



# Sociality in killer whales: the role of recruiters



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## Introduction

Killer whales (*Orcinus orca*; Fig. 1) are marine top predators with a world wide distribution, and a very variable diet, from extreme specialization to fully generalist diet. This variation in predation tactics and strategies is permitted by group living, and collaboration during predation attempts, and this implies a complex, hierarchically structured, social and communication system. We studied sociality of killer whales in the South Atlantic, focusing on a small local population that is resident at Sea Lion Island (Falkland Island, SLI) during the spring and summer months. Previous anecdotal evidences suggested the presence in this population of peculiar pinniped hunting tactics, and the inter-generation cultural transmission of them.

## Methods

We carried out field work at SLI during two seasons (2013-2015; 2-8 observers; 415 days). We identified killer whales by visual observation and photo-identification using features of the saddle patch and the outline of the dorsal fin. Inter-rater reliability of killer whales identification was almost 100% when pictures were available. We carried out daily surveys of the SLI coastline (11814 km) and regular observation periods of one hour length from vantage points (2821 hours). We measured association as joint presence during the same observation, and we obtained association matrices including all identified individuals. We draw sociograms, and calculated social network statistics using UCINET (Analytic Technologies).

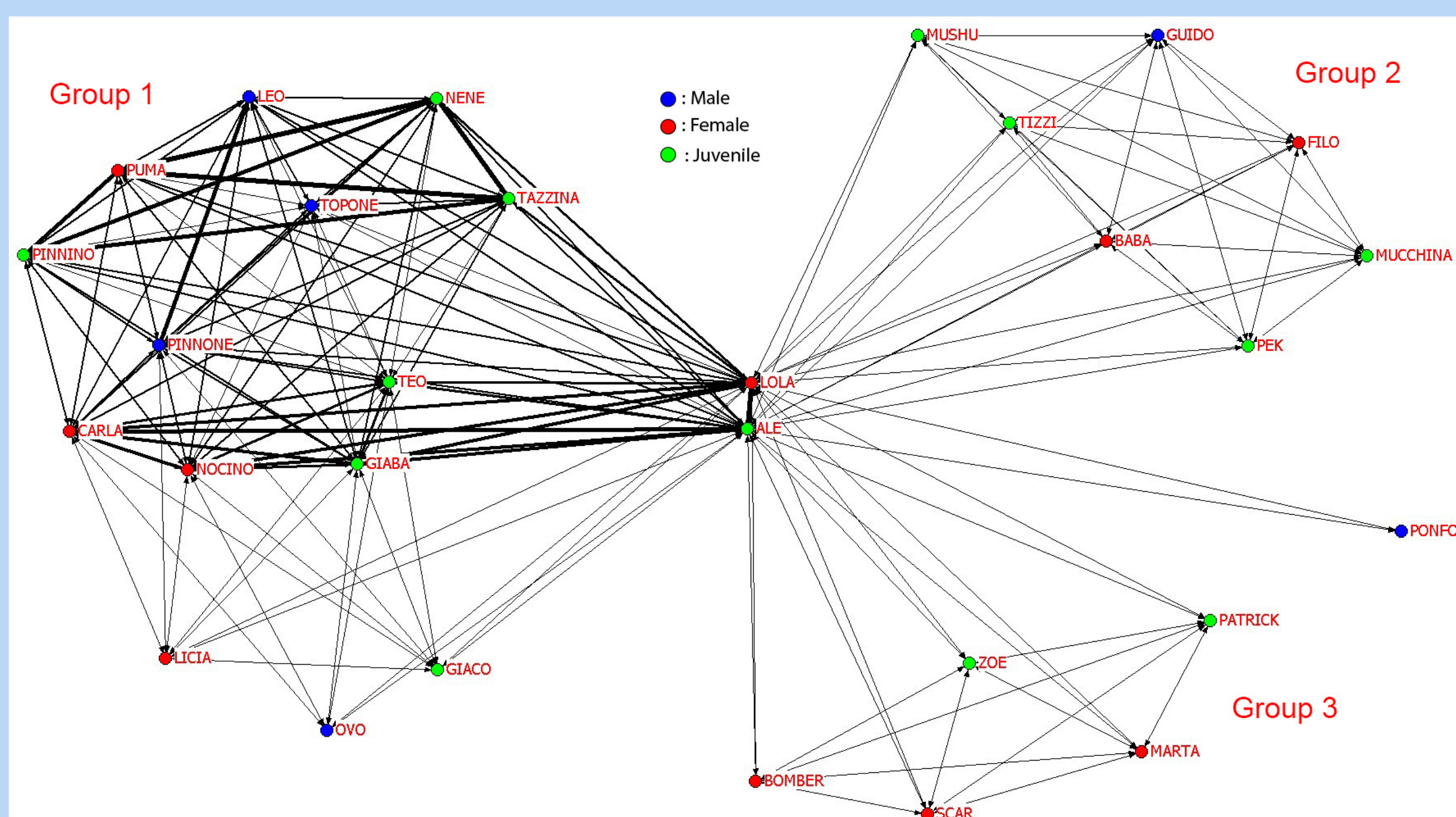


Fig. 2 – Sociogram of Sea Lion Island killer whales, centred on the recruiters pair, Lola and Ale

## Results

- We obtained 1039 killer whales observations, with 1 to 13 individuals present together.
- We identified 31 killer whales (photo-identification catalogue available on the website of the research team, [www.eleseal.org](http://www.eleseal.org)), including 13 resident individuals (Fig. 1), the first of which was photo-identified in 2004, and 18 transient individuals (Fig. 3).
- Resident killer whales were observed in both seasons.
- The basic killer whale social unit was the mother-calves group.
- We observed four mother-calves group that normally included just one calf, but had a maximum of three calf generations (the mother, Puma, and the three calves, Tazzina, Nene, and Pinnino; Fig. 2).



Fig. 1 – A killer whale pod including two resident mother-calf pairs

- Although three males (Pinnone, Leo and Topone; Fig. 2) were resident, their presence was less regular, and they were less bonded to the other killer whales.
- Resident mother-calf pairs were usually associated in pods of 4-8 individuals that showed coordinated activity during patrolling and predation events.
- Transient individuals appeared for brief periods, from one to a few days, and were always observed together with one of the resident mother-calf pair, Lola and Ale.
- Social network analysis showed that Lola and Ale acted as recruiters of new transient individuals linking the main group of resident individuals (Group 1, Fig. 2), to the two groups of transients (Group 2, 7 individuals including a male, and Group 3, 5 individuals), and to a transient isolated male (Ponfo).
- Analysis of social network indices of centrality and dominance showed that Lola and Ale had higher values than either the other residents and the transients.

## Conclusions

- Group size and association patterns changed in each season, but the basic building blocks of the social structure was the same, i.e., the mother-calf pair.
- Pods were the result of stable association of 2-3 mother-calves groups.
- Two individuals, Lola and Ale, acted as recruiters of new whales, being normally associated with other residents, but also with previously unseen transient individuals.
- **Recruiters can have a fundamental role in the structuring of killer whale social systems, favouring the creation of new associations.**



Fig. 3 – A killer whale pod including residents (labelled in red) and transient individuals (labelled in blue)