

# Chapter 8

## Play, Sexual Display, or Just Boredom Relief?



Vera M. F. da Silva and Lucas G. Spinelli

**Abstract** Cetaceans use objects and interact with conspecifics for play and socializing, often exhibiting complex behaviors that we do not understand. A few seconds of activity on the water's surface rarely indicates intraspecific behaviors and interactions. What has already been described chiefly for common bottlenose dolphins (*Tursiops truncatus*) has been extrapolated to other species, with little information on river dolphins despite their accessibility. In this chapter, we review what is known about sexually related behaviors in different contexts, such as learning, play, sexual display, aggression, and boredom (weariness and restlessness through a lack of interest) among cetacean species, especially the Amazon river dolphin (*Inia geoffrensis*).

**Keywords** Aggression · Boredom · Copulation · Distracted behavior · Homosexual behavior · Object-carry · Play · Restlessness · Socio-sexual behavior

### 8.1 Introduction

Like many animals, cetaceans spend most of their time searching for food, moving among locations, avoiding predators, socializing, and resting. However, cetacean behavior is challenging to observe and interpret. Whales and dolphins spend most of

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**Supplementary Information** The online version contains supplementary material available at [https://doi.org/10.1007/978-3-031-35651-3\\_8](https://doi.org/10.1007/978-3-031-35651-3_8).

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their time submerged, often in turbid, low-light, or pelagic environments where observation is limited. The short time they spend at the surface often results in uncertainty and misinterpretation of their behavior by human observers. Some cetacean species are evasive or submerge when a boat or a diver approaches, making it difficult to record undisturbed behavior. New tools such as aerial drones offer unique opportunities for behavioral observations of cetaceans in the wild (Fettermann et al. 2022; Ramos et al. 2023, this book).

Many whale species are migratory and spend extended periods submerged. When near the coast, their large size makes them easier to observe. In contrast, dolphins are smaller, faster swimmers and often form social groups or pods. Regardless of size, most cetacean behavior occurs underwater (Würsig 2019, for odontocetes; Clark and Garland 2022, for mysticetes). Recording river dolphin behavior is also challenging because of water turbidity and discreet surface behaviors, even though they may live close to human settlements.

Knowledge of the size and structure of cetacean groups is essential for behavioral interpretation. Because social life demands different ecological and behavioral conditions, there are costs to group living, such as food and reproductive competition and interference, and fitness benefits, such as group vigilance and increased foraging success.

One difficulty in behavioral interpretation is discerning the difference between sexual (copulation, reproductive success) and socio-sexual behavior (Ham et al. 2023, this book). The latter includes behaviors not linked to reproduction but to a social context necessary for maintaining relationships among individuals, sometimes mistakenly interpreted as play. Here we review common behavioral categories for cetaceans, such as play, sexual and socio-sexual behavior, and the possibility of behaviors associated with boredom, defined here as disinterested or distracted behavior.

## 8.2 Play

Because of the accessibility of a few dolphin species in captivity and the wild, we know more about dolphin behavior than other cetaceans. Even for well-known species such as the bottlenose dolphins, the definition of play and its social role are still unclear. Burghardt (2005) proposed five criteria to define play: (1) play behaviors do not have a direct ecological function and therefore are not directly related to the individual's survival; (2) play is a behavior that brings pleasure or rewards to the individual, being spontaneous but intentional; (3) play is nothing more than a modification of an activity or behavior inherent in that individual; (4) play is often repeated, but it is not a rigid or stereotypical behavior; and (5) play does not co-occur with other activities such as foraging, reproduction, or defense.

According to Hill et al. (2017), play is a behavioral phenomenon commonly observed in calves and sub-adults of social and solitary species. Although play is

more common in young individuals, adults also engage in play, and it can be a solitary or group activity, especially in dolphins. Play behavior can occur throughout an individual's life and may be associated with learning and mechanical and sensory development (Hill et al. 2017). Play may prepare the individual for foraging, courtship, and mating. Cetacean calves play with their mother or conspecifics, which prepares them for complex social behavior (Mann and Smuts 1999; Nakamura and Sakai 2014). In adults, play takes on another role and varies in accordance with social context. It is not a common behavior in adult life; it seems to be a reflection of the behaviors and activities carried out by an immature animal in the adult phase, as these relate to the animal's immediate interest in itself—a pleasure stimulus or in a context of interaction with other individuals (Mason 1968; Bekoff 1972; Cairns 1976). When adults play, they are often in a group with individuals of both sexes and various ages, which facilitates the transmission of information among individuals. Calves mimic adult behavior to learn foraging, courtship, and mating techniques (Galef and Laland 2005; Herzing 2005; Kuczaj and Yeater 2006).

Paulos et al. (2010) describe several play categories and list species participating in social play. These authors distinguish two types of play, social and parallel. Social play involves some form of cooperation, while parallel play occurs when individuals play in the same area but do not interact. Individuals may display different types of play behavior while swimming and using objects. Southern right whales (*Eubalaena australis*) perform several locomotory maneuvers considered as play, ranging from beating their caudal and pectoral flippers against the water to jumping and desynchronized swimming (Paulos et al. 2010). Killer whales (*Orcinus orca*) in coastal areas of Argentina display play-like behavior while teaching younger pod members to beach and return to deep water. However, this behavior in adults is also associated with capturing young sea lions on the shore (Rendell and Whitehead 2001). Captive common bottlenose dolphins (*Tursiops truncatus*) and beluga whales (*Delphinapterus leucas*) show similar adult-juvenile interactions with adults teaching their young to beach at the edge of pools; but it may be a stereotypic behavior (Hill 2009; Paulos et al. 2010; Hill and Ramirez 2014; Guarino et al. 2016).

In addition to swimming-related behaviors, play involves using abiotic and biotic objects. For example, bottlenose dolphins use puffer fish (*Tetraodon* sp.) as a recreational object, and spinner dolphins (*Stenella longirostris*) use seaweed (Fig. 8.1). In captivity, it is common for some species of dolphins to interact with plastic toys because of the artificial environment they are in and the activities they are subjected to (DelFour et al. 2017), but in the wild, this behavior is also observed on account of human garbage dumped in rivers and oceans. Species such as rough-toothed dolphins (*Steno bredanensis*) (Kuczaj and Yeater 2007), bottlenose dolphins (Sakai et al. 2006), and spinner dolphins (Norris 1991) have been recorded displaying cooperative play by throwing plastic objects and carrying plastic bags on their dorsal fin, flippers, tail, and rostrum.

Seaweed is often abundant near shore, and many cetaceans use it for play, passing it between their melon, pectoral flippers, flukes, and group members. Owen et al. (2012) reviewed the use of seaweed by different cetaceans, including humpback whales (*Megaptera novaeangliae*). They concluded that humpback whales' use of



**Fig. 8.1** Spinner dolphin (*Stenella longirostris*) from the Brazilian Fernando de Noronha Archipelago, Brazil, exhibiting object play, carrying seaweed with its pectoral fin

seaweed is self-rewarding and not a form of social display, but instead, they use it as an object for play. Payne (1972) described the same behavior for southern right whales. Bowhead whales (*Balaena mysticetus*) were observed playing with logs up to 20 m long. This behavior included nudging or pushing the log with their head or body, lifting the log onto their back or tail stock, and while supine and keeping it between their pectoral flippers (Würsig et al. 1989). However, this activity also may be used to facilitate skin sloughing (Fortune et al. 2017).

The Amazon river dolphin or boto (*Inia geoffrensis*) is an inquisitive animal that approaches boats, the landing stages of riverside houses, and people swimming or fishing. There are accounts of botos pushing canoes, holding the paddles or keels of wooden canoes, and generally interacting with canoes with women and children. Interactions with people have generated many legends and are part of the folklore of indigenous Amazonians. This dolphin has been the source of local people's fascination, and most stories involving humans and botos have a sexual connotation (da Silva et al. 2017; Box 8.1).

### **Box 8.1 Sexual Accounts of Botos and Humans**

In the Brazilian Amazon, no animal has held such fascination by humans as the boto. This is demonstrated by its importance in indigenous cosmology and by the number of existing legends and myths (da Silva et al. 2017). However, the most prevalent element associated with botos is the male's purported sexual power as flirt and seducer. A popular legend is about its ability to transform into a handsome white man and seduce young women during

(continued)

**Box 8.1** (continued)

parties, usually during the full moon. Unwanted pregnancy, infant mortality, and miscarriages are also attributed to the boto; the shape of the aborted fetus can be compared to a “little boto,” and perhaps this is why the idea of this supernatural paternity evolved (Lima 2012). Similarly, the female boto can also transform into a beautiful woman, usually white, naked, and with long hair, and she seduces fishermen in their canoes and takes them to the “enchanted city” (*encantados*) at the bottom of the river (Cravalho 1999; Amoroso 2013). Female boto can apparently excite the sexual interest of fishermen, and intercourse with them can supposedly lead to exhaustion, mental derangement, or even death (Smith 1981). Informal conversations with fishermen in the Brazilian Amazon several decades ago (by VMFS) revealed accounts of the sexual use of boto females caught accidentally in nets, sometimes leaving the animal tied with a rope to a tree by the caudal peduncle for several days.

The Cocama Indigenous people in the Peruvian Amazon call the boto “pirawira” (pira = fish; wira = penis) “penis-fish” in reference to their sexual seduction power (Ruiz 2011). Among these abilities, they also attribute to the boto the detection and strong attraction to menstruating women (Slater 1994). Anatomical parts of this dolphin such as the eye, vagina, and penis are also considered magical charms. The eye was considered a powerful amulet of incredible love effectiveness capable of attracting the desired person when observed through the dry eye of the boto, previously prepared by a shaman or equivalent entity (Câmara-Cascudo 1954; da Silva et al. 2017). In a similar way, it is also believed that alcohol or perfume, with small pieces of the boto’s genitalia, when spread over the body, exert great attraction on the loved one, “holding” the sexual partner (Smith 1981; Slater 1994). Beliefs involving botos and enchanted places below water served and perhaps still serve an important ecological role for the protection of habitats and animals in the region.

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In the wild, botos play with aquatic plants and interact with snakes, stingrays, turtles, electric eels, large fishes, and other animals. These interspecific associations are sometimes playful behavior but may become harassment or predation. Botos sometimes carry debris in their mouths, such as discarded human clothes (Fig. 8.2), plastic bottles, and other objects. Adult male botos also interact with the calves of Amazonian manatees (*Trichechus inunguis*) and of conspecifics. The latter interactions are not well understood but may be attempted infanticide (Bowler et al. 2018), rough play, or agonistic behavior without the intention of killing the calf (da Silva et al. 2021, 2022; Projeto Boto unpubl. data). Intriguingly, there are no records of such behavior toward the sympatric tucuxi (*Sotalia fluviatilis*). The tucuxi is a highly social dolphin, occurring in groups of 2 to 6 and sometimes up to 15 individuals (Martin et al. 2004; Coimbra et al. 2016).

### 8.3 Sexual and Socio-Sexual Behavior

In contrast to sexual behavior, socio-sexual behavior is defined as sexual activity between individuals of different ages and sexes, which does not necessarily relate to reproduction. In some mammals, this behavior may be independent of hormonal influence (Lilley 2019). Instead, it may reinforce the relationships among individuals (alliance, dominance) or the development of courtship behaviors (Connor et al. 2000a, b). Socio-sexual behavior occurs in many species and mating systems (MacFarlane et al. 2007; Bailey and Zuk 2009).

By definition, in this context animals are engaged in genital contact between individuals of the same or opposite sex. These are tactile interactions in which one



**Fig. 8.2** Amazon river dolphin (*Inia geoffrensis*) in the Central Amazon, Brazil, performing object play with different objects. (a) Playing with a large seed, throwing it in the air and catching it several times as a ball. (b) Using seaweed as object play and carrying it on its melon; at times using their rostrum. (c) Carrying a piece of human clothing and shaking it at the surface. (d) Playing with a stingray. It is possible that they also eat this cartilaginous fish and sometimes are stung by stingray spine

dolphin (initiator) touches the other (recipient) in the genital area with the tip of a flipper, with its fluke, rostrum, melon, with its genital (mounting), and perhaps the male also having an erection, with or without penetration of the other's genital slit, regardless of whether male-male or male-female (Serres et al. 2022).

The socio-sexual behavior in terrestrial animals, especially nonhuman primates, has been well described (Campbell 2007; Furuichi et al. 2014; Nakamura and Sakai 2014). In cetaceans, most descriptions of socio-sexual behavior are based primarily on bottlenose dolphins and, more generally, about males engaging in sexual behavior with conspecific males, perhaps as part of establishment of bonds (Connor and Krützen 2015). Sexual behavior in cetaceans is challenging to observe in the wild but has been described in the Indo-Pacific bottlenose dolphin (*T. aduncus*) (Mann 2006; Nakamura and Sakai 2014). The socio-sexual behavior in this species was observed in calves (Fig. 8.3) and continued into adulthood. These behaviors include pelvic thrusting, genital stimulation, so-called rooster struts, aerial displays, mouthing, S-postures, lateral presentation, and pursuit in pairs or large groups of sexually interactive individuals (Mann 2006; Nakamura and Sakai 2014; Hill et al. 2015).

In bottlenose dolphins, socio-sexual behavior among males occurs more often in calves and juveniles than in adults and even among female-female and male-female interactions. Play may be necessary for building alliances and strengthening ties among individuals of the same population. These relationships may last throughout





**Fig. 8.3** Mother and calf Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) from Mikura Island, Japan, engaged in social-sexual behavior. Mother was rubbing the genital area of her calf with the tip of her fin

life because males form alliances to prevent males from other groups from mating (Mann 2006; Connor 2007).

All age-sex classes participate in socio-sexual behavior or sexual play in the Indo-Pacific bottlenose dolphins described by Mann (2006) and Connor (2007). Several authors describe socio-sexual behavior as a form of social learning and for maintaining dominance hierarchies (Östman 1991; Harvey et al. 2017), forming alliances (Mann 2006; Bailey and Zuk 2009), and practicing reproductive behavior. However, Serres et al. (2022) consider these interpretations to be unvalidated. Working with different species of dolphins in captivity such as Yangtze finless porpoises (*Neophocaena asiaeorientalis asiaeorientalis*), East Asian finless porpoises (*Neophocaena asiaeorientalis sunameri*), and bottlenose dolphins, they concluded that socio-sexual interactions may play a different role depending on the species and may be necessary for social interactions. For example, finless porpoises do not appear to engage in other social interactions except those enabling the establishment of bonds.

Unlike other dolphin species, the Amazon river dolphin exhibits different socio-sexual behavior (Martin et al. 2008). The first observations were made in the Mamirauá Reserve (AM, Brazil), a region of floodplains (*várzeas*), in which male dolphins carry branches, floating vegetation, or lumps of hard clay, which they display, apparently to impress females (Martin et al. 2008) (Fig. 8.4). When first observed, this behavior was interpreted as play, but accumulated evidence from many encounters later demonstrated that it is in fact socio-sexual behavior. Systematic observations revealed that the social structure of groups during this activity was mainly adults and, less frequently, juveniles (Martin et al. 2008). Because





**Fig. 8.4** Social-sexual behavior performed by male Amazon river dolphin (*Inia geoffrensis*) in the Central Amazon, Brazil, using different types of objects. (a and b) Carrying a lump of clay. (c) Carrying and thrashing floating vegetation. (d) Carrying a stick

individuals in groups were reliably recognizable by observers, it was shown that in 75% of the observations of known individuals, the carrier was an adult male surrounded by other adult males and females. During this display, the carrier exposed its head at the surface while holding the object in its mouth, tossing it, or turning its body on its axis, almost like a dance, apparently to attract the attention of females. Other males exhibited aggressive interactions and excitement, but only one boto in the group was the carrier. This behavior occurs year-round but with higher frequency during the high water season, coincident with estrus (Martin and da Silva 2018), which indicates an association with seasonal mating (Martin et al. 2008). Araujo and Wang (2012) and Entiauspe-Neto et al. (2022) described similar behavior in botos from other geographical areas, such as the Araguaia River (Pará, Brazil) and the Tijamuchi River (Bolivia), confirming its common occurrence. The use of objects or adornment as a socio-sexual display is uncommon in nonhuman species and is rare in cetaceans. Allen et al. (2017) reported the behavior of male Australian humpback dolphins (*Sousa sahulensis*) carrying sponges in their mouths while producing specific vocalizations and performing body postures to attract females.

An encounter between two adult male botos and a Beni anaconda snake (*Eunectes beniensis*) was described by Entiauspe-Neto et al. (2022), who reported that two sexually mature male dolphins became sexually aroused during this interaction with erect and exposed penises, suggesting that this was socio-sexual behavior. This behavior could be predation or teaching juveniles how to kill a snake. However, this anaconda species is small, reaching a maximum length of 2 m, and therefore not a threat to adult male river dolphins.



**Fig. 8.5** Four-year-old subadult male Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) from Mikura Island, Japan, engaged in social-sexual behavior; one was inserting his penis in another member of its pod

Male-male homosexual activity is a prevalent behavior among dolphins, with many observations for individuals in captivity (Andersen and Dziedzic 1964; Amundin and Amundin 1971; Sylvestre 1985; Östman 1991; Zhang et al. 2015) and some opportunistic observations in the wild (Mann 2006; Connor and Krützen 2015; Harvey et al. 2017). Mann (2006) described the homosexual behavior of Indo-Pacific bottlenose dolphins of Shark Bay, Western Australia, in which homosexual interaction among male calves is more frequent (~50%) than heterosexual interactions. Socio-sexual homosexual behavior may benefit males by providing opportunities to practice mating, which is essential for male reproductive success.

In spinner dolphins at the Brazilian Fernando de Noronha archipelago, SW Atlantic, pre-mating behavior was recorded with the male touching a female's flipper or body with his flippers or rubbing, nudging, or gently biting the genital slit with his beak. This behavior was observed among males and juveniles, and intromission occurred during mating-like behavior and the rubbing of genitals against each other (Silva et al. 2005).

Mating behavior was never observed in a study of Indo-Pacific bottlenose dolphins near Mikura Island, Japan, despite hundreds of hours of underwater observation and filming (Mai Sakai, personal communication). However, socio-sexual behavior was often observed, consisting of females mating with their male progeny and mating behavior among sub-adult males (Fig. 8.5), usually with 2 to 14 participants exchanging the roles of performer and recipient, sometimes in mixed groups (Furuichi et al. 2014; Nakamura and Sakai 2014).

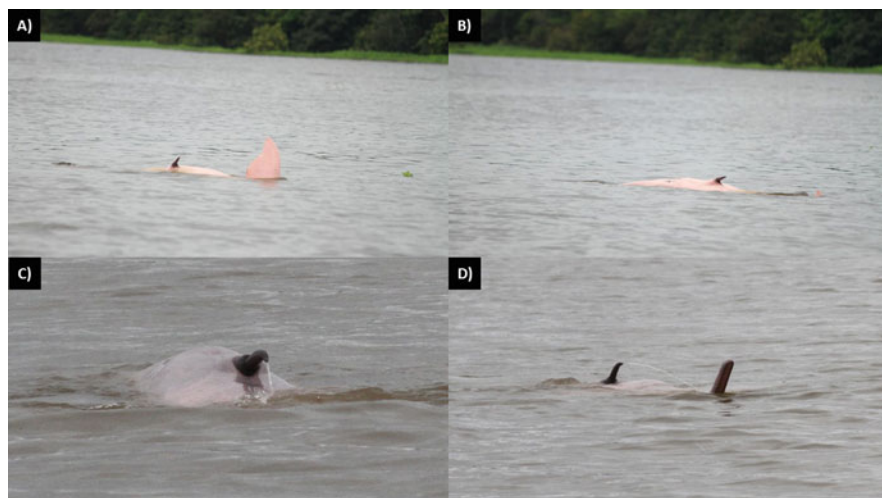


**Fig. 8.6** Homosexual behavior by Amazon river dolphin (*Inia geoffrensis*). (a) One male (initiator) swims belly up under the other male (recipient) with his penis erect and penetrates his genital slit. (b) The botos rotate their body, and the initiator introduced his penis completely into the recipient's genital slit. (c) They stopped rotating their bodies, copulating with their heads in opposite directions. (d) A second attempt to copulate. All activity was performed in a calm and gentle manner

In captivity, homosexual interactions among bottlenose dolphins were first reported by McBride and Hebb (1948) and later by Caldwell and Caldwell (1972). More recently, Serres et al. (2022) analyzed the socio-sexual interactions in three groups of small cetaceans (Yangtze finless porpoise, East-Asian finless porpoise, and bottlenose dolphins) and suggested this behavior among captive males may be associated with dominance hierarchies as described by Serres et al. (2019).

Because of turbid water, underwater observations in the Amazon river are challenging. As a result, tucuxi and boto mating behavior has not been reported despite many hours of monitoring (Projeto Boto unpubl. data). However, opportunistic underwater video recordings in a reservoir with clear water were made of homosexual behavior between two male botos with other individuals swimming nearby but not interfering (recorded by R. Romero/AMPA) (Fig. 8.6). Sylvestre (1985) reported homosexual behavior in captive male botos at the Duisburg Zoo, Germany, and Boede et al. (2018) at the Valencia Aquarium, Venezuela.

Male-female interactions during the mating season and the tooth-rake scars caused by male-male agonistic interactions were observed during the capture and handling of botos by Projeto Boto in the Central Amazon (Martin and da Silva 2006). Botos are sexually dimorphic, with males larger than females, and tooth-rake scars over much of their bodies, especially in adult males (Martin and da Silva 2006). Some larger individuals have areas of modified skin (cobblestones) on the shoulders and the caudal peduncle, which could be used as a shield or weapon during male-male aggression, suggesting competition for mating opportunities (Martin and da Silva 2006). Adult females with tooth-rake scars, although on a smaller scale when



**Fig. 8.7** Social-sexual behavior in an individual context. (a and b) Amazon river dolphin (*Inia geoffrensis*) displaying its erect penis above the water. (c and d) Amazon river dolphin displaying its erect penis above the water and urinating at the same time. (d) The urine stream is directed toward its own open mouth

compared to males, suggest agonistic interactions with males during mating (Projeto Boto, unpubl. data).

Cetacean sexual behaviors may provide individual pleasure in a social context. In several cetacean species, such as Hector's dolphin (*Cephalorhynchus hectori*), humpback whales, bottlenose dolphins, Atlantic spotted dolphins (*Stenella frontalis*), and botos, males display an erect penis above and below the water (Slooten 1994; Pack et al. 2002; Melillo et al. 2009; Araujo and Wang 2012; Projeto Boto unpubl. data) (Fig. 8.7). This behavior can occur in the presence of other individuals or alone and may be associated with self-pleasure, to attract females, or to demonstrate dominance among competing males. Bottlenose dolphins in Bimini, the Bahamas, were observed exposing the penis while supine at the surface and swimming toward Atlantic spotted dolphins (Melillo et al. 2009).

In addition to exposing the penis, adult male botos were recorded urinating into the air while supine and stationary at the surface. This behavior was observed in two boto populations (Araguaia River and Mamirauá Reserve, Brazil) and has been described as a solitary behavior or involving two or more adults, sometimes drinking the ejected urine (Araujo and Wang 2012; Projeto Boto unpubl. data). Araujo and Wang (2012) suggested that aerial urination has a socialization or communication function with a sensory role.

Masturbation has been observed in many animal taxa and is common in dolphins (Lateefah et al. 2022). This behavior, observed mainly in captive dolphins, is still poorly understood and may be associated with sexual frustration, the elimination of excess semen, or sexual display (Morisaka et al. 2013). Most reports of this behavior are from several species of male dolphins in captivity, such as bottlenose dolphin,

spinner dolphin, killer whale, baiji (*Lipotes vexillifer*), and boto (McBride and Hebb 1948; McBride and Kritzler 1951; Harrison and Ridgway 1971; Defran and Pryor 1980; Chen et al. 2001, 2002). The males rubbed their erect penis against the walls, the bottom of the tank, or objects such as brushes left in the tank (Sylvestre 1985).

At the Valencia Aquarium in Venezuela, masturbation and homosexual interactions among captive Orinoco river dolphins (*I. g. humboldtiana*) were commonly observed in females and males from an early age, except when a female was pregnant (Boede et al. 2018). A female boto born at the Valencia Aquarium started interacting sexually with other botos and attempted copulation at the age of 2 years. These behaviors are not hormonally dependent (Boede et al. 2018).

Zhang et al. (2015) described socio-sexual behavior between two female Yangtze finless porpoises in captivity, while Brown (1962) reported this same behavior between different species, such as the pilot whale (*Globicephala* sp.) and striped dolphin (*Stenella coeruleoalba*). Although reports are mainly for captive animals, this behavior also occurs in the wild. Female homosexual behaviors in bottlenose dolphins, Atlantic spotted dolphins, Hawaiian spinner dolphins, and dusky dolphins have been observed (B. Würsig, pers. com.). These socio-sexual behaviors may be associated with companionship, communication, and for providing pleasure. Brennan et al. (2022) described the presence of a highly innervated clitoris in female common bottlenose dolphins and how this structure is functional, sensitive, and stimulated by touch. The females were observed touching each other's genitalia with their rostrum and pectoral and dorsal fin, possibly stimulating the clitoral region.

## 8.4 Animal Boredom

Boredom may be defined as the state of weariness and restlessness through a lack of interest (Campbell 2007; Burn 2017; Svendsen 2019), but it may motivate exploration and learning (Burn 2017). However, the concept of boredom behavior is not yet well understood in animals and is a problematic behavior to measure or evaluate (Mason and Mendl 1993). The available literature is mainly on animals in impoverished environments resulting in frustration and apparent boredom (Latham and Mason 2010; Burn 2017; Mason and Burn 2017; Meagher 2018). No detailed information exists on this subject for dolphins or other cetaceans in captivity or nature.

Like all animals, cetaceans are sentient and use internal and external sensory information to inform and guide their behavior (Brakes and Simmonds 2011). Some behaviors are learned, and some are innate, enabling creative problem-solving or activity to relieve boredom. Indo-Pacific bottlenose dolphins in Shark Bay use tools such as sponges and shells for foraging and play (Smolker et al. 1997; Wild et al. 2020), similar to the Indo-Pacific humpback dolphin (*Sousa chinensis*) (Parra 2007). This activity was learned from other individuals, generating a cultural behavior in this population. Allen et al. (2017) reported a different use of sponges by the Australian humpback dolphins, in which the object was presented to adult females



as a socio-sexual behavior. Whether this behavior was associated with curiosity or the alleviation of boredom is unknown. According to Burn (2017), boredom might motivate young animals to seek stimulation that helps them learn about their environment.

In the rivers of the Amazon basin, botos are surrounded by abiotic and biotic objects distributed along the river banks with riparian vegetation and seasonally flooded forest. Food is abundant, leaving plenty of time for other activities. There are no records of nonhuman predation of botos, although black caimans (*Melanosuchus niger*), bull sharks (*Carcharhinus leucas*), and jaguars (*Panthera onca*) are potential predators.

Botos were recorded on several occasions and in different areas throwing an electric eel, locally known as poraque (*Electrophorus* sp.), into the air with their tail or touching this fish several times with the rostrum, thus receiving some degree of electric shock. This fish can reach up to 2 m, producing an electric shock of up to 860 volts (de Santana et al. 2019). There is no record of botos eating electric eels, although they eat smaller gymnotiform fishes, which produce a low-voltage electric discharge (da Silva 1983). The reason adult male botos choose to play with such fish is unknown, but it causes excited activity. In video recordings of this behavior, a single male dolphin repeatedly harasses the fish ([portalamazonia.com](http://portalamazonia.com); @Eliane Jardim).

One of the most intriguing behaviors of botos is male attacks on conspecific calves, with prolonged and repeated pushing, battering, tossing, and forced submergence, which may or may not be lethal (da Silva et al. 2021). Botos have a wide gape and firm bite, which could kill a calf. The motive for this behavior is not clear, and it does not fit the sexual selection hypothesis of killing a calf to have the mother come into estrus (da Silva et al. 2021). Aggression toward calves usually attracts a large group of botos. It can be described as play, a socio-sexual display, or dysfunctional “flash mob” behavior as described in human crowd behavior (da Silva et al. 2021). The aggression of botos toward neonate Amazonian manatees (*Trichechus inunguis*) was described by da Silva et al. (2022) and suggested similar behavior of play or display because there is little or no interaction between these sympatric species and no competition for food or mates. Rescued orphaned Amazonian manatee calves sometimes have the scars of boto teeth, mainly on the tail and the flippers but not on the head, suggesting that the main purpose of the interaction was not killing (da Silva et al. 2022). These aggressive behaviors toward calves have no apparent fitness advantage and may result from boredom or frustration.

## 8.5 Conclusions

Our general inability to see below the water’s surface makes the observation of cetacean behavior challenging. Most interpretations of behavior are difficult to validate, especially with incomplete observations. Many cetaceans are organized into complex social groups, with little evidence of how social behaviors are

structured. Much remains unknown about the evolution of cetacean social behavior and its importance for fitness. Further information on cetacean behavior associated with play, sexual displays, and boredom may be revealed using autonomous aerial underwater drones to observe fleeting and partially obscured behaviors.

**Acknowledgments** We are grateful to the many individuals who have contributed to Projeto Boto fieldwork, collecting information on boto behavior presented here. The constructive comments and suggestions made by Tony Martin, André Barreto, and Rodrigo Amaral greatly improved our chapter and to whom we are grateful. We also thank the contributions from Dara Orbach, Bernd Würsig, and the revision and editing by Kathleen Dudzinski and Randall Davis. We greatly appreciate our colleagues who generously provided the beautiful photos and videos that illustrate our chapter. During the writing of the manuscript, LS was a student of the PPG—Freshwater Biology and Inland Fisheries at the National Institute for Research—in the Amazon with a scholarship from Aperfeiçoamento de Pessoal de Nível Superior—Brasil (CAPES) (Finance Code 88887.488687/2020-00).

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