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This dissertation reviews the literature on the specialty area of dolphin assisted therapy (DAT), a subfield of animal assisted therapy (AAT). To date the literature on the effectiveness of DAT has been mixed although a majority of it is positive. The study was conducted with 40 parents whose children were attending a 2 week, 10 day DAT program in the Ukraine. A parent report scale using the Behavior Dimensions Rating Scale (BDRS) was administered on site pre and post therapy. The results support previous positive evidence in the field and suggest that this DAT program is effective with special children with special needs. More research should continue in the field to add to the body of knowledge by replication of DAT studies. Further research could include focusing on the theoretical assumptions of how it works. This research could help in creating national or international standards of practice, and to legitimize the field providing credible, ethical and quality services which affects both the humans and animals involved.

A Summative Evaluation of a Dolphin Assisted Therapy Program for Children with Special Needs

by
Rachel M. Dilts

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Rachel M. Dilts, Author

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Chapter 1
General Introduction: Linking the Manuscripts Thematically

The purpose of this dissertation is to explore the topic of Dolphin Assisted Therapy (DAT) effectiveness and the clinical implications for counselors through the summative evaluation of a DAT program for children with special needs. The themes that are drawn include the necessity of empirical research to continue in DAT, where it is lacking, and the implications of this research. The first manuscript, a literature review, examines DAT through its history, its terminology, and through review of the professional and popular literature in the field. Further, it looks at the uses of DAT and how it works, including the implications of both. Animal Assisted Therapy (AAT), the larger field in which DAT resides, continues to gain popularity and even has a center devoted to this kind of research. This center, called the Delta Society (1996), describes its organization as "an international, not-for-profit organization of pet owners and health or human service professionals. Its mission is to promote animals helping people improve their health, independence, and quality of life" (p. 81).

DAT is a subfield of AAT has been used increasingly since its inception, but there has continued to be a lack of research documenting its effectiveness. The promise of DAT through the small amount of research conducted, however, suggests it is an incredible catalyst for positive change in people's lives. The need for more research is fundamental for supporting evidence of its effectiveness. This support could secure

funding for programs to help people who could benefit from it. Thus, there are implications for training, education, and ethical issues to be addressed.

The second manuscript, a research study, includes data collection and analysis through a summative evaluation of a DAT program with for children with special needs. Some literature has suggested inconclusive results and even discounted DAT, but the majority seems to suggest it is effective. This disparity is a reason why more research needs to be conducted in the field: to provide credibility for the therapy. If it is as effective as most of the research claims, then DAT may involve specialized training in the future, and this will come from building the nomothetical net for DAT effectiveness. If specific expertise is required for offering services, as is the situation in many areas of counseling (ACA, 2005), then being trained and competent becomes an ethical issue.

As of yet, there are no licensed, standardized trainings or certifications for counselors in DAT. Individual DAT programs may offer their own training programs, though. AAT offers some certifications, but the specialty field of DAT does not include this, possibly due to the deficiency of research and the disparity of findings. Continued empirical research is recommended in the field of DAT to help it be recognized as a credible form of therapy.

What is DAT?

DAT seems to be born from the term *Animal Assisted Therapy* as defined by the Delta Society (1996):

> a goal directed intervention in which an animal that meets specific criteria is an integral part of the treatment process. AAT is directed and/or delivered by a health/human service professional with

> specialized expertise and within the scope of practice of his/her profession. AAT is designed to promote improvement in human, physical, social, emotional, and/or cognitive functioning (p. 79).

Levinson (1984) calls the area of AAT human/companion animal therapy. He describes it as a process that introduces a companion animal into the life of a person to enhance emotional well-being. There have been many names for this, but the term *AAT* is the one most cited in the professional literature and used in this manuscript. AAT is also used with a variety of animals, not just traditional companion animals. Thus, horses and dolphins are used for treatment. DAT does not seem to be formally defined, itself, but is rather seen as AAT using dolphins as the animal.

DAT is a subfield of AAT that uses dolphins to assist in the treatment of people. The assistance can be part of multiple types of therapy depending on the needs of the clients. The role of the dolphin is to help clients reach their goals in therapy using a program that may include physical, occupational, and/or counseling methods. Many DAT programs offer multiple types of therapy to clients in addition to the sessions with dolphins as part of a multimethod approach to healing.

Historical Perspective

A relationship between animals and humans has been around since the start of humankind and increased after humans began to domesticate animals. The use of animals in therapy, according to Macauley (2006), was documented in 1792 at the York Retreat in England, which used farm animals to improve the attitude of mental health patients. Since then, it has grown into a professional field, in which the Delta Society is

the leading U.S.-based organization dedicated solely to the research of human animal relationships (Delta Society, 1996).

DAT seems to have started in the 1970s with Betsy Smith, although published empirical research didn't begin until the 1980s. Smith (2003) details the use of dolphins as an integral part of treatment with autistic children. She initially watched her mentally disabled brother benefit from dolphin interactions, which led her to conduct her own studies. She found that children diagnosed with autism exhibited dramatic, observable behavioral differences. In one instance, two autistic children were able to each hold a side of a bucket, lift it together, and pour water from it over a dolphin. Never before had these two children demonstrated interactive, mutually cooperative play. Many stories and accounts of dolphins and their positive effects on humans are also in popular literature. Currently, however, there is little research on DAT published in professional journals.

Who Can Benefit From DAT?

One of the most popular groups of people to benefit from DAT is children with developmental disabilities or pervasive disorders, which could be classified under the more general term of *special needs*; this the most researched population (Brensing & Linke, 2003; Lotan, 2006; Lukina, 1999; Nathanson, 1989; Nathanson & de Faria, 1993; Nathanson et al., 1997; Nathanson, 1998; Servais, 1999; Smith, 1987; Smith, 1988). DAT has also been shown to be effective with populations of people who have depression, anxiety, or physical pain (Antonioli & Reveli, 2005; Likura et al., 2001;

Webb & Drummond, 2001). Thus, for people who have tried other, more available or traditional treatments that have not worked, this could be another tool to help them.

DAT appears to benefit the dolphins, as well. Dolphins seem to be inherently interested in attention, and they enjoy and even seek out human contact (Smith, 1987). For those dolphins already in captivity, DAT could provide that needed contact while also helping people. There is limited research in DAT with wild dolphins versus captive ones. If wild dolphins are effective, then an increase in the number of people seeking this service could occur. It would thus be important to see how these dolphins could be incorporated into DAT and whether there are ethical implications of such use. Currently, there are a few swims with wild dolphins available that are used for therapeutic purposes. These dolphins are in their natural habitat, and humans encounter them only when the dolphins approach them.

Implications

Complementary and Alternative Medicine

DAT as an alternative or complement to traditional therapies shows promising results and could have potential health benefits (Nathanson et al., 1997; Nathanson, 1998a). Alternative therapies have been used with clients to promote healing in many capacities, and DAT as part of AAT could be considered a type of Complementary or Alternative Medicine (CAM). CAM is described by the National Cancer Institute (2001), as cited in Johnson, Meadows, Haubner, and Sevedge (2003), as “a broad range of healing philosophies, approaches and therapies, and is complementary when combined with traditional medicine and alternative when provided alone” (p. 56).

Some insurance companies do fund CAM as long the treatments are shown to be empirically sound as evaluated through repeated research efforts. The ability for specific populations to have access to DAT could be based on more researchers producing sound results that support its benefits.

Professional Training

Counselor educators could be part of the process of training counselors in these kinds of alternative therapies and in helping to create local, state, national, and international standards. Yet standards and training for DAT have not yet been adopted, possibly due to the issue of lack of research. The more research that can be produced and the credibility of findings published, the more promise there is for a future of DAT that provides high quality and standardized treatment for the benefit of clients.

The role of a licensed professional in DAT is very important. School and community counselors should be aware of this type of treatment in order to make referrals and/or be involved in the treatment process itself. Some insurance companies might approve this kind of treatment only with licensed professional counselors, social workers, physical therapists, or occupational therapists, depending on the diagnosis of the client. Many DAT programs do not have licensed professionals on staff, and in order to bill insurance, they may invite the client's counselor or therapist to be part of the treatment.

Counselors and psychotherapists must be competent when delivering specialized techniques with clients (ACA, 2005). The American Counseling Association (ACA) *Code of Ethics* (2005) states, "Counselors must practice only within the boundaries of

their competence, based on their education, training, supervised experience, state and national professional credentials, and appropriate professional experience" (C.2.a. Boundaries of Competence). Similarly, the APA *Ethical Principles* (2002) states that, "Psychologists provide services, teach, and conduct research with populations and in areas only within the boundaries of their competence, based on their education, training, supervised experience, consultation, study, or professional experience" (Principle 2.01a Boundaries of Competence). To provide this level of competence, mental health professionals would need to be informed and get experience in DAT, as well as be involved in research and application.

Research Process

The second manuscript focuses on additional research needed in the field by the collection and analysis of data in a DAT program for children with special needs. The program selected for study was located at an international site; thus the data collection was done remotely. The specific role of the site was to follow directions provided by the researcher to collect data on site. The director of DolphinSwim was the site contact. The collection process went smoothly due to specific directions given to him regarding (1) the paperwork to be handed out first (informed consent), (2) the protocol for administering the scale to willing participants, and (3) the process to code paperwork to protect confidentiality. The data collection sequence was the site's only role, and they sent the data to the researcher by email immediately after it was collected. When questions arose, the site contacted the researcher by email.

The role of the researcher included securing the site and everything leading up to data collection. This included drafting the research question and design, and submitting a research proposal for approval. Afterwards the analysis and interpretation of data was conducted. In addition, the researcher gave clear directions for data collection, organized paperwork coherently, and made early deadlines for the site, thus allowing for any questions or problems that could arise to be addressed before the research began. This resulted in a successful collaboration. These roles and procedures have implications for future researchers interested in doing remote studies, which will be discussed later.

Ch 2
Literature Review Manuscript

Abstract

This article reviews the literature on the specialty area of Dolphin Assisted Therapy (DAT), a subfield of Animal Assisted Therapy (AAT). The examination of the literature starts in the field of AAT through discussing terminology, definitions, history, uses, and theoretical assumptions about how it works. The field of DAT builds upon this review and looks specifically at popular literature and empirical research. To date, the outcomes on the effectiveness of DAT have been mixed although a majority is positive. Among many themes, it seems to have both a stimulatory and a relaxing effect on patients, which span a wide variety of diagnoses from depression, anxiety, and pain relief to children with special needs. If the research in DAT continues, then the creation of best practices and standards in the field and additions to the nomothetical net will be increased.

Chapter 2
A Summative Review of Dolphin Assisted Therapy Literature

Animal Assisted Therapy (AAT) has become increasingly popular, and its use spans a variety of populations. There are many different animals used in the field of AAT, most often dogs, cats, and rabbits (Stanley-Hermanns & Miller, 2002). Macauley (2006) reports other animals have been used in therapy, as well, including turtles, chicks, pigs, fish, and horses. The use of horses is also known as hippotherapy. Dolphins have been used increasingly with disabled, mentally ill, and terminally ill people (Brensing & Linke, 2003).

Animal Assisted Therapy

Animal Assisted Therapy is the term used in the majority of professional research (Bernstein, Friedman & Malaspina, 2000; Heimlich, 2001; Kaymen, 2005; Sellers, 2005; Tedeschi, Fitchett & Molido, 2005; Velde, Cipriani & Fisher, 2005; Zamir, 2006). The field of AAT has been connected with numerous titles through the popular press, including (a) pet facilitated therapy, (b) pet assisted therapy, (c) human/companion animal bond, (d) people-pet partnership, and (e) pets by prescription (Janssen, 1998). The professional press also lists zootherapy as terminology to describe an animal assisted therapy (Servais, 1999). The most commonly seen term in empirical studies is that of Animal Assisted Therapy (AAT) (Banks & Banks, 2002; Bernstein, Friedman, & Malaspina, 2000; Folse, Minder, Aycock, & Kelly, 1994; Jalongo, Astorino, & Bomboy, 2004; Macauley, 2006; Martin & Farnum, 2002; Sellers, 2005). Hence, AAT is the term that will be used in this article.

AAT is also a part of Complementary and Alternative Medicine (CAM) and of Nature Based Therapies (Johnson, Meadows, Haubner, & Sevedge, 2003; Lundgren, 2004). CAM is described by the National Cancer Institute (2001), as cited in Johnson, Meadows, Haubner, and Sevedge (2003), as "a broad range of healing philosophies, approaches, and therapies" (pg. 56). It is complementary when combined with traditional medicine and alternative when provided alone. AAT, as part of the CAM definition, is recognized by some in the medical community as a healing therapy.

Levinson (1984) defines the terminology of human/companion animal therapy as a process that introduces a companion animal into the life of a person to enhance the latter's emotional well-being. It first builds off of touch and attachment formation, evolves into the need for animal companionship, and later enhances the ability for those who have experienced it to have satisfactory human relationships. The Delta Society (1996), as a self-documented leader in AAT research, has written a book about the standards and practices for the field.

The Delta Society's (1996) definition of AAT is:

> a goal directed intervention in which an animal that meets specific criteria is an integral part of the treatment process. AAT is directed and/or delivered by a health/human service professional with specialized expertise and within the scope of practice of his/her profession. AAT is designed to promote improvement in human, physical, social, emotional, and/or cognitive functioning (p. 79).

This definition focuses on the animal as an integral part of treatment. AAT should not to be confused with Animal Assisted Activities (AAA). According to the Delta Society (1996), these are "activities that involve animals visiting people. The same activity can be repeated with different people, unlike a therapy program that is tailored to

a particular person or medical condition" (p. 79). The main difference seems to be AAT provides a goal directed intervention as part of a specialized therapy process delivered by a health or human service professional to promote functioning in the client. AAA may include animal visits to promote motivational, educational, or recreational benefits to improve quality of life of the person visited but not as part of a therapeutic program. In AAT, the animal assists in the therapy process. Thus, the therapy could include a variety of forms of treatment (physical therapy, occupational therapy, and counseling) depending on the client's needs. The animal assists in any of these therapies that fit the goals for the client.

The term Animal Assisted Therapy is sometimes called *animal therapy* in the popular press (as defined by publications in magazines, newspapers or other media and not peer reviewed journals or edited books). If animal assisted therapy is not defined, this could be seen as helping animals rather than humans. Animal therapy focuses on helping the animal heal, not the person. There are, in fact, facilities that use AAT and animal therapy together in treatment. Mallon (1992) provides a literature review examining this approach and states it can be useful and positive to help troubled youth with socialization, children with special needs, and those suffering from loneliness and separation. One of these programs, called Green Chimneys, is located on the East coast and is a center for at-risk youth. Ross (1993) describes Green Chimneys as a place that houses youth with backgrounds of abuse who have feelings of being thrown away and who may distrust other humans. It also has a rehabilitation facility for injured wildlife. The process of having the youths help the physically injured animals gives the youths the ability to form relationships with the animals and, in the process, heal themselves.

They learn empathy, nurturance, and forgiveness while experiencing the unconditional love that animals can provide. Both the animals and the youth receive therapy here—thus leading to some confusion between AAT and animal therapy.

The History of AAT

Animals and humans have a long relationship. According to the Judeo-Christian perspective, the relationship is described in Genesis during the creation of man. It states, "Rule over the fish of the sea and the birds of the air and over every living creature that moves on the ground" (*Life Applications Study Bible, NIV* [1997] Gen. 1:26). During the long history of coexistence, humans hunted animals (and vice-versa) for food. The domestication of animals may have begun a new stage in the relationship between animals and humans. Canby (1979) reports the dog was domesticated 30,000 years ago (in Yukon's Old Crow Region), and Catanzaro (2003) states the cat was domesticated more recently, about 9,000 years ago. Domestication possibly changed the previous relationship from one of ruling over or antagonism (hunting or ignoring each other) to one with the possibility of other interactions, including companionship.

The benefits of human-animal interaction have been seen very early in history. Animals have been discussed in the improvement of the emotional and functional status of humans since the time of the ancient Greeks (Riede, 1987). The first systematic use of animals to benefit people occurred in Belgium in the 9th century (Catanzaro, 2003). Animals were later part of the process of assisting people with disabilities in therapy. This process is documented by Serpell (2000), who reports that in 1699, John Locke advocated giving children small animals to teach nurturing and a sense of responsibility.

Catanzaro (2003) states that animals were used with psychotic patients to help them learn nurturing and self-control in the 1790s. In 1867, a home for people with epilepsy was formed in Germany, including a focus on integrating animals into therapy. Its treatments included animals that were considered essential in the patients' care. Florence Nightengale, a famous nurse during the 19th century, also provided animals for companionship to people with chronic diseases (Serpell, 2000).

During the 20th century, Boris Levenson (1984) became a leader in animal-human relationship research with his classic article, "Human/Companion Animal Therapy." Lundgren (2004) gives credit to Levenson as the founder of pet facilitated therapy. Building off his work, the Delta Society was formed by Leo Bustad to research the human-animal bond (Catanzaro, 2003). The Delta Society, based in the United States, is still a self-documented leader in the field (Delta Society, 1996).

The human-animal bond is an area within AAT. Levinson (1984) speaks of this bond as one reason behind how AAT works. A book was published about the human-animal bond developing even when the focus is on medical research. *The Inevitable Bond* discusses the automatic and often unwanted bonds that form between scientists and researchers and the animals in their work and the ethical implications of this (Davis & Balfour, 1992). But the Delta Society (1996), reports that our understanding of the human-animal bond is still in its infancy. Therefore, future research in AAT could document how humans benefit from animal contact whether through an inevitable bond or other reasons, and discuss the validity and reliability of using animals to increase human health.

The Uses of AAT

The uses of AAT are varied. Many studies have related its benefits to various types of disorders and populations. Heimlich (2001) discussed its positive effects in children with disabilities. Kogan, Granger, Fitchett, Helmer, and Young (1999) used a case study approach to address its positive use for children with special needs. Folse, Minder, Aycock, and Santana (1994) studied a group of adult college students and found depression scores decreased more when using AAT alone. This was compared to two other groups. One had a combination of AAT and directed group psychotherapy and the other had no treatment at all. Kaymen (2005) explored the use of AAT as a reading intervention strategy by having children read to dogs. It was found that children's reading levels improved. In addition, many researchers have seen benefits of AAT in elderly populations and in long-term care facilities (Bernstein, Friedman, & Malaspina, 2000; Sellers, 2005; Velde, Cipriani, & Fisher, 2005). Tedeschi, Fitchette, and Molidor (2005) include the benefits of AAT in social work. Velde, Cipriani, and Fisher (2005) speak of its use in occupational therapy. Simply having a pet has been shown to reduce blood pressure and heart rate for medical purposes (Viruez-Ortega & Buela-Casal, 2006). Thus, the uses of AAT are numerous and varied.

How AAT Works

According to Levinson (1984), there are four ways in how AAT works: companion animals as (a) therapeutic adjuncts, (b) sole therapists, (c) catalysts, and (d) means of making contact with nature. A companion animal as an adjunct has the main role of decreasing the initial shock when meeting new therapists or having a new group

experiences. Petting the animal distracts people from their own anxiety and provides touch comfort that therapists cannot give. The animal as a sole therapist occurs when people own a pet because pets can be helpful in allowing expression, releasing emotions, and in overcoming inhibitions, allowing therapeutic change to occur. Animals as catalysts refer to nonprofessionals that take animals to nursing homes, hospitals, schools, and residential settings. As a result of contact with these animals, patients may feel freer to disclose and discuss their concerns or feelings with the volunteers and staff. Last, animals as a means of connecting with nature means that people return to a more peaceful, balanced existence. This stems from Levinson's observation and opinion that people seem to be estranged from life and that not only are people alienated from their inner selves, but also from nature and animals.

In addition to Levinson's thoughts, there are other ideas on how AAT may work. Martin and Farnum (2002) report that animals may be one way to increase attachment between children with pervasive development disorders and their social environment. Animals could act as transitional objects, allowing children to first establish bonds with the animals, and then extend these to humans (George, 1998; Katcher, 2000). Animals may also facilitate relaxation and sociability (Lundgren, 2004).

Dolphin Assisted Therapy

DAT is a subfield of AAT that uses a dolphin to assist in peoples' treatment. This assistance can be part of multiple types of therapy depending on the needs of the client. Many DAT programs offer a multimethod approach to healing, in which multiple types of therapy in addition to sessions with dolphins are available. The environment in which

DAT takes place can vary by location. Some programs use dolphins in captivity and others use wild encounters only. Even if used in captivity, the dolphins are not considered pets or companion animals. As stated previously, although AAT focuses more on companion animals, many other species have been incorporated into AAT because of their unique and specialized uses.

The use of wild animals for therapeutic benefit is rare due to their inaccessibility, unpredictability and the infrequency of interactions. Capaldo (1989) states that one exception is swimming with dolphins, which is considered less dangerous and possibly more mutually acceptable than interacting with other wild animals**.**

The History of DAT

Human beings' fascination with dolphins is recounted briefly by Ackerman (2003). He states, "In Native American myths, dolphins accompany the souls of the dead to the underworld. To early Christians, a dolphin draped over a cross symbolized Christ. The Minoans revered the dolphin, proclaiming it an incarnation of their sea God, Poseidon" (p. 41).

Montagu (2003) speaks of the history of dolphins, starting with a pictographic seal from ancient Crete. The history continues in one of Aesop's fables in which a dolphin reportedly saves a monkey during a storm when a ship capsizes. This is one example of many Greek myths showing dolphin and human interactions. In the New Zealand story of Opo, Montagu continues with a real-life account of a wild dolphin voluntarily interacting with a human. It is said that she was a child's playmate and almost begged to be petted, constantly seeking human attention. In addition, the

cooperativeness of dolphins and their concern for and attention towards humans has been recounted by fisherman for years.

Dolphins' attention and either concern for or curiosity about humans is seen as possible evidence of their healing abilities. For example, engaging with dolphins to help people with psychological disturbances goes back to the 1970s, when people seemed to make remarkable recoveries after swimming with wild dolphins (Cochrane & Callen, 1992).

Popular Literature

Horace Dobbs (1990) wrote the book *Dance to a Dolphin's Song*, in which he describes a person named Bill who was experiencing extreme depression for many years: "He would neither eat nor utter a word, despite the love and support of his devoted family…. He lost weight. Slowly he was dying" (p. 16). On a family vacation to raise his spirits, Bill meets Horace Dobbs. Dobbs had always believed that an encounter with a dolphin could help people with depression, but he had never tested his theory before Bill. After the first encounter of swimming with a dolphin, Dobbs' describes Bill's family's response: "From the boat Edna [his wife] saw traces of the Bill she once knew and loved. As she watched Bill and Simo [the dolphin] together in the water she broke down and cried" (p. 25).

In the article "Healers from the Deep," published in *American Health*, Goodstein (1991) reports on a mother of a son with Down's Syndrome as she speaks about her son's experience with DAT after two weeks at the Dolphin Research Center in Florida: "At the rate he was going when he was two he would have just been a nice kid all his

life, now he'll be able to go to junior college if he wants and have a career" (pp. 61-62). She believes the dolphins opened her son's mind.

Halls (1996) wrote an article published in *USKids Magazine* called "Dolphin Therapy—Making a Splash!" A handicapped child named Joseph and his parents describe their experience with DAT. "We didn't come here to see Joseph cured," his father says. "We came for a breakthrough on which we could build. And Joseph would tell you—the dolphins definitely helped" (p. 4). Although they are not cited from empirical research studies, the above are interesting accounts about the positive effects from DAT.

International Symposium on Dolphin Assisted Therapy (ISDAT) 1995

Two International Symposiums on Dolphin Assisted Therapy (ISDAT) were held which brought many leaders in DAT together. The first ISDAT conference proceedings were conducted in 1995 in memory of a Steven Jozsef. He and his wife, Macy, started the foundation Living From the Heart as a DAT-alternative-cancer-therapy program. Jozsef had an interest in human brain wave frequencies, the use of alpha biofeedback, and their connection to dolphin brainwaves. The first ISDAT held a range of presentations, described below, although not empirically reviewed or published and many were either proposals for research or under current study (*International Symposium*, 1995).

DATA Dolphin Research Project. The Florida Back Institute presented information about its ongoing study. The goal was to prove or disprove that human interaction with

dolphins might give limited or even unlimited pain relief due to increased release of plasma hormones. Participants all reported back pain related to surgery. Blood levels were checked for plasma hormones before and after dolphin swims, and this study was presented as in trial and recommended replication in water alone (without dolphins) for comparison.

Neuro-electrical Effects of Human-Dolphin Interaction and Sono-Chemical Hypotheses. The Aquathought Research Foundation, headed by David Cole, sought to establish factors between physiological changes that occur during human-dolphin interaction and the amount of echolocation present during the interaction. The analysis of the data was under study, and several trends were emerging: the dominant brain frequency (beta) dropped after the dolphin interaction, and a period of hemispheric synchronization (the brainwaves emitted from both hemispheres are in place and of similar frequency) occurred. This brain synchronization resulted in resting or meditative states of alpha. Further, the induced alpha brain state, a possible form of psychoneuroimmunology, (e.g. interaction between psychological processes and the nervous and immune systems) was considered to be the reason behind strengthening the immune system. This strengthening of immunity was a hypothesis for alternative cancer treatment. Continuing research was recommended on collecting neurological information using EEG data, which could give new information to the underlying processes for strengthening the immune system and possible alternative health treatments.

Telemetry Monitoring of Bottlenose Dolphin Biosonar During Dolphin-Human Interaction. The researchers were in the process of constructing a way to monitor dolphin biosonar emissions, (e.g. sonar or echolocation) to which humans are exposed during DAT. The construction consisted of a floating hydrophone and a waterproofed signal analysis telemetry unit. During DAT, this would allow for computer monitoring of emissions in open water environments. Due to the small size of the unit, people could have it attached to them with a short rope, leave it free-floating in a location, or tow it behind a boat. A major advantage discussed was the unit's flexibility which allowed monitoring of dolphin biosonar signals in both captive and wild settings without hindrance from cables. The researchers suggested that further study of the biosonar emissions of dolphins could show how DAT works.

The Monroe Institute's Hemi-Sync(r) Process: A Theoretical Perspective. The researchers explained that the Hemi-Sync auditory-guidance process could give access to beneficial mind-consciousness states by helping to guide individuals to different consciousness states because these states were related to some of the research with dolphins and brain wave activity. The Institute claimed that the Hemi-Sync process was safe and effective. It also concluded that this process could have a wide variety of applications, including relaxation, meditation, intuition development, enriched learning, improved sleep, wellness, and the exploration of expanded mind-consciousness states.

The "Hello, Dolphin" Project. The researchers reported assessing possible subtle communication between dolphins and humans. The theory was that holographic imaging

could be involved in dolphin-dolphin communication and, therefore, in dolphin-human communication, which takes place during interactions. The researchers suggested the possibility that dolphins sense electric fields from people and attempt to communicate using the same frequencies as human brain wave frequency. This information was based on data showing a significant alteration of human brain wave frequencies conforming to recordings from dolphins during human interactions. This conformation could be a benefit of DAT.

International Symposium on Dolphin Assisted Therapy (ISDAT) 1996

The second and final ISDAT symposium, held in 1996, included some of the following presentations:

CranioSacral Therapy With Dolphins. The Upledger Institute was founded in 1985 to improve the quality of life of individuals who have pain or dysfunction as a result of brain, spinal cord or other (CNS) central nervous system problems. The treatment was conducted by doctors or therapists from various healthcare backgrounds with the focus of helping people towards optimal health performance. CranioSacral Therapy, according to the program, is a gentle, hands-on method that evaluates and enhances the craniosacral physiological system. It increases the body's natural healing abilities, and research has shown it to be useful for a variety of medical problems with pain and disease. This program was unique because the Upledger Institute teamed with the Dolphin Research Center to include dolphins in the therapy sessions, which was not the case with other craniosacral therapy providers.

Dolphin Therapy Effects: A Hypothesis. The hypothesis looked at how stimulating the temporal lobes with very low intensity magnetic fields could result in a new experience, which the researchers termed transformational or mystical. The process can result in hemispheric synchronization, which was thought to achieve altered perceptions. The perception of self became altered when the right hemisphere was connected to the left hemisphere. When observing dolphin emissions, the emissions fell within the range needed for these transformational experiences. Overall, this hypothesis included the relationship of neurochemical and neurophysiological systems and how dolphins could produce those in clients, resulting in healing reports.

Results of Using Afalina Dolphins With a Purpose of Rehabilitation, Social Adaptation and Medical Treatment of Children in the Program Called Dolphin Therapy. In 1986, Ludmila Lukina started a new field of research at the State Oceanarium of Ukraine, located in Sevastopol, Crimea. This research included using dolphins to help with medicinal procedures, and doctors sometimes referred their patients when traditional treatments were not effective. In the summer months yearly, people of all ages with different diseases received DAT, and over 150,000 people reported improved mood and work capacity. Patients reportedly felt a disappearance of symptoms related to disease immediately after swimming with dolphins. The following diagnoses benefited the most: children's neurosis, including enuresis, phobia, and stammering (60% of patients); infantile cerebral paralysis (30% of patients); oligophrenia and others (10% of patients).

Electroencephalographic Results of Human-Dolphin Interaction: A Sonophoresis Model. Sonophoresis is the enhancement of the transport of permeants, such as hormones, through cell membranes. Sonophoresis could be a result of echolocation, thus contributing to the explanation of the chemical and electrical changes in the brain when human beings swim with dolphins.

Complementary Concepts On the Effects of Sound on Consciousness. The basic premise presented was that sound could mediate consciousness and provide access to beneficial states of consciousness, which could provide healing. The properties of sound translating into altered states of consciousness may be part of the dolphin-human interaction during therapy.

Professional Literature

There is limited empirical research published on DAT. The following is a review of the available research by date and published results in the professional literature.

Smith

Betsy Smith, PhD, wrote a chapter in the book *Between Species: Celebrating the Dolphin-Human Bond* entitled “Dolphin Assisted Therapy” (2003). This chapter discusses her work with dolphins starting in the 1970s, when she watched her mentally disabled brother benefit from dolphin interactions. She speaks of the research she did into the 1980s with children with neurological brain damage or who were autistic.

Children who reported pre-treatment attention spans of only 5 to 10 minutes later sustained up to one-hour attention spans after six dolphin encounter sessions.

Smith (1987, 1988) later described the process of autistic children completing eight DAT sessions, using pre- and post-treatment questionnaires to determine spontaneous and interactive play behavior. She reported that within minutes, the children were reaching out and touching the dolphins spontaneously, and at the end of the treatment, one child could even tread water alone.

Nathanson, et al.

Dave Nathanson, a clinical psychologist, has published numerous articles about DAT. He coined the term *dolphin human therapy*. Nathanson (1980) presented information on his findings at the Congress proceedings of the XVI World Assembly of the World Organization for Preschool Education. He studied verbal and nonverbal children before and after DAT sessions. Among his results, he found a nonverbal boy was four times more likely to respond to a dolphin than to his mother, and a verbal girl remembered 13% more vocabulary words after working with a dolphin.

His next published research was done in 1988 at the Dolphin Research Center, (DRC), Grassey Key, Florida (Nathanson, 1989). His research questioned if the results from his 1978-79 study could be replicated using a larger sample size, in a shorter time period, and in-water. His subjects included six children, two to six years old with the following diagnoses: (a) three with Down's syndrome, (b) one with hydrocephaly, (c) one with brain damage, and (d) one multiply handicapped. His results found that

children learned information 2 to 10 times faster and with greater retention as compared to a classroom setting.

In 1992, again at DRC, Nathanson and de Faria researched eight children looking at verbal and nonverbal response improvements. The subjects were three to eight years old with the following diagnoses: (a) four with Down's syndrome, (b) three with cerebral palsy, and (c) one with brain damage, (Nathanson & de Faria, 1993). They compared interactions with dolphins versus interactions with each child's favorite toy. The results showed that children did well in water using their favorite toy for reinforcement but achieved significantly better results in water with dolphin interaction as reinforcement.

Nathanson, deCastro, Friend, and McMachon (1997) conducted research in 1995-1996 with 47 children, two to three years of age: (a) 19 with cerebral palsy, (b) 11 with brain damage, (c) five with Down's syndrome, (d) four with Autism, (e) two with Rett syndrome, (f) two with tuberculosis, (g) one with Cri-du-Chat, and (h) one with head injury. The question under investigation was whether two weeks in the Dolphin Human Therapy program could achieve the same or better results than six months of conventional physical or speech therapy. Their results showed significantly greater improvement and more cost-effective treatment with DAT. Marino and Lilienfeld (1998) criticized Nathanson's interpretation, discussed later.

Finally, Nathanson (1998a) researched 71 sets of parents from eight countries during 1995-97. The diagnoses of children included Angelman syndrome, Asperger syndrome, attention deficit disorder, autism, cerebral palsy, developmental delay, Down's syndrome, hydrocephaly, microcephaly, pervasive developmental disorder, Rett

syndrome, traumatic brain injury, and tuberous sclerosis. The research addressed whether gains made in two weeks of Dolphin Human Therapy were maintained or improved after at least one year after the Dolphin Human Therapy. His results showed that children maintained or improved skills about 50% of the time on 15 measures of behavior.

Marino and Lilienfeld

Marino and Lilienfeld (1998) published an article in response to Nathanson's short-term and long-term effectiveness research. They argued that there were serious flaws in his data and that his rationale for DAT was not valid, making his results premature and uninterpretable. They claimed that one of the biggest threats to validity in the long-term studies was subject maturation. Nathanson (1998b) replied to their article acknowledging the threats to validity in his study but saying they had misinterpreted his attention deficit theory and disregarded single subject research design.

Lukina

Lukina (1999) looked at the possibility of using DAT for children with psychoneurological diseases because DAT had been found to be a non-medication correction of psychoemotional states. Four groups of children with different sympotomology were studied, including a group of healthy children (the first group). Through qualitative analysis, almost all the children in the study showed positive reactions to the therapy. The second group had manifestations of depression, night phobias, hysteria, and enuresis, which decreased an average of 50-70%. The children in

the third group showed excitation when attempting verbal expression that they hadn't shown previously. Ninety percent of the children in the fourth group experienced improved sleep and overall general state of mind, as well as improved confidence in their strength and abilities.

Servais

Servais (1999) reviewed the 1991 Beligian Autidolfijn Project, which assessed the interactions of autistic children and dolphins. The project took four years and the results were inconclusive, possibly due to the experimental design. One group of children did seem to show benefits from working with dolphins, however. But this group seemed to have a better relationship with the therapist, so it was unclear whether the DAT or the relationship with the therapist led to those outcomes. Servais suggests that more rigorous and standardized experimental designs may produce better results.

Likura, et al.

Likura et al. (2001) researched the effects of dolphin assisted seawater therapy for severe dermatitis. Because it is reported many patients do not respond to ointments and drugs, the alternative treatment of seawater was an effective if painful option. The staff performed seawater therapy over six days with dolphins in the vicinity. The presence of the dolphins seemed to alleviate the pain patients experienced while bathing in the seawater, and their skin conditions improved; they also reported that they enjoyed being with the dolphins.

Webb and Drummond

Webb and Drummond (2001) hypothesized that people swimming with dolphins would experience greater levels of well-being and reduced levels of anxiety than those who swam without dolphins. Participants were a sample of people who were at Perth's Under Water World Marine Park in Australia. The population was divided into two groups, both of which completed well-being and anxiety measures before and after their swim. One group of participants swam in the ocean with dolphins and the other group swam in the ocean without dolphins. In both groups, well-being increased, but only in the dolphin group did anxiety decrease. These findings suggest that anticipation of a new and exciting experience and that swimming itself may increase well-being, but only swimming with dolphins may lower anxiety.

Brensing and Linke, and Brensing, Linke, and Todt

Brensing and Linke (2003) researched the behavior of dolphins towards adults and children during swim with dolphin programs and towards children with disabilities during therapy sessions. They found that all dolphins kept a greater distance from adults than from children, preferring smaller people or children to larger ones. They concluded that assisting behavior could be easily reinforced in the dolphins but could not explain the success of the therapy and argued that there is still no proof behind its effectiveness versus other animal therapies.

Brensing, Linke, and Todt (2003) asked if dolphins could heal by ultrasound. Ultrasound is the process in which dolphin echolocation or sonar scans an object. They recorded 83 sessions at Dolphins Plus and observed that only 1 in 5 dolphins behaved

significantly different towards patients. They do note that the ultrasound could have an impact on biological tissue but that the duration of those contacts would not have been enough to meet the requirements of common ultrasound therapy.

Antonioli and Reveli

Antonioli and Reveli (2005) performed a study in Honduras using a randomized controlled trial with dolphins in the treatment of depression. Outpatients were recruited through announcements on the internet, newspaper, and radio. A total of 30 patients were randomly assigned, 15 in the experimental group and 15 in the control group. Only the experimental group swam with the dolphins. The therapy was found effective in alleviating symptoms of depression in the experimental group after two weeks of treatment. The researchers concluded that, based on a holistic approach through interaction with animals in nature, DAT is effective for mild to moderate depression.

Brensing, Linke, Busch, Matthes, and Eke van der Woude

Brensing, Linke, Busch, Matthes, and Eke van der Woude (2005) looked at the impact of different groups of swimmers on swim with dolphin programs in two settings. The settings differed on the amount of physical space in the dolphin's environment. They observed 83 sessions at Dolphins Plus in Florida and 37 sessions at Dolphin Reef in Israel. Their results showed that limited space does affect dolphins' attraction to swimmers. This need for certain amounts of space or distance from swimmers could interfere with DAT, and thus DAT may be less effective (or even ineffective) if dolphins do not have enough room to interact.

Akiyama and Ohta

Akiyama and Ohta (2006) researched dolphins' vocalizations when interacting with people. They recorded 2,642 whistles during four different periods, including pre-feeding, feeding, free time without people, and interaction with people on a float. They found that dolphins increased their vocalizations during interactions with people and concluded that increased vocalizations and attention given to humans may contribute to effective treatment for humans' health problems.

Lotan

Lotan (2006) reviews many alternative treatments for children with Rett's disorder. He then provides a quick overview of the positive effects in DAT and an account of one child's positive experience with it.

Summary of Professional Literature

DAT has been frequently used with children and with people with pervasive developmental disorders (Brensing & Linke, 2003; Lotan, 2006; Lukina, 1999; Nathanson, 1989; Nathanson & de Faria, 1993; Nathanson, deCastro, Friend, & McMahon, 1997; Nathanson, 1998a; Servais, 1999; Smith, 1988; Smith, 1987). There is some evidence for its use in lifting depression (Antoniolo & Reveli, 2005) and in reducing anxiety (Webb & Drummond, 2001). Further, dolphins were documented as helping to alleviate physical pain (Likura et al., 2001).

How DAT Works

Lilly (1978) has done extensive research on dolphins and concludes that they are extremely intelligent mammals, maybe as intelligent in some ways as human beings. Dolphin intelligence could contribute to their usefulness in DAT.

Cochran and Callen (1992) discuss many possibilities as to how DAT might work, including dolphins' intelligence in directing their attention to those who are weak and ailing and the unconditional love they can provide to humans. Dolphins' compassionate nature has been reported in accounts of saving people from drowning. Another possibility to the workings of DAT is as follows: the process of just floating in the water has shown to have a significant impact on the release of brain chemicals (although water doesn't completely eliminate the pull of gravity, it does give people some freedom from physical weight), and the process of swimming with dolphins can elicit emotions from calmness to intense joy, which could release deep-seated feelings (some people have reported bursting into tears after an encounter, allowing for an emotional release). Thus, the combination of floating in the water with dolphins could be very effective.

It has also been suggested that the dolphins' brain waves are equal to those in the alpha and theta regions of humans' meditative state, and some people have hypothesized that human brain waves resonate with those of the dolphins'. Dolphin-Inspirations (2008) discusses the brain wave states including beta, alpha, theta, and delta (four of the general brain wave states humans experience). Alpha is the important one in this discussion, as this is the resting and relaxed state of the brain (sometimes called meditative). The alpha brain state is where dolphins spend most of their time because they are conscious

breathers, unlike humans. One theory behind DAT is that just swimming with dolphins can elicit this brain wave state or that the humans automatically match their brain wave states to those of the dolphins during encounters (ISDAT, 1996).

Last, is the idea of the effect of dolphin sonar. People report that they can feel their bodies being scanned and hear the echolocation of the dolphin; this process could affect biological tissue. Whitlow (1993), in his book *The Sonar of Dolphins*, says that dolphins' ability to discriminate and recognize features of targets with its sonar is a characteristic that man-made sonar systems do not possess and is, therefore, superior. Dolphin sonar could provide synergistic benefits when combined with the effects of water and the intelligence of dolphins to focus their echolocation on the weak and ailing. Though as yet unproven, it is in discussion.

In a published dissertation, *Peak Experiences with Cetaceans,* DeMares (1998) suggests that significant interactions with cetaceans (dolphins are part of this family) awakens a sense of harmony, connectedness, and aliveness in people—a peak experience. Through phenomenological analysis, he concludes that in a peak encounter during a human-nonhuman animal interaction, the human may rediscover a previously lost part of the self. White (2003) recalls a personal experience that exemplifies this:

> All I know is I was a different person when I crawled from the sea than the one who plunged in an hour before. Colors were brighter. Gratitude for being alive moved me to a strange combination of laughter and tears. My old worldview had collapsed on itself. A new one had sprung from the sea, from my swim, and from the dolphins' gaze (p. 72).

Nathanson (1998a) provides another approach, describing the process of DAT through an attention deficit theory. The dolphin is a highly motivating reward for many

people and thus can provide an opportunity to change behavior. Nathanson documents this in his work with children with pervasive developmental disorders, in which they experience an increased ability to learn and other positive behavioral changes (Nathanson, 1989; Nathanson & de Freire, 1993; Nathanson, et al., 1997; Nathanson, 1998a). In these studies his focus was on using the dolphin as a reward when the children learned new skills. He found that the dolphin could hold the attention of children and increase motivation to acquire new positive behaviors (e.g. eye contact, physical movements, speech, reading new words, following directions, etc.).

Costs

The nonprofit organization Living From the Heart offers five-day DAT sessions. In a phone conversation in 2007 with Macy Jozsef the owner of this organization (personal communication) the following is a list of their costs which vary depending on location and program. The DAT sessions in Mexico over five days cost $700; the ones at Sea World, San Antonio, Texas, over a three-day period are $900 but include room, board, and meals. At the time of this research, the Mexico site was in transition and not offering DAT.

The nonprofit organization DolphinSwim, an Austrian company operating in the Ukraine, offers two week programs over 10 days, where participants have weekends off. The following is a list of costs from for DolphinSwim in 2008 (personal communication): the 10-day program in Yalta is €4800 and consists of 10 sessions of 30-minute therapeutic dolphin interaction; this also includes all other therapies and activities during the program.

Costs for programs can vary depending on their location, length of programs and other services offered as a multimethod approach to treatment. Although the programs can be expensive, there has been some research comparing DAT costs with other forms of therapy. Nathanson, deCastro, Friend, and McMahon (1997) found that, when compared with conventional therapy, the two week program of Dolphin Human Therapy, provided by Nathanson, seemed to be cost-effective given the increase of motivation, attention span, improvement in gross and fine motor skills, and speech and language acquisition. As discussed previously, this work was criticized by Marino and Lilienfeld (1998), and was rebutted by Nathanson (1998b). This suggests the need for further research in this area and for replication of results.

Themes

The themes about how DAT works that emerges from reviewing literature are based upon the research to date. This research is slowly building on both its effectiveness and theories on how it works. The following themes must be understood as assumptions until more research can provide conclusive evidence. The themes drawn from the above literature about how DAT works include (a) brain wave, (b) sonar, (c) emotional, (d) environmental, and (e) multimethod.

Brain Wave

Many of the presentations from the ISDAT 1995 and 1996 looked at physiologically based reasons for how DAT works. One of these is brain wave synchronization into a resting state or meditative form of consciousness. The program

DolphinSwim focuses on the brain wave state of alpha (the brain is in a relaxed state); this state may increase the likelihood of successful therapeutic interventions. As stated by DolphinSwim (n.d.), “Alpha-Therapy is a multimodal therapy-concept that employs the positive effects of the alpha-state, for accelerated learning on the physical, cognitive, psychological and social plane.”

Sonar

Sonar is also known as dolphin echolocation when referring to the dolphin’s use of it, versus the broader term of sonar which could be referring to those mechanisms used on submarines for example. The sonar or echolocation of dolphins is a process that also focuses on physiological change. The dolphin scans an object or person using ultrasound, and this process could affect biological tissue. It is probable that man-made sonar is not as effective as dolphin sonar.

Emotional

In reviewing other studies above, DAT seems to provide both excitatory and relaxing emotional effects concurrently, which is unique. These opposite effects are interesting because of the wide range of diagnoses helped. It may be useful, for example, for depressed clients to experience an excitatory effect and for clients with anxiety disorders to be helped by the relaxing effect of the dolphin interaction. Some studies suggest DAT also enhances emotional release which could be therapeutically beneficial.

Environmental

Other studies focused on the interaction levels of dolphins with humans and the observation that dolphins seem to either be curious or interested in these interactions. The interactions could be limited based on the physical space provided. The theme of the environment in which the dolphin lives is important. In order to provide therapeutic levels of interaction, a certain amount of physical space could be needed. If studies show that more space is more therapeutic, this could increase costs, since bigger facilities would be required.

Multimethod Approach

The final theme that emerges from the literature review is that of the multimethod approach. Multimethod means the process of using multiple types of therapy in addition to the dolphin interactions. The dolphins assist in therapy that could include, for example, craniosacral, behavior modification, counseling, and medical or physical treatments. Even the use of dolphins in treating skin diseases was noted. Thus, the methods of how DAT is used can vary depending on the diagnoses of the clients (as well as on the specific DAT program).

Conclusion

In general, the majority of findings suggest DAT's effectiveness. Other, specific findings discuss that DAT can help with issues of depression, anxiety, and pain. In addition, children with developmental disabilities have shown increased verbal response and attention spans. In using dolphins as reinforcement, and in conjunction with

traditional therapies, new skills can be retained. These results need replication and further research to prove their validity, but the results thus far show that DAT is a promising therapy from which many individuals could benefit.

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Chapter 3
Research Manuscript

Abstract

A subfield of Animal Assisted Therapy (AAT) is Dolphin Assisted Therapy (DAT). Because of limited empirical research, studies in DAT so far have yielded mixed and inconclusive results regarding its effectiveness and how it works. This study is intended to add to the nomothetical net in DAT effectiveness research. In the Ukraine, a program called DolphinSwim agreed to take part in a study that surveyed 37 of their participants. These participants were the parents of children with special needs, as defined by a variety of diagnoses, including developmental, cognitive, emotional, and physical disorders. Over the summer months, five treatment programs were conducted, each lasting 10 days in a two-week period. The Behavior Dimensions Rating Scale (BDRS) was administered to program participants before and after the two-week sessions. The results were analyzed using a *t* test and were found to show positive behavioral movements at the .05 level. The results and their implications for the future of DAT programs are discussed.

Chapter 3
A Summative Evaluation of a DAT Program for Children With Special Needs

Animal Assisted Therapy (AAT) has been called many names in the popular press, including (a) pet facilitated therapy, (b) pet assisted therapy, (c) people-pet partnership, (d) human/companion animal bond, and (e) pets by prescription (Janssen, 1998). The professional press also lists zootherapy in identifying AAT services (Servais, 1999). The Delta Society (1996), a US-based organization focused on this kind of research, defines AAT as:

> a goal directed intervention in which an animal that meets specific criteria is an integral part of the treatment process. AAT is directed and/or delivered by a health/human service professional with specialized expertise and within the scope of practice of his/her profession. AAT is designed to promote improvement in human, physical, social, emotional, and/or cognitive functioning (p. 79).

The Delta Society does not specify the animals to be used in AAT; however, most programs utilize companion animals due to their accessibility and ease of use. AAT is an assisting type of therapy, which means the animal can assist in multiple types of treatments, including physical, occupational, recreational, and clinical. In the case of Dolphin Assisted Therapy (DAT), the animals assisting the humans are dolphins.

Review of the Literature

History

Encounters with dolphins, including stories of them saving human lives, have been documented since ancient times (Frohoff & Peterson, 2003). DAT, however, is a

new and emerging specialty within the professional, published field of AAT. It has only been in the professional literature since the 1980s, starting with research by Betsy Smith (Smith, 1987) and continued by Dave Nathanson (Nathanson, 1989). Research data is still limited and has yielded mixed conclusions, although a majority of studies have delivered positive results. The positive effects of DAT have been documented in multiple research studies (Akiyama & Ohta, 2006; Antonioli & Reveli, 2005; Likura, et al., 2001; Nathanson, 1989; Nathanson, deCastro, Friend, & McMahon, 1997; Nathanson & de Faria, 1993; Webb & Drummond, 2001). Other studies have delivered results that are negative or inconclusive. (Brensing, Linke, & Todt, 2003; Marino & Lilienfeld, 1998).

Uses

One of the areas in which DAT has shown the most promising research results is for children with special needs (Brensing, & Linke, 2003; Lotan, 2006; Lukina, 1999; Nathanson, 1989; Nathanson & de Faria, 1993; Nathanson et al., 1997; Servais, 1999; Smith, 1987; Smith, 1988). Heimlich (2001) also indicated DAT's positive effects on children with disabilities. Kogan, Granger, Fitchett, Helmer, and Young (1999) continue to focus on children with special needs as a population that could benefit from DAT.

How DAT Works

A majority of studies have shown DAT to be an effective treatment; however, although various theories have been proposed, it is still unknown how DAT works. Martin and Farnum (2002) report that animals may be one way to increase attachment between children with special needs and their social environment. Animals could act as transitional objects, allowing children to first establish bonds with the animals, and then extend these bonds to humans. As George (1988) and Katcher (2000) suggest, once a bond is established, the experience of that process can then be transferred to a person. Animals may also act as relaxation and social facilitators (Lundgren, 2004).

Cochran and Callen (1992) cover multiple theories on DAT, including (a) chemical releases in the brain, (b) unconditional love and acceptance, (c) emotional release, (d) brain wave connections, (e) the combination of AAT and being in water, (f) dolphin sonar, and (g) the unique intelligence of dolphins to provide assistance in therapy.

Nathanson (1998a) describes the specific use of dolphins in AAT with children with special needs using an attention deficit theory. He defines the dolphin as a highly motivating reward, which can thus provide a unique opportunity to change behavior. In his work with children with pervasive developmental disorders, positive behavioral modification was evidenced by the children's increased ability to learn (Nathanson, 1989; Nathanson, 1998; Nathanson & de Faria 1993; Nathanson et al., 1997).

Whatever the theory is behind how DAT works, the positive effects with this population are promising. More research on the effectiveness of DAT and its underlying mechanisms can have implications for the future. More results could be applied to better training, standardizations, and certifications of DAT, which would increase quality of care and perhaps support equal access funding for those who need it.

Rationale of the Study

DAT studies have had some controversial results (Marino & Lilienfeld, 1998); but they have also shown promise therefore, empirically sound research must continue. It is logical for counselor educators to be part of this process, since insurance companies require the approval of licensed professional counselors for billing claims. Without insurance, DAT can be very costly to clients. School and community counselors, too, should be aware of all resources available for their clients, including DAT for treating certain populations. Knowing that DAT is effective can help in the process of referral and best practice for counselors. The ACA *Code of Ethics* (2005) states, “Counselors must practice only within the boundaries of their competence, based on their education, training, supervised experience, state and national professional credentials, and appropriate professional experience” (C.2.a. Boundaries of Competence). Counselor educators are involved in the supervision, education, and training of counselors, so it is necessary that counselor educators be well-versed in DAT research and have appropriate background and education to provide this knowledge to trainees. Some of these

counselor educators could be actively involved in DAT research and add to the body of literature, as well.

Therefore, the reasons for this study include the following:

1. Evidence for counselors to make good referrals,
2. Knowledge of the process and best practices, so counselor educators can inform counseling candidates adequately,
3. Building of the nomothetical net about DAT effectiveness, and
4. Insurance funding for DAT services to provide equal opportunities.

Program Information

DolphinSwim, an Austrian company operating in the Ukraine, provided its services and clientele for this research study. Although DAT, as its name suggests, is an "assisting" therapy, like most AAT programs it includes a multimethod approach to treatment. DAT sessions are not the only component of a client's experience.

DolphinSwim describes their program as Alpha-Therapy, a multimethod DAT concept that employs the positive effects of dolphin interaction as a stimulator for accelerated learning on physical, cognitive, psychological and social levels. The main focus during the dolphin sessions are the quality of interactions and the sphere (explained below) between the client and the animal. The therapist acts as a mediator who facilitates the interaction according to what is needed in each situation. The program is designed to promote the general development of the client; at the same time, it offers the opportunity to develop specific competencies depending on the zone of proximal development. The

zone is a place at which each child is developmentally ready or able to build on, so each child may be at a different place of skill, language, physical, or cognitive development.

Everything that is done as part of DolphinSwim's two-week program has the focus of encouraging and supporting alpha states in clients. Alpha-Therapy at DolphinSwim includes cognitive therapy, physiotherapy, cranio-sacrial therapy, art therapy, and psychotherapy as part of the DAT process. The client's family is part of many of these sessions (DolphinSwim, n.d.).

According to DolphinSwim's website, the alpha state is therapeutic because it is when both hemispheres of the brain are in synchrony and the inputting of data most likely to occur. In times of stress, the brain operates at beta levels, but when accessing the alpha state, the subconscious can be reached and perceptions open, making it favorable for psychotherapeutic interventions. The alpha state may be connected to psychoneuroimmunology, (e.g. interaction between psychological processes and the nervous or immune system) in which cellular changes take place and enhance the immune system.

Dolphin interactions consist of 10 sessions, approximately 30 minutes each, administered over a two-week period. Additionally, each client receives 20 sessions in a one-to-one therapy room setting, eight outdoor group sessions, several sessions in the Alpha-Sphere (discussed below), and parental coaching. Each day is structured according to an individual schedule for each client and usually starts with the DAT session in the morning. Afterwards, the child moves to the therapy room for a session with the dolphin therapist. The therapist uses references to actual events in the pool to focus specifically upon the needs and experiences of the child. Furthermore, every client receives an

additional therapy session each day to intensify the effect of DAT. All this takes place before lunchtime. In the afternoon, the clients are joined by their siblings (if they are present), and are treated in a group session. This session has the function of integrating the dolphin experience in a playful way. Group activities include outdoor exploration, and activities in the playground, at the pool, or on the beach of the hotel. The group is lead by a qualified teacher and eight trainees.

The DolphinSwim center is equipped with an Alpha-Sphere constructed by Sha (n.d.). On their company website, Sha describes how the sphere works:

> AlphaSphere stimulates and connects your senses. Different perceptional dimensions blend into one holistic multisensory experience. Hearing, seeing, feeling–AlphaSphere allows you to experience your senses not as separate sensations, but as a whole. Color, shape and light in unique combination with sound, vibrations and warmth lead to ultra-deep relaxation. You feel light and free, both physically and mentally. Rational and analytical thinking fade into the background. All feeling is directed towards your inner self (Sha, n.d.).

This sphere offers the clients and their family relaxation and a perception-enhancing experience that aims to facilitate the alpha-inducing effect of the dolphin interaction. While children are mainly accompanied by an occupational therapist, parents can share their experience and related issues with a parental coach. Parental coaching can also be used independent of the Alpha-Sphere.

Thus, DolphinSwim takes advantage of these effects as part of their multimethod therapy. As they state on their website:

> Alpha-Therapy is an intensive short term-therapy-program that works on the human as a whole, but also offers the opportunity to train specific skills. The combination of therapies and the environment

> in which the programs take place, are specially designed to amplify alpha and utilize this special brain state (DolphinSwim, n.d.).

Also within the framework of cultural historical psychology, mental abilities are seen as functional brain systems that work in a hierarchical structure, such as the sensorimotorical and the lower and higher cognitive processes up to language and thinking. In this method, the functional, healthy brain systems of the patient are the basis from which the dysfunctional brain systems are rebuilt by multi-stimulation of all senses through tasks that represent challenges at the zone of proximal development (Vygotsky, 1978).

The effects of dolphin interaction, such as increased alpha brainwaves and a harmonization of the brain hemispheres (ISDAT, 1996), in combination with the course of applications as a part of Alpha-Therapy, simultaneously promote relaxation and stimulation. Also, the anxiolytic effects (Webb & Drummond, 2001), the anti-depressant effects (Antonioli & Reveli, 2005) and the motivational effects (Nathanson, 1997) of dolphin interaction play an important role in the setting of Alpha-Therapy that focuses on the utilization of these effects by applying cognitive and physical therapy methods based on Vygotsky´s cultural historical and activity theory described above (Vygotsky, 1978, 1986).

Materials and Methodology

Participants

Each two-week program usually includes 10 children, their parent or caregiver, DAT staff, and a dolphin trainer(s). The participants sign up months in advance for this

service. Participants for the study described in this article were chosen through convenience sampling due to availability but this can minimize volunteerism and other selection biases by selecting every available participant who meets the criteria of the study (Hulley, et al., 2001).

Parents were chosen as participants based on their ability to report on their children. Dale (1996) states that parent reports have advantages over other forms of assessment, such as structured tests or quality sampling, due to the experience the parent has with the child. This extensive background is more than any researcher or clinician can obtain; additionally, parent reports seem to be less influenced by performance factors.

Many of the parents who sign up their children to attend DAT sessions through DolphinSwim report diagnoses of Autism, which is part of the broader Autistic Spectrum Disorders (ASD). The three main forms of ASD are Autism; Asperger Syndrome; and Pervasive Developmental Disorder, Not Otherwise Specified (PDD-NOS). Autism forms the core of the ASDs. ASDs contain a wide variety of psychological conditions characterized by abnormalities in social interactions and communication, and repetitive behaviors and restrictive interests (World Health Organization, 1992).

Autism is a fairly recent diagnosis in the medical community. The concept, according to Ghuman, Jaswinder, and Ford (1998), originated with Kanner's 1943 publication of his classic paper, "Autistic Disturbance of Affective Conduct." In this, he describes 11 children who showed extreme autistic aloneness, abnormalities of language, obsessive desire for sameness, and limitation in spontaneous activity. Currently, the APA

(1994) in the *DSM-IV* defines Autism as “the presence of markedly abnormal or impaired development in social interaction and communication and a restricted repertoire of activity and interests” (p. 66).

Parental reports on their children, according to DolphinSwim, have revealed other types of disorders with behavioral symptoms, such as Attention Deficit Hyperactivity Disorder and Down’s syndrome. There may also be cases of Cerebral Palsy; Developmental Disorders, Not Otherwise Specified; and other types of rare physical and mental disorders associated with developmental delays and special needs.

Paperwork

Due to the program’s location, participants would likely speak English or German, according to DolphinSwim. All paperwork was translated into German by native German language speakers. It was then translated back into English by other native German speakers to find any discrepancies. Those discrepancies were adjusted through feedback from all translators for the best fit in the German language.

Riverside Publishing gave consent to translate the Behavior Dimensions Rating Scale (BDRS) into German for one year (See Appendix C). Any questions or problems that arose during the study were referred to the English and German speaking individuals at DolphinSwim, where the local German translators could be accessed.

Informed Consent

Before DAT sessions began, an informed consent letter was given to all willing participants, that is, the parents of children with special needs. The letter was written in

either English or German, depending on the participant's native language. The letter explained confidentiality and the purpose and uses of the research. If the parents decided to participate, they were then offered the pretest BDRS in either English or German and given a copy of the informed consent letter in their language (See Appendix B).

Instrument

The instrument selected for this research was the Behavior Dimensions Rating Scale (BDRS) Parent Report Form, which is for ages five to adult and contains four subscales: Aggressive/Acting Out, Irresponsible/Inattentive, Socially Withdrawn, and Fearful/Anxious (Bullock & Wilson, 1989). It looks at behavioral symptoms over a wide range of behaviors that fit into the four subscales, allowing for collection of data on a heterogeneous population. The flexibility of the scale to meet many symptoms was helpful because the population was quite diverse, as can be seen by reviewing the participant information discussed later.

Within the four subscales of the BDRS, for example, the Socially Withdrawn scale relates to participants who report that they are a parent of a child with Autism and the broader spectrum ASD. Other diagnoses could fit specifically to other subscales, but for ease of use, the entire form was given to all participants regardless of diagnosis or presenting problems. This allowed for collection on behaviors related to multiple diagnoses or co-diagnoses. The scale consists of a single page with 43 questions on a bipolar Likert display of behavioral symptoms. The BDRS gives the time length for completion as only five to 10 minutes (Bullock and Wilson, 1989) and is thus a quick process for participants.

Instrument Reliability and Validity

According to the *BDRS Examiner's Manual* by Bullock and Wilson (1989), two procedures were used to examine reliability: internal consistency and test-retest reliability. Interrater agreement and the standard error of measurement were also conducted. Anastasi (1982) states the reliability of coefficients: those between 1.0 and .9 are excellent, those between .89 and .80 are good, and those between .79 and .70 are adequate. Anything below .70 suggests very low or inadequate reliability. Based on these numbers, Bullock and Wilson (1989) computed the internal consistency reliability of the BDRS as between good and excellent and the test-retest reliability as good. The interrater reliability was not an issue because the same parent filled out the form each time; interrater reliability would only need to be addressed if different people were filling out the pre- and posttest forms.

The BDRS (Bullock & Wilson, 1989) also looked at multiple forms of validity, of which two will be discussed here: content and criterion-related. In content validity, the questions are reviewed by judges to determine if they are appropriate indicators of emotional disturbance, and all of the judges suggested additional items; thus, 14 questions were added and one of the original questions was removed. Criterion-related validity was assessed, and the results of this showed that the data significantly differentiated between groups of students who had been labeled emotionally disturbed and those who had not.

Method

Quantitative methodology was used to explore the research question of the effectiveness of a DAT program for children with special needs:

Is there a positive change in behaviors after completing a DAT program compared to before participating?

The null hypothesis is that no change occurs in comparing behaviors before and after participating in a DAT program per parent report. The alternative or research hypothesis is that behaviors identified through a pretest will change by identification through post testing after receiving DAT sessions based on parent report. If the null hypothesis is refuted and the alternative retained, this suggests that the DAT program is effective for children with special needs.

Design

The research question used a one-group pretest-posttest design (Shadish, Cook & Campbell, 2002). It is a quasi-experimental design, due to the convenience sampling of participants. Random sampling is not a feasible option to create a true experiment due to the limited number of people available to study. Therefore, all willing participants were included in the data set.

Procedures

First, Riverside Publishing approved a licensing agreement for one-year, allowing for the translation of the BDRS from the original English into German. Then the rest of the paperwork was translated from English to German, including the informed consent letter.

All participants attending the DolphinSwim program were solicited to take part in the study on site. Only willing participants were part of the study, and as volunteers, they could choose to not answer all questions or to stop participating at any time; this was explained in the informed consent letter. The BDRS was given to these participants on site prior to attending any DAT sessions and again after the program was completed.

DolphinSwim agreed to hand out and collect the informed consent letters and to administer the BDRS on site. DolphinSwim is set up as a research site, and participants were aware that research could be conducted and could anticipate this. In addition, the staff at DolphinSwim are familiar with various research study protocols and were given directions on how to administer the BDRS.

A form was used to keep track of a unique code assigned to each participant to maintain his or her confidentiality. DolphinSwim was given detailed instructions for handing out the forms and for recording the names, codes, ages and genders of children participating. This tracking form was kept separate from the BDRS data, and the data that came in had no identifying information about the parents or children beyond the code to match pre- and posttest forms.

All paperwork was mailed to DolphinSwim by June 1st, 2008, in preparation for the summer DAT programs that started July 1st. There were five programs between July 2008 and September 2008. DolphinSwim agreed to be available by email to check in during the process and to send all data and forms back as they were completed.

Data Analysis

The comparison of the pretest and posttest scales was studied using a *t* test, which is used when looking at differences between two groups of data. The paired *t*-test was used, which is relevant when the same participant(s) are filling out both the pre- and posttest forms. The null hypothesis would be rejected if there were a difference in behaviors reported by parents during the two data collections times. If this occurred, the research hypothesis stating that there will be a difference in behaviors reported by parents would be accepted.

Results

Demographic Data

Forty subjects were signed up for the summer programs: 20 females and 20 males. Of these, 19 females and 18 males agreed to participate. All participants chose German as their first language; therefore, none of the English paperwork was used. Participant ages ranged from 4 to 21. Although the BDRS is designed for use up to age 18, the study included three participants who were age 21. Since they were dependents—not

considered independent adults and/or they operated at below their age level—all were included in the question analysis and one was included in the total BDRS subscale for filling out all 43 questions. For score transformation to take place in the total BDRS subscale, the high school grade range for analysis was used for the one participant.

The actual presenting symptoms and diagnoses reported by parents varied and included the following: cerebral palsy, developmental delay, developmental disorder, developmental deficits, West syndrome, mental retardation, Autism, hemiparesis, encephalitis, de Morsier syndrome, Down's syndrome, epilepsy, Rett syndrome, microcephaly, and Lesch-Nyhan syndrome. The diagnosis of Autism specifically accounted for nine cases, although other cases may have reported these symptoms despite not having the actual diagnosis. Most parents reported multiple diagnoses or presenting problems. Given the wide spectrum of physical and mental disorders, parents reported a variety of emotional and behavioral problems in their children in addition to or apart from a specific diagnosis.

Due to the variety of ages involved, all grade levels from kindergarten through high school were included. In order for score transformation to take place in the scales of the BDRS, a grade level was needed. The BDRS lists American grade levels, but all participants were from other countries. In order to transform BDRS subscale and total scale results, the ages of the participants were matched with the grade level they would be in American schools. Due to their diagnoses, most participants would have tested into much lower grade levels; however, for the purpose of the study and the ability to conduct

data analysis on the subscales and total BDRS scale, the children were matched to the grade level for their current age. The results show what children would operate like in a grade level equivalent to their age. If, following the DAT program, the results showed that a child was operating at a normal grade level, that information would be relevant because it can be assumed that most, if not all, of the participants would be performing at a grade level lower than their age. Moving up to normal behavior at a grade level for their age would mark a significant improvement.

Results Analysis

This quasi-experiment consisted of 40 participants total, and all but three chose to fill out both forms (pretest and posttest), giving a total *n* of 37. Because participants were volunteers and thus were able to stop at anytime or not fill out all the information, a fluctuation of *n* occurred. The results consist of comparisons at the group level pre/post for the four different subscales and the total score on the BDRS using the *t* test. Also, post hoc analysis was conducted on all 43 individual questions to see differences within the scale itself and to include those participants that did not fill out enough questions to result in subscale or total BDRS scores. Questions that participants filled out on the pretest scale but not on the posttest and vice-versa were dropped because the results could not be compared at the pre/post level. Only those questions that participants filled out on both the pre- and posttest forms were used, resulting in the differences in *n* for the subscales, total score, and individual question analysis.

It is useful to begin with a quick review of the subscales. Bullock and Wilson (1989) state that each subscale corresponds to multiple behavioral problems. The first subscale, the Aggressive/Acting Out scale, is comprised of behaviors like fighting, threatening, and general social aggressiveness and hostility. The second subscale, Irresponsible/Inattentive, involves rule-breaking and inattentive or irresponsible behaviors that may account for the child's inability to meet the demands of a situation. The third subscale is called Socially Withdrawn, and its behaviors include shyness, timidity, self-consciousness, reluctance, and passivity. The fourth and final subscale, Fearful/Anxious, is characterized by tenseness, anxiety, and distrustfulness.

Parents marked a Likert scale from 1 to 7 on their child's behavior for each of the 43 questions offering bipolar descriptors of behavior (e.g., attentive to inattentive). These questions also correspond to the four different subscales for behavioral problems. The lower scores, those closer to one, indicated positive behaviors, and the higher scores, those closer to seven, indicated negative behaviors. The differences between the pre- and posttest questions and subscales were analyzed. At the group level, a mean difference between pre- and posttest scores greater than 0 indicated that a positive behavioral direction had occurred. Anything equal to or below 0 indicated either no change or a change for the negative.

For subscale 1 (Aggressive/Acting Out), 20 participants filled out both pre- and posttest forms corresponding to all questions for the scale. The scores ranged from -5 to +9 with only one frequency result in a -10 to -6 range. The results at a .05 alpha level

yielded a mean difference of greater than 0, which indicates that a statistically significant positive change occurred. The mean score for posttest results was 2.1 with SD 4.57 and *p*-value of .0271 (See Appendix D.1).

For subscale 2 (Inattentive/Acting Out), 25 participants filled out both pre- and posttest questions corresponding to this scale. Scores ranged from -5 to +14 with only one frequency result in the -10 to -6 range. The results at a .05 alpha level also yielded a mean difference of greater than 0, indicating statistically significant positive change occurred. The mean score for posttest results was 2.24 with SD of 4.48 and a *p*-value of .0099 (See Appendix D.1).

For subscale 3 (Socially Withdrawn), 26 participants filled out both pre- and posttest questions corresponding to this scale. Scores ranged from -10 to +34. The results at a .05 alpha level again yielded a mean difference of greater than 0, and thus statistically significant positive change occurred. The mean score for posttest results was 5.07 with SD of 7.95 and a *p*-value of .0016 (See Appendix D.1).

Last, subscale 4 (Fearful/Anxious) included 24 participants that filled out both pre- and posttest questions corresponding to this scale. Scores ranged from -5 to +24. The results indicated that at a .05 alpha level a mean difference of greater than 0 occurred, indicating statistically significant positive change in behaviors. The mean score for posttest results was 5.29 with a SD of 6.25 and a *p*-value of .0002 (See Appendix D.1).

When comparing the total BDRS scores, all 43 questions needed to be completely filled out by participants. Out of the total 37 that filled out pre- and posttest forms, only

19 answered all questions to receive a total score. Figure 1 below shows the frequency range of scores from -5 to 19 with a fairly normal distribution pattern. Overall most participants frequently scored in at least the 0 or above range, reflecting positive behavior change.

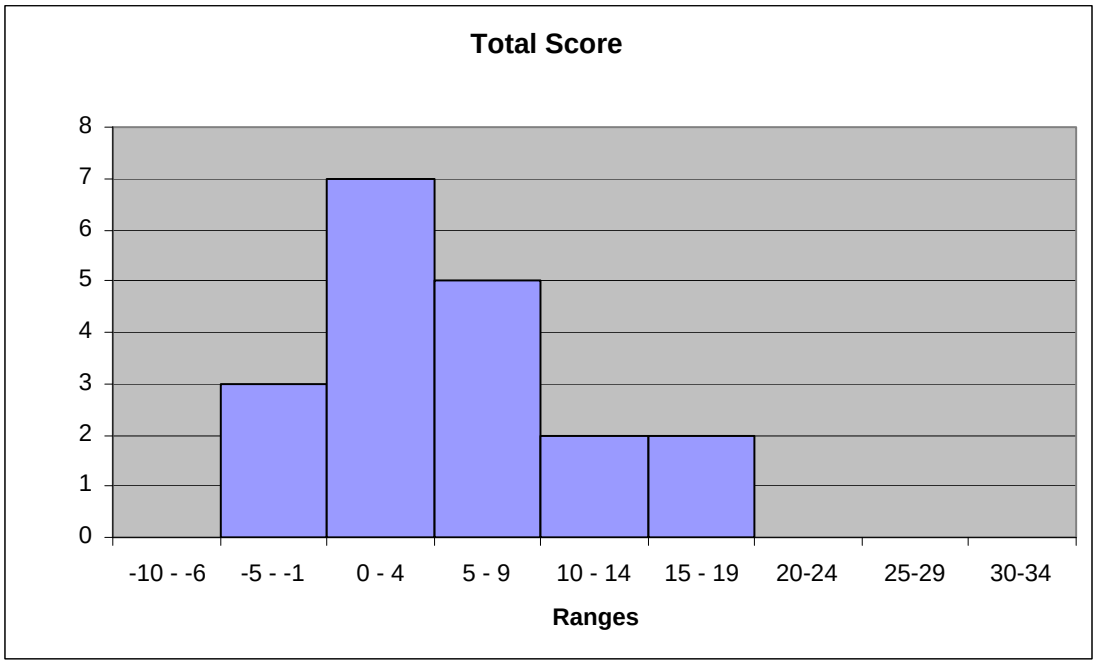

Figure 1: Total BDRS Score Range of the 19 participants who completed all questions.

The results for the total BDRS at a .05 alpha level indicate a mean difference of greater than 0, meaning that positive change occurred with the inclusion of all subscales into the total score. The mean score for posttest results was 5.57 with SD of 5.86 and a *p*-value of .0003 (See Appendix D.1).

Post Hoc Analyses

Post-hoc analyses were conducted after the data collection and analysis of group level results for subscales and total BDRS scores. The analyses include comments on

individual questions at the group level in the BDRS and individual participant results. This process was done after the fact or not specified *a priori* as the objective before data collection began. Post-hoc allows for other aspects of the data to be analyzed as they are found.

The ability to look at individual results is an interesting aspect of the study, although it is not quantitative in nature. Graphing the 19 individual results reflected a visual baseline change from pre- and posttest subscales and total BDRS results. Although the BDRS copyright does not allow for publishing these graphs, nearly all gave a visual representation of positive change. Brief information is provided in the discussion section regarding an example of a participant with one negative subscale change.

Since some participants did not fill out the entire BDRS, individual questions were also compared. This comparison could not be accounted for *a priori,* since it was not known that some participants would not answer all questions. The questions were thus analyzed separate from their subscales and total BDRS scores, with the *t* test at a .05 alpha level. Appendix D.2 shows the results for each question, with *n* indicating how many participants filled out each question on both pre- and posttest forms and whether the results for a positive change was statistically significant or not. It also shows other pertinent details for mean, SD, and *p*-values.

The questions from 1 to 43 with statistically significant results at a minimum of .05 *p* level and a brief description of each are in Table 1.

Table 1: Description of Positive Statistically Significant BDRS Questions.

Question Number	**Low End Attribute**	**High End Attribute**
2	Self-conscious	Confident
3	Short Attention Span	Long Attention Span
4	Disruptive	Non-disruptive
7	Quiet	Talkative
10	Breaks Rules	Observes Rules
11	Distractible	Stays on Task
12	Tense	Tranquil
13	Timid	Bold
17	Passive	Active
19	Fearful	Self-confident
24	Reluctant	Eager
30	Inattentive	Attentive
31	Unmotivated	Motivated
36	Hostile to New Ideas	Receptive to New Ideas
38	Unsure	Sure
40	Difficulty Learning	No Difficulty Learning
43	Complains About Physical Problems	Does Not Complain About Physical Problems

Nearly all the remaining questions (20) indicated a result in a positive change direction but were not statistically significant at a .05 *p* level. The only numbers

corresponding to a negative change or a change in the opposite direction were 1, 6, 16, 20, 25, and 41, although none were statistically significant (See Appendix D.1).

Discussion

The overall results of this DAT program suggest that during the course of the program, positive changes took place for participating children with special needs. The subscales, total BDRS score, and a majority of the individual questions further suggest that these improvements were made at a statistically significant level. Thus, at a 95% confidence level, these results are correct and accurate and show the possibilities for uses of DAT.

The greatest changes seemed to occur in subscales 3 and 4. Subscale 3 (Socially Withdrawn) measures problem behaviors related to disorders that cause aloofness. Many of the participants had a diagnosis of Autism, with nine actual reports of this; but many other types of developmental delays and deficiencies include withdrawn behavior, such as ASD. Subscale 4 (Fearful/Anxious) showed the most change, and it, too, can include symptoms of Autism or ASD, and symptoms of anxiety disorders. All of the subscales showed significant improvement, suggesting that any type of behavioral deficit or problem related to these four subscales could be helped with the DAT program.

One interesting note about the results is that some of the questions were not statistically significant on their own, but all subscales and total subscale scores that derived their data from the individual questions were. Specifically, 17 questions were

positively significant, while another 20 were positive but not significant. As stated previously, since parents were volunteers and could choose to not answer every question, *n* varied for the questions, subscales, and total score. This variability in *n* may have affected outcomes for individual questions. It is unclear why a majority of parents did not fill out all the questions in the BDRS. Perhaps those parents were either confused by the question or didn't know how to answer it and so left it blank.

This difference in significance may be accounted for by the transformation of scores depending on each child's age, gender, and grade level for the subscales and total score of the BDRS, which provided new numbers to compare. The individual questions' scores were not transformed by age, gender, or grade level and this may have affected why some were not significant. For example, when comparing behavioral deficits of a 6-year old male with a 16-year old female, (grade K-3 and grade 9-12, respectively) there may be lesser or greater behavioral movement based on their individual factors. The subscale and total score transformation takes this into account, making a standardized number to compare at the group level. But even without the transformation, when comparing everyone as a group on individual questions, the overall movement was positive, nonetheless.

Among the results, six questions did show negative movement, although not significant, in the opposite direction. These questions showed results with very high *p* levels ranging from .54 to .95, not even close to a low .05 level. All but one of these questions was related to the BDRS subscale 1 (Aggressive/Acting Out) behaviors. There

is a theory in behavior modification called an Extinction Burst, which occurs when problem behaviors are being extinguished. When this happens, frustration or aggressive behaviors can actually appear to get worse before they get better (Martin & Pear, 2007). Although these five questions were not significant, and the overall subscale of Aggressive/Acting Out did show positive results, the individual questions could be an example of this theory.

The positive movement of behavior in most questions, all subscales, and in the total BDRS score, leads to the question of how DAT works. Going back to theoretical reasoning, DeMares (1998) suggests that a peak experience with cetaceans can awaken a sense of harmony, connectedness, and aliveness in people. Nathanson (1998) discusses his attention deficit theory in which the dolphin is a highly motivating reward and thus can provide an opportunity to change behavior. Lilly (1978) suggests dolphins could be as intelligent as humans, and this could be a huge factor in their ability to relate to clients.

Additionally, Cochran and Callen (1992) provide an overview of many theories, including the intelligence of dolphins, their nonjudgmental approach, unconditional love or acceptance, the healing properties of water inducing brain chemical change, the elicitation of emotion, the creation of alpha states equal to a meditative state or linked to psychoneuroimmunology, and the possibilities of dolphin sonar and its physiological effects.

Another possibility behind how DAT works could be the interaction of any or all these factors. It would be very difficult, however, to test individual factors and the

benefits on clients. For example, dolphins live in water, so it's impossible to remove them from water, which may contain healing properties; thus, one cannot test the effect of dolphins without the effect of water. Still, the possibility of a combination of factors should be added to the theories, even though this study is not theoretical but rather a program evaluation. It would be very difficult to set up a study looking at individual properties of DAT when they cannot be isolated, but more studies comparing DAT with other water therapies or just swimming could be one aspect to continue.

As the main title indicates, the purpose of this study was to evaluate whether a DAT program was effective for children with special needs, and results suggest that it is. Which populations are helped most is an area for future research, but the data shows that DolphinSwim, which uses DAT, is helpful to those who participates, whatever their diagnosis. Indeed, the wide variety of problem behaviors that improved shows the flexibility of DAT as a treatment. Children with primarily physical, emotional, or behavioral symptoms, or combinations of these, benefited per their parents' BDRS reports. This suggests that this DAT program can serve a wide variety of clients.

Limitations of This Study

Language Translation

Limitations to this study are inherent with an international research study and possible language barriers. With the permission of its publisher, the BDRS was translated into German, but this format has not been standardized and repeated for its reliability and

validity. Although multiple translators were involved, repeated use of the form in German could be helpful to determine its effectiveness.

Parent Report

A second limitation is that any parent report study has the possibilities of inaccuracy because of over-inflation of positive results. Parents want to see their children get better, and this could influence how they respond on the posttest. However, it is also possible that if their child is not showing improvement, many parents may be ready to say this, as they are paying for the service and want it to not only be worth the price, but worth the effort for them and for their child. Thus, if their children do not improve, they could be very likely to report this and state their frustration with the service.

Design

The design of the study also has limitations. According to Shadish, Cook, and Campbell (2002), the limits to the one group pretest/posttest design, can include assignment, comparison groups, and treatments. These limits relate to threats of internal validity of the study.

Shadish, Cook, and Campbell (2002) address the fact that the researcher does not control assignment in most quasi-experiments. This control is the main difference between quasi- and true experiments. Nonrandom methods could produce different results than random assignment. Due to the limited number of participants available and

cost of the program, all willing participants were used. A positive note about assignment in this case, however, is that nearly all participants who originally signed up for the DAT program—37 out of 40—completed both scales.

Shadish, Cook, and Campbell (2002) discuss comparison groups and how they can provide data about what would have happened if there was no treatment for participants. Unfortunately, again due to the availability of participants, it was not feasible for some participants to receive treatment and others not. The only thing possible in this type of situation would be to find a nonequivalent comparison group that did not go through the treatment. But since participants' diagnoses are so diverse— from Autism to Cerebral Palsy, Down's syndrome to Epilepsy, and more—it would be nearly impossible to find a group of children who would be equivalent to the treatment group for a true comparison. Thus, drawing from internal control groups or external control groups was not possible.

Treatment is the third area to explore in threats to internal validity. To help with causal inference, the control that the researcher has on the application and schedule of treatment is addressed. According to Shadish, Cook, and Campbell (2002) there are multiple ways to do this, which are addressed as follows.

In switching replication, the original control group is given the treatment at a later date. In this case, however, a control group could not be used at a later date nor could participants be told when they could sign up for DAT. Parents sign up for programs that meet their schedule, and they must also travel to the site; to dictate when

people can have treatment is not feasible for those who are paying for the service. In order for this to happen, the organization that offers DAT itself would have to set up a schedule to allow for switching replication and offer it to their potential clients.

Another type of replication is the reversed treatment method, which applies a treatment that is expected to reverse the outcome. In this study using a vulnerable population, there would be strong ethical concerns in trying to reverse or even reduce any positive results that occurred through DAT. The goal of the DAT program is to have these outcomes continue long after it has ended. Any efforts to reduce positive outcomes to children with special needs would be highly unethical, and so should not be considered as a type of research design.

The removed treatment method would demonstrate a pattern of outcomes that shows there is causal inference that the treatment works. Again, DAT programs in general hope to achieve positive behaviors that are retained after the treatment has ended. If behaviors return to baseline after the DAT program is finished, that suggests that the children would need to be in continuous DAT to maintain the positive behaviors; due to cost and location, it would be nearly impossible to provide DAT on a daily basis for participants. Follow up studies could help to see what happens months after DAT has ended.

Last, the repeated treatments method occurs when participants receive more than one treatment in order to compare baselines in more than one instance. The more baselines available for comparison, the easier it is to have causal inference. Since these

programs are costly, only available in certain locations, and require significant amounts of time, it is not possible to have participants go through an additional two-week program soon after the first. It may be possible, however, to have follow-up studies for those participants that have gone through DAT once before and to compare those two rounds of treatment. Some participants have continued to come back for more services, but according to these programs it seems to be at least a year later that they need, want, or are able to come back. Follow up studies would take considerable scheduling and organization, and because of the cost, would again have to be open to just those participants who were willing and able to return.

Discussion of Post-Hoc Analyses

The interpretations of the BDRS item level results are limited since they were not set *a priori*. The information was gleaned by looking through the results afterward, and observing that participants did not answer all of the questions. Since the finding of the subscale and total subscale results were so robust, there is some validity in looking further at the data to find patterns or further information to explain results. The post-hoc analyses are a subset of a larger group of data, and to not be misleading to readers, this is stated for its limitation set after the fact. There could be bias from the researcher in interpreting the post-hoc data. The researcher, by looking at the data over and over again, could start to see patterns based only on interpretation, or could be biased towards supporting or discounting certain aspects of the research. The post-hoc subset of data also

did not include the score transformations that took place to standardize scores for group level results, which was available for the subscale and total scale results of the BDRS. Without score transformation, it could be more difficult to include individual scores for comparison at the group level.

Implications for Researchers

An area for future research would be to compare DAT with other forms of Animal Assisted Therapy. If DAT proves to be a better choice over other animals, and demand for dolphin services were to increase, there are ethical implications in regard to the dolphins. For this reason, future research might compare the effectiveness of using wild dolphins in their natural environment over captive dolphins, and whether this is even possible for certain populations. In captive settings, the dolphins are trained to come up to clients. In the wild, they are free to come and go, making contact more difficult for clients. To help create best practices for the field, the length of time and/or sessions necessary for change to occur is another area for research. In addition, the need for replication is vital in many areas of DAT to truly show its effectiveness. This study shows there is great possibility for change and that research should continue.

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Chapter 4
General Conclusion

Research Replication and Continuation

Dolphin Assisted Therapy has been shown in previous research to be a promising area for change in people's lives (Akiyama & Ohta, 2006; Antonioli & Reveli, 2005; Likura et al., 2001; Nathanson, 1989; Nathanson, 1998a; Nathanson & de Faria, 1993; Nathanson et al., 1997; Webb & Drummond, 2001). More research is needed, though, as a common theme is the limited available research to support its effectiveness conclusively.

The research described in this dissertation was originally set up to be a follow-up study, but the issues involved in getting participants to send back materials after they were home and from so many different countries proved too difficult. Ideally, follow up will continue with these participants because it is important to know whether the positive effects of DAT took place only on site or whether and how long they lasted. Nathanson's study (1998a) is rare in that it included a longitudinal follow up to his 1997 study on the short-term effectiveness of DAT. More long-term studies should be conducted.

Because of DAT location difficulties, existing dolphin centers may also be more likely to provide therapy with more supportive research. In fact, when this researcher contacted a dolphin center in the US about adding this type of therapy, the person spoken to said they needed more research to understand its benefit. There are hundreds of dolphin centers located in all parts of the world that do not offer DAT services, thus making potential participants travel even further to find one that does. There are also a very few centers that do offer both dolphin encounters and dolphin assisted therapy. If

research continues to show its effectiveness, adding therapy services would be an investment for centers, as they would need to hire trained staff and to protect the privacy of clients. But it could also end up being a positive investment with more clientele and variety of programs.

Validity

This study had higher external than internal validity due to many limitations involved with the internal components of the one-group pretest-posttest design (Shadish, Cook & Campbell, 2002). These limitations to internal validity were related to the assignment of subject, comparison groups, and treatment. Specifically, the validity of findings is limited because the study design did not provide random sampling and assignment or a control/comparison group. The ability to conclusively say DAT was effective was further limited by not having switching replications, reverse, or removed treatments (Shadish, Cook, & Campbell, 2002), as discussed under limitations in the research article. These limits could not be reduced due to the researcher not having control over the DAT program in terms of (a) scheduling of clients from multiple countries to set up control/comparison groups or (b) how and when treatments were received. The existing participants already signed up for the summer therapy programs were studied without these controls.

Due to the research being in a real world setting, versus an artificial one though, external validity increased. The real world setting provides elements that are naturally occurring, for example (a) the population interested in taking part in the study, and (b) the multimethods component of the program. If this study were to be replicated, it is likely

that the same results would be found or generalized to another group of participants that sign up for future summer programs at DolphinSwim. Although it must be noted that this is one study, and replication could further enhance the generalization to future programs. The research was done using the naturally existing population of parents of children with special needs who sign up for a DAT program, but the generalization would be limited to this program. Other DAT programs could have different ways of conducting their therapy processes. It seems the more similar a program is to DolphinsSwim in regard to features and processes, the more generalizable these results would be to another program. Additionally, it is not feasible to generalize these results to the entire population of parents of children with special needs because there could be inherent differences in those wanting to sign up for a DAT program versus those who do not.

If more controls could be put in place and the internal validity increased, there would be a trade off with external validity. Controlling for participant variables, using control groups, or limiting confounding variables (like just using DAT alone without other therapies) could provide more valid results in effectiveness. A decrease in external validity would continue as more controls were put in place to increase internal validity. Results would include less ability to generalize to populations that are signing up for the DAT program. The trade off between internal and external validity is something to be addressed when setting up more research.

Costs

Cost is an important issue because DAT can be expensive, and if proven to be an effective mode of treatment, it might be able to be funded by insurance. In fact, according

to some DAT programs, some insurance companies are providing reimbursement for these services when conducted by licensed professionals. The more research conducted will increase the credibility needed for insurance reimbursement, and thus increase equal access to all people wanting this treatment. A poor scenario for any treatment is that it is only available to the rich; if a treatment is found to be effective, all people—regardless of socioeconomic status—should have equal access to it.

Because DAT's expense and location adds to the difficulty of clients receiving treatment, further research, especially comparing it to other treatments, is vital. One of Nathanson's studies (1998a) compared clients who received only two weeks of DAT with clients who received traditional types of therapy, like counseling and speech or physical therapies, for longer time periods. He found that the behavior improvements continued even six months later and was higher for the group of children who only had the two weeks of DAT versus those who did not. In addition when comparing the costs of multiple therapies over the course of a year, the DAT only group was found to be cost-effective. This kind of study and more like it can provide insight into the cost-effectiveness, especially for those traveling long distances to receive DAT.

Ethical Considerations

With the possible addition of increased therapy services as more research is conducted and effectiveness continues to be shown, the issue of ethics arises, particularly in the area of the impact on the dolphins. Many people do not believe in using captive animals for human purposes. Wild dolphin programs are available and need be considered and researched for their possibilities in therapy. With this, the ethics continue

in regard to how to conduct therapy in wild encounters while still allowing the dolphins freedom to behave naturally. For example, in a place called Monkey Mia in Australia, wild dolphins visit humans on a daily basis. But that is not their natural behavior; they visit because the humans feed them. This leads to the ethical dilemma of how to interact with dolphins. Thus, could having DAT completely in natural settings without feeding them in the wild keep dolphins' natural behaviors intact, and is this ethical? This is a question to consider for the wild therapy programs versus captive ones. For captive ones, the ability to monitor facilities and to provide the best possible care needs to continue; the welfare of not just the human but the animal must be considered.

When continuing the call for more research, the area of who should receive DAT needs to be considered, as well. Most of the research documented in the review of the literature was for children with special needs (Brensing & Linke, 2003; Lotan, 2006; Lukina, 1999; Nathanson, 1989; Nathanson, 1998a; Nathanson & de Faria, 1993; Nathanson et al., 1997; Servais, 1999; Smith, 1987; Smith, 1988). There is some evidence that DAT can be used with other populations to lift depression (Antoniolo & Reveley, 2007), to reduce anxiety (Webb & Drummond, 2001), and to alleviate physical pain (Likura et al., 2001). Study in all of these areas also needs to continue to add to the body of research about whom DAT can serve.

Ethics comes in again in this area in regard to certain populations. Can those with physical pain and disabilities access wild swim therapies, and would some of these people need to use captive facilities instead? Should captive facilities be limited to the populations that can't access wild encounters? Perhaps if the dolphins are treated with the

best care and given the best environments possible, this will not be a concern; still, many people and wildlife organizations may have ethical issues with it.

Theoretical Assumptions

The question of how therapy actually works continues to be unanswered, and more research is needed in this area, as well; if research continues to support the validity of the field of DAT, the possibility of understanding the changes becomes even more important. Understanding how the process works could serve as a guideline for DAT standards and practices that do not yet exist. No one theory has stood out as the main cause.

Some of the theories on how DAT works include DeMares' (1998) idea of human beings having a peak experience with cetaceans, which awakens a sense of harmony, connectedness, and aliveness in them. Nathanson (1998a) suggests his attention deficit theory of the dolphin as a highly motivating reward and thus providing a unique opportunity to change behavior. Lilly (1978) suggests dolphins could be as intelligent as humans and that this intelligence could factor significantly in their ability to relate to clients. Cochran and Callen (1992) provide an overview of many theories, including dolphins' intelligence, their nonjudgmental approach, and their unconditional love; being in the water itself inducing brain chemical change in human beings; other properties of water; elicitation of emotions; creating meditative brain waves; and the possible physiological effects of dolphin sonar. Finally, the interaction of some or all of these effects needs to be considered, as well. It may be very difficult isolate the effects from

one another, but finding ways to do so could pinpoint the main cause of DAT's effectiveness.

Recommendations

Counselors & Counselor Educators

DAT needs to continue both with the research recommended above and as a treatment option for patients. This, thus, brings back the need for counselors and counselor educators to be aware of DAT in itself and as a resource for families. Because of the limited research, DAT should not take the place of medical doctors, other counseling, and physical or speech therapies for clients. But the accurate information regarding DAT's strengths and limitations should be available for families to consider it as a complementary or alternative medicine.

Again, DAT comes from the Animal Assisted Therapy field, which itself comes from the nature-based therapies, part of complementary and alternative medicine (CAM). CAM is funded under certain insurance companies, and, because of this possibility, counselors and counselor educators should be knowledgeable about the uses of alternative therapies for clients both in working with them in the schools and in community agencies so that they can make appropriate referrals for and provide resources to parents, children, and families in need.

Counselor Educators are part of the process to teach and train new counselors and are involved in research for best practices. DAT is an alternative therapy field with no overarching professional organizations or standards in place. Each facility operates based on its own assumptions of how DAT works for its clients. It is still unclear how many

sessions are needed, over what length of time, the specific foci, and if using multimethod approaches are the most beneficial to clients. PhD level professionals can and should be involved in the research that could help standardize the field, bringing it more credibility and quality services to clients, and informing counselors of other non-traditional therapies like DAT.

Conducting a Remote Study

Since this research was conducted remotely, it is important to note the challenges involved. Finding a remote location willing to participate was difficult but possible through the use of email and phone contact, and by having clear objectives and directions for the site upon contact. This clarity allowed the site to make an informed choice about whether to participate and what their role in the study should be.

The strengths of the site studied could be useful for others interested in doing remote studies. The site itself was set up as a place of research where participants knew before signing up for therapy that they could be asked to join a study. The site director was involved in his own research for completing his dissertation. His background included having an MS in Psychology already and being supervised by a faculty member at the University of Vienna. The site director's familiarity with the research process, including the vital importance of confidentiality and following protocols, was very important. Conducting a similar study could be more difficult for sites not set up for research and staff not familiar with research processes.

The main weakness involved in using a remote site is the loss of firsthand experience by the researcher. For example, the researcher was unable to observe the

therapy in person, which could have provided more primary knowledge about the processes of DAT instead of hearing accounts of it in conversations with DAT directors and in the literature. This researcher has, however, worked in dolphin training, and this has provided some background and understanding of how the therapy could work and what it might look like in person. A way to mitigate this distance factor would be to have videos of the therapy of past or even current clients available (which this site did provide).

Another difficulty is the costs that can accumulate for conducting an international and remote study. In this case, the cost was low due to the need for only one mailing with all paperwork and because the site was willing to assist for free; there was no budget needed to pay for their time in data collection or for scanning the data to send back to this researcher. It is possible that the site was willing to do this for free because it is a place of research, familiar with research processes, and interested in continuing research. Other sites may ask for compensation. Still, when compared with traveling and staying at the site to conduct data collection in person, doing a remote study seems more cost effective.

The most important part of doing a remote study is the planning phase. Having early deadlines in case problems arise is vital. Finding a site with professionals familiar with research is also important in order for the researchers to feel comfortable trusting the site staff to collect the data properly. Clear and specific directions and communication between the site and the researcher is a must. Last, having some kind of background in the process being studied could be helpful when unable to travel to the location.

Conclusion

This chapter discussed the thoughts regarding DAT literature and ideas for future research. These include the need for replication and continuation of empirical studies, as well as the aspects of setting up research designs by looking at the trade-offs between internal and external validity. A review of the inherent costs of programs is also important because as more DAT effectiveness research continues, costs could be mitigated by insurance. Ethical considerations of the impact on both animals and humans need to be reviewed regularly as more research is added in support of DAT. Also, how this research on a type of complementary and alternative therapy (DAT) relates to counselors and counselor educators is reviewed here. Finally, the strengths and weaknesses of conducting a remote study were evaluated, with an emphasis on how this study was successful and why.

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APPENDICES

Appendix A: Dissertation Formats

Format Options for the Dissertation

nota bene: the dissertation elements required for the proposal defense are italized.

Standard Document Format (Traditional-Style):
Refers to one thesis document that addresses a single theme. The Pretext Pages, Introduction, Conclusion, and Bibliography are **mandatory**. Your committee determines the additional chapters; you choose the chapter titles. The following parts comprise the Standard Document Format:
Pretext Pages
Chapter 1 – Introduction
Chapter 2 – Literature Review
Chapter 3 – Materials and Methods
Chapter 4 – Results
Chapter 5 – Discussion
Chapter 6 – Conclusion
Bibliography
Appendices

Manuscript Document Format (Contemporary-Style, Article-Style):
Is a single thesis document made up of several scholarly manuscripts or journal articles addressing a common theme. All manuscripts/articles must be related or address a single, common theme. You must be the primary author of each manuscript. Co-authors other than your major professor must be mentioned in a Contribution of Authors page (see Figure 9, page 8) in the pretext section of the document. The following parts comprise the Manuscript Document Format:
Pretext Pages
Chapter 1 – General Introduction (common introduction linking all manuscripts thematically)
Chapter 2 – First Manuscript
Chapter 3 – Second Manuscript (Parts I & III)
I. Introduction (including rationale for study)
II. Review of the Literature
III. Materials and Methods
IV. Results
V. Discussion
Chapter 4 – General Conclusion (common conclusion linking all manuscripts thematically)
Bibliography (common bibliography covering all manuscripts, although each manuscript may have its own reference section)

Appendix B.1: Informed Consent; English Version

Oregon State University
College of Education
210 Education Hall, Corvallis, Oregon 97331-3502
T 541-737-4661 | **F** 541-737-8971| http://oregonstate.edu/education

Project Title: A Summative Evaluation of a Dolphin Assisted Therapy Program with Special Needs Children

Principal Investigator: Cass Dykeman, PhD, Teacher & Counselor Education Department, Oregon State University, Corvallis, OR, USA
Co-Investigator(s): Rachel Dilts, MA, ABD, Graduate Student, Teacher & Counselor Education Department, Oregon State University, Corvallis, OR, USA

WHAT IS THE PURPOSE OF THIS STUDY?

You are being invited to take part in a research study designed to explore the effectiveness of dolphin assisted therapy (DAT). Based on previous research it is hypothesized that through parent report, children with special needs will show a difference in identified behaviors by attending DAT, thus suggesting an effective program. This study will add to the research in dolphin assisted therapy. Results will be used for a dissertation defense, and possibly publication. We are studying this because of the minimal research available on the effectiveness of DAT, although most results are positive; more research needs to be done to provide credibility in the field.

WHAT IS THE PURPOSE OF THIS FORM?

This consent form gives the information you will need to help you decide whether to be in the study or not. Please read the form carefully. You may ask any questions about the research, the possible risks and benefits, your rights as a volunteer, and anything else that is not clear. When all of your questions have been answered, you can decide if you want to be in this study or not.

WHY AM I BEING INVITED TO TAKE PART IN THIS STUDY?

You are being invited to take part in this study because you have signed your child up for DAT sessions with DolphinSwim. You are also the parent of a special needs child attending DAT sessions. Your feedback through parent report may provide valuable information on the effectiveness of a DAT program.

WHAT WILL HAPPEN DURING THIS STUDY AND HOW LONG WILL IT TAKE?

The DAT sessions and experiences will not be effected. The purpose is to have you fill out a short survey regarding your child's behavior. All surveys are identical. The first one is given on site prior to your child attending any DAT sessions. The next one will be given on site, after completion of the two week program. The final one will be given one month after the program, sent to you by email (preferred) or home address. You will be provided a self-addressed stamped envelope for your easy return. If you agree to take part in this study, your involvement will last 5-10 minutes for each instance; the time it takes to fill out the short survey. Your child will not have to do anything or fill anything out. This is a parent report study only.

WHAT ARE THE RISKS OF THIS STUDY?

There are no foreseeable risks associated to participating in this study. The quick parent survey is easy to fill out and would not seem to pose any risk or discomfort to you.

WHAT ARE THE BENEFITS OF THIS STUDY?

We do not know if there is a benefit from being in this study. However, we hope that, in the future, other people might benefit because of the ability to add research results in the field of DAT.

WILL I BE PAID FOR PARTICIPATING?

You will not be paid for being in this research study.

WHO WILL SEE THE INFORMATION I GIVE?

Federal government regulatory agencies and the Oregon State University Institutional Review Board (a committee that reviews and approves research studies) may inspect and copy records pertaining to this research. Some of these records could contain information that personally identifies you. To help protect confidentiality, we will be using a coding system. Your name will be given a code. The survey you fill out will only have this code on it. All forms will be locked in file cabinet and password-protected computer files. If we write a report or article about this study or share the study data set with others, we will do so in such a way that you cannot be directly identified.

DO I HAVE A CHOICE TO BE IN THE STUDY?

If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the study and still keep the benefits and rights you had before volunteering. If you decide not to take part in this study, your decision will have no effect on the quality of care, or services received from DolphinSwim.

You will not be treated differently if you decide to stop taking part in the study. You are free to skip any questions that you would prefer not to answer on the survey. If you choose to withdraw from this project before it ends, the researchers may keep information collected

about you and this information may be included in study reports, but your identity will never be made public.

WHAT IF I HAVE QUESTIONS?

If you have any questions about this research project, please contact:
Principle Investigator
Cass Dykeman, Ph.D
Oregon State University
Corvallis, OR 97331
USA
541-737-8204
cass.dykeman@onid.orst.edu

Co-Investigator
Rachel Dilts, MA
Oregon State University
Corvallis, OR 97331
USA
503-409-0557
rachel.dilts@oregonstate.edu

For German Language speakers:
DolphinSwim Contact
Norbert Tomasich
DolphinSwim

If you have questions about your rights as a participant, please contact the Oregon State University Institutional Review Board (IRB) Human Protections Administrator, at (541) 737-4933 or by email at IRB@oregonstate.edu. If you are German speaking only you may contact Norbert Tomasich and your information will be relayed to the principle and co-investigator or IRB if you wish.

Your signature indicates that this research study has been explained to you, that your questions have been answered, and that you agree to take part in this study. You will receive a copy of this form.

_____

(Name-printed)

_____ _____

(Signature) **(Date)**

Appendix B.2: Informed Consent; German Version

Oregon State University
College of Education
210 Education Hall, Corvallis, Oregon 97331-3502
T 541-737-4661 | **F** 541-737-8971| http://oregonstate.edu/education

Zustimmungserklärung

Projekt-Titel: Eine summative Evaluation eines Delphintherapie-Programmes mit Kindern mit Behinderung

Forschungsleiter: Cass Dykeman, PhD, Teacher & Counselor Education Department, Oregon State University, Corvallis, OR, USA

Forschungsmitarbeiterin: Rachel Dilts, MA, ABD, Graduate Student, Teacher & Counselor Education Department, Oregon State University, Corvallis, OR, USA

Forschungseinrichtung: Mag. Norbert Trompisch, Direktor von Dolphinswim Alpha Therapie, Zollerg. 14, 5a, 1070 Wien, Austria

WAS IST DER ZWECK DIESER STUDIE?

Sie sind herzlich eingeladen in einer Studie zur Effektivität der Delphintherapie (DAT) teilzunehmen. Anhand vorgegangener Studien mittels Elternprotokolle besteht die Annahme, dass Kinder mit Behinderung durch die Teilnahme an der Delphintherapie Veränderungen in bestimmten Verhaltensbereichen zeigen, und es sich folglich dabei um eine effektive Therapiemassnahme handelt. Diese Studie leistet einen weiteren Forschungsbeitrag in diesem Bereich. Die Resultate werden für eine Dissertation und nachfolgende Publikation genützt. Wir widmen uns diesem Thema, weil es nach wie vor zuwenig Studien dazu gibt; obwohl die Studien, die bislang durchgeführt wurden überwiegend positive Ergebnisse erbrachten, ist eine Intensivierung der Forschung für eine Steigerung der Anerkennung der Delphintherapie (bspw. durch Krankenkassen) erforderlich .

Was ist der Zweck dieses Formulars?
Diese Zustimmungserklärung beeinhaltet alle Informationen, die Sie benötigen um zu entscheiden, ob Sie an dieser Studie teilnehmen wollen oder nicht. Bitte lesen Sie diese aufmerksam durch. Sie beeinhaltet Fragen zum Forschungsprojekt, den möglichen Gefahren und Nutzen, Ihre Rechte als TeilnehmerIn und vieles mehr. Wenn für Sie alle Fragen beantwortet sind, können Sie über Ihre Teilnahme entscheiden.

Was wird während der Studie geschehen und wie lange wird sie dauern?
Die Delphintherapie und ihr Ablauf werden durch diese Untersuchung nicht gestört. Das Erhebungsmittel, das zur Anwendung kommen wird, sind kurze Fragebögen zum Verhalten Ihres Kindes. Diese sind alle identisch. Der erste wird Ihnen vor Beginn der Delphintherapie vorgelegt. Der nächste nach Beendigung der letzten Delphintherapie-Einheit noch vor Ort vorgelegt. Der letzte Fragebogen wird Ihnen einen Monat nach der Delphintherapie nach Hause geschickt, entweder per e.mail (vorzugsweise) oder postalisch. Ein frankiertes Rückantwortkuvert wird beigelegt. Wenn Sie dieser Studie zustimmen, bedeutet Ihr Aufwand zwischen 5 und 10 Minuten. Ihr Kind muss nichts machen, oder ausfüllen. Dies ist lediglich eine Elternfragebogen-Studie.

Was sind die Risiken dieser Studie?
Die Teilnahme an dieser Studie beeinhaltet keine vorhersehbaren Risiken. Der Elternfragebogen ist einfach und schnell auszufüllen und birgt unserer Einschätzung nach keine Risiken oder Unannehmlichkeiten für Sie in sich.

Wie profitieren Sie von dieser Studie?
Wir wissen nicht, ob diese Studie Ihnen unmittelbar einen Vorteil bringt. Wir hoffen jedoch, dass andere Menschen durch den gegebenen Zuwachs an Wissen im Bereich der Delphintherapie profitieren werden.

Werden Sie für die Teilnahme bezahlt?
Sie werden für Teilnahme an dieser Forschungsstudie nicht bezahlt.

Wer wird die Information, die ich gebe, sehen?
Bundestaatliche Behörden der U.S.A. und die Review-Komission der staatlichen Universität von Oregon, USA (zuständig für die Revision und Bewertung von Forschungsarbeiten) werden die Arbeit gegebenenfalls inspiszieren und Kopien der Aufzeichungen anfertigen. Diese Aufzeichnungen könnten eventuell auch Daten beeinhalten, die auf Sie zurückführbar sind. Um jedoch Konfidenzialität (im Sinne des Datenschutzes) zu gewährleisten, werden wir ein Kodiersystem benützen. Ihr Name wird mit einem Code versehen. Der Fragebogen, den Sie ausfüllen wird lediglich diesen Code tragen (nicht Ihren Namen). Alle Fragebögen werden versperrt aufbewahrt und alle Informationen am PC mit Passwörtern versehen. Wenn wir einen Bericht über die Studie verfassen, oder die Daten dieser Studie mit anderen austauschen, dann immer so, dass die Daten nicht auf Sie persönlich zurückgeführt werden können.

Haben Sie eine Wahl an der Studie teilzunehmen?
Wenn Sie sich entscheiden an der Studie teilzunehmen, dann aufgrund dessen, dass Sie wirklich teilnehmen wollen. Sie verlieren keine Zuwendungen oder Rechte, wenn Sie sich gegen eine Teilnahme entscheiden. Sie können jederzeit entscheiden aus der Studie auszusteigen, ohne dass dabei Nachteile für Sie erwachsen. Dies hat selbstverständlich keinerlei Auswirkungen auf die Qualität der Leistungen, die Sie in der Alpha-Therapie von Dolphinswim erhalten.

Wenn Sie sich entschließen sollten, die Studie abzubrechen, werden Sie dadurch nicht anders seitens des Teams von Dolphinswim behandelt werden. Sie haben die Möglichkeit Fragen nicht zu beantworten, wenn es Ihnen beliebt. Wenn Sie vorzeitig aus der Studie aussteigen, behalten sich die Forscher die Möglichkeit ein, die bis zu diesem Zeitpunkt gesammelten Daten zu behalten, auszuwerten und in Berichte einfließen zu lassen, wobei Ihre Identität natürlich geschützt wird.

Sie haben irgendwelche Fragen?
Wenn Sie irgendwelche Fragen bezüglich dieses Projektes haben, können Sie gerne den Forschungsleiter:
Oregon State University
Corvallis, OR 97331
USA
541-737-8204
cass.dykeman@onid.orst.edu

die Forschungsmitarbeiterin:
Rachel Dilts, MA, ABD
Oregon State University
Corvallis, OR 97331
USA
503-409-0557
rachel.dilts@oregonstate.edu

oder Mag. Norbert Trompisch unter office@dolphinswim, oder telefonisch 0043 676 3063857 kontaktieren.

Falls Sie Fragen hinsichtlich Ihrer Rechte als Studien-TeilnehmerIn haben, können Sie den Institutional Review Board (IRB) Human Protections Administrator der staatlichen Universität von Oregon, USA kontaktieren, telefonisch unter 001 (541) 737-4933 oder per e.mail IRB@oregonstate.edu.

Mit Ihrer Unterschrift geben Sie bekannt, dass Ihnen die Studie erklärt, relevante Fragen beantwortet wurden, und dass Sie zustimmen an der Studie teilzunehmen. Sie werden von uns eine Kopie dieser Zustimmungserklärung erhalten.

_____
(Name-Druckbuchstaben)

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(Unterschrift) **(Datum)**

Appendix C: Riverside Contract

Riverside Publishing has given their consent to translate the instrument, Behavior Dimensions Rating Scale (BDRS) into German. This was signed and sent back to their company.

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Janet A. Wiedemann, Permissions Manager

Appendix D.1: BDRS Results; Subscales/Total

Frequency Distribution for Scale Responses

Range	Scale 1	Scale 2	Scale 3	Scale 4	Total
-10 - -6	1	1	2	0	0
-5 - -1	4	4	0	1	3
0 - 4	8	13	11	12	7
5 - 9	7	6	8	6	5
10 - 14	0	1	3	2	2
15 - 19	0	0	0	2	2
20-24	0	0	1	1	0
25-29	0	0	0	0	0
30-34	0	0	1	0	0
total	20	25	26	24	19

Hypothesis Test Results

Scale	Number	Mean	St Deviation	Test Statistic	p-value	Significant
1	20	2.1000	4.5757	2.0525	0.0271	Yes
2	25	2.2400	4.4840	2.4977	0.0099	Yes
3	26	5.0769	7.9545	3.2544	0.0016	Yes
4	24	5.2917	6.2518	4.1466	0.0002	Yes
Total	19	5.5789	5.8625	4.1481	0.0003	Yes

H0 mean difference <= 0
Ha mean difference > 0

alpha = .05

Difference = value before - value after
Difference > 0 implies positive change
Rejecting H0 means positive change in student

Significant Yes = positive change, reject H0
Significient No = no change, do not rejct H0

Appendix D.2: BDRS Results; Individual Questions (1-43)

Hypothesis Test Results

Question	Number	Mean	St Deviation	Test Statistic	p-value	Significant
1	26	-0.3462	1.0561	-1.6713	0.9464	No
2	35	1.2857	1.6903	4.5000	0.0000	Yes
3	34	0.7059	2.0528	2.0051	0.0266	Yes
4	29	0.8276	2.0190	2.2074	0.0178	Yes
5	35	0.3143	1.5102	1.2312	0.1133	No
6	33	-0.1212	1.7095	-0.4073	0.6568	No
7	33	0.6061	1.4348	2.4265	0.0105	Yes
8	33	0.1515	1.3257	0.6565	0.2581	No
9	33	0.0606	0.8993	0.3871	0.3506	No
10	32	0.6875	1.0298	3.7766	0.0003	Yes
11	34	0.8824	2.0855	2.4670	0.0095	Yes
12	33	1.2121	1.9805	3.5158	0.0007	Yes
13	33	1.2121	2.1325	3.2653	0.0013	Yes
14	27	0.4074	2.2914	0.9239	0.1820	No
15	29	0.2759	1.5788	0.9409	0.1774	No
16	30	-0.0333	1.7515	-0.1042	0.5412	No
17	35	0.7143	1.5825	2.6704	0.0058	Yes
18	32	0.2188	1.2111	1.0218	0.1574	No
19	35	1.5143	1.9759	4.5339	0.0000	Yes
20	32	-0.0625	1.8654	-0.1895	0.5745	No
21	34	0.3529	1.3230	1.5555	0.0647	No
22	31	0.3548	1.2793	1.5444	0.0665	No
23	33	0.2424	1.5006	0.9280	0.1802	No
24	31	0.6129	1.6264	2.0982	0.0222	Yes
25	32	-0.0938	1.4449	-0.3670	0.6420	No
26	33	0.0000	1.5207	0.0000	0.5000	No
27	34	0.2353	1.2324	1.1133	0.1368	No
28	31	0.2903	1.7358	0.9313	0.1796	No
29	34	0.2353	1.8758	0.7314	0.2348	No
30	35	0.8000	1.1832	4.0000	0.0002	Yes
31	33	0.6364	1.4962	2.4433	0.0101	Yes
32	33	0.3636	2.1911	0.9533	0.1738	No
33	36	0.1111	1.0079	0.6614	0.2563	No
34	29	0.0000	1.5584	0.0000	0.5000	No
35	33	0.0606	1.0589	0.3288	0.3722	No
36	34	0.7647	2.1328	2.0906	0.0222	Yes
37	28	0.3214	1.0905	1.5597	0.0652	No
38	34	1.2941	1.5673	4.8147	0.0000	Yes
39	35	0.4000	1.4390	1.6446	0.0546	No
40	28	0.5714	1.6872	1.7922	0.0422	Yes
41	31	-0.1613	1.6145	-0.5562	0.7089	No
42	33	0.1212	1.4309	0.4866	0.3149	No
43	30	0.7000	2.0869	1.8372	0.0382	Yes