The idea that human interaction with dolphins may be beneficial was first formulated in the 1960s by John Lilly, who studied dolphin-human communication and suggested that dolphins could help humans learn to communicate better with one another. Lilly's ideas were extended into the 1970s when dolphin researchers began examining the effects that interacting with dolphins appeared to have on children with neurological impairments (1).

The choice of dolphins for this interaction program with ASD children and many other such programs has been based on a number of factors namely: positive image of these animals in the general population (big, protective, friendly aquatic mammals, intelligent and communicative); curious, easily and willingly trainable; capable of sustaining complex interaction with humans when properly conditioned; general cooperative and playful attitude; accepting physical contact, including hugs, caresses and kisses; non-threatening expression; soft skin, and delicate movements. These factors have been suggested as useful, in facilitating the establishment of their relationships with humans, with possible therapeutic effects in children (2).

However, most of the empirical research on the effectiveness of dolphin-assisted therapy has been conducted in the last decade and has been carried out primarily by those who operate dolphin-assisted therapy programs and other "dolphin-swim" programs (3). Autism spectrum disorder (ASD) is a brain developmental disorder, characterized by impaired social interactions, communication deficits, restricted interests and repetitive and stereotyped behaviors (4).

The combination of desperation and a lack of effective treatment options provided by the physician may lead parents to pursue treatments with little or no empirical support. The number of diagnosed cases of ASD has increased ten times in the past 20 years with the current rate of one in every 166 children born being diagnosed (5). In spite of the popular appeal, scientific evaluation of this therapeutic strategy has been scarce and controversial. “Dolphin Assisted Therapy” (DAT) has been examined in a relatively low number of studies, almost always
affected by severe methodological limitations (2).

Supporters and therapists of DAT claim it is effective in treating people with clinical disorders as well as conditions including autism, epilepsy, Angelman syndrome, Down syndrome, dyslexia, Rett syndrome, Tay-Sachs disease, Tourette syndrome, William syndrome, cancer, and AIDS. (1). The Autism Spectrum comprises a set of related pervasive developmental disorders (PDDs) that are all characterized by atypicalities in the domains of communication and socialization and by a restricted and repetitive pattern of interests and activities. The disorders subsumed under this spectrum include Autistic Disorder, Asperger’s Disorder, and PDD-Not Otherwise Specified (PDD-NOS), which together affect approximately 1% of the population and are around three to four times more common in males than females (6). Interaction programs involving dolphins and patients with various pathologies or developmental disorders (e.g., cerebral palsy, intellectual impairment, autism, atopic dermatitis, post-traumatic stress disorder, depression) have stimulated interest in their beneficial effects and therapeutic potential e.g., (2).

Despite these persistent threats to validity and the lack of empirical support for DAT, it is not surprising that many health professionals have continued to offer such treatment as an option.

Likewise it is not surprising that those seeking treatment continue to heed the recommendations of both health professionals and the media to employ purveyors of DAT (5).

**DAT (Dolphin Assisted Therapy) Impact**

Children with Autism spectrum disorders (ASD) have reduced capacity for social interactions, such as mutual gaze, pointing, showing objects of interest and answering back when called. They show a lack of emotional resonance that disturbs the translation and interpretation of the emotions of others. These limitations are linked to their difficulties in the establishment of primary and secondary intersubjectivities, conducive to a richer communication and to the development of language (2).

DAT consists of defining a treatment goal for the individual child, such as completing a gross or fine motor task (e.g., placing a ring on a peg) or producing a language behavior (e.g., independently saying a word). Materials used as adjuncts to therapy are typically present during a DAT session, including rubber balls or rings for eliciting motor responses, or flash cards depicting objects for language responses. Children receive on-dock orientation to the dolphins, with the child and the child’s therapist typically sitting at the edge of a padded floating dock about 2-3 inches above the water, while a dolphin trainer controls the movements of a dolphin in the water. During orientation, children are able to touch or play with the dolphin from the dock or to give hand signals to the dolphin to elicit specific dolphin behaviors (3). Nathanson claim that dolphin human therapy has successfully increased motivation, gross and fine motor skills, speech, language, and attention. They also claim that two weeks of therapy is just as good if not better than six months of other traditional treatments. Humphries evaluated six studies supporting DAT and
found all of the studies were at risk for investigator bias, novelty of the therapy, and multiple treatment interference (5).

In addition to ultrasound-based theories, Nathanson based his dolphin-assisted therapy on the theory that, as a result of swimming with dolphins, children will increase their attention to stimuli in the environment. Nathanson’s attention deficit hypothesis implies that people with mental retardation and other disorders are unable to learn because of a deficit in physiological attention to the important details of the stimuli and not because they are unable to process information. This contributes the overar-ching theory that animals increase attention for individuals, therefore leading to improved cognitive processes such as enhanced learning, motor skills, language, and memory (5).

Facts in Society

Researchers and practitioners of DAT as well as parents with children diagnosed with an ASD should be aware that support for this type of treatment has not been empirically validated. Studies that have been held up as supporting DAT have serious methodological flaws rendering their results weak and meaningless. Alternative treatments have sprung up, many with associated risk, with no empirical support and little documentation. However, many of these unconventional methods have the backing of major organizations supporting families with special needs children (5).

As the popularity of DAT has grown, claims of its therapeutic benefits have also grown, primarily through anecdotes reported via mainstream media channels. Such reports claim that dolphin-assisted therapy helps children with post-traumatic stress disorder, autism, Down's syndrome, cancer, and other neurological, physical, or psychological conditions. The reports assert that the therapy’s success rates for physical or behavioral improvement are as high as 90%. Critics of the therapy suggest that DAT is similar to interactions with domestic animals or to taking a warm bath and, therefore, question the validity of the reported benefits. Further, critics claim that the therapy has potential for causing harm to participants since there have been reports of injuries during dolphin-swim programs (3).

Prevent the Occurrence of Prenatal Autism

Genes play a significant role in the risk of autism, and disease-related genes may be identified in up to 25% of children with autism. However, a variety of environmental factors may increase the risk of autism and prenatal valproate exposure would be a modifiable environmental exposure. Autism spectrum disorders are characterized by social and communication difficulties and by stereotyped or repetitive behaviors and interests. The autism spectrum disorders include childhood autism (autistic disorder), Asperger syndrome, atypical autism, and other or unspecified pervasive developmental disorders. We analyzed the risks associated with all autism spectrum disorders and with the most severe of the autism spectrum disorders, childhood autism (7).

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