; there is no evidence for this attribute in the later Painted Hand Period. The ‘Paunch Detail’ is a core characteristic of the Gwion Period (91.92% of occurrences of this attribute are within this stylistic period). The frequency of this attribute

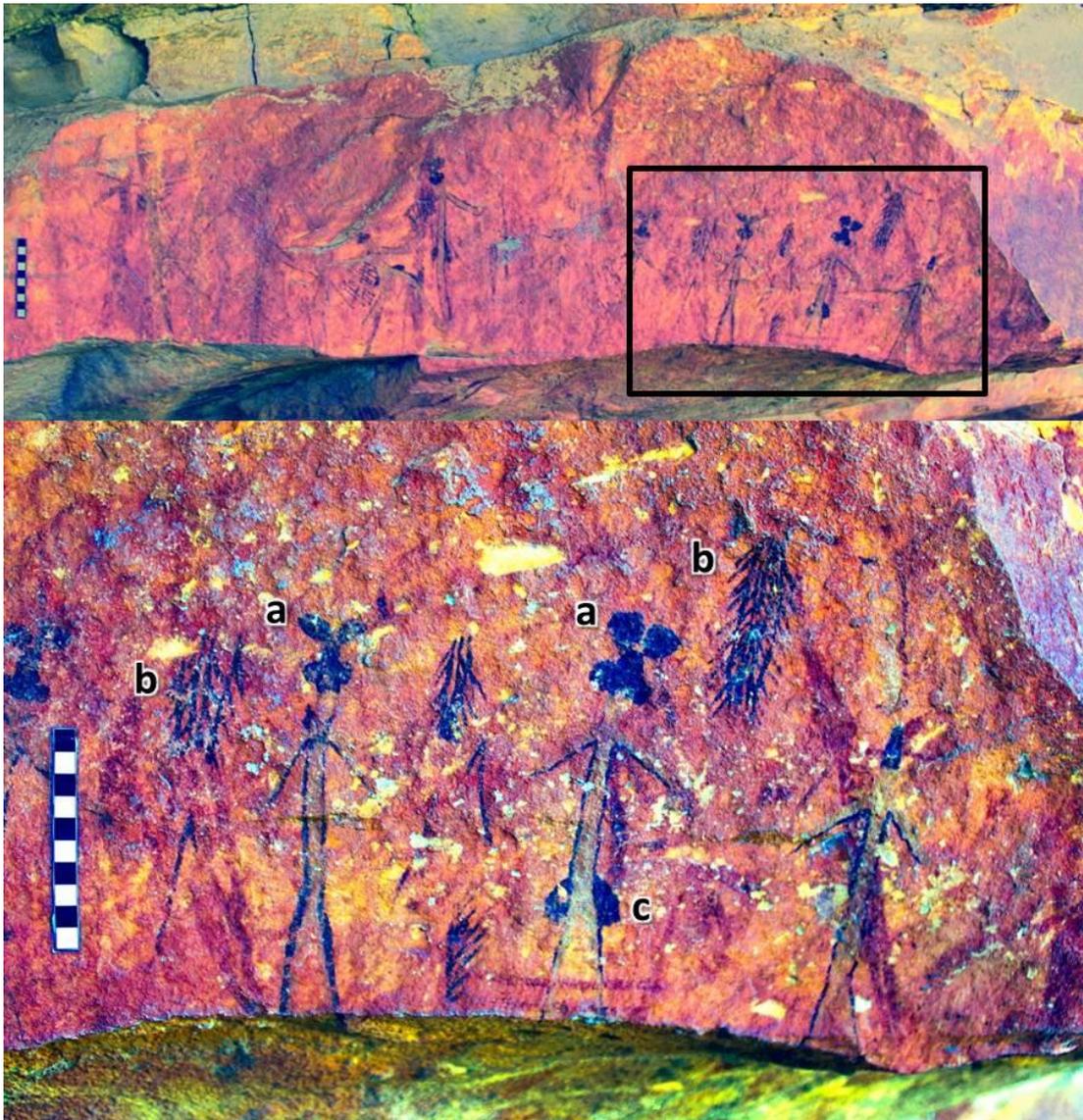
occurring within the Wararrajai Gwion Period (5.31%) drops noticeably, indicative of the clinal nature of many attributes. Such curvilinear attributes are replaced by more stylised ones e.g. 'Tapering Elliptical Body' (77.59%) in the Wararrajai Gwion Period. This corresponds with a reduction in the naturalistic representation of anthropomorphic figures, as they become more stylised. The transitional anthropomorphic figure in Figure 6.11, which displays the 'Paunch Detail', a residual attribute of the Gwion Period, also displays the following core characteristic of the Wararrajai Gwion Period: 'Rectangle Head', 'Square-Tip Legs', and 'Skull Cap' headdress.



**Figure 6.11** Transitional figure with 'Paunch Detail' (KERC13-1-4186), photograph digitally enhanced with D-stretch, scale is 10 cm

Another example of the links between the Gwion and Wararrajai Gwion Periods is shown in Figure 6.12. A row of seven Wararrajai Gwion Period anthropomorphic figures, overlies at least three Gwion Period anthropomorphic figures. This

superimposition is clearest in the figures on the far right. The Wararrajai Gwion Period anthropomorphic figures display Headdress and Artefact attributes that are core characteristics of the Wararrajai Gwion Period ('Helmet' or 'Helmet with Additions', and 'Multi-Barb Spear Group (Upright)') respectively); but also the Dress Detail attribute 'Baggy Pubic Apron' found in both the Gwion and Wararrajai Gwion Periods (see Appendix 4).



**Figure 6.12** Wararrajai Gwion Period figures overlaying Gwion Period figures (LMR02C-2), photographs digitally enhanced with D-stretch, scale is 10 cm

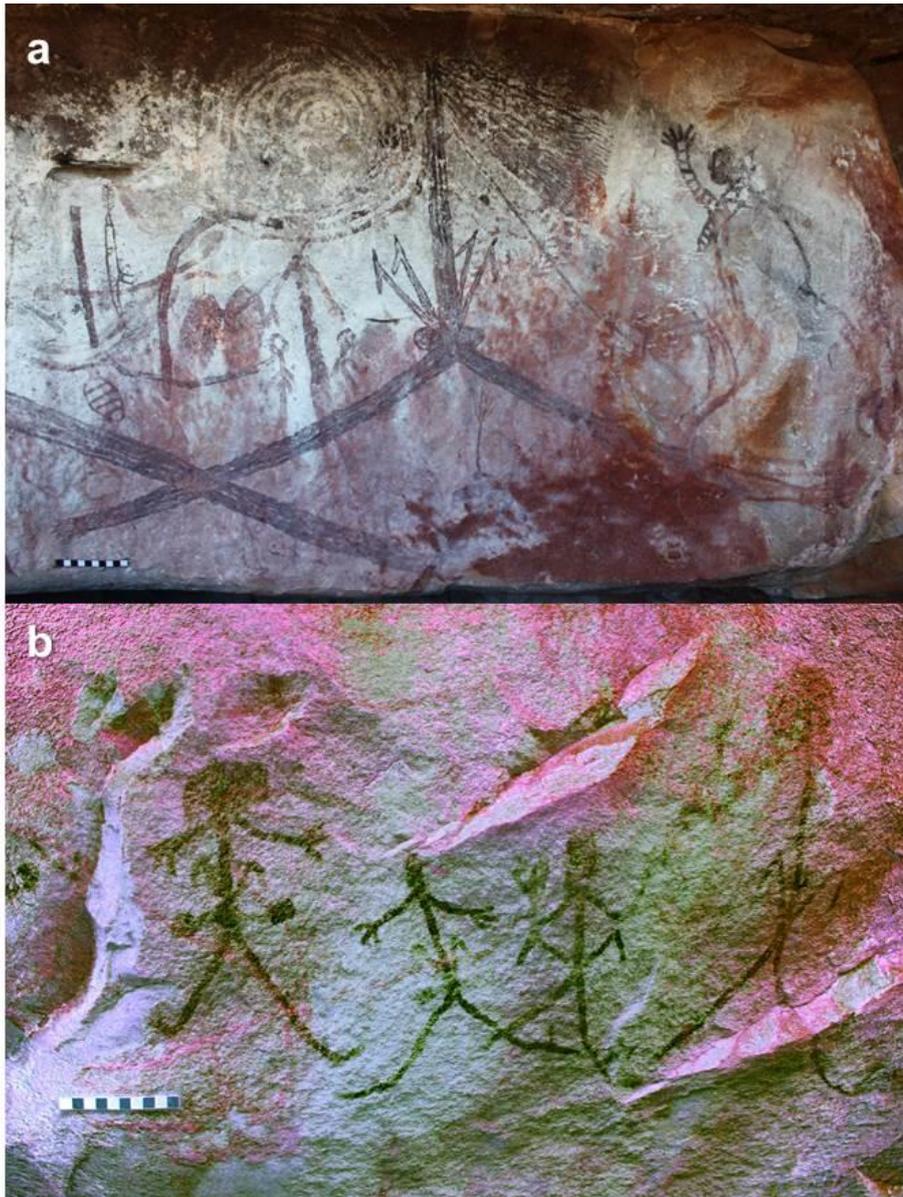
- a) 'Helmet' or 'Helmet with Additions'
- b) 'Multi-Barb Spear Group (Upright)'
- c) 'Baggy Pubic Apron'

Other attributes that are common within both the Gwion and Wararrajai Gwion Periods, but cease to be depicted in the Painted Hand Period are: 'Crossed Legs' and the similar 'Sitting Cross-legged'. The 'Sitting Cross-legged' attribute is very common within Dynamic Gwion anthropomorphic figures, a sub-group of the Gwion Period, which are often depicted undertaking utilitarian tasks e.g. hunting.

### **6.3.2. Attributes that link the Wararrajai Gwion and Painted Hand Periods**

Walsh (2000:207) has argued that there is 'no evidence whatsoever suggesting a transition of form' between the Wararrajai Gwion and Painted Hand Periods. The results of this research suggest otherwise.

The 'Hooked Stick', one of the two types of spearthrowers depicted in the art assemblage of the study area, indicates a continuation from the Wararrajai Gwion Period. The 'Hooked Stick' first appears in association with anthropomorphic figures in the Gwion Period (n=4), becomes common within the Wararrajai Gwion Period (n=56), and continues into the Painted Hand Period (n=44). The 'Spatula Handle Spearthrower' on the other hand, was only recorded within the Wararrajai Gwion Period (n=16). The placement of the 'Hooked Stick' in relation to the associated anthropomorphic figures changes markedly from the Wararrajai Gwion to the Painted Hand Period. Within the Wararrajai Gwion Period, the 'Hooked Stick' and 'Spatula Handle Spearthrower' are aligned close to the body and held in the hand, whereas in the Painted Hand Period, the 'Hooked Stick' is only depicted attached at the waist (Figure 6.13).



**Figure 6.13** Examples of 'Hooked Sticks' associated with Painted Hand Period anthropomorphic figures, scale is 10 cm

a) MM15-2-7305

b) OTB01-21-2044, photograph digitally enhanced using DStretch

A number of Painted Hand Period anthropomorphic figures that depict 'Hooked Sticks' attached at the waist also contain residual Gwion and Wararrajai Gwion Period attributes and incipient Wanjina Period attributes. The anthropomorphic figure in Figure 6.13(a) has:

- Crescent Boomerangs in both hands, a core characteristic of the Gwion Period (77.33%),

- ‘Cummerbund Waistband’, a Body Decoration attribute, which is a core characteristic of the Gwion Period (79.55%), and
- ‘Frill Toes’, which occur throughout the sequence and dominate in the Wanjina period (64.80%).

The anthropomorphic figure in Figure 6.13(b) has:

- ‘Three Finger Hands’, an attribute that occurs throughout the sequence but is most dominant within the Painted Hand Period (43.43%), and
- ‘Feet in Either Direction’, an attribute that occurs throughout the sequence but is most dominant in the Wanjina Period (46.87%).

Additionally, both figures have the ‘Standing Spread-Legged’ attribute, which first comes into use in the Wararrajai Gwion Period (13.44%), before it becomes popular in the Painted Hand (24.73%) and Wanjina Periods (24.73%) (Figure 6.14).



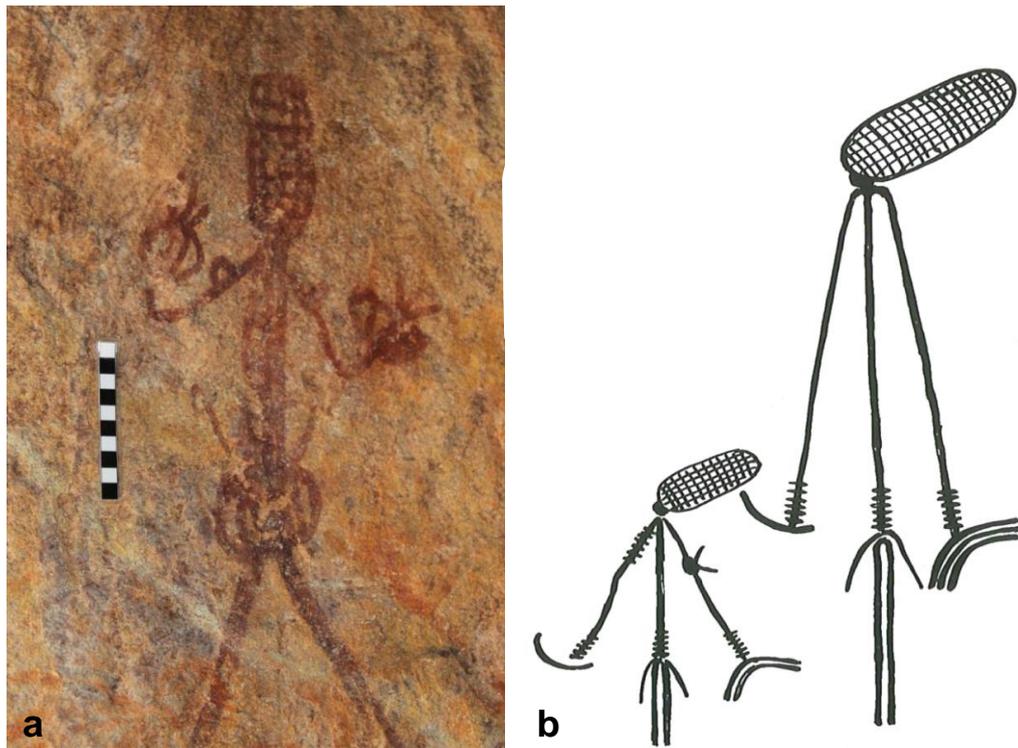
**Figure 6.14** Example of a Wararrajai Gwion anthropomorphic figure with ‘Standing Spread-Legged’ attribute (UL28-1-4973), motif height is approx. 225 mm

Analysis of superimposition demonstrates that these anthropomorphic figures occur in the sequence after the Wararrajai Gwion Period (Figure 6.15).



**Figure 6.15** White Painted Hand Period anthropomorphic figure superimposing the multiple Wararrajai Gwion Period anthropomorphic figures (BSC18-2), photograph digitally enhanced using DStretch, scale is 10 cm

A particular headdress type, the ‘Cross-hatched Melon’ also provides a stylistic link between the Wararrajai Gwion and Painted Hand Periods (Figure 6.16). Figure 6.16(a) illustrates an anthropomorphic figure identified as Painted Hand Period with a ‘Cross-hatched Melon’ headdress; and Figure 6.16(b) illustrates what Walsh (2000:178, Fig. 234) published as a ‘discrete panel of Stick Clothes Peg Figures’ with the same headdress type. This presents evidence for a continuation in headdress attributes through Walsh’s assumed period of ‘discontinuity’.



**Figure 6.16** Continuation of the 'Cross-hatched Melon' headdress

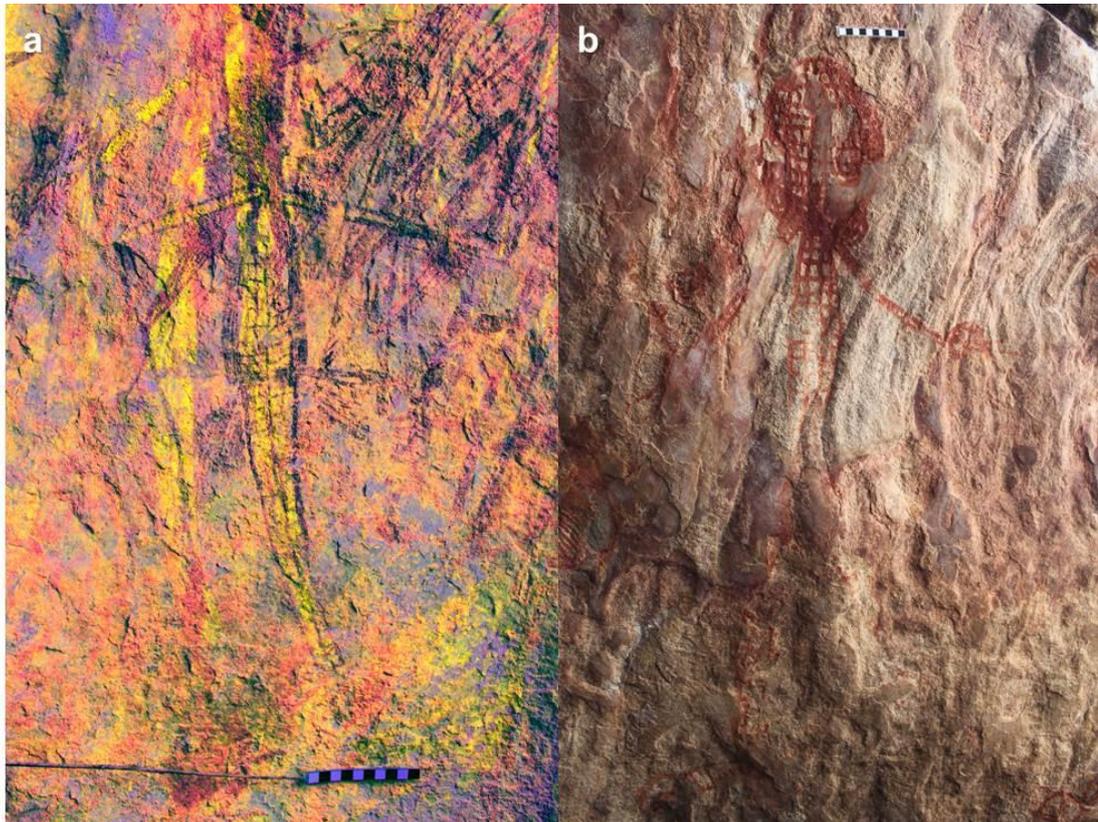
- a) Painted Hand Period anthropomorphic figure (BSC17-3-806). This figure also has 'Three Figure Hands' and two 'Hooked Sticks' attached to the waist, scale is 10 cm
- b) Pair of Wararajai Gwion Period anthropomorphic figures (after Walsh 2000:178, Fig. 234)

The cross hatched infill headdresses, though not in the Melon shape is also shown in the earlier Gwion Period (Figure 6.17).



**Figure 6.17** Example of 'Cross Hatched' infill headdress in the Gwion Period (BSC22-1-1048), scale is 10 cm

A final example provided in relation to infill type 'Cross Hatched'. Presented in Figure 6.18 are anthropomorphic figures from the (a) Wararrajai Gwion Period and (b) Painted Hand Period that are both depicted using 'Cross Hatched' infill.



**Figure 6.18** Continuation of 'Cross Hatched' Infill, scale is 10 cm

- a) Wararrajai Gwion Period anthropomorphic figure (SBY01-3-2461), photograph digitally enhanced using DStretch
- b) Painted Hand Period anthropomorphic figure (BSC17-4-829)

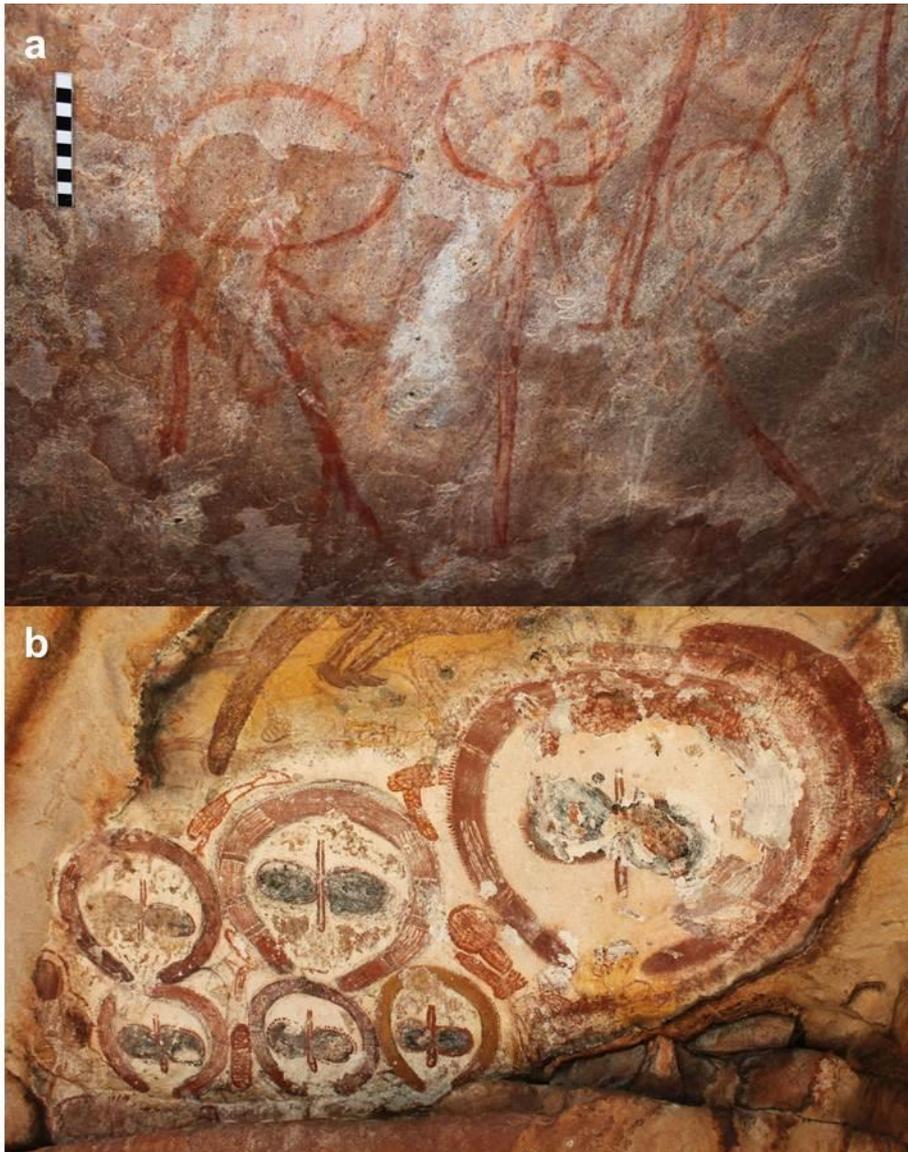
### 6.3.3. Attributes that link the Painted Hand and Wanjina Periods

We know from numerous and consistent superimpositions that the Painted Hand Period precedes the Wanjina Period (see for example Figure 6.19).



**Figure 6.19** Wanjina Period anthropomorphic figure legs superimposing the yellow Painted Hand Period (OTB01-30), scale is 10 cm

The most notable attributes that link the Painted Hand Period to the Wanjina Period is Headdress. Particularly the following types: ‘Concentric Arc’, ‘Disk’, ‘Halo’, ‘Pin Ray Additions’, ‘Propeller’, and ‘Shocked’ (Figure 6.20).



**Figure 6.20** Example of continuation of headdress type 'Halo'

- a) Row of Painted Hand Period anthropomorphic figures (BSC01-8), scale is 10 cm
- b) Panel of Wanjina Period anthropomorphic figures (KERC02-5)

Overall, this evidence of continuity, in addition to the evidence of gradual change provided by the CA, demonstrates an evolutionary relationship from the Gwion Period to the Wanjina Period. This evidence suggests a cultural transition, rather than the replacement of one society with another; a diffusionist explanation applied to the Kimberley rock art sequence by researchers such as Walsh (1994, 2000) and Worms 1955 (see McNiven and Russell 1997 for a review). Based on the evidence presented, this 'one cultural transition' argument is considered valid, even though the production of rock art is unlikely to have occurred at a steady, constant rate through

time (Taçon and Chippindale 1992:5). Additionally, the ‘one cultural transition’ argument is not meant to infer that continuity of style implies continuity of cultural practice or meaning throughout the entire sequence, but rather it is a visual statement of an ideology of cultural continuity (Rosenfeld 2000:56).

## 6.4. Summary

In summary, the results of this research indicate that gradual change and continuity are both apparent in the northwest Kimberley rock art assemblage. Gradual changes in attribute preferences through time indicate ‘cultural transformations between the major artistic phases, as people repeatedly reorganised their economies and ideologies, as well as altered cultural rules for painting’ (Hiscock 2008:115). Such changes are not only evident in the art, but also in the relationships between the art, and the environmental, economic, and social contexts in which it was produced.

The purpose of the following chapters is to discuss how we may *explain* these changes and also the stability, questioning whether the influence of climate variability, economic factors, social structures, and/or other factors are likely to be accountable for the decisions made by the artists (Dillehay 2012:25). This is done in order to provide insight into the changing economy, social life and ideology of the inhabitants of the northwest Kimberley.