

DOLPHINS AND AUTISTIC CHILDREN ENCOUNTERS: THE ANIMAL POINT OF VIEW

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INTRODUCTION Among the animal assisted therapies, the encounter between patients who suffer from communicative disorders such as autism, and dolphins represents an innovative approach if compared with the more consolidated therapies with dogs or horses.

While several studies have tried to point out the effects of these interactions on human beings (Smith, 1983; Nathanson *et al.*, 1993; Nathanson *et al.*, 1997) research on the animals' side is at the moment completely lacking.

This study aims to investigate the behaviour of a *Tursiops truncatus* community during autistic children encounters at the Rimini Delphinarium.

MATERIALS AND METHODS Subject of the study was a community of bottlenose dolphins (*Tursiops truncatus*) – two adults and three juveniles - housed in the Rimini Delphinarium (Table 1).

A specific ethogram, including 35 behavioural elements organized into 3 main classes (“Neutral”, “Approach” and “Avoid”), was first set up and then used during the observations (Table 2).

In June and September 2001 individual-follow (continuous sampling) observations (Mann, 1999) were daily carried out from 08.00 a.m. to 10.00 a.m. during six 20 minutes periods corresponding to as many consecutive children swim sessions. A total number of 120 hours (24 h/animal) of sampling was performed. Frequency and duration values were scored by means of a videocamera and analysed by Observer 3.0 (Noldus, 1997) software and χ^2 Test.

RESULTS Swim participants (animal or children) determined the occurrence, kind and duration of the interactions, since no control of the dolphins' movements was performed by the trainers.

“NEUTRAL” behaviours (frequency 75%, duration 93%), especially “Locomotory and Postural” displays, were the predominant activities seen, revealing that solitary patterns with no relationship neither with humans nor with conspecifics were the dolphins' most usually exhibited activities in assisted therapy sessions (Fig. 1). This result is consistent with Samuels & Spradlin (1995) who studied bottlenose dolphins during swim programs for tourists.

“APPROACH” patterns (frequency 24%, duration 5%) showed gradually decreasing values from “Investigation” “Interest” and subsequently to “Light Contact” behaviours (Fig. 2). In fact, the animals were more frequently seen to be involved in activities as standing in front of or inspecting the human beings. However, as the interaction with children became more intense - e.g. including opening the rostrum, shaking flippers or physical contacts – the frequencies reduced their number.

As for “AVOID” class, fast swim and flipper/tail slap towards the water surface were the only potentially risky displays seen while no evidence of dangerous actions - as hit or strongly pull - for animals or humans was observed.

A significant relationship between interaction and age class was observed with the youngest and still immature individuals showing the highest values of approaches both in frequency (adult=84; young=440) (Fig. 3) and duration (adult=17.0 min.; young=90.5 min.).

According to Constantine (2001), the playful bent of the juveniles' interactive displays - e.g. brief repeated contacts with the childrens' foot and light ceaselessly seizing by the rostrum at the children wet suit's hood - was clearly evident.

Every day six autistic children, one by one and following a random order, swam in the pool with dolphins for a 20 minutes period each. An evident dolphins' decreasing interest in humans appeared after the first three periods, corresponding to an hour from the beginning of the swimming sessions (Fig. 4).

According to Orams *et al.* (1996) and Constantine (2001) and as observed in other mammals (e.g. *Pongo pygmaeus*, *Pan paniscus*), bottlenose dolphin revealed a clear tendency to habituation to a stimulus' presence by a gradual diminishing of behavioural responses.

CONCLUSIONS Although the investigation here presented is far to be conclusive, some of these findings will help in better understanding the animals' point of view during dolphins/autistic children encounters.

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Table 1. Subjects and social contest in the Rimini Delphinarium

RIMINI DELPHINARIUM			
BEHAVIOUR	SEX	BIRTH DATE	PROVENIENCE
ALFA	F	1979	Gulf of Mexico
SPEEDY	M	1970	Adriatic Sea
SOLE	M	03 May 1993	Born in captivity (Alfa x Speedy)
LUNA	F	12 May 1995	Born in captivity (Alfa x Speedy)
BLUE	F	26 June 1997	Born in captivity (Beta x Speedy)

Table 2. ETHOGRAM

		BEHAVIOUR	DESCRIPTION & REFERENCE	
NEUTRAL	LOCOMOTORY & POSTURAL BEHAVIOURS	Circle swim	Swimming clockwise or counterclockwise (Sobel <i>et al.</i> , 1994)	
		Random swim	Random swimming (Sobel <i>et al.</i> , 1994)	
		Glide	Moving forward without swim strokes for at least 5 seconds [Anonymous at Monkey Mia (Australia), 1990]	
		Stand	The dolphin lays inactive in the water (Denkinger & von Fersen, 1996)	
		Exploratory behaviour	Scanning horizontal/perpendicular to the bottom (Herzing, 1996)	
		Pool rub	Dolphin is rubbing side/ventral, back area on bottom (Herzing, 1996)	
		Leap	Entire body clears the water, exit and enter head first (Shane, 1990). Dolphin lifts itself out the water on an angle so that only the caudal peduncle and the tail remain underwater and then falls back into the water (Pilleri, 1986)	
	SOCIAL BEHAVIOUR	Contact	Any behaviour which involved physical contact between two animals (Nelson & Lien, 1994)	
		Chase	One dolphin, or group of dolphins chasing each other in fast, medium, or slow chase (Herzing, 1996)	
		Push	Pushing with the beak, the side or ventral part another animal (Pilleri, 1986)	
		Hit	A dolphin strikes another violently with its rostrum/tail/body [Anonymous at Monkey Mia (Australia), 1990]	
		Sexual behaviour	The animals used their penis to touch every part of each others body even to extend them into the blowhole or rarely into the anus; passive animal was swimming in normal posture on the surface underneath in belly-up (Renjun, 1994)	
		Suckling	When the calf inserts its lower jaw into the mother's urogenital groove and the upper jaw is in contact with the lateral skin of the mammary gland, it suffers its neck as if bracing , with a cessation of tail flexing (Peddemors <i>et al.</i> , 1992)	
	PLAY	Play with objects	Play with a number of different toys, plastic balls, rings, rubber tubes, brushes rugby balls, carried in the mouth of underneath a flipper, balanced on the rostrum or thrown above the surface of the water (Renjun, 1994)	
		BUBBLES	Bubble	Producing bubbles from the blowhole (von Streit & von Fersen, 1996)
Bubble interest	The animals show interest for the bubble movements and follow it up to the water surface (Pace, 2000)			
APPROACH	INVESTIGATION	Swim around the stimulus	Circling slowly stationary objects (Lockyer & Morris, 1986)	
		Stand by in front of the stimulus	Remain motionless [in front of the object] (Pilleri <i>et al.</i> , 1990)	
		Inspection of the stimulus	The object was inspected from a distance of 50 cm, then from 30 cm and lastly from only 2-3 cm away (close inspection) (Pilleri <i>et al.</i> , 1990)	
	INTEREST	Open jaws in front of the stimulus	The dolphins open jaws in front of the object (Lockyer & Morris, 1986)	
		Bubble in front of the stimulus	Producing bubbles from the blowhole (von Streit & von Fersen, 1996)	
		Shaking flipper/head in front of the stimulus	Shaking the flippers (von Streit & von Fersen, 1996). Dolphin moves head vertically/horizontally usually in rapid motion (Herzing, 1996)	
		Slapping the water close to the stimulus	Swimming towards the stimulus, diving under and swerving and slapping the water with the flukes close to the model (Caldwell & Caldwell, 1964)	
		Bring objects to the stimulus	The dolphin brings objects to the stimulus	
		Squeeze in front of the stimulus	Swim in between two or more animals, pushing them apart [Anonymous at Monkey Mia (Australia), 1990]	
	LIGHT CONTACT	Contacts with the stimulus	The dolphin contact the object (Pilleri <i>et al.</i> , 1990)	
		Push the stimulus	Push the object using the beak (Pilleri <i>et al.</i> , 1990)	
		Seize by the rostrum the stimulus	The dolphin takes the object cautiously between its slightly open jaws and bite it (Pilleri <i>et al.</i> , 1990)	
	AVOID	STRONG CONTACT	Hit the stimulus	Spear the object with the tip of the beak [or other parts of the body] (Pilleri <i>et al.</i> , 1990)
			Pull up the stimulus	The dolphin strongly pulls up the stimulus
		AVOIDANCE	Fast swim/extreme agitation	The dolphin would first freeze and then gradually begin swimming faster and faster in small circles (Pilleri <i>et al.</i> , 1990)
Avoiding			The dolphin avoids the object and remains for a long time in the back part of the tank (Pilleri <i>et al.</i> , 1990)	
Passing in front of the stimulus			Mother passes calf very closely, thus carrying it in her wake to her side (von Streit & von Fersen, 1996)	
Jaw clap			An animal claps his jaws together forcefully to produce a sharp loud sound, as form of intimidation or displeasure (Tavolga & Essapian, 1957)	
Flipper or tail slap	Pectoral flipper slapping the surface. [...] Flukes raised above the surface and ventral/dorsal side slapped downward, usually making a loud, percussive sound (Shane, 1990)			

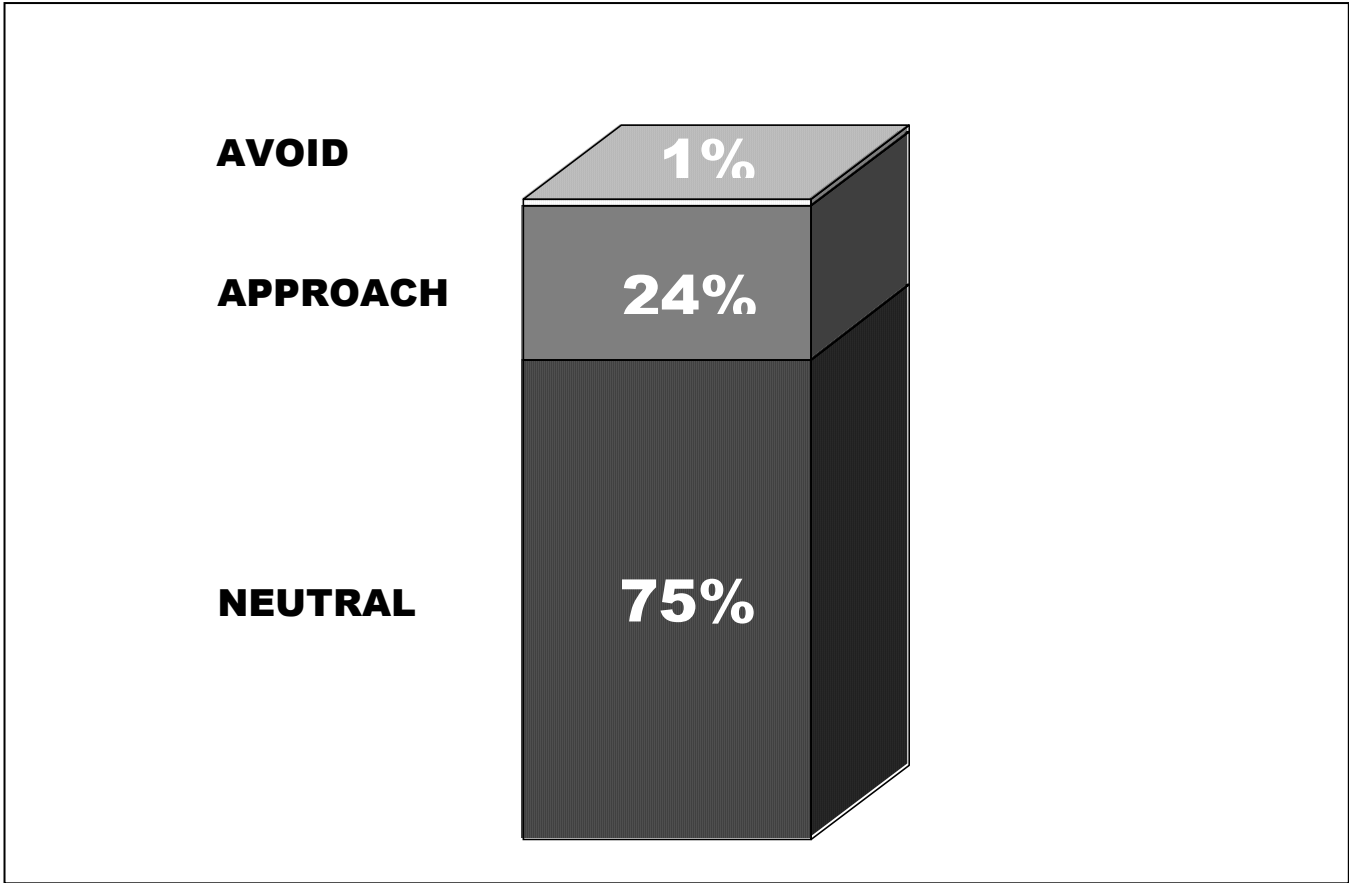


Fig. 1. BEHAVIOURAL CLASSES: Frequency distribution

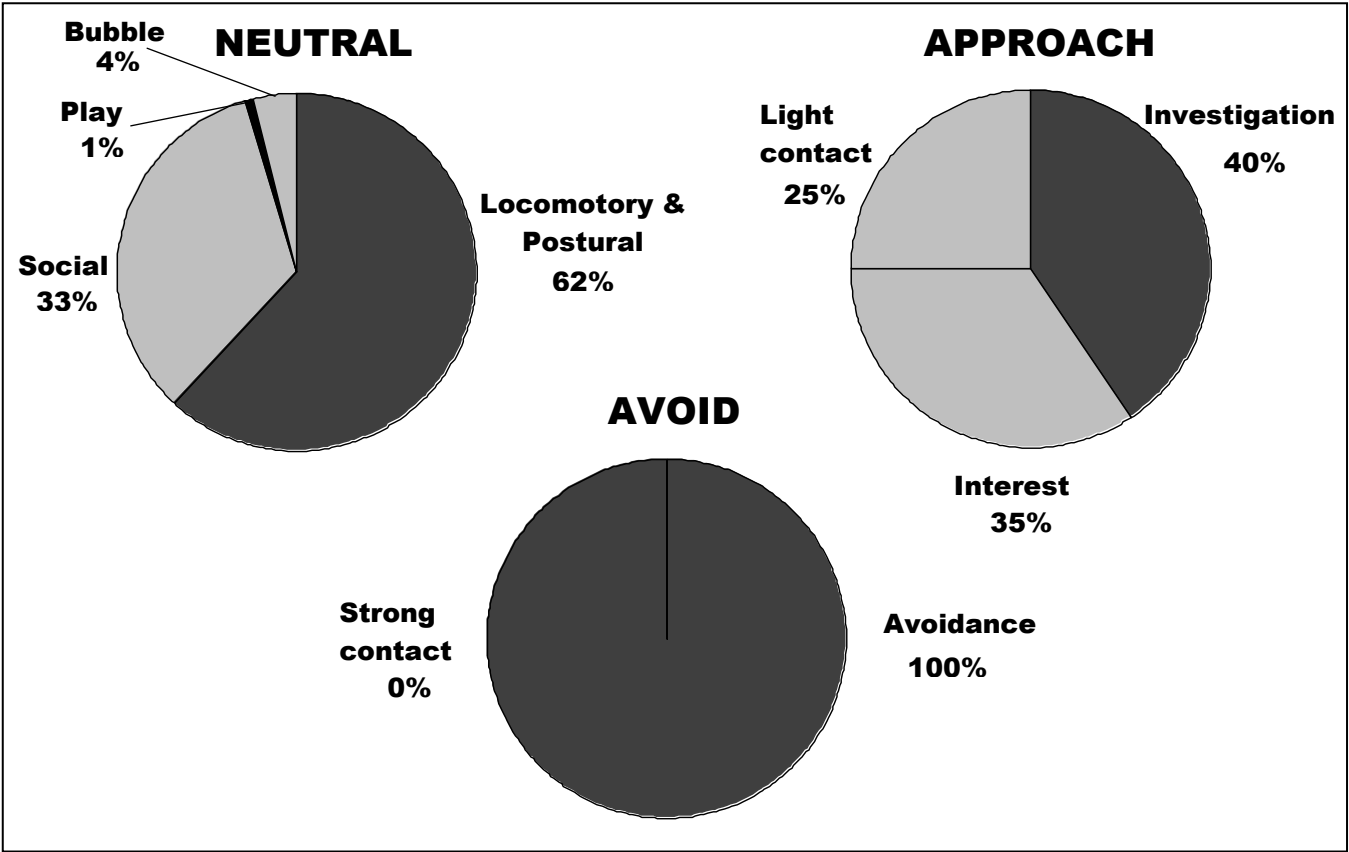


Fig. 2. BEHAVIOURAL CATEGORIES: Frequency distribution

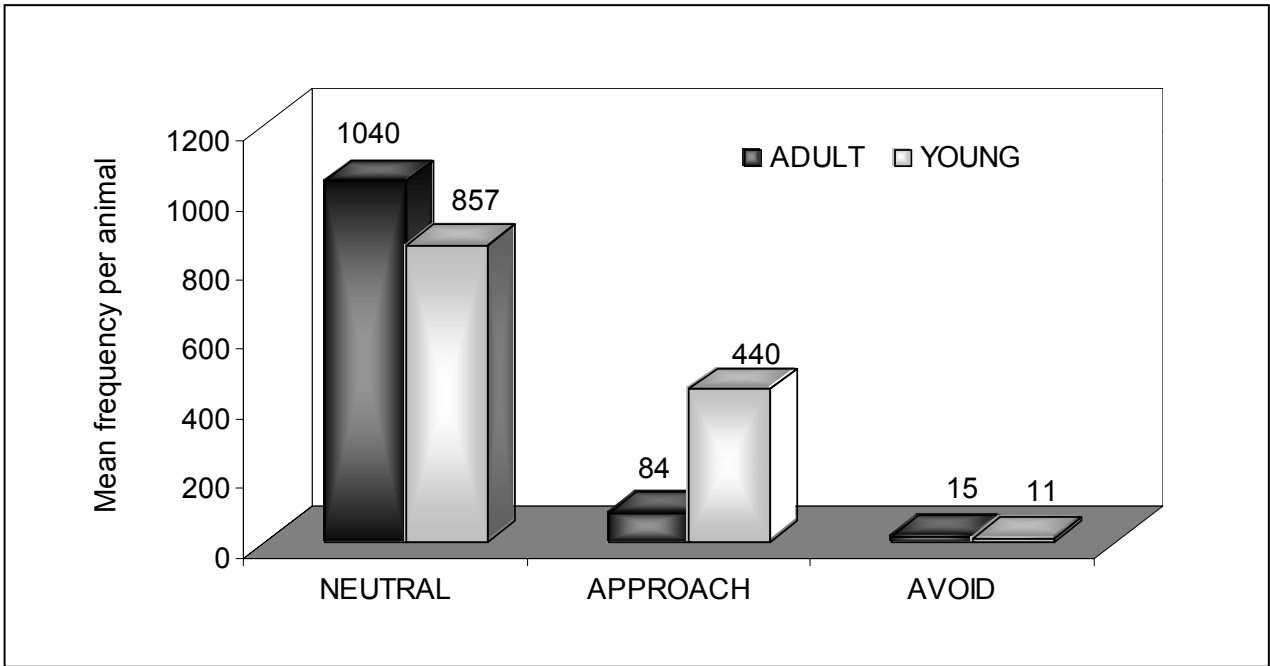


Fig. 3. BEHAVIOURAL CLASSES FREQUENCY DISTRIBUTION: ADULTS vs. JUVENILES

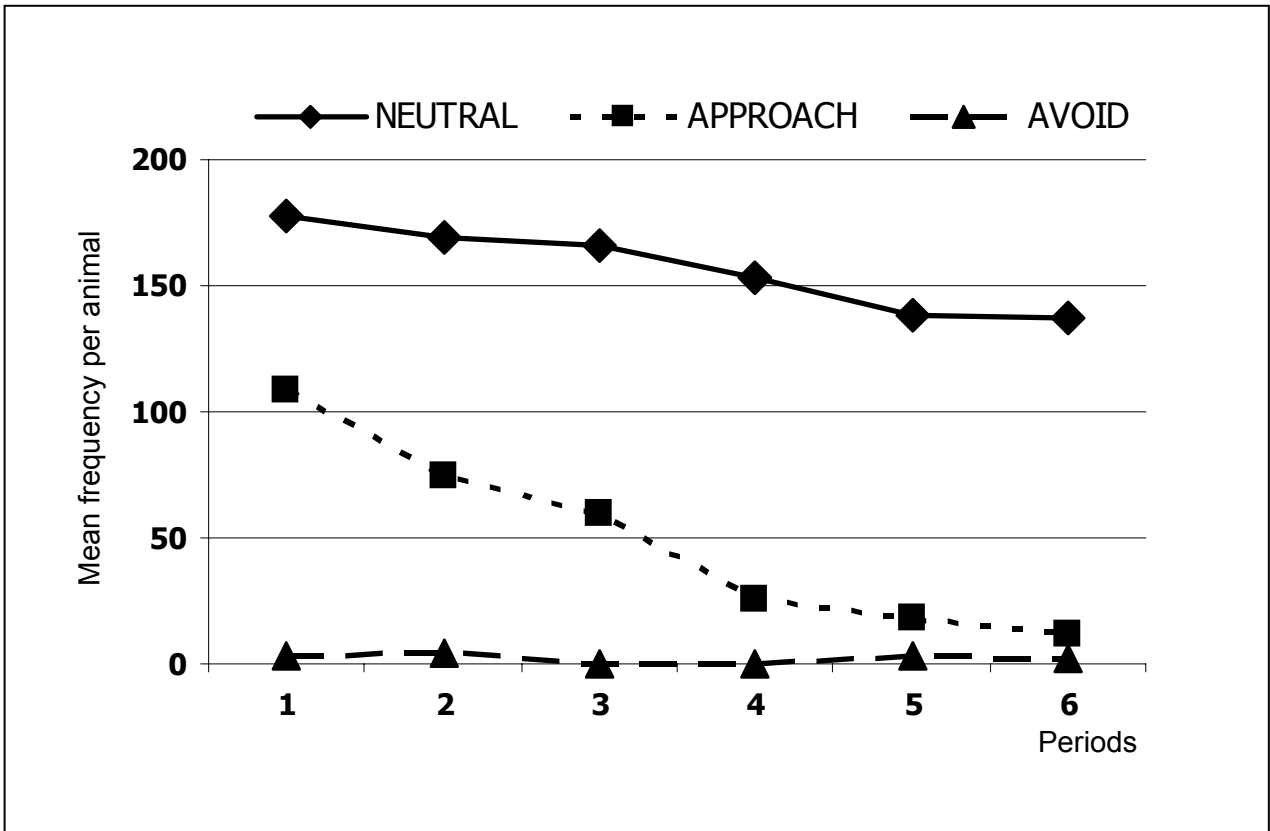


Fig. 4. BEHAVIOURAL CLASSES TREND