

CHAPTER SEVEN

Why Porpoise Trainers Are Not Dolphin Lovers

Real and false communication in the operant setting

By Karen Pryor¹

DOLPHIN LOVERS ABOUND. Everyone who has ever seen "Flipper" on television, visited an oceanarium, or read John Lilly's books thinks that dolphins are cute, playful, friendly, harmless, and affectionate to each other and to man, that they save drowning people, and that they are possessed of extraordinary intelligence and a rich communication system comparable perhaps to our own.

Porpoise trainers know otherwise (many prefer the word "porpoise" to "dolphin" because it differentiates the mammals from a pelagic fish, *Coryphaena hippurus*, which is also called "dolphin.") The novice trainer quickly learns that porpoises can be very aggressive. They are highly social animals, to which rank order is a matter of considerable importance. Aggressive interactions between porpoises, usually during dominance disputes, include striking, raking with the teeth, and ramming with the beak or rostrum, sometimes with serious consequences, such as broken ribs or vertebrae, or punctured lungs, in the

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rammed animal. A dolphin that has become accustomed to humans shows no hesitation in challenging the human for dominance, by means of threat displays and blows; a person who is in the water with an aggressive porpoise is at a dangerous disadvantage. The sentimental view that these animals are harmless stems at least in part from the fact that they are usually in the water and we are usually on boats or dry land; they can't get at us.

Interaction with porpoises in a training situation, usually with the trainer at tank-side, also brings their vaunted intelligence under pragmatic scrutiny. A poll of experienced trainers reveals that some trainers, after working with many individual animals of several species for five years or more, were not willing to place porpoise intelligence levels above that of dogs; the majority of the respondents, however, agreed with the dictum that porpoise intelligence is "between the dog and the chimpanzee, and nearer to the chimpanzee" (by no means, however, does it appear to trainers to be equal to or superior to that of the great apes.)

A confounding effect of this question is that most of the porpoises kept in captivity are Atlantic bottlenosed porpoises, *Tursiops truncatus*, a coastal species which is highly adaptable, plastic in its behavior, and an opportunistic feeder, showing a marked tendency to play with and to manipulate objects, and some tolerance for solitude. Other genera of Delphinidae, such as pilot whales, belugas, and the small, pelagic, white-sided, spinner and spotter porpoises, exhibit quite different behavioral profiles. Spinner porpoises (*Stenella longirostris*), for example, show very little tendency to play and high avoidance of foreign objects. They have difficulty negotiating barriers or obstacles, seldom learn to tolerate (much less solicit) human touch, and become inappetent and in fact rapidly moribund if kept in isolation from species mates. It is perhaps unfortunate that the popular view of porpoises is based on the genus *Tursiops*, the bottlenose, which is in fact a rather anomalous member of the Delphinidae, behaviorally.

Nevertheless, whether the subject is an inactive pilot whale, a very active but timid spinner, or a bold, aggressive bottlenosed dolphin, the trainer can train it: not by loving it, or even liking it—

one may find oneself cordially despising a particular individual—but by operant conditioning (Defran and Pryor 1980).

People often ask a working trainer about “communication,” John Lilly having established an apparently ineradicable mystique by holding that there is something unusual about dolphin communication (Lilly, 1961). The flippant answer is that anyone can communicate just fine with a whistle and a bucket of fish.

In fact what is “different” about porpoises, compared to other frequently trained animals, is the manner in which they are trained. Aversive methods are virtually unavailable. The porpoise trainer cannot use the choke chain, the spur, the elephant hook, the cattle prod, or even a fist, on an animal that can swim away if alarmed. As they cannot “get at” us, so we cannot “get at” them.

The laboratory psychologist’s mind may at once turn to devising some arcane method of punishment. In fact, punishment is unnecessary. Other than the mild negative reinforcement of a brief interruption of the training session, (a “time-out”) porpoise trainers achieve highly disciplined and complex responses entirely with positive reinforcement.

The proliferation of trained porpoise shows, as well as some rather limited use of trained porpoises as domestic animals working in the open sea, has paralleled in time the promulgation and increasing public awareness of the laws of operant conditioning described by B.F. Skinner and others. Unlike traditional animal trainers, porpoise trainers are not only at the mercy of these laws, they are aware of them, and use them consciously. The jargon of the porpoise trainer is the jargon of the laboratory: successive approximation, conditioned stimuli, variable schedules of reinforcement, and so on. Unlike the shaper working under laboratory conditions, however, the porpoise trainer, in addition to being largely limited to positive reinforcement, is interacting with the animal; he or she can see the animal, the animal can see him or her, and both can introduce changes in the training process, at will. It is a situation, both rigorous and admitting of spontaneity: a game.

The game has “rules” on both sides: “I will reinforce you only for jumps in which you do not touch the hoop as you pass

through it;" "I have come to expect a fish for at least every three or four jumps, and will stop jumping if you let eight or ten responses go unrewarded." It is a game in which challenge is always present, as the trainer, mindful of the various techniques for maintaining response levels, raises criteria or introduces new criteria; but, at least in the hands of a skilled trainer, it is a game that the animal always, eventually, wins.

A dog or a horse learns responses because it must do so to avoid aversive stimuli; a pigeon in a Skinner box must work, because it is hungry; and when we train people, we generally use a mix of positive and negative, of praise and coercion, though sometimes covert. There is little coercion, however, in the porpoise-trainer interaction (even food deprivation is hazardous, and seldom used) and this has an effect upon both trainer and animal. The animal is, as it were, training the trainer to give fish, and thus is shaped towards finding new ways to elicit fish; it is shaped in fact towards innovative response. The trainer in turn may become a very skilled and imaginative user of Skinner's laws. Porpoise trainer shoptalk (as opposed, let us say, to racehorse trainer shoptalk) is generally concerned with ingenious shaping programs, or novel use of operant conditioning techniques and not with the personalities or achievement of individual animals. It is the fascination of the game that keeps porpoise trainers in their strenuous, low-paying jobs, year after year, and not the fascination of the animals themselves. Many trainers in fact come to prefer the more reliably conditionable pinnipeds, and some greatly enjoy working with birds, another group that cannot be trained aversively.

This is not to say that every porpoise trainer is a walking compendium of Skinnerian laws. The less educated trainer, or the self-taught trainer working in isolation, may be full of superstitious behaviors ("You have to wear white; dolphins like white") or may be unable to say how he is cueing his animals, and thus fall victim to Clever Hans phenomenon, maintaining, for example, that his animals respond telepathically. The animals of course quickly develop superstitious behavior too; for example, only responding to trainers in white clothes.

The nontrainer, interacting with dolphins, is also apt to misinterpret, especially in the matter of social signaling. He may, for example, interpret the gaped jaw, a threat display, as a "smile," or touches and jostling as affectionate play, when they are often dominance challenges. Dr. Lilly made much of anecdotes concerning a male porpoise making sexual advances to a human female, but male bottlenosed porpoises in captivity may exhibit sexual behavior towards almost anything; and it is a behavior which, after all, we do not find intelligent or endearing in male dogs (Lilly 1978).

The interactive, positive-reinforcement training setting is an excellent way to become acquainted with the nature and function of social signals in an unfamiliar species. You do not need months or years of observation to discover which gestures, postures, and acts are aggressive, which affiliative, and so on. For example, in spinner porpoises, an extremely loud echo-location click-train is a threat display. This may not be obvious the first time you swim with spinners; if it is immediately followed by a sharp blow of a dorsal fin to your upper arm, you will recognize it the second time you hear it, and prepare to take evasive action.

In the operant setting, most large mammals quickly direct their intraspecific social signals at the trainer. They are not begging; begging does not work; they are exhibiting frustration, making submissive or aggressive displays, and so on, both giving and garnering information. One of the commonest trainer-directed social signals is sudden eye contact, which can be described metaphorically as the "Am I on the right track?" eye contact. Verifying that the trainer is indeed watching, the animal then escalates the vigor or duration of the response, and thus earns reinforcement. This is not a behavior seen only in porpoises, although they make eye contact more often than many other mammals; I have experienced this specific social interchange of information in an operant conditioning setting with an elephant, a wolf, a hyena, several polar bears, and primates.

The wise trainer makes use of whatever social signaling he feels he can accurately interpret. The animal can make use of this communication link too. Porpoises, for example, probably do not care what we think of them, and, according to Gish, do

not necessarily, in their own acoustic social signaling, increase volume to add emphasis; nevertheless porpoises can learn that human increased volume—yelling—means “I mean it!” and respond appropriately, not from fear or a desire to please, as a dog might, but from having gleaned the appropriate information in training interactions (Gish 1979).

The richness and detail of information available in the operant setting enables communication to occur on a level considerably exceeding that of the usual interactions between man and beast. The porpoise trainer, for example, can change his tankside location to indicate when he wants previously conditioned responses, and when the animal is at liberty to earn reinforcement through new responses. A porpoise can indicate through a series of totally wrong responses that the quality of the fish reward is not satisfactory; this device is not uncommon in research animals being fed from feeding machines, in which fish may dry out or spoil. The porpoise, through actions, and with eye contact, may deliberately test the trainer's criteria: take, for example, this episode (Pryor 1975):

Two false killer whales (*Pseudorca crassidens*) have been trained to jump a hurdle simultaneously, in opposite directions. The behavior, used in daily public performances, has deteriorated, due to trainer carelessness. One whale now always jumps too late, spoiling the effect of the mid-air crossing of trajectories. A corrective training session was held, as follows:

(1) Trainer presents cue (an underwater sound). Both animals approach hurdle. Animal A jumps from the left; the conditioned reinforcer (a whistle) is sounded, and the cue is turned off; animal B then jumps from the right. Animal A receives a handful of fish. Animal B returns to trainer but is not reinforced.

(2) Trainer presents cue. Both animals approach the jump, jump simultaneously in opposite directions, hear the whistle, the cue is turned off, and both are rewarded with 2 pounds of fish, many small fish (>10) dumped directly into the animals' large mouths. These are very large animals, and that constitutes the usual reinforcement.

(3) Trainer presents cue, and the first episode is repeated, with animal B jumping late, after the cue is off, getting no whistle, and no fish.

(4) Trainer presents cue and animal B does something quite unprecedented; it switches sides and jumps in synchrony with animal A, but from the left or same side, hearing the cue, and the whistle, but getting no fish.

(5) Trainer presents cue. Both animals jump, and from opposite directions, and animal B is just slightly late. Animal A receives 2 pounds of fish, and animal B gets one little 2-ounce smelt. Animal B physically startles, and makes eye contact with the trainer.

(6) Trainer presents cue. Animal B increases swimming speed and makes a perfect jump, opposite to and in synchrony with animal A. Both animals are given 4-pound rewards. Both animals henceforth perform the response correctly, eight times a day.

Does this demonstrate these large delphinids' "intelligence?" Perhaps: One would not expect such methodical testing of the criteria by a spinner porpoise, which has a behavioral repertoire generally more limited and rigid than that of *Pseudorca*. However, the anecdote may demonstrate the kind of communication that can arise purely through operant conditioning and through using positive reinforcement flexibly. Nothing in the "rules" suggests that half a reinforcement should convey the information, "You're about half right." But whether or not that interpretation represents what truly happened, there was information in the unusually tiny reinforcement, information possibly accessible to an animal that had experienced the earning of many consistently larger reinforcements, information that the animal, to all pragmatic intents and purposes, recognized and made note of.

Gregory Bateson has stated that operant conditioning is a method of communicating with an alien species (Bateson, pers. comm.) Others have suggested that the various language acquisition experiments with apes are nothing more than glorified operant conditioning.

Whether what the apes do is related to language, as we use language, is beside the point to a porpoise trainer. Like the porpoises, the apes have experienced very elaborate operant conditioning programs, in a setting conducive to interchange of social signals and a setting which, while rigorous, is admitting of spontaneity on both sides. It is a training circumstance that is rather rare in the world at large. What seems evident, and is

taken now almost for granted by many researchers, is that at least chimpanzees are capable of assimilating enormous numbers of signs—conditioned stimuli, if you will—and of attaching correct meanings to these signs. A signing chimp, or even an ape that merely recognizes some signs (such as some orangutans and gorillas now do at the National Zoo) is capable both of giving and receiving information that is far more subtle than that normally conveyed between a person and a pet animal or a caged specimen. Something is developed; it may or may not be language; it is certainly heightened communication.

Innovative responses, and increased communication, thus may be not so much an indication of unusual or near-human capabilities in a species, but rather an artifact of the effect of advanced techniques ("glorified," if you like) of operant conditioning in opening pathways for communication, including two-way and unpremeditated communication, between other species—perhaps many other species—and man.

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