

DOLPHIN ALLIANCE NETWORKS

R.C. Connor, M. Krutzen, W.S. Sherwin

¹UMASS-Dartmouth, North Dartmouth, MA United States, ²University of Zurich, Zurich, Switzerland,

³University of New South Wales, Sydney, New South Wales, Australia

Presenter's Email: rconnor@umassd.edu

Male bottlenose dolphins (*Tursiops* sp.) in Shark Bay, Western Australia likely face cognitive challenges from their unusual pattern of nested alliance formation. Males cooperate in pairs and trios to herd individual females. Each male also belongs to a 2nd order alliance whose members cooperate in competition over females. Previous research revealed two patterns of alliance formation; small highly stable pairs and trios of related males that form teams of 4-6 males, and a very large 'super-alliance' of 14 unrelated males whose members formed trios that often changed composition. From 2001-2006 we expanded the study area to over 600km² and examined alliance relationships among over 100 adult males that associated in more than 12 2nd order alliances. We found other large alliances of 10-14 males and groups of intermediate sizes (7-9) indicating a continuum of 2nd order alliance size in the population. Further, the dichotomy in relatedness patterns was no longer apparent. Male-male relationships and consortship patterns varied within groups and also between groups of the same size. Alliances exhibited a continuous chain of range overlap such that each alliance overlapped with a number of other groups but males in the northern part of the study area did not overlap with males in the south. Primatologists have highlighted the number of social relationships and knowledge of 3rd party relationships as being important cognitive challenges facing non-human primates. Our observations suggest a focus on the challenges of navigating a nested social structure and uncertainty, rather than simply knowledge of, 3rd party relationships.

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