Chapter 10
Social Conflict Management in Primates: Is There a Case For Dolphins?

Marina Cords and Janet Mann

A male and female juvenile dolphin pet each other. Petting is analogous to primate grooming and is often seen after conflicts. (Photograph credit: Courtesy of Ewa Krzyszscyk, Shark Bay Dolphin Research Project)

M. Cords (✉)
Department of Ecology, Evolution and Environmental Biology, Columbia University, New York, NY 10027, USA
e-mail: mc51@columbia.edu

J. Mann
Departments of Biology and Psychology, Georgetown University, Washington, DC 20057, USA

J. Yamagiwa and L. Karczmarski (eds.), *Primates and Cetaceans: Field Research and Conservation of Complex Mammalian Societies*, Primatology Monographs,
DOI 10.1007/978-4-431-54523-1_10, © Springer Japan 2014

Abstract Gregarious animals face unavoidable conflicts of interest and thus therefore are likely to evolve behavioral mechanisms that allow them to manage conflict and thus maintain their social bonds. Multiple forms of conflict management characterize primates, but far less research has focused on dolphins, especially under natural conditions. Captive studies of dolphins have confirmed post-conflict reconciliation, a well-studied form of conflict management in primates. The fission–fusion nature of dolphin social systems, along with the vast home ranges of individuals, pose particular difficulties for the study of conflict management. Conflicts among male allies are likely to be a fruitful area for further research on conflict management, both because allies are valuable social partners and because they interact frequently over extended periods.

Keywords Aggression • Alliance • Conflict • Conflict management • Reconciliation • Social organization

10.1 Introduction

Conflicts of interest characterize members of any animal population but are especially acute for those living in social groups. Disputes over resources, mates, relationships, movement patterns, or other activities can compromise group integrity. Further, in species in which group living is based on individualized cooperative relationships, escalated aggressive conflicts have the potential to disrupt those relationships and thus to threaten both the benefits and the mechanisms of group living. Gregarious animals are therefore expected to have evolved a capacity to manage conflict (Aureli et al. 2002).

10.2 Conflict Management in Primates and Dolphins

Conflict management includes behavior that prevents aggressive escalation of conflicts and which mitigates or repairs the damage caused by such escalation (Cords and Killen 1998; Aureli and de Waal 2000, Appendix B). Studies of nonhuman primates provide various examples of conflict management behavior in multiple species. For example, ritualized dominance relationships, the development of routines and social conventions (such as respect for possession), and displays of reassurance that precede situations in which conflict is likely to erupt are types of behavior that reduce the likelihood of escalated aggression in nonhuman primates. In addition, animals with a conflict of interest may simply avoid each other, at least temporarily. Should aggressive conflict nevertheless erupt, primates often use various tactics to keep aggression relatively mild and brief. For example, they may adhere to ritualized forms of aggression that are less physically dangerous, redirect received aggression onto a third party to end the original aggressive interaction, or heed the "policing"

interventions of powerful individuals that quickly bring escalated fighting to an end. After aggression is over, nonhuman primates have been shown to engage in several kinds of "post-conflict" interactions, which both reduce anxiety triggered by the previous aggressive conflict and reestablish a cooperative relationship with a former opponent, either directly or through its relatives (Wittig and Boesch 2003).

Best studied among primates are patterns of post-conflict friendly reunion, or "reconciliation" (Arnold et al. 2010). In a typical case, former opponents interact in an affiliative way within a few minutes after their aggression has ceased. They are selectively attracted to each other (although attraction to one another's kin has also been documented). Some studies have demonstrated that such post-conflict reunions reduce the chance of subsequent aggression, that individual opponents reduce self-directed behavior associated with anxiety, and that they restore levels of tolerance to pre-conflict levels (Aureli et al. 2002). Because approaching an individual who may still be aggressively motivated is risky, we expect reconciliation to be strategically targeted. It should occur only when aggression causes anxiety or disrupts cooperative relationships, and particularly when the opponent is a valuable social partner (likely to interact in a way that benefits the subject) but unpredictable, and when a prior history of generally friendly interaction patterns facilitates affiliation after aggression (Cords and Aureli 2000; Aureli et al. 2002). There is much evidence that partner value influences the tendency to reconcile, although it is often indirect (Watts 2006; Arnold et al. 2010).

Of the approximately 35 species of delphinids, all are highly social, living in stable (e.g., killer whale, false killer whale, pilot whale) or temporary (e.g., bottlenose dolphin, spotted dolphin) groups. Some species show heavy scarring (e.g., Risso's dolphin, *Grampus griseus*; MacLeod 1998) or tooth rake marks (Scott et al. 2005; MacLeod 1998) and clearly must engage in frequent battle. These scars and marks are likely to be good indicators of intraspecific aggression in delphinids and reveal which individuals are most vulnerable to attack. Species with extensive markings would, in general, be good candidates for studying aggression and conflict management. Although the highly social nature of these animals coupled with battle scars suggests that conflict management mechanisms should be part of their social life, little research has addressed this topic to date. Three studies of reconciliation in captive bottlenose dolphins involved two to seven dolphins of mixed sex (Weaver 2003; Tamaki et al. 2006; Holobinko and Waring 2010). These studies revealed high rates of post-conflict affiliation, and one study found some evidence that affiliation (flipper rubbing) reduced the likelihood of subsequent conflict (Tamaki et al. 2006). Although these results suggest parallels with primates, the captive environment—where continuous observation is possible—is likely to have influenced the dolphins' behavior: particularly, captive dolphins are unable to avoid each other, unlike their wild counterparts. Confirmation of these patterns of behavior in wild populations, as in primates, is therefore important.

Logistic difficulties are undoubtedly a major reason why the study of conflict management in delphinids is still in its infancy. The open fission–fusion nature of many delphinid societies presents particular challenges, because individuals may not encounter each other for weeks, months, and even years. Avoidance or reduced levels of association may be especially important ways of managing conflict in

these spatially dispersed societies, but they are probably the hardest behavioral patterns to study. In addition, the difficulties inherent in observing cetaceans mean that observers not only miss some proportion of agonistic and affiliative (or conciliatory) interactions but often may have difficulty tracking association and avoidance following such interactions. Post-conflict behavior is especially hard to study in wild populations.

10.3 The Nature of Conflict in Primates and Dolphins

Mammalian conflicts are often over resources, mates, or status. Even if finding or feeding on prey is conducted socially (in groups), most delphinids catch individual prey items (fish or squid) that are swallowed quickly. Occasionally dolphins "display" their catch to others, who approach the fish closely for apparent inspection, but never challenge the owner or attempt to steal prey (Mann et al. 2007). Thus, direct feeding competition is unlikely to lead to aggressive conflicts. Rarely do dolphins chase the same individual prey item, and doing so would probably result in failure for both. An exception might be mammal-eating killer whales, which not only hunt cooperatively but also share prey, typically with kin (Baird and Dill 1996). Food-sharing with kin has also been documented in fish-eating killer whales, although cooperative hunting has not been documented (Ford and Ellis 2006). Although much primate aggression occurs in the context of feeding, and involves contests over enduring feeding sites, primates rarely reconcile when the conflict involves food, probably because the stakes are small (Aureli et al. 2002). Cooperative hunting in killer whales (and carnivores such as spotted hyenas; Wahaj et al. 2001) may raise the stakes, however, because the risk of injury and resource value are high. For the same reason, maintaining close cooperative bonds and conflict management would be critical, regardless of the source of conflict, when group members are highly interdependent.

For most delphinids, however, conflict over mating, both within and between the sexes, might be a more fruitful context in which to examine conflict resolution. Males form enduring alliances in bottlenose dolphins and perhaps other delphinid species (Connor et al. 2000). In Shark Bay bottlenose dolphins, alliances of two or three males consort with and show aggression toward individual females (Connor et al. 1996, 2000; Owen et al. 2002; Scott et al. 2005). Cycling females experience much more aggression than noncycling females, and conflicts between females are exceedingly rare (Scott et al. 2005). The majority of Shark Bay bottlenose dolphins have tooth rake markings from conspecifics, suggesting that most individuals regularly receive attacks from others. Fresh wounds are more commonly observed on cycling females than on females in other reproductive states (Scott et al. 2005). Watson-Capps and Mann (unpublished data), studying male–female interactions during consortships of Shark Bay bottlenose dolphins, recently found that affiliation rates were significantly higher within 10 min post conflict than at any other time. This affiliation may placate aggressive male alliances or repair intersexual

relationships. Because consortships can last for weeks, or even months, females may be highly motivated to placate aggressive males and reduce the costs of prolonged association with males.

Well-developed conflict resolution mechanisms should also occur between male allies, who are in direct reproductive competition, and yet must cooperate against other alliances competing for the same female. Studies of nonhuman primates have provided some evidence that frequent allies are more likely to reconcile aggressive conflicts (Watts 2006), even in cases in which the alliance is not directly linked to acquiring a mate.

10.4 Conclusion

The study of conflict management in dolphins is still in its infancy, but would provide a valuable context in which to confirm or extend general patterns that have emerged from studies of primates. Conflict between allies is likely to be the most fruitful context for exploring reconciliation in delphinids, not only because allies are valuable partners, but also because male allies stay together and post-conflict observations are possible. Future research in this area will help identify the forces that shape group living in delphinids.

References

Arnold K, Fraser ON, Aureli F (2010) Postconflict reconciliation. In: Campbell CJ, Fuentes A, MacKinnon KC, Bearder SK, Stumpf R (eds) Primates in perspective, 2nd edn. Oxford University Press, Oxford, pp 608–625

Aureli F, de Waal F (2000) Natural conflict resolution. University of California Press, Berkeley

Aureli F, Cords M, van Schaik CP (2002) Conflict resolution following aggression in gregarious animals: a predictive framework. Anim Behav 64:325–343

Baird RW, Dill LM (1996) Ecological and social determinants of group size in transient killer whales. Behav Ecol 7:408–416

Connor RC, Richards AF, Smolker RA, Mann J (1996) Patterns of female attractiveness in Indian Ocean bottlenose dolphins. Behaviour 133:37–69

Connor RC, Wells R, Mann J, Read A (2000) The bottlenose dolphin, *Tursiops* sp.: social relationships in a fission–fusion society. In: Mann J, Connor R, Tyack P, Whitehead H (eds) Cetacean societies: field studies of dolphins and whales. University of Chicago Press, Chicago, pp 91–126

Cords M, Aureli F (2000) Reconciliation and relationship qualities. In: Aureli F, de Waal F (eds) Natural conflict resolution. University of California Press, Berkeley, pp 177–198

Cords M, Killen M (1998) Conflict resolution in human and non-human primates. In: Langer J, Killen M (eds) Piaget, evolution, and development. Erlbaum Associates, Hillsdale, pp 193–217

Ford JKB, Ellis GM (2006) Selective foraging by fish-eating killer whales *Orcinus orca* in British Columbia. Mar Ecol Prog Ser 316:185–199

Holobinko A, Waring GH (2010) Conflict and reconciliation behavior trends of the bottlenose dolphin (*Tursiops truncatus*). Zoo Biol 29:567–585

MacLeod CD (1998) Intraspecific scarring in odontocete cetaceans: an indicator of male 'quality' in aggressive social interactions? J Zool 244:71–77

Mann J, Sargeant BL, Minor M (2007) Calf inspection of fish catches: opportunities for oblique social learning? Mar Mamm Sci 23:197–202

Owen ECG, Wells RS, Hofmann S (2002) Ranging and association patterns of paired and unpaired adult male Atlantic bottlenose dolphins, *Tursiops truncatus*, in Sarasota, Florida, provide no evidence for alternative male strategies. Can J Zool 80:2072–2089

Scott E, Mann J, Watson-Capps JJ, Sargeant BL, Connor RC (2005) Aggression in bottlenose dolphins: evidence for sexual coercion, male–male competition, and female tolerance through analysis of tooth-rake marks and behaviour. Behaviour 142:21–44

Tamaki N, Morisaka T, Michihiro T (2006) Does body contact contribute towards repairing relationships? The association between flipper-rubbing and aggressive behavior in captive bottlenose dolphins. Behav Processes 37:209–215

Wahaj SA, Guse KR, Holekamp KE (2001) Reconciliation in the spotted hyena (*Crocuta crocuta*). Ethology 107:1057–1074

Watts DP (2006) Conflict resolution in chimpanzees and the valuable-relationships hypothesis. Int J Primatol 27:1337–1364

Weaver A (2003) Conflict and reconciliation in captive bottlenose dolphins, *Tursiops truncatus*. Mar Mamm Sci 19:836–846

Wittig RM, Boesch C (2003) The choice of post-conflict interactions in wild chimpanzees (*Pan troglodytes*). Behaviour 140:1527–1559