Corroboree Behaviour of New Holland and White-cheeked Honeyeaters

GRAHAM H. PYKE & PAUL J. O'CONNOR
The Australian Museum, 6-8 College Street, Sydney, N.S.W. 2000

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Noisy Miners *Manorina melanocephala* and New Holland Honeyeaters *Phylidonyris novaehollandiae* exhibit a group behaviour that has been termed a 'corroboree' (Cameron 1970; Dow 1975; Rooke 1979; Paton 1979). In both species this behaviour involves close proximity of two or more individuals and, for most individuals in the group, repeated calling, adoption of a posture resembling a low bow with head raised and movement of the wings (Cameron 1970; Dow 1975; Rooke 1979). New Holland Honeyeaters flutter their wings (Rooke 1979) whereas Noisy Miners wave their wings (Dow 1975). This combination of movement, postures and vocalisation by many individuals is reminiscent of dances, known as corroborees, performed by Australian aborigines. It is presumably for this reason that the word 'corroboree' was chosen by Cameron (1970) for the behaviour. Similar behaviour has been reported for Yellow-tufted Honeyeater *Lichenostomus melanops* (Mathews 1924; Bryant 1936; Wakefield 1958), Yellow-tinted Honeyeater *Lichenostomus flavescens* (Immelmann 1961) and Yellow-plumed Honeyeater *Lichenostomus ornatus* (Rooke 1979). In the present study we report on corroboree behaviour in the New Holland Honeyeater and its congener, the White-cheeked Honeyeater *P. nigra*.

Methods

Observations were made as part of a larger study on the abundance and movements of honeyeaters in heathland near Sydney (see Pyke 1983, 1985; Pyke & Recher 1986; Pyke *et al.* 1989). As part of the larger study we used a mapping technique to regularly determine the number of resident honeyeaters present on two grids and, in most cases, their individual identities (see Pyke & Recher 1986; Pyke *et al.* 1989). At the same time we recorded the behaviours when first seen for all observed birds. Because we sometimes observed birds calling in groups, but without fluttering their wings, we include these calling groups in the analysis in addition to corroborees *sensu strictu*.

This corroboree study was carried out from January 1986 through March 1987 in two grids in heathland in Brisbane Water National Park, 35 km north of Sydney. One 10.1 ha grid (Pyke grid) was located next to the paved road joining Pearl Beach and Patonga and was about 5 km from Patonga. The other 10.9 ha grid (Recher grid) spanned both sides of the dirt road leading to Warrah Trig (for further details see Pyke & Recher 1986 and Pyke *et al.* 1989). Sample sizes were small, so the data from these two grids were combined. We have been regularly colour-banding birds on these two grids since March 1982.

Resident honeyeaters were mapped on each grid over four four-day periods every six to eight weeks (see Pyke & Recher 1986). This mapping involved an observer walking through a grid recording the location, behaviour and identity, if known, of each bird observed. Birds had been colour-banded in each grid and many individuals were recognisable on the basis of their colour combination. Mapping was carried out for about 4 h in the morning, commencing at sunrise, and about 3 h in the afternoon.

Results

Both calling groups and corroborees were observed relatively rarely; for New Holland and White-cheeked Honeyeaters combined, only 0.8% of observations involved group calling or corroboree behaviour (Table 2).

Almost all calling groups and corroborees consisted of New Holland or White-cheeked Honeyeaters but not both. Of 29 calling groups, four were of New Holland Honeyeaters, 24 were of White-cheeked Honeyeaters and one contained both species. Of 19 corroborees, two were of New Holland Honeyeaters and the rest were of White-cheeked Honeyeaters. Almost all the individuals involved in the two kinds of group were adults (calling groups: 95%, $n = 96$; corroborees: 100%, $n = 88$). Resident birds are all adults (Pyke *et al.* 1989). The data for both honeyeater species are combined in the analyses below because the numbers of observed groups for each species are small, the species are congeneric and they are similar in other aspects of their biology (e.g. Pyke & Recher 1986; unpubl.).

Mean group size is significantly larger for corroborees than for calling groups (Table 1, $P < 0.05$, Student's t-test). Large calling groups were observed infrequently; most observed groups involved three individuals (Table 1). For corroborees, groups of three, five and six individuals occurred most frequently (Table 1).

TABLE 1 Frequency distributions of numbers of individuals per group.

Number of individuals	Calling	Corroboree
3	22	6
4	5	2
5	1	5
6		5
7		
8	1	1
n	29	19
$\bar{X}$	3.41	4.63
s.e.	0.19	0.31

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TABLE 2 Frequencies of New Holland and White-cheeked Honeyeater observations, calling groups and corroborees during each month.

Month	Number of observations (n)	Calling groups	Corroborees	Combined (C)	$(10^4 \times C)/n$
January	609	3		3	4.9
February	553	4	1	5	9.0
March	876	7	7	14	16.0
April	542	3	4	7	12.9
May	332	3	2	5	15.0
June	281	4	1	5	17.8
July	829	3	1	4	4.8
August	453		1	1	2.2
September	366		1	1	2.7
October	751	2		2	2.7
November/December	232		1	1	4.3
Total	5824	29	19	48	

Fifty-one per cent (n = 5285) of the observations of New Holland and White-cheeked Honeyeater behaviour were made during the morning. The percentages of calling groups and corroborees observed during this time of day were about the same as this (calling groups: 38%, n = 29; corroborees: 53%, n = 19; neither significantly different from 51%, P's > 0.05, χ^2 test). Consequently, birds are just as likely to form calling groups or corroborees in the morning as in the afternoon.

Both kinds of group behaviour tend to occur during February through June (Table 2). Note that the numbers of observations reported in Table 2 do not reflect abundance because the amounts of time spent collecting them per calendar month were not equal.

Eighty-eight per cent of individually colour-banded birds observed in either calling groups or corroborees had been mapped as resident (Table 3). All but one of these was resident at the time it was observed in a group (Table 3).

Of the birds observed in groups, and for which the legs could be clearly seen, about half were banded (calling groups: 44%, n = 43; corroborees: 62%, n = 21; combined: 50%). The difference in proportions of banded and unbanded birds between the two group types is not significant ($P > 0.05$, χ^2 test). The proportion of banded birds among known residents is similar (i.e. 66%, n = 738, Pyke *et al.* 1989).

Almost all of the individually identified birds observed in either calling groups or corroborees were male (Table 3).

The average distance between the location of an observed group and the centre of activity of a resident bird participating in the group was only 53 m (n = 15, *s.e.* = 10 m), indicating that grouping behaviour involves birds that are close neighbours. In this respect the two group types are not significantly different ($P > 0.05$, Student's t-test).

TABLE 3 Residency status and sex of individually colour-banded birds in groups.

	Group Type		Combined	
	Calling	Corroboree		
Present resident	7	7	14	} 88%
Absent resident		1	1	
Never resident	2		2	
Totals	9	8	17	
Male	8	7	15	
Female	—	1	1	
Unknown	1	—	1	
Totals	9	8	17	

Discussion

Grouping behaviour by New Holland and White-cheeked Honeyeaters in our study area apparently involves birds that are adult male residents. The age composition and proportion of banded birds in observed groups are similar to those for resident birds; whereas, if non-resident (and largely unbanded) birds participated in calling groups or corroborees, the proportion of banded birds in the observed groups would have been lower than the proportion for known residents. In addition almost all the individually colour-banded birds observed in groups are resident and male (Table 3).

Birds are most likely to be observed in corroborees or calling groups during February through June, which coincides with the period when the density of resident New Holland and White-cheeked Honeyeaters is relatively high (see Table 2 and Pyke & Recher 1986). However, individuals are not necessarily resident throughout this period and many show gaps between times of residency (Pyke *et al.* 1989). Consequently, areas of residency are being re-established throughout this period and it is possible, as the observations of Rooke (1979) suggest, that group behaviour in our study is initiated by birds that are re-establishing their accustomed home ranges in the heathland.

Little is known about which individuals exhibit corroboree behaviour, the seasonal pattern of occurrence of this behaviour, and its context and function. For Noisy Miners, which live in groups, corroborees involve some but not necessarily all of the group members (Dow 1975). Paton (1979, pers. comm.) found that New Holland Honeyeater corroborees tended to be most frequent in the breeding season (i.e. from establishing a breeding territory to fledgling stages) and tended to involve birds that were adult, male and resident. Rooke (1979) carried out aviary experiments that suggest individuals initiate corroboree behaviour when they return to their accustomed physical environment after a period of absence. When an individual initiates corroboree behaviour, others join in (Rooke 1979; Paton 1979). Rooke (1979) also reported that, in his study area in Western Australia, corroboree behaviour is most commonly observed during June and July when New Holland Honeyeaters are returning to previously utilised feeding ranges and probably strengthening or establishing their breeding ranges.

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