A Comparison of Theories for the Treatment of Autism

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Abstract

This paper examines theories of treatment for children with autism. Under the current diagnosis criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (APA, 1994), the essential characteristics of Autistic Disorder include (1) abnormal or impaired social development, (2) abnormal development in communication, and (3) a restricted repertoire of activities and interests. Two forms of therapy for children with autism are discussed: applied behavior analysis, also known as the Lovaas method, and complex perception therapy. Applied behavior analysis is one of the most prevalent treatments for children with autism in the United States, whereas complex perception therapy is rooted in Austria, although variations of this treatment also exist in the U.S. The theories supporting both treatment methods and how they are put into practice are discussed. Each treatment method is examined in terms of how it addresses the three aspects of the *DSM-IV* definition of Autistic Disorder. Impressions from personal experience working with each therapy and suggestions regarding what can be done to improve treatment for children with autism are also discussed.

A Comparison of Theories for the Treatment of Autism

Overview

In spite of its relatively short history as a diagnosis, autism has stirred up controversy with regard to its definition, cause, and treatment. Autism is assumed to be a neurological disorder that is diagnosed by functional impairments (APA, 1994). Estimates from the Centers for Disease Control and Prevention are that autism and related disorders occur in 1 of every 500 individuals, placing it as the third most prevalent developmental disability (Gillberg, 1997). Under the current diagnostic criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (APA, 1994), the essential characteristics of Autistic Disorder include (1) abnormal or impaired social development, (2) abnormal development in communication, and (3) a restricted repertoire of activities and interests. In order to be considered Autistic Disorder, symptoms in these three areas must be present before the age of three years.

Autism researchers have not been able to pinpoint a specific cause, although there are several theories. Some medical researchers have made links between autism and biological or neurological abnormalities in the brain, but this evidence is still inconclusive (Autism Society of America, 2002). Studies also suggest a genetic component, but it appears that no single gene is directly linked to autism, suggesting a complex combination of several genes (Autism Society of America, 2002). Others have theorized that there are links between autism and some vaccinations, dietary allergies, specific viruses, or pollutants in the environment, yet these theories have also not been supported with conclusive empirical evidence (Edelson, 1999).

As there are multiple theories of the cause of autism, there are also numerous theories about its treatment. Designing a treatment plan for children with autism is difficult due to the vast variability of symptoms and autistic characteristics between individuals. There is no "typical" case of autism (Simpson, 2001). A wide spectrum of characteristics appears in various combinations with a broad range of severity, yet all are classified as symptoms of autism. These individual differences make treatment a particular challenge, as no one treatment plan has been found to address all types and variations of autism (Gresham, Beebe-Frankenberger, and MacMillan, 1999). Yet, if the theory which underpins the treatment is accurate, effective methods of intervention should follow. Therefore, particular stress is given to the theories supporting treatment methods in this paper.

History. The concept of what autism is and how it should be dealt with has changed throughout the past century. Although the condition likely existed earlier, the term autism was first used by Bleuler at the beginning of the 20th century as a term to describe schizophrenics' withdrawal into fantasy (Zager, 1999). Then in the 1940s, two different researchers used the term *autism* to describe a social deficiency that was apparent in young children. Leo Kanner, a psychologist working in the United States, studied 11 children with extreme social deficits who were originally thought to be schizophrenic. Kanner recognized that these children did not represent cases of childhood schizophrenia. Therefore, Kanner described the syndrome as *early infantile autism* (Zager, 1999). Around the same time, Hans Asperger was working with children in Austria who were exhibiting difficulties in social and educational settings and had been referred to him for presumed personality disorders. Like Kanner, Asperger saw

something unique about these children, and he too chose the term *autism* to denote the disorder (Zager, 1999). Since the recognition of autism, diagnostic criteria have been modified from Kanner and Asperger´s original observations, but many characteristics of the disorder still hold true.

Definition. As mentioned before, the *DSM-IV* (APA, 1994) designates three primary areas of impairment for individuals with Autistic Disorder: social development, communication, and restricted routines and interests. Impairments in social development include non-verbal behaviors, such as irregularities in eye-to-eye gaze, facial expressions, and body posture. A child with autism typically does not develop peer relationships at the appropriate developmental level, either because he or she has no interest in other children or because of a lack of understanding of how to behave in social interactions. Often, a child with autism does not attempt to share experiences with others and lacks social and emotional reciprocity and an awareness of others.

Communicative delays for individuals with autism include impairments in both verbal and nonverbal communication (APA, 1994). Most children with autism lack or show significant delays in the development of spoken language. For those who do speak, they may speak with an abnormal pitch, intonation, rate, rhythm, or stress put on words. A verbal child with autism may also use stereotyped, repetitive phrases, or speak in a metaphorical language (language only understood by the child and those close to him) or a unique communicative style. Comprehension of language is often a problem for individuals with autism, resulting in a failure to understand simple directions or jokes. Spontaneous make-believe and imaginative play is usually absent or markedly impaired, and individuals may exhibit a lack of interest in simple imitation games and routines.

Restricted patterns of routines and interests are "abnormal either in intensity or focus" (APA, 1994, p. 67). This may involve an insistence on sameness; adherence to specific, nonfunctional routines; and resistance to change. Often, individuals with autism become preoccupied with parts of objects (like a button or part of the body), are fascinated by movement (such as the wheel of a toy car or spinning their bodies), and may become attached to inanimate objects. Individuals with autism may also have stereotyped body movements, like flapping their hands, rocking their bodies, or adopting an abnormal posture.

The *DSM-IV* (APA, 1994) also designates various characteristics as associated features of autism. Some specific features that are common among individuals with autism include odd responses to sensory stimuli; abnormalities in eating, sleeping, mood and affect; behavioral problems, such as hyperactivity, temper tantrums, short attention span, impulsivity, aggressiveness, and self-injurious behavior; depression (especially in older individuals); and inappropriate fear responses (either undue fear or a lack of adaptive fear). Autistic individuals typically have an uneven cognitive profile, exhibiting higher skills in some areas, while significantly delayed in others. Seventy-five percent of children diagnosed with Autistic Disorder function at a mentally retarded level (APA, 1994).

Purpose. An effective treatment plan for a child with autism must address each of these dimensions—social abnormalities, communication impairments, and restricted repertoires of activities and interests—as well as dealing with the various associated features. Each child requires a treatment plan that is adjusted to fit his or her specific needs. For example, the therapy design for an echolalic child (a child who will repeat

what is said, but may not be able to use these words in meaningful conversation) must be different than for a mute child. Nevertheless, a method of treatment claiming to be an effective mode of intervention for children with autism should be capable of being adapted to attend to each area of deficiency. In this paper, two forms of therapy for children with autism are discussed: applied behavior analysis, also known as the Lovaas method, and complex perception therapy. In addition to a review and analysis of these two theories of treatment, the author has had experience working as a therapist in both treatment styles, therefore drawing conclusions from both quantitative and qualitative perspectives.

Applied Behavior Analysis

Applied behavior analysis (ABA) has been broadly defined as the study of the science of behavior (Helfin & Alberto, 2001b). More specifically, it has been described as "a science that seeks to use empirically validated behavior change procedures for assisting individuals in developing skills with social value" (Autism Society of America, 2002).

Operant conditioning and empirical research, relying on structure and data collection, are central to ABA programs. (Helfin & Alberto, 2001b). The use of ABA to treat children began in the 1950s and 60s when Bijou combined B. F. Skinner's theory of behavior with his own research in child development at the University of Washington Institute for Child Development (Green, 2001). During the 1960s, multiple researchers began to report success stories of applying behaviorist principles to teach children with autism. These studies and others set the foundation for current ABA treatment for children with autism and related disorders.

Empirical Studies. The watershed study examining the application of behavior analytic principles to treat autism was conducted by Lovaas at the University of California, Los Angeles (Lovaas, 1987). Lovaas began a behavior intervention project in 1970 with the goal of providing an intense, comprehensive model for learning that would allow a child with autism to achieve his or her highest potential, ideally reaching the developmental level of his or her peers by the first grade. Lovaas' method is conceptually based on the theory of operant conditioning, using reinforcement as a means of facilitating the learning process.

The 19 participants in Lovaas' study received three years of intensive treatment (Lovaas, 1987, p. 5). The first year's goals included reducing self-stimulatory behaviors, increasing compliance to basic verbal commands, teaching imitation, introducing appropriate peer play, and training the family to continue carrying out aspects of treatment at home. The emphasis of the second year was on expressive and early abstract language, interactive peer play, and the integration of the child into a preschool group. By the third year of treatment, the child learned to express emotions appropriately; read, write, do arithmetic and other pre-academic tasks; utilize observational learning; and the autistic student was enrolled in a preschool with a teacher who was willing to help carry out the treatment. These goals created the framework for the implementation of Lovaas' treatment method.

In his study, called the UCLA Young Autism Project (1987), Lovaas focused on the effectiveness of early intervention. The children who participated in Lovaas' study were each diagnosed independently of the UCLA Young Autism Project. They were required to have a chronological age of less than 40 months if mute, and less than 46

months if echolalic. Also, at a chronological age of 30 months, the participants must have had a prorated mental age of at least 11 months, thus excluding those within the profoundly retarded range (p. 4). Participants were divided into two groups according to staff availability at the time of referral. True random assignment was not used due to ethical considerations and parental protest. The 19 participants in the intensive-treatment experimental group received 40 or more hours of one-on-one therapy each week. Comparison Group 1 participants (n=19) received minimal one-on-one treatment for 10 hours a week or less. Comparison Group 2 (n=21) met the same qualifications as all the other participants in the study, but they did not receive any treatment through the UCLA project. Comparison Group 2 was included to ensure that the individuals referred to the UCLA Young Autism Project did not represent an atypical subgroup of children with autism (p. 5). The experimental group and Comparison Group 1 received treatment for a minimum of two years. Post-treatment measures were administered when the participants were six or seven years old.

The post-treatment measurements revealed promising results for children in the intensive treatment group. Of the 19 participants that received intensive treatment for 40 hours a week, nine children (47%) passed the first grade in a typical classroom with average or above average intelligence quotient (mean of 107, range 94 to 120); eight participants (42%) passed first grade in a special needs classroom and scored within the mildly to moderately retarded range on IQ tests (mean of 70, range 56 to 95); and two children (10%) scored in the profoundly retarded range (IQ less than 30) and were placed in self-contained classes for autistic and retarded individuals (Lovaas, 1987, p. 6). When compared to participants in Comparison Group 1, the experimental group's average IQ

was 30 points higher. The data from Lovaas' study shows that 47% of participants receiving intensive treatment achieved average intellectual and educational functioning, but only 2% of the participants from Comparison Group 1 reached this level (p. 7). No differences were found in the pretreatment or post-treatment scores for Comparison Group 1 and Comparison Group 2. At the time of publication, Lovaas' treatment method was the first to show such positive outcomes that were supported by empirical evidence.

McEachin, Smith, and Lovaas (1993) examined the long-term effects of treatment received by the 19 participants in the treatment group of the UCLA Project. The goal of this study was two-fold: (1) to evaluate the degree to which the participants maintained gains measured at the end of Lovaas' study (1987), and (2) to determine if the "normal-functioning" participants were free of autistic symptoms. The mean age of the participants for the long-term follow-up study was 13 years old (range 9 to 19 years). Those participants who were considered "normal-functioning" by Lovaas (1987) terminated intensive treatment after evaluation at seven-years of age. Other participants continued treatment for various amounts of time. In the long-term follow-up study participants were evaluated according to current school placement; intelligence quotient, measured by the Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974) for verbal participants and Leiter International Performance Scale (Leiter, 1959) and Peabody Picture Vocabulary Test-Revised (Dunn, 1981) for nonverbal participants; a structured interview with parents to evaluate the child's adaptive behavior using the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984); and the Personality Inventory for Children (Wirt, Lachar, Klinedinst, & Seat, 1977) to measure psychological disturbance.

Results of standardized IQ tests show that participants from the treatment group maintained the intelligence levels exhibited in the initial post-treatment measures (McEachin et al., 1993). Of the nine children determined to be "normal-functioning" at the end of the initial study ("normal-functioning" defined by school placement and intelligence level), eight children remained in typical classrooms, exhibiting average intelligence and adaptive functioning: None of the participants from first comparison group were evaluated as "normal functioning" in the follow-up study (p. 368). One participant in the treatment group who was placed in a special classroom at the end of the initial study moved into a regular class and was in junior college at the time of the follow-up study. Thus, consistent with the initial data, 47% of participants in the treatment group were considered "normal–functioning" in follow-up evaluations (although two children switched placements). The results reported in this study indicate that the gains made in the UCLA Young Autism Project were able to be maintained long term.

The best-outcome or "normal-functioning" participants from Lovaas' study (1987) were also evaluated by McEachin et al. (1993) to determine whether they were free of autistic symptoms. The nine best-outcome participants were evaluated by clinical psychology students with no knowledge of the participants' diagnosis or the purpose of the study. A nonclinical comparison group with the same age range and no history of behavioral disturbance was assembled in order to verify the validity of assessment procedures.

Results indicated that all best-outcome participants scored on the high end of normal range for intelligence quotient (range 99 to 136). Scores on the Vineland

Adaptive Behavior Scales also fell in the average range on all subscales (Communication, Daily Living Skills, and Socialization). Three participants had marginal scores in one subtest area, but all had composite scores within the normal range. On the Maladaptive Behavior Scale, the same three participants (3 of 8 tested) scored in the clinically significant range for maladaptive behavior, compared to one participant from the nonclinical comparison group who scored in this range. However, the mean score of all participants was within the normal range.

Scores on the Personality Inventory for Children were normal across all scales. High scores were noted on the Intellectual-Screening scale, assessing intellectual development (indicating abnormalities in development), but because this scale measured participants' early history, scores of any individual with autism would be affected. The Clinical Rating Scale, which addresses items such as compulsive or ritualistic behavior, empathy for and interest in others, sense of humor, depressed mood, anxiety, and hyperactivity, revealed some deviance from the comparison group, but the results were skewed due to one participant who was no longer considered "normal-functioning" due to his removal from the general classroom (he was placed in a class for children with language delays) at the time of the follow-up study. These results suggest that eight of the nine participants from the intensive-treatment group in the initial UCLA Young Autism Project (Lovaas, 1987) who were classified as "normal-functioning" at the end of the study maintained gains and exhibited average functioning in intelligence and adaptive behaviors (McEachin et al., 1993).

Although the results from the studies conducted by Lovaas and colleagues seem promising, it is important to note some of the criticisms made against Lovaas' study

concerning its internal and external validity. Gresham and MacMillan (1997) pointed out numerous elements they consider to be threats to validity. One of the most obvious weaknesses of the study is the lack of random selection and assignment of participants. Because the participants were matched to groups according to staff availability, the study is considered to be a quasi-experimental design rather than a true experiment (Gresham, Beebe-Frankenberger, & MacMillan, 1999). In response to this frequent criticism, Lovaas emphasizes that the experimental design and comparison groups were found to be similar on 19 of 20 variables measured at the onset of the study (Smith & Lovaas, 1997). The dissimilar variable is not specified.

Instrumentation is also a concern when considering internal validity. Specifically, pretest and posttest scores are based on different measurements, and pretest and posttest scores were obtained under different experimental conditions (Gresham & MacMillan, 1997). Smith and Lovaas (1997) respond to the criticism by noting that no single test would be appropriate for the developmental levels of the children at both intake and follow-up.

Requirements for age and prorated age were imposed for the selection of participants in Lovaas' study, thus excluding approximately 15% of the potential participants (Gresham & MacMillan, 1997). Smith and Lovaas (1997) claim that this cut-off point was necessary because "no valid procedure exists for diagnosing autism in children who have severe or profound mental retardation" (p. 209), but Gresham and MacMillan consider this to be a threat to external validity.

Furthermore, differences in therapist characteristics, including their training and motivation, as well as family characteristics give reason to question whether Lovaas'

technique would have the same results in the general population of children with autism (Gresham & MacMillan, 1997). Gresham and MacMillan also note the potential biases of parent motivation, staff availability, and staff motivation between the experimental and control groups.

A variation of Lovaas' study was conducted by Smith, Groen, and Wynn (2000) in an attempt to determine the effectiveness of intensive early intervention for children with autism and pervasive developmental disorders using a fully randomized experimental design. Smith et al. used the same treatment manual as Lovaas (1987), yet the research was conducted independent of Lovaas. Twenty-eight participants were involved in this study, half diagnosed with autism and half as pervasive developmental disorder not otherwise specified (NOS). All participants were required to be between 18 and 42 months old, have an IQ between 35 and 75, be independently diagnosed with autism or pervasive developmental disorder-NOS, live within a one-hour drive of the treatment site, and have no other major medical problems. Participants who were referred to the study and met these requirements were divided into two groups: an intensive treatment group (n=15) and a parent-training group (n=13).

The intensive treatment group received a mean of 24.52 hours of treatment per week for 2 to 3 years (Smith et al., 2000). In the beginning of treatment, the student therapists focused on one-on-one treatment with the child. When the child began to progress with language, cooperated and played appropriately, and acquired some self-help skills, the treatment method was shifted from a one-on-one therapy design to a naturalistic approach, involving enrollment in a typical public school classroom with his or her student therapist serving as an aide. At this point, one-on-one treatment hours

were phased out. If a child did not master the necessary skills for enrollment in a typical classroom after 18 months of treatment, he or she was enrolled in a special education class.

In the parent-training group (n=13), parents were trained for 5 hours a week (for 3 to 9 months) to use the same approach specified by Lovaas (1987) and asked to work with their child five additional hours each week (Smith et al., 2000). Children in this group were also enrolled in a special education class (independent of UCLA Young Autism Project) for 10 to 15 hours per week.

Post-treatment evaluations occurred when participants were between 7 and 8 years old. The intensive treatment group demonstrated significantly higher performance in intellectual functioning, measured by the Stanford-Binet Intelligence Scale (Thorndike, Hagen, & Sattler, 1986) and the Bayley Scales of Infant Development-Mental Development Index (Bayley, 1969); visual-spatial skills, according to the Merrill-Palmer Scale of Mental Tests (Stutsman, 1948); language development, measured by the Reynell Development Language Scales (Reynell, 1990); and academic achievement, using the Wechsler Individualized Achievement Test (Wechsler, 1992) when compared to the parent-training group (Smith et al., 2000). No significant differences were noted between the two groups on the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984) or the Achenbach Child Behavior Checklist (Achenbach, 1991), measuring degrees of adaptive behaviors, in contrast to McEachin et al.'s findings (1993). Pretreatment and post-treatment scores on behavior management were not discussed. In the intensive treatment group, those diagnosed with pervasive developmental disorder-NOS scored higher, on average, than those with autism.

Participants were also evaluated in terms of school placement using three categories of classification: (1) a regular classroom with no special assistance, (2) a regular classroom with support, or (3) a self-contained class (Smith et al., 2000). Overall, the intensive treatment group had less restrictive classroom placements (4 placed in a regular class without support and 2 in a regular class with support). In the parent-training group, no participants were placed in a classroom without support, but 3 were included with support. In Lovaas' study (1987), children were classified as "normal-functioning" if they were placed in a typical classroom without support and had an IQ greater than 85. Only 2 participants from Smith et al. who received early intensive treatment met these qualifications (1 with autism, 1 with pervasive developmental disorder-NOS), but 2 others fell just below the IQ cutoff. None from the parent training group qualified. Yet, these four "normal-functioning" participants from Smith et al. represented only 27% of the treatment group, compared to the 47% who were determined "normal-functioning" in Lovaas' study.

Smith et al. (2000) speculate several possibilities for this discrepancy: It could be that the treatment is not as effective as initially reported; several differences in treatment, including reduced intensity, the phasing out of treatment for those with slow progress, and decreased parental involvement in the intensive treatment group, could have had some impact on the outcome; and the intensive treatment group exhibited lower IQ scores and a lower language level at intake than the treatment group in Lovaas' study (1987), possibly influencing outcome measurements. Although Smith et al. did improve on Lovaas' experimental design by having a random assignment of participants and uniform assessment procedures, the study is weakened due to the small sample size and the lack

of a true control group. Nevertheless, several implications can be made from the results of this study. While not as high as previously reported, it is clear that large gains are possible with early intensive treatment. Early intensive treatment may be especially beneficial for those with pervasive developmental disorder-NOS, as well as for those with autism. The study also implies that intensive treatment is likely more effective than parent-training (Smith, et al., 2000).

Studies such as these conducted by Lovaas (1987), McEachin et al. (1993), and Smith et al. (2000) have been imperative in giving credence to the practice of ABA as a treatment for children with autism. However, the specifics of ABA treatment programs are frequently debated. For the purposes of this discussion, the current trends in ABA treatment as deliberated in recent literature on the topic will be discussed.

Application. The key components of an ABA program are: high intensity, requiring many hours of treatment each week; reinforcement, using behaviorist principles of positive reinforcement to teach new skills; and structure, adhering to strict methods of instruction and data collection (Autism Society of America, 2001). When designing an ABA treatment program, the child's skills and needs are assessed (Green, 2001). Each targeted skill is broken down into attainable tasks that are first introduced by the therapist with physical or verbal prompts followed by positive reinforcement for correct answers. Skills are then taught through continued and varied repetition. When teaching a new skill, the therapist may shape a response by first accepting approximations of the correct response and gradually raising expectations as the child's skill increases (Smith, 2001). ABA programs stress detailed data collection, allowing therapists to determine when the child has mastered a particular skill (Helfin & Alberto, 2001b). Mastered skills are then

added to a group of maintenance drills that are routinely reviewed while new skills are constantly introduced. Various skills build on each other; for example, the child must first master attention, cooperation, and imitations in order to learn language skills.

The typical method of instruction for ABA programs, especially in the early stages of treatment, is called "discrete trials." Discrete trial training consists of three primary components: antecedent, behavior, and consequence (Smith, 2001). The antecedent (or cue) is the direction given by the therapist to the child. The child's response to the antecedent is his or her behavior. The consequence is the therapist's reaction to that behavior. If a child responds to the antecedent with an undesirable behavior, the therapist ignores it or responds with a flat "no," therefore giving the child no reinforcement and eventually causing the behavior to become extinct (Smith, 2001). The therapist positively reinforces correct responses. Reinforcements are carefully chosen based on what will motivate the child to succeed—in the beginning stages of therapy, it may be necessary to reinforce the child with candy or physical rewards, but these are coupled with social praise (i.e. verbal praise) until the child eventually responds to social praise alone. To insure skill acquisition, it is critical that both consequences and cues are consistent across settings until the skill is mastered (Heflin & Alberto, 2001a). Once a skill is mastered, consequences, cues, materials, people (those giving cues), and settings should be varied to promote generalization.

Applied behavior analysis is built on the idea that individuals with autism do not learn from the environment using typical techniques such as exploration, creative play, modeling, and conversation, making teaching situations frustrating and ineffective for children with autism (Smith, 2001). By creating an environment with many learning

opportunities in which the chance to succeed is increased and number of failures decreased, discrete trial training is capable of being highly effective for children with autism. Concepts and events are broken down into short, simple tasks that have a clear start and finish, thus making the learning experience more accessible and effectual for the child (Smith, 2001). Furthermore, ABA programs are extremely data-based, allowing therapists to identify which elements of the program are effective for an individual child based on documented performance and adjust the instructional methods appropriately (Heflin & Alberto, 2001b). Aside from these specifics, ABA programs are designed to be fun, tapping into those activities and interests the child enjoys in order to create a positive and motivational learning atmosphere.

The most effective applications of discrete trial training have been in teaching new behaviors and discriminations (Smith, 2001). New behaviors include both motor movements and speech sounds. For example, the first skill a child learns in his ABA program may be to sit, because sitting is a prerequisite for other learning opportunities. Imitation can be taught using discrete trials, enabling the child to learn new speech sounds, motor skills for sign language, and appropriate play skills. Imitation is a natural mode of learning for most children, yet children with autism seem to have little ability or interest in imitating others in their normal environments. Discrete trial training creates a learning environment in which imitation is taught and reinforced and then able to be used as a means of teaching new skills.

Discrimination tasks, requiring the child to respond differentially to various cues, have also been taught effectively using the discrete trial format (Smith, 2001). Receptive language tasks, in which the child responds to a verbal cue with an action, require the

child to apply discrimination skills. Using discrete trials, a therapist may teach receptive language skills with an antecedent such as, “Give me the shoe,” requiring the child to respond by picking up the shoe rather than the hat. Likewise, discrete trial training has been the most researched method for teaching expressive language (Smith, 2001). Expressive language drills require that the child give a verbal response to a visual cue; when the therapist points to the color blue, the child says “blue” (if he responds correctly). Conversational skills, necessitating a verbal response to verbal cues, can also be taught by this method (Cue: “What is your name?” Response: “My name is Angie.”).

Discrete trial training has been proven to be an effective means for teaching appropriate grammatical and syntactical skills that are often difficult or confusing for individuals with autism; various drills focus on plurals, adjectives, yes/no questions, opposites, prepositions, pronouns, and time relations (Smith, 2001). For mute children with autism, signs and phrases in sign language have been taught efficiently with discrete trial training (Carr, 1979).

The discrete trial method can also be an efficacious means of managing disruptive behaviors (Smith, 2001). Disruptive behaviors are replaced with adaptive behaviors by engaging the child in learning interactions in which he will likely succeed, providing ample positive reinforcement for appropriate responses and ignoring disruptive behaviors. Adaptive behaviors, such as using verbal requests rather than having a tantrum, can be taught explicitly with discrete trial training.

Although the discrete trial method has been proven to be quite effective for teaching new skills to children, it has limitations. First, because discrete trial training is conducted in a controlled environment and based on a series of rigid cues and responses,

the acquired skills may not transfer to a more typical setting (Smith, 2001). For example, the child may only respond appropriately when cued or when working one-on-one with an adult. Furthermore, the child is only taught to respond to cues and not to initiate interactions, also inhibiting skills from being applied in natural settings. In order to rectify these problems, alternate forms of behavior modification and instructional strategies are necessary.

Current research on ABA programs promotes a variety of instructional methods designed to further the expansion and generalization of skills. Although discrete trial training is an option for teaching advanced skills, alternative means of instruction may be more appropriate as the child develops. Incidental teaching is a prime example of how skills learned in discrete trials can be expanded to fit a more typical setting (Smith, 2001). In incidental teaching, the child initiates the activity and the teacher instructs within that context. For example, several toys are placed in the child's view. If the child reaches for a truck, the therapist first asks, “What is it?” or “What do you want?,” teaching him how to appropriately verbalize requests. Incidental teaching should be incorporated into playtime between the child and therapist, and also in situations outside of the instructional setting in order to insure the generalization of acquired skills in a naturalistic setting.

Other methods of instruction that may be incorporated into ABA programs include video modeling, in which the child views a video with models who demonstrate conversational statements (Charlop & Milstein, 1989; as cited in Smith, 2001); script fading, involving teaching the child conversational scripts that he can practice with peers, gradually fading out the need for the scripts (Kranz & McClannahan, 1997; as cited in

Smith, 2001); and picture schedules, using a collection of pictures to guide the child through play activities or the steps of daily living tasks like setting a table (McClannahan & Krantz, 1999; as cited in Smith, 2001).

Because ABA programs attempt to teach children with autism the appropriate skills for normal age-level functioning, inclusion in a classroom with typically developing peers is a natural goal. Discrete trial training and alternative instruction help prepare the child for a classroom setting, while the classroom conversely provides an environment for further practice and generalization of acquired skills.

For those who design ABA programs, it is unclear when discrete trial training should be faded out and alternate methods of instruction incorporated. Smith (2001) describes this quandary as "more of an art than a science" (p. 86). Although supporters of ABA concur that discrete trial training is an essential component to any ABA treatment plan, providing the basis for the child's acquisition of new skills, the amount of time spent in discrete trial training is highly debated (Smith, 2001). Lovaas and colleagues maintain that 40 hours a week of discrete trial training at an early age is necessary for maximum success (Lovaas, 1987), but others argue that such a high intensity is not cost-effective and would place too much strain on the child and family. It is also unclear whether the intensity or the instructional method is responsible for a child's success. Perhaps any one-on-one treatment for 40 hours a week would be as effective. The child's age and individual skill acquisition rate have significant influence on these decisions as well. In spite of this debate, it is generally accepted that the number of hours spent in discrete trial training can decrease as the treatment progresses, allowing

other modes of instruction to take precedence in order to insure the generalization of skills.

The overall goal of ABA programs is to teach children with autism to learn from their environments. Although individuals with autism do not use the typical techniques to acquire knowledge about the environment, these skills can be taught. By combining instructional techniques, ABA programs seek to teach the fundamentals of communication and social interaction, replacing maladaptive behaviors with adaptive ones and teaching age-appropriate skills.

Analysis. Clearly, a primary strength of applied behavior analysis is the range of adaptability for each individual child. From the onset, the ABA program is tailored specifically to the strengths and needs of the child. Extensive data collection provides documentation of the child's progress or lack thereof, allowing the methods of instruction to be adjusted accordingly. For these reasons, ABA programs are able to address a majority of the impairments characteristic of individuals with autism.

Impairments in social development include difficulties with nonverbal behaviors that typically facilitate and regulate social interactions. ABA is able to address some of these behaviors, such as body posture and gestures, by teaching imitation skills and then modeling appropriate social behaviors through interactions with the therapist or video and peer modeling. Other nonverbal behaviors, such as eye-to-eye gaze can be encouraged through positive reinforcement.

Social development involves learning how to appropriately interact with peers and adults. Most ABA programs work towards some level of inclusion or interaction with typical peers. Lovaas' treatment guidelines (1987) include an introduction of appropriate

peer play in one-on-one therapy time during the first year of treatment, interactive peer play through integration in a preschool group in the second year, and enrollment in a typical preschool as a primary component of the third year. Although a significant focus is placed on preparing the child for interactions with peers, much of the treatment is conducted in a one-on-one setting, often in the child's home with little or no contact with typically developing peers. Nevertheless, the close interactive relationship between the child and his or her therapists creates opportunities for the child to learn to share experiences with others. To encourage such interactions, the therapist may ask the child, "What are you doing?" The therapist would then respond to an appropriate response from the child with praise and positive reinforcement, encouraging the sharing of the experience.

An awareness of others can to some degree be dealt with through discrete trial training. For example, individuals with autism often have a difficult time reading the emotions of others. A series of drills could be designed to address this topic. First, one drill may use flashcards that typify various emotions through facial expressions. The therapist asks the child, "How does he feel?" If the picture is of a person crying the correct response would be, "He feels sad." After mastery of the flash cards, the therapist could express an emotion through her own facial expression and ask, "How do I feel?" The same concepts could then be transferred to pictures in books and other mediums.

Social reciprocity can also be taught with discrete trial training using a "scripted" reciprocal conversation. The conversation may go something like:

Therapist: "What's your name?"

Child: "My name is Angie. What is your name?"

Therapist: “My name is Mary. Where do you live?”

Child: “I live in Chattanooga. Where do you live?”

The child would likely require substantial prompting before understanding that she was expected to reciprocate the question. Once the skill is mastered without prompting on a variety of conversational questions, the script would be faded out, leading to more natural conversations. Although discrete trials like the examples given are not likely to independently bring the child up to an appropriate level of social interaction, they do provide some experience and foundation for future social interactions in natural settings.

The second major area of impairment for children with autism is that of language and communication. As mentioned earlier, discrete trial training has been demonstrated to be an effective means of teaching verbal language skills? from basic speech sounds to complex grammar usage (Smith, 2001). Frequent areas of difficulty for verbal children with autism, such as pitch, intonation, rhythm, and stress of words, can be dealt with to some degree through discrete trials and modeling, but speech therapy may be more effective for some children with significant difficulties in this area. In ABA sessions, stereotyped or repetitive phrases are usually dealt with by redirecting the child to use appropriate forms of speech. Metaphorical language may also be redirected or ignored in an attempt to encourage the child to use appropriate, meaningful language.

The comprehension of language is dealt with frequently in ABA programs. Discrete trial training teaches receptive language through drills in which the therapist gives a verbal cue and the child must respond with an action, requiring that the child attend to the therapist's instructions and comprehend what is being asked of him. These drills will start off very simply, perhaps with one-word cues, and gradually require a

more complex comprehension of language. Furthermore, tasks which focus on developing other skills that require language comprehension can be adapted to be sure the child comprehends the instructions. For example, the therapist gives the child a cue and then says, "Now you say it." The child must repeat the instruction correctly before continuing with the task, insuring that difficulties in language comprehension are not a factor of slower progress in other areas.

Spontaneous imaginative play is another area of considerable difficulty for children with autism. To teach appropriate play skills in an ABA program, discrete trial training can be used to introduce the concept of pretending. For example, the therapist may ask the child, "Pretend to be a horse," while modeling how a horse acts and encouraging the child to do the same (this drill would require that the child has already learned to discriminate between different animals and animal sounds). Imaginative play is also frequently taught and encouraged through incidental learning. If a child shows interest in a toy car, the therapist would then lead the child through appropriate play activities, such as pretending to drive the car on a road or stop to fill it up with gas, etc.

Several symptoms resulting from the child's restricted repertoire of activities and interests can be dealt with in ABA programs either through redirection or other means. In dealing with a child's resistance to change, the structured format of ABA sessions helps the child function with minimal frustration. However, an ABA program gradually forces the child to learn to deal with some degree of change in order to prepare him for a classroom environment. One aspect of the program may be an occasional rearrangement of furniture, forcing the child to learn to cope with changes within a safe environment.

Other restrictive behaviors may interfere with therapy tasks. A child's insistence on sameness may limit his generalization of a concept being taught. For example, in a task requiring the child to match flashcards, the child may insist that the cards be presented in the same order they were presented when initially introduced. A good therapist should catch such patterns and vary the presentation of materials, being certain that the child knows, for example, that hot is the opposite of cold *and* cold is the opposite of hot. Some children may also exhibit nonfunctional routines that interfere with tasks. These routines may be specifically targeted during therapy. Symptoms such as a preoccupation with parts of objects or an attachment to inanimate objects may be handled during ABA treatment by redirecting the child's interest to more appropriate behaviors. If these behaviors are the child's attempt to withdraw from a situation or interaction, the therapist should make active attempts to discourage social withdrawal and engage the child in a constructive task.

A fascination with movement may be incorporated into the therapy session as a form of positive reinforcement, but movement and other forms of sensory stimulation are not typically a part of ABA programs. Stereotyped body movements that are considered self-stimulatory behaviors, such as hand flapping and rocking, are discouraged in ABA programs. A record may be kept of particular problem behaviors for an individual child to allow therapists to keep track of how often and when behaviors occur (during particular drills, playtime, end of the session, etc.). Self-stimulatory behaviors are redirected with commands such as, "Quiet hands" (for hand flapping). If the behavior does not fade, direct strategies may be employed. Abnormal posture may also be addressed, primarily through behavioral principles of shaping and positive reinforcement.

In addition to these primary symptoms of Autistic Disorder, several of the associated features are addressed in ABA programs. Behavior problems, such as aggressiveness and self-injurious behaviors, are redirected by the therapist. Temper tantrums are redirected and the child is taught adaptive behaviors, such as verbalizing needs, to decrease the child's frustration level. It is important for the therapist to work through tantrums so as not to reinforce negative behaviors. Impulsivity may be addressed by teaching techniques for self-control. Therapy sessions are also designed to adapt to short attention spans. Discrete trial training, for example, is comprised of very short drills with breaks every few minutes and longer breaks every hour. Although the child may be in treatment for many hours a week, the session is designed to adapt to the needs of children with short attention spans.

Other symptoms associated with autism are not dealt with directly in ABA treatment programs but may be addressed indirectly. A child's atypical responses to sensory stimuli are not necessarily dealt with in therapy, but may be considered when choosing reinforcements for the child. For example, a child who has extreme tactile sensitivities may crave sensory experiences such as deep pressure applied to arms and legs or playing in a tub of dry rice; the experience can be used as motivation and positive reinforcement for good performance in therapy tasks. Some inappropriate fear responses can be addressed in ABA. If a child lacks appropriate responses to dangerous situations, for instance, she will be taught to discriminate between certain safe and unsafe situations. Some excessive fears may also be addressed according to the needs of the individual child. Depression, another symptom associated with autism, is not dealt with directly in ABA therapy. However, depression is more typical of adolescent and older individuals

with autism, while applied behavior analysis is usually targeted at younger children. Abnormalities in eating, sleeping, mood, and affect are not normally dealt with in ABA programs.

Overall, a key benefit of applied behavior analysis is its ability to adapt to the needs and strengths of the individual child. Furthermore, numerous studies indicate that it works for approximately 50% of participants (according to the more optimistic outcome data). However, the other 50% of participants must also be considered. In spite of controversies over issues like intensity of treatment or specific aspects of application, ABA programs have yielded remarkable results for many children with autism.

Nevertheless, there are weaknesses in the ABA treatment method and specific areas which seem to be neglected. First, sensory functioning, including hyper- and hyposensitivity to sensory stimuli and movement, is not dealt with directly in most ABA programs. Likewise, abnormalities in eating, sleeping, mood, affect, and fear responses are not explicitly addressed.

Another major concern with ABA programs is the sheer intensity and expense of treatment. In rebuttal to this argument, advocates of ABA point out that for those children who reach "normal-functioning" and are integrated into typical classrooms, a few years of extra expense will actually cost school systems less than keeping that child in special services for the duration of his or her time in school. A cost-analysis of ABA programs using representative costs from Pennsylvania estimate that savings range from $187,000 to $203,000 per child for ages 3 to 22 years old (Jacobson, Mulick, & Green, 1998). This analysis assumes average participation in ABA programs would be 3 years during early childhood (2 years old to school entry) and that some children would

participate in regular education without support, some in special education, and some in intensive special education.

Some critics of ABA claim that the treatment methods do not necessarily help children learn, but turn them into robots with skills that cannot be generalized to natural settings. Although discrete trial training may not fully allow concepts to be generalized, there seems to be a consensus in current behavior analytic theory that other techniques should be incorporated into ABA programs to insure generalization of skills (Alberto & Helfin, 2001a; Green, 2001; Smith, 2001).

While many of these issues will likely continue to incite controversy, the central difficulty with applied behavior analysis is its negligence of a causation theory. The foundations of applied behavior analysis are based on behaviorist principles which have yielded success. However, the guiding principles behind the theory do not seek to address the root of the problems from which the impairments stem. This idea will be discussed in more detail in the conclusions of this paper.

Complex Perception Therapy

As suggested by the name, complex perception therapy focuses on the role of perception for children and adolescents with autism and related disorders. Complex perception therapy was developed by Bánffy in the 1980s to treat children and adolescents with autism and perceptive deficiencies (REHA Centre, 2002). Bánffy's Rehabilitation Centre in Innsbruck, Austria offers treatment to more than 200 children from Austria and abroad each year. Though the breadth of this method of treatment appears relatively small, other models of intervention which are similar in theory (such as sensory integration therapy, which will be discussed in more detail) are becoming more

and more widely accepted. A variety of literature regarding complex perception therapy has not yet been published. Therefore, the discussion in this paper about the theory and application of complex perception therapy is dependent on materials published by the REHA-Centre (2002) and personal experience as a therapist in the REHA-Centre.

Sensory Aspects of Autism. As complex perception therapy places significant emphasis on sensory processing, it is important to first discuss the sensory aspects of autism. The sensory system and the atypical reactions of children with autism to sensory stimulation are outlined as follows.

The sensory systems include auditory, olfactory, vestibular (i.e. movement), proprioceptive (i.e. muscular control), tactile, and visual systems—each responsible for gathering information about the environment and how a person is to respond to various situations. Cook (1990) discusses the tendencies of children with autism and other pervasive developmental disorders to exhibit qualities of abnormal perception in several or all of these areas. A person with a pervasive developmental disorder may exhibit hyper- or hyposensitivity to smells or sounds, consequently either failing to process these environmental cues, or using the information inappropriately.

The vestibular system detects movement and the body's position with respect to gravity, providing information about posture, balance, and coordinated head and eye movements. It coordinates the left and right sides of the body and plans and executes body movement. Some children with pervasive developmental disorders exhibit difficulties with balance and have extreme reactions to movement by either not tolerating movement or craving it (Cook, 1990). The proprioceptive system takes input from the muscles and joints to convey information about the location and movement of different

body parts. This system enables a person to maintain posture and conduct resistive muscle activities like pushing and pulling objects. Children with pervasive developmental disorders sometimes have problems maintaining an appropriate posture and performing tasks requiring the use of opposing muscles groups (Cook, 1990).

The tactile system not only gathers information about the environment through touch, but it also serves as a warning device for potentially harmful situations and provides information about affective domains, like bonding and comfort, thus facilitating the development and learning of adaptive skills. Some children with autism react with extreme sensitivity to touch, tending to have very negative reactions to particular types of touch. Other children will react conversely by craving tactile input (Cook, 1990).

The visual system receives input about multiple aspects of the environment that, when processed, give meaning to what is seen, often reinforcing input from other sensory systems. Similar to the sensory reactions discussed thus far, children with autism react to visual stimuli on both ends of the continuum: some children will focus on a specific visual stimulus, like the spinning wheel of a toy car, while others may not attend to any meaningful visual input (Cook, 1990). It is important to note that an individual child may fall at one end of the spectrum, exhibiting hyper- or hyposensitivity to sensory stimuli, or may fluctuate between the extremes, even within the same sense modality (Sensory Integration International, 1991).

A study was conducted by Kienz and Dunn (1997) comparing sensory processing of children with and without autism using the Sensory Profile. With a sample of 32 children with autism (aged 3 to 13 years old) and 64 children without autism (aged 3 to 10 years old), the study compares the groups' responses on the 99 items included in the

Sensory Profile. The Sensory Profile, completed by the participants' parents, is composed of statements and questions about the child's behavior during functional activities (Kienz & Dunn, 1997). This form of measurement avoids some of the problems that come with standardized sensory integration tests, including the autistic child's short attention span and inability to focus on testing items, and is based on observations of the child in natural settings.

When a multivariant analysis of covariance was completed on the test items, differences between children with and without autism were significant on 84 of the 99 items (85%) (Kienz & Dunn, 1997). These 84 items represented differences in each of the sensory modalities. The areas with the largest percentage of items that indicated differences between the two groups were body position (100% of items indicated difference) and touch (95%), and the least number different in activity level (33%). No single item was reported as frequently occurring in 80% or more of the children with autism, indicating that there is wide spectrum of functional abilities among children with autism, and no specific item describes all children with the diagnosis. Although the sample size is small and may not represent the entire population of individuals with autism, Kienz and Dunn's study indicates that significant differences between children with and without autism may be evident in all areas of sensory functioning.

Theory. Practitioners of complex perception therapy assert that deficiencies in perceptual processes of individuals with autism lead to multiple problems in development (REHA Centre, 2002). In theory, because individuals with autism have difficulties organizing and understanding their perceptions, they develop rigid behaviors in order to find security and make sense of their environment. According to this perspective, autistic

behaviors involve a retreat into the self and function as a coping strategy as the individual seems to give up on social communication in order to deal with an overabundance or depravation of stimulation.

Complex perception therapy, developed in Austria by Bánffy in the mid-1980s, is designed to address all domains of perception and help children with autism deal with their various perceptive deficiencies. Concurrent with other theories on the causes of autism (Talay-Ongan, 2000), this theory attributes the disorder to physiological causes—specifically, to deficiencies in the neurology of perception (REHA Centre, 2002). However, unlike interventions such as applied behavior analysis that attempt to overcome the physiological deficiencies through an alternate means of instruction, complex perception therapy addresses the perceived origin of problems? an inability to organize perceptions? by ameliorating the processes of perception. Although proponents of complex perception therapy claim it is based on scientific principles, no references were given to support claims that therapeutic interventions enhance the processing of sensory information in children with autism.

Perception, involving an integration of the various senses, “creates an experience of the environment and enables us to act within it” (Goldstein, 2002, p. 3). When perceptive organs work together, giving an individual a cohesive understanding of the incoming stimuli, the individual is capable of having a stable interaction with his environment. This ability to organize perceptions is a precondition for learning and, thus, for the development of personality (REHA Centre, 2002). By organizing and structuring his perceptions of the world around him, a child develops a sense of security, and is then capable of exploring the environment outside of himself. This organization of

perceptions creates a frame of reference that allows the developing child to explore and interact with his environment.

Advocates of complex perception therapy also claim that communication and cognition are directly linked to perception (REHA Centre, 2002). In normal functioning, the body receives sensory input from the environment to form concepts which are then translated into speech concepts and cognitive schema. In higher stages of language development, the speech concepts are generalized and then able to be used figuratively. If an individual is unable to structure the sensory input from the environment, the consequent stages of language development are also impaired. Likewise, in order to develop cognitive schema which reflect an understanding of the self and the individual's relationship to the environment, the individual must be capable of organizing input related to space and time (REHA Centre, 2002). Many activities in complex perception therapy therefore address body position, the body's relationship to the surrounding environment, personal time perception, rhythm, and an understanding of duration.

Finally, the theory asserts that an alternation between tension and relaxation facilitates good perception and learning (REHA Centre, 2002). In other words, every active phase necessitates a passive phase, and each passive phase is conditional on an active phase. In order to function appropriately in the environment, an individual must learn to consciously differentiate between such phases in order to respond appropriately to various situations. In a discussion of sensory integration therapy (which will be addressed later in detail), Cook (1980) specifies the fundamental aspect of neurological functioning as "the balance of excitation and inhibition" (p. 1). Cook explains that the brain must balance excitatory and inhibitory activity in order to focus on the meaningful

aspects of the task at hand. An inability to find this balance results in extreme reactions of either over- or under-responsiveness to sensory stimuli, as seen in many children with autism. Whether the problems lie in an inability to consciously differentiate between these two states, as Bánffy suggests (REHA Centre, 2002), or if it is more an issue of a neurological balance between the extremes, as outlined by Cook (1990), this concept of activity versus inactivity is incorporated throughout complex perception therapy. These principles of perception provide the theoretical basis for complex perception therapy.

Although there is currently no empirical support to verify the effects of complex perception therapy for children with autism, Piaget's theory of development provides another framework from which the theory can be examined. Piaget's theory is based on the idea that every form of cognition stems from an earlier mode of functioning. Piaget asserts that the individual's concept of reality is a product of both past experience and current cognitive structures, dividing human development into stages that describe how people change the way they interact with the environment and interpret reality (Bjorklund, 1989).

The sensorimotor period is Piaget's first stage of development, typically lasting from birth until two years of age. During this stage, the child acquires knowledge through direct actions on objects (Bjorklund, 1989). Through the various substages of the sensorimotor period, the child learns more and more about the relationship between his body and the environment by taking an active role in development. The child develops a sense of self and begins to understand his relationship to the outside world.

According to Piaget, cognitive development is a biological process, yet dependent on adaptations made by the individual as learning takes place (Bjorklund, 1989).

Adaptation involves two processes: assimilation, incorporating new experiences into existing schemes; and accommodation, adjusting schemes to accept new information that does not fit into existing cognitive structures. The typically developing child seeks equilibrium by means of adaptation, resulting in coherence and stability within the environment. As the child interacts with the environment, information is reorganized, leading to new interactions with the environment as the child adapts and builds on mental schema.

Children with autism appear to have problems achieving equilibrium. This could be the result of a biological problem, making individuals with autism unable to use typical adaptation skills. According to Piaget and many other developmental psychologists, difficulties in the sensorimotor stage lead to problems in the development of higher levels of cognitive functioning, due to the epigenetic quality of development (each skill having origins in an earlier form of functioning) (Bjorklund, 1989). Although the perceptual abilities of an autistic child's individual sense organs may in intact, problems occur when processing new information and attempting to incorporate incoming stimuli into organized schemes. As a result, the child has difficulty understanding the relationship between himself and the world and is unable to achieve equilibrium.

The second stage in Piaget's developmental theory is called the Preoperational Stage (usually ages 2 to 7 years old). A primary characteristic that separates the preoperational and subsequent stages from the sensorimotor stage is the development of symbolic functioning (Bjorklund, 1989). For example, object permanence is obtained, allowing the child to know something exists even when out of sight. Studies have

supported the idea that young infants lack object permanence. Harris (1983) reported that 4 to 8 month old infants would not reach for an object that was completely covered, though they would reach for it if only partially covered or if the cover is transparent. Other studies have shown that even when the child has grasped the object, if it is quickly covered, the child will not retrieve the object or show any indication of awareness of the covered object (Gratch, 1972; Gratch & Landers, 1971). Piaget's theory maintains that a lack of object permanence is due to the inability to form mental images (Bjorklund, 1989). The mastery of object permanence is therefore a key step towards symbolic functioning.

Piaget asserts that symbolic abilities are an outgrowth of sensorimotor functioning: a result of action schemes being internalized and formed into mental representations (Bjorklund, 1989). With symbolic functioning, a child is able to develop imagery skills, initiate symbolic play, and develop symbolic language (verbal and gestural). These abilities are typically difficult for children with autism, indicating that they have not been able to progress to full preoperational functioning.

Piaget's theory of development is important in a discussion of complex perception therapy because it provides a model of normal functioning, allowing psychologists to see how impairments of some individuals could affect their overall development. In the case of individuals with autism, the problem seems to lie in what Piaget would call the sensorimotor stage. They are able to perceive stimuli with their senses, but problems arise in the processing and adaptation of this incoming information. Complex perception therapy attempts to address how sensations are processed in order to help incoming information be organized in a way that helps the child adapt and achieve equilibrium.

Although Piaget's theory of development is useful in providing a larger framework from which to look at complex perception therapy, it does not supply evidence for the efficacy of the therapy.

Application. Complex perception therapy is designed to provide the child with ample one-on-one treatment while also working within a group setting (REHA Centre, 2002). Each child has a therapist with whom she works individually (a child could have up to four therapists in extreme cases). Eight to twelve children are in therapy together, allowing the group itself to serve as a "therapeutic instrument," creating motivation and enhancing social interactions. A session leader directs the other therapists and children through all the activities. One day in therapy involves 10 hours of treatment. Most children attend one day a week, although children with more severe symptoms may attend three to four days in a week. Detailed reports about each child are completed by the therapists after all therapy sessions. Therapists receive both theoretical and practical training and attend a weekly instructional session.

A full day of therapy addresses all domains of perception. The activities are highly structured and intentional. As one would imagine, the session is rich with activity and sensory stimulation, addressing each area of perceptive experience. Every session also has a theme, such as "flowers" or "things that fly" or "hot versus cold," that is incorporated into most of the activities, reinforcing a specific set of ideas with repetition throughout the day. To get a better grasp on the types of activities involved in this treatment method, we will walk through a typical therapy session.

The session begins with a time of relaxation. While soothing music plays in the background, the therapist holds the child and rocks steadily. This creates a bonding time

for the child and therapist, helps calm the child, and allows the child to tune in to the music and relax. A session leader then leads the group through a period of suggestion and mental imaging. All the children lay on their backs while the leader instructs them to relax each section of their body going from head to toe, speaking in a slow, calm voice. The leader instructs the children to regulate their breathing, keeping breaths steady and slow. The children are directed through a time of mental imaging, during which they are encouraged to stay focused and on task throughout the day. They are then led through a series of stretches and exercises that require muscle coordination and gross motor control. These exercises are usually accompanied by fun songs and rhymes in which the children can participate.

The daily theme is introduced in the morning and built upon throughout the day. There is usually an object that represents the theme that the therapist and child explore and discuss together. If the theme is "flowers," the therapist may give the child a flower and ask him to feel and smell the flower (perhaps with his eyes closed). They may also discuss what kind of flower it is, its color, the difference between the blossom and the leaves, etc. If the theme is "things made of wood," they may examine a wooden block, pointing out its color and hardness and smell.

The use of imagination is an important component of the therapy that is incorporated in many aspects of the session and often associated with the theme. For example, if the day's theme is "things that fly," the therapist may tell the child to pretend that he's a rocket about to blast off, or a bird or a bee. These ideas are introduced in the early stages of the session and carried through later activities and games.

The children move from their mats to the gym floor for more activities. The activities and games that take place during mid-morning and in mid-afternoon are highly active and primarily address the vestibular (balance and gravity) and proprioceptive (movement and perception of muscles and joints) systems, body control (primarily gross motor skills) and body schema, and auditory- and visual-motor skills. To warm up for this active stage of the session, energetic music is played while the children are instructed to crawl on their bellies, slide across the floor, crawl on their hands and knees, walk on their knees, run, march, and dance around. These activities promote gross motor skills, coordination between both sides of the body, and good balance. At this point in the therapy session, there has been a transition from a relaxed phase to an active phase. This pattern of alternation between relaxation and high activity is consistent in each session, providing a framework for the day's activities. According to the principles discussed earlier in the theory of complex perception therapy, the alternation between tension and relaxation creates a condition for good perception and learning, establishing an appropriate therapeutic atmosphere.

Each therapy session has a different selection and arrangement of activities, but all address the same areas of sensory experience. For examples of activities of specific therapy sessions, see Appendix A. Activities that deal with the vestibular area, addressing movement, balance, and gravity, may include asking the child to stand on one leg or rotate her body around a single axis. To work on balance skills, the child may try to balance an object on her head or back, or balance a small ball on a spoon. Props, such as small wooden see-saws that rock back and forth, may also help stimulate the vestibular

system. With the help of the therapist, a child could practice sitting, standing, and laying on the see-saw, learning how to maintain balance through body control.

For experience with the proprioceptive system (dealing with the movement and location of muscles and joints) the therapist may instruct the child to push her hands, feet, and arms against each other. The child may also practice scrunching up small and then stretching out large ("pretend to be big like a tree, small like a mouse"). A weight filled with water can be a useful tool; the child would use a variety of muscle groups by lifting the weight up high, holding it down low, swinging the weight, rolling it across their bodies, etc. The children may also climb bars on the wall and hang with their feet off the ground, requiring the use of various muscles, as well as reinforcing an understanding of gravity. Relay races and obstacle courses are other examples of activities that require the use of multiple muscle groups, while also making activities fun.

General body control may be particularly difficult for children with autism, as it often requires coordination between several perceptive areas. Body control may be addressed in the therapy session with exercise such as using tongs to pick up objects and put them in a container, picking things up with one's toes, requiring the child to reach for something while lying on the floor propped up on his elbows, or bouncing a balloon in the air using only his nose. These are just a few examples of how children may be challenged to use different motor skills and coordinate various muscle groups to accomplish a variety of tasks.

In this active stage of the treatment, visual- and auditory-motor skills are often addressed in the form of group games. For example, the children sit in a circle and one child walks around and gives an item to another child in the circle (the item would be

relevant to the day's theme). The child with the item hides it behind his back. The other children are then asked who has the item. This activity requires that the other children pay attention and watch what is happening, a task that often requires a great deal of practice and prompting for children with autism. Auditory-motor tasks usually require that the children listen to and follow verbal instructions. They may also practice keeping rhythm with the music using drums or other noisemakers, or may make up their own rhythms for the other children to imitate.

Before lunch, the children begin to calm down and enter another period of relaxation. Much of the focus of this relaxation time is on tactile stimulation. The therapist rubs different materials, such as a piece of fur, plastic, a scrub brush, and a toothbrush, on the child's skin. The therapist and child discuss how the various materials feel and how they are different. The therapist rolls the child's feet on a wooden foot roller for another type of tactile stimulation, and then rolls the foot-roller on the child's arms and legs for relaxation and tactile sensation. The therapists also massage the children's hands and feet.

During lunch, the children are encouraged to participate in setting the table and putting their dirty dishes in the appropriate place, promoting basic self-help skills needed for a more independent lifestyle. They are then given an unstructured playtime.

The second half of the day begins with a brief period of relaxation before beginning another active stage of therapy. The afternoon activities are similar to those already discussed. In the later afternoon, the children do "table work," focusing on olfactory and taste sensations, fine motor skills, and visual-motor coordination.

The children are exposed to a variety of olfactory and taste experiences during each session. First, the therapist gives the child oils of different fragrances (peppermint, flowers, trees, fruits, etc.) and the child identifies each smell. The therapist will then present the child with a plate of different fruits and vegetables and the child must smell and taste each food. The child is also asked to try substances that taste salty, sweet, and bitter. Other activities that deal with smell and taste may be added to emphasize the day's theme. If the theme is "wood," the children may smell different items made of wood. When discussing "hot and cold," the children may taste different warm and cold beverages. After these exercises, the children are allowed to have a snack. They are encouraged to chose their snack and be responsible for their plates and utensils.

The child and therapist then work on visual-motor worksheets that require the child to trace or color a picture or complete a simple maze. The children also make a craft or form something out of paper-machè, requiring the practice fine motor skills, visual-motor coordination, and creativity.

For verbal children, the therapist helps the child practice good communication skills with positive encouragement and prompting when needed. Speech processes are dealt with throughout the therapy session. As mentioned in the discussion of the theory supporting complex perception therapy, language development is a result of multiple stages. First, the child must be able to organize perceptions into concepts: a skill which is addressed in all stages of the therapy session by constant exposure to sensory stimuli. Then, such concepts must be converted into symbolic representations. Exercises such as drawing and writing can help develop this skill. After a child forms a representation of a concept, this representation must be generalized. The themes for each session are one

way ideas are generalized in the therapy setting. If the theme is "hot and cold," the children will touch things that are hot and cold, feel how their skin gets warm when you rub it and cold when you put an ice cube on it, taste beverages that are hot and then ones that are cold, and then talk about what clothes you wear when it is hot and what you wear when it is cold. Finally, social communication is practiced with conversations (for verbal children) between the therapist and child. On occasion, a speech therapist also meets with each child for work on an individual basis.

The entire therapy session is designed around the concept of experiences. Situations are set up to allow the child to safely explore his environment using a variety of senses and mediums. If the therapist wants the child to understand the concept "apple," she will not just show the child an apple; she will give the child an apple and lead him through a process of "experiencing" the apple. First, they will examine the color and shape and hardness of the apple. Then, the therapist will direct the child to dissect the apple. The child tears the apple apart, first experiencing the peel and then the fleshy part, feeling the juice and texture and smelling the scent. The child continues to tear the apple apart until he finds the core and the seeds. According to the principles of complex perception therapy, children with perceptive deficiencies, such as children with autism, must be encouraged to actively explore the environment in order to form an understanding of objects outside of themselves and begin to make sense of the various sensory input they receive.

Each day before leaving to go home, all children have thirty minutes of auditory therapy. This treatment is based on Bèrard Auditory Integration Training and the Tomatis Method (REHA Centre, 2002). Bèrard Auditory Integration Training uses music

created from a special device to strengthen the acoustic reflex muscle in the middle ear, stimulate auditory areas of the brain, and enable the auditory cortex to reorganize by shifting thresholds in the brain to improve functioning (The Davis Center, 2000). Bèrard's method is designed to address hyper- and hyposensitivity to sound by improving the body's reaction to sensory overload in the brain. The Tomatis Method is geared towards enhancing auditory processing and communication (Sollier, 2002). Tomatis asserts that humans listen with both their ears and their body. While most people listen predominantly with their ears, Tomatis claims that individuals with autism listen primarily with their bodies, allowing irrelevant background noise to enter the body unfiltered, causing problems with attention to important stimuli. By listening to gated music through headphones equipped with a vibrator, the music is perceived first by the vibrations and then through the ears a few milliseconds later. In theory, the individual gradually adjusts to listening primarily with the ears.

The Tomatis Method is also designed to facilitate language development by improving self-listening skills (Sollier, 2002). The child speaks into a microphone which immediately plays the sound of the voice in the right ear and vibrates the child's bones, allowing the child to hear his own voice and perceive his own body. In theory, once a sound is able to be perceived, it can be produced verbally. Then, as language develops, the child discovers "his voice," leading to a development of the child's sense of self. The Tomatis Method does not claim to cure autism, but does report the attenuation of many autistic symptoms from improving social skills to increasing the child's appreciation for food (Sollier, 2002).

Sensory Integration Therapy. Sensory integration therapy, an intervention typically provided by occupational therapists, is similar in theory and to some degree in practice, to complex perception therapy. Cook (1990) defines sensory integration as "the organizing and processing of sensory information from different sensory channels for a specific purpose" (p. 1). Like Bánffy's (2002) theory, sensory integration is based on the idea that an appropriate interplay of the senses is necessary for an adequate interpretation of, and response to, everyday situations (Sensory Integration International, 1991). The organization of senses is defined as *sensory integration*. The integration of sensory stimuli involves proper registration (deciding which stimuli to attend to) and processing so that the individual can make an appropriate response (Cook, 1990).

Children with autism appear to have problems with integration, resulting in an inadequate or unclear representation of sensory input. Consequently, these children have problems developing adequate representations of the self and their world (Cook, 1990). Proponents of this theory maintain that dysfunctions in sensory integration will manifest as problems in learning, development, and behavior (Sensory Integration International, 1991). As early as 1974, Ornitz hypothesized that problems with the modulation of sensory input are the cause of deficiencies in social, communication, and language skills in children with autism. More recent research has supported the idea that other autistic behaviors are also a result of abnormalities in sensory processing; for example, Baranek, Foster, and Berkson (1997) assert that stereotyped behaviors are an attempt to regulate the sensory systems that are otherwise unbalanced, and Greenspan and Wieder (1997b) contend that self-stimulatory behaviors (like rocking, spinning, hand flapping) and self-

absorbed behaviors are also a result of regulatory difficulties with sensory processing (as cited in Case-Smith & Bryan, 1999).

Indicators of sensory integration disorder include an over-sensitivity to touch, movement, sights, and sounds; under-sensitivity to other forms of sensory stimulation such as pain and body position; extreme high and low activity levels; problems with gross and fine motor skills; delays in speech, language, motor skills, and academic achievement; poor organization of behavior leading to impulsiveness, rigidity, frustration, and withdrawal; and a poor self-concept (Sensory Integration International, 1991). These symptoms of sensory integrative dysfunction deal with problems in the areas of communication, social interaction, and rigid behaviors: each of the three problem areas defined by the *DSM-IV* definition for Autistic Disorder (APA, 1994). Many of the features described in the *DSM-IV*'s description of autism are also signs of dysfunction in sensory integration, such as odd responses to sensory stimuli, hyperactivity, frustration, and impulsiveness. The correspondence between indicators of sensory integration disorder and the definition of autism lends support to the claims that dysfunctions in sensory processing and perception are associated with autistic behaviors.

Complex perception therapy and sensory integration therapy deal with the concept of perception's role in Autistic Disorder differently. While sensory integration theory suggests that problems with perception are one aspect of autism, the theory of complex perception therapy implies that perceptive deficiencies are the primary cause and component of autism. This difference becomes more evident as one examines how sensory integrative treatment is put in to practice and combined with other techniques.

Sensory integration therapy is designed to help children with sensory integrative dysfunction organize their responses to sensory input (Case-Smith & Bryan, 1999). Activities are set up by the therapist to provide the child with experiences rich with sensory stimulation (Cook, 1990). These activities are designed so that the child will be able to register, modulate, and integrate the sensory input and respond appropriately. Experiences in the therapy session facilitate organization and adaptation of the child's nervous system, enabling the child to deal with more complex interactions in naturalistic settings (Cook, 1990). Unlike complex perception therapy, sensory integration therapy typically occurs in a one-on-one setting, allowing activities to be designed to specifically meet the needs of the individual child, yet lacking the benefits of complex perception therapy's group interactions.

Although no true empirical studies have evaluated the effectiveness of sensory integration therapy for children with autism and related disorders, there are indications of positive benefits from this type of intervention. In a study in 1999, Case-Smith and Miller sent surveys to 500 occupational therapists in the United States. Of these surveys, 292 (58%) were returned and included in the study. Almost all participants (about 96%) indicated that they frequently used sensory integration therapy in their treatment of children with pervasive developmental disorders. Sensory processing ability was most frequently noted as the area of most improvement as a result of treatment by occupational therapists. The study indicates that practicing therapists support sensory integration therapy because of their successful experience in the field, which is supported by other studies reporting performance gains from sensory integration therapy (Ayres, 1987; Ayres & Tickle, 1980). Yet, it is unclear whether these performance gains are a result of

the maturation of the nervous system or an actual effect of treatment. Case-Smith and Miller also indicate that therapists find it helpful to take a holistic approach to treatment by combining principles of sensory integration with other modes of treatment, such as child-centered play, behavior analysis, and cognitive training. Though this study does not utilize a strong methodology, it is able to give some indication of current trends among occupational therapists using sensory integration techniques.

A key difference between sensory integration therapy and complex perception therapy is revealed in how the intervention is applied in relation to a child's overall treatment plan. As noted by Case-Smith and Miller (1999), a holistic approach combining sensory integration therapy with other treatment models is common. Likewise, sensory integration therapy is often considered to be a supplemental intervention that is only one aspect of a child's overall educational plan. In contrast, complex perception therapy often stands alone or at least as the primary method of intervention for children with autism.

Analysis. Complex perception therapy clearly addresses aspects of each of the major areas of impairment described in the diagnostic definition of Autistic Disorder (APA, 1994). Yet, there are several components missing that hinder it from being a comprehensive treatment for children with autism. First, I will examine what specific parts of the definition are addressed and how they are implemented in the therapy.

In the domain of social development, impairment in the use of nonverbal behaviors for social interaction, such as eye-to-eye gaze, facial expression, body postures and gestures, is characteristic of Autistic Disorder. Body posture is dealt with in complex perception therapy by promoting body control through exercises focusing on the

vestibular and proprioceptive areas. Other nonverbal behaviors for social interaction, such as eye-to-eye gaze and facial expressions, are not explicitly addressed in the therapy. The group environment of each therapy session addresses some areas of social development. In dealing with difficulties of developing peer relationships, the therapy group increases the opportunity for social interaction. However, there does not seem to be a strong focus on building these peer relationships. The primary times of interaction with peers are during games, lunchtime, and playtime; most of the rest of the therapy time is spent with the therapist and child working together individually. There is no opportunity for social interaction with typical peers. Advocates of inclusion would likely argue that such a setting has the potential to increase autistic behaviors through imitation rather than encouraging appropriate interaction with peers. Children with autism do not typically seek to share their experiences with others. The one-on-one relationship between the therapist and child and the positive feedback that the child receives from the therapist encourage greater interaction and give the child a safe way to begin to share experiences. The development of social and emotional reciprocity does not seem to be stressed in this treatment method. Again, an awareness of others manifests somewhat as an effect of the group setting, but is not a main topic in treatment goals.

As mentioned earlier, complex perception therapy deals with the topic of communication on several levels. To address impairments in nonverbal communication, the therapy emphasizes the preconditions for verbal communication. This includes the development of other types of symbolic representation, such as drawing and writing, as well as other forms of communication, such as rhythmic expression. As reflected in the general profile of individuals with autism, some of the children participating in complex

perception therapy are verbal while others are not. A speech therapist works with children individually on specific needs, although the child may not see the speech therapist every week. In the actual therapy session, spoken language is practiced between the therapists and the children and with the entire group, led by the session leader. Much of this practice is focused on the identification and description of objects. Abnormalities in speech (such as pitch, intonation, and stress of words), are addressed with voice exercises. The therapist takes a word (often the theme word of the day), and sounds out each letter or letter combination and the child repeats until he pronounces the entire word. Vocal control is taught by directing the children to vocalize high and low tones. Mouth exercises also promote motor control of the mouth. Other typical impairments in spoken language, such as stereotyped or repetitive phrases or the use of metaphorical language are not addressed in the therapy session. The comprehension of language is stressed in complex perception therapy by requiring that the children listen to verbal directions in games and activities. The children are also taught to attend to appropriate auditory stimuli. These stimuli are not only verbal directions, but musical or other sounds. The discrimination of and attention to auditory stimuli is a critical prerequisite to language comprehension. The absence or impairment of imaginative play is also considered a diagnostic feature of Autistic Disorder. Imagination is encouraged across many of the activities in complex perception therapy, often incorporated with the session's theme. For example, if the theme were "flowers," the children may all pretend they are flowers blowing in the wind; they may pretend to grow tall like a flower or pretend to pick flowers in an imaginary field.

The restricted areas of interests and activities of individuals with autism are dealt with on several levels in complex perception therapy. Because most individuals with autism tend to insist on sameness and resist change, the therapy sessions follow a structured pattern of activities to help to reduce the children's frustration. While the therapy does not seem to try to change their insistence on sameness, it continually exposes the children to new stimuli and experiences within an unthreatening environment. Also, according to the theory of complex perception therapy, teaching the child to organize his perceptions helps him form a structured frame of reference and sense of security. He is then able to begin exploring his environment.

Along the same lines, perception theory maintains that rigid behaviors and nonfunctional routines are an individual's attempts to find structure and security in his environment. If he is able to structure the sensory input from the environment, these rigid routines will no longer be necessary. An attachment to inanimate objects is not necessarily discouraged in the therapy, though it is designed to give the children a full experience of objects and stimulate all areas of sensory experience.

Complex perception therapy challenges the children to experience various types of movement, as well as teaching them to gain control of their own body movement. According to some theories of perception, stereotyped body movements provide sensory stimulation that the child lacks and are done in an attempt to regulate perception and control their environment. By putting the child in an environment with a large amount and variety of sensory experiences, the child is able to begin to make sense of the environment and no longer needs these behaviors.

Complex perception therapy deals with several of the associated features mentioned in *DSM-IV* (APA, 1994). The odd responses to sensory stimuli are dealt with directly, as all aspects of the treatment deal with exposure to and processing of sensory stimuli. Many of the behavioral problems are dealt with indirectly. By making the outside environment accessible to the child and allowing the child to develop a sense of self, frustration is decreased, consequently decreasing some of the behavioral problems. Short attention spans are addressed by teaching the children to attend to the task at hand and discriminate between sensory stimuli. By improving how perceptions are organized, the treatment attempts to improve attention. Though the root of self-injurious behavior is unknown, some ideas are that it results from a need for sensory input or an inability to respond appropriately to or process perception. Sensory integration therapy therefore attempts to deal with self-injurious behaviors through its broad efforts of helping the child experience and organize perception.

Another feature associated with autism is depression, especially for adolescents and older individuals with autism. On the one hand, the therapy attempts to increase the child or adolescent's awareness of self, which could actually contribute to depression as the individual becomes more aware of her deficiencies. However, individual, family, and group counseling is offered through the REHA-Centre (2002), which could help to alleviate the problem.

Many children with autism either lack fear in situations in which fear is an adaptive quality, or have excessive fears that are unfounded. A lack of fear is handled by the therapy by increasing the child's consciousness about the reality of her environment.

Excessive fears are dealt with by challenging the child to face some of those fears in a safe, protected environment.

Children with autism vary significantly in both abilities and impairments, often exhibiting uneven cognitive profiles (showing strengths in one developmental area, while abnormally low in another). In complex perception therapy, children of all different developmental levels are in therapy together. This is possible because most of the treatment takes place between the child and the therapist. The collection of data and the consistency of having the same therapist for an extended period of time allow the therapist to address the child's individual strengths and weaknesses. However, the overall design of the treatment is not adjusted for the individual child.

When assessing a treatment method, one must consider the overall goal of intervention. Complex perception therapy is not necessarily directed at overcoming autism or reaching normal-functioning, but is designed to help individuals with autism learn to cope with their impairments and better function in their environment. Supporters of complex perception therapy claim that it increases intellectual level and encourages emotional unfolding, but make no claims of normal functioning. The goal appears to be to allow individuals with autism to make contact with their environment and others and establish the fundamentals of communication.

There are several areas of complex perception therapy that seem to be weak or questionable. First, it does not allow for any interaction with typical peers or explicitly teach appropriate social skills. Second, there is little opportunity for individual design of treatment. In general, the therapy sessions are goal-oriented, but they are not goal-directed for the individual child. Although some adaptations can be made because of the

individual attention the child receives from the therapist, children of all developmental levels participate in the same activities each therapy session. If a child is in treatment for several years, some expectations may change, but the design of the therapy sessions does not. Third, while some self-help skills are encouraged, such as changing their own clothes and setting their place at mealtimes, little attempt is made in treatment to eliminate maladaptive behaviors. It is expected that these behaviors will decrease naturally with the addition of new behaviors. While the therapy gives an interesting perspective on how to help individuals with autism cope with their impairments in perception, there is reason to question what lasting effects this treatment could have, as there are currently no outcome studies.

Although the treatment measures of complex perception therapy address the range of impairments outlined in *DSM-IV*'s definition of Autistic Disorder (APA, 1994), the methods are dependent on a set of purely theoretical concepts with no experimental research to verify their effects. Multiple electronic databases, including PsycInfo, MedLine, CINAHL (for resources in nursing and allied health), and ERIC (for resources in education), were examined, but no empirical studies supporting the efficacy of complex perception therapy were found. This therapy and others with similar ideology, such as sensory integration treatment, are built upon propositions that have not yet been proven to have significant effects for children with autism, although therapists believe these practices are helpful. This lack of research could have more significant implications than simply providing ineffective or less effective intervention: there is the possibility of iatrogenic effects. For example, when applying auditory integration therapy, practitioners are unable to know how much air pressure is actually in the ear

canal. An irregular size or shape of the ear canal could amplify the amount of pressure, ultimately doing damage to the child's ear. These concerns necessitate further research in the area of perception and perceptual processing in individuals with autism.

Experiential Analysis

My interest in ABA treatment and complex perception therapy was kindled by personal experience working in both settings. Over the course of a year, I worked as an ABA therapist for two children with Autistic Disorder. The first child, whom I will call Child A, was 4 years old, verbal, and considered to have high-functioning autism. Child A received 20 to 30 hours of ABA therapy each week in her home treatment program. The program was highly structured, emphasizing detailed data collection and evaluation. For one year, I worked with Child A several hours a week. Discrete trial training was the primary method of instruction, focusing on pre-academic skills to prepare her for inclusion in a typical classroom, combined with behavior modification techniques and incidental teaching.

The most remarkable aspect of working with Child A was the progress I was able to see through the year in both skill acquisition and adaptive behaviors. The intensity of the one-on-one treatment in ABA programs requires that the therapist know the child well, learning how to best motivate and respond to the child. While working with Child A, I was able to participate in other activities in Child A's life beyond the scheduled therapy sessions. For example, I would accompany Child A and her mother to the store or out to eat and periodically baby-sit for Child A and her brother. These experiences provided an opportunity to generalize skills learned in the therapy sessions, while also giving me the chance to get to know Child A in a variety of settings. Temper tantrums

and disruptive behaviors made some sessions and outings particularly challenging. However, I was able to observe significant changes in Child A's behaviors during the year both in therapy sessions and everyday interactions.

During my time as one of Child A's therapists, she successfully entered a typical kindergarten class with the help of a classroom assistant. This move was a significant step in Child A's progress, providing an entirely new environment in which she could practice skills taught and developed in ABA therapy. As therapists, we learned how to incorporate what was being taught at school into the home program. Often, we would include her homework as part of the therapy session and build on those skills being taught at school. Communication between the teachers at school and ABA therapists in the home program played a vital role in Child A's progress; Child A's mother acted as the primary liaison between these two settings. Now six years old, Child A continues to participate in a typical classroom with a classroom assistant while also receiving ABA treatment at home.

When I began working with Child B, she was six years old, nonverbal, and diagnosed with Autistic Disorder. For three months I worked with Child B once a week using ABA techniques. I also had the opportunity to observe a session with her child psychologist who managed her ABA program. Although the goals for therapy were clearly defined, the treatment was much less structured than I had experienced with Child A, requiring that I take a more active role in designing and planning activities for each ABA session.

The individual differences between Child A and Child B were remarkable. Child B had a very cheerful personality with few of the behavioral problems experienced by

Child A. Child B was also almost entirely nonverbal, though she was able to read (a condition called *hyperlexia*). Clearly, this notable difference between the children made treatment designs quite different between the two children. The experiences of working with these two children exemplified how adaptable ABA therapy can be for children with various needs.

I was highly impressed with the involvement of the families in the ABA treatment programs. Although this factor will vary from case to case, the parents were intimately involved in what their child was learning (Child A's mother also served as a therapist in her daughter's ABA home program) and able to encourage those skills taught in therapy in their day-to-day lives, thus encouraging a broad generalization of skills. Overall, these experiences were extremely rewarding and, in fact, fun.

For two and a half months while studying abroad in Innsbruck, Austria, I worked as a therapist doing complex perception therapy at the REHA Centre. As a therapist, I was paired up with a child with whom I worked individually once a week for a full day of therapy. All therapists also met once a week for training with Dr. Bánffy. During these sessions, we were instructed in the theory of complex perception therapy, practiced new activities that would be incorporated into therapy sessions, and had the opportunity to raise specific questions and concerns. This experience was a particular challenge for me, as all training and therapy sessions were conducted in German. Nevertheless, the emphasis on activity and physical movement during therapy sessions made my participation possible in spite of the language challenge.

My experiences working at the REHA Centre were positive, although the theory and activities of the therapy were new and different from most previous experiences I had

working with children with autism. Therapy sessions were fun and seemed to incite the children, motivating them to interact with the environment rather than withdrawing into themselves. Disruptive behaviors and noncompliance were typically not significant problems in complex perception therapy compared to ABA treatment, but the children in complex perception therapy were also not being challenged to master skills and tasks similar to those learned by typically developing peers.

While I find the theory behind complex perception therapy intriguing, I cannot deny the remarkable results I have observed as a result of ABA treatment. Though my time at the REHA Centre was short, causing my perspective to be highly limited, I was not able to see the session-to-session progress as I had in working with ABA programs. As mentioned earlier, ABA programs are highly adaptable, allowing specific behaviors or skills to be targeted according to the child's needs. Complex perception therapy, while providing one-on-one interactions between the therapist and child, does not adjust treatment design (i.e. specific activities) to fit the individual child.

From my experience, I would argue both ABA treatment and complex perception therapy provide something of value to children with autism. Yet, if complex perception therapy achieves what it intends to do (to improve perceptual processing), I question whether this therapy alone supplies what the child needs for the behavior to reflect these neurological changes. More precisely, I am not convinced that complex perception therapy can have a significant impact on the child's prognosis. Though I have greater confidence in ABA treatment, there are still many ways it can be improved. One possibility would be to put more emphasis on how information is processed rather than only dealing with observable behaviors, perhaps by incorporating activities similar to

those of complex perception therapy. By doing so, treatment programs would be able to address cause, while also taking an active role in manipulating behavior. It may be that these ideologies are more compatible than they first appear.

Discussion

Notable progress has been made over the past 60 years with regard to the understanding of autism. Yet so much remains unknown about this complex condition. The discussions in this paper of applied behavior analysis and complex perception therapy provide a glimpse of current treatment options for individuals with autism. While these two models of intervention only reflect a portion of what is available to children with autism, the vast difference between the two approaches allow for an intriguing comparison of how two different ideologies can be put in to practice as attempts to improve functioning of individuals with autism.

Consider how these two methods contrast. On the one hand, complex perception therapy places heavy emphasis on the theoretical basis of the treatment, centering in on the perceived cause of autistic behavior: abnormal neurological functioning of the perceptual system. On the other hand, ABA gives little regard to the origins of autistic behavior, but instead makes use of what works: namely, behaviorist techniques and intensive one-on-one instruction.

Before drawing firm conclusions about which is the better or the more effective intervention, further research is imperative. Outcome studies for complex perception and sensory integration therapies are necessary in order to objectively compare them to ABA programs. A possible starting point for this research would be to use a modified Lovaas methodology, designing a study after the work done by Lovaas (1987) and colleagues to

obtain outcome data for complex perception or sensory integration therapy. As far as empirical support for ABA is concerned, more studies with larger samples and improved methodology are necessary to address areas of controversy, including the number of treatment hours necessary for an effective, cost-efficient intervention program and more reliable outcome statistics.

For the present time, there are several ways to approach a conclusion concerning complex perception therapy and ABA treatment options. First, one could review the data currently available to determine which option is more effective. By default, the ABA method would prevail because it has the supporting data that complex perception therapy lacks. Another option is to wait until further research is complete in order to compare results and make a determination. A third option would be to begin now to blend the two models of treatment to form a new individualized-style treatment program which incorporates key components of both ideologies.

This author favors the last option. Until further evidence of more effective treatment practices is available, aspects of both complex perception therapy and ABA treatment could be integrated to offer a fuller treatment option. One way this could be done would be to incorporate some of the concepts of sensory integration and complex perception therapy in an ABA program. The benefits of an individualized program design offered by ABA methods would then remain intact, while addressing areas of sensory needs which ABA programs tend to neglect. The session may begin with a period of relaxation similar to complex perception therapy, allowing the child to focus and relax before launching into discrete trials and activities typical of ABA programs. Other activities designed to stimulate the sensory systems and facilitate the modulation of

sensory input could be incorporated into later parts of the session. This treatment design would lose the benefits of the group setting found in complex perception therapy sessions, but would allow for a more individualized program and, eventually, interactions with typically developing peers. Some children with autism may have an educational program which incorporates ABA techniques while receiving sensory integration therapy as a supplemental treatment, but a fuller integration of the two ideologies could potentially enhance the effectiveness of each, making the comprehensive intervention plan more effective.

While both complex perception therapy and ABA share the general goal to improve the overall functioning of individuals with autism, the specific goals of each intervention are notably different. ABA seeks to help children reach their highest potential with the ultimate aim being “normal-functioning” in terms of intelligence, school placement, and social functioning. In contrast, complex perception therapy aims to improve functioning, but makes no claims to transform children with autism into “typical" children. As a result, the complex perception therapy method is more focused on how the child processes information, rather than what is actually learned, in contrast to ABA.

These fundamental differences in theory are rooted in the fact that complex perception therapy attempts to first address the biology–specifically, the processes of perception–and allows the behavior to follow. Conversely, ABA targets behavior, assuming the biology will adjust accordingly. Thus, we are left with the question: biology or behavior? which do we change first?

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Appendix A

Sample of activities for complex perception therapy session

Session 1
I. Thema: Blumen und Farben / *Theme: Flowers and Colors*

EINSTIMMUNG ATMUNG STIMME / *ASSOCIATION-BREATHING-VOICE*

1. Schaukeln, entspannen, Suggestion, Vorstellungen / *Rocking, relaxation, suggestion, mental imaging*
2. Imagination / *Imagination*
3 Rotation / *Rotation exercises*
4. Progressive sensomotorische Stimulation / *Progressive sensory-motor stimulation*
5. Lateralität (zwischendurch immer wieder) / *Lateral movement back and forth*
6. B-L-U-M-E buchstabieren / *Spell B-L-U-M-E (flower)*
7. Blumen der Linie entlang blasen / *Blow the flowers along the line on the floor*

VESTIBULÄRER BEREICH / *VESTIBULAR AREA*

8. Alle robben, krabbeln, rutschen, gehen auf den Knien, gehen, laufen, marschieren, tanzen auf der bunten Blumenwiese (Blumen auflegen) / *Children crawl on their bellies, crawl on hands and knees, slide, walk on knees, walk, run, march, dance in imaginary field of flowers*
9. Schlangenlauf um Blumen herum / *Slither around the flower like a snake*
10. Alle schaukeln wie eine Blume im Wind / *Everyone sway like a flower in the wind*
11. Alle stehen wie eine Blume im Wind / *Everyone stand on one leg like a flower*
12. Alle Blumen drehen sich um die eigene Achse / *All the flowers rotate around an axis*

PROPRIOZEPTIVER BEREICH / *PROPRIOCEPTIVE AREA*

13. Blumen pflücken (dabei bücken) / *Pick flowers (and lay them down)*
14. Blume wäscht: immer grösser werden / *The flower grows: it becomes bigger and bigger (children pretend to flowers)*
15. Im Kreis weit auseinander gehen um Blumen herum / *Children form a circle and go around the flowers together*
16. Spiel: Rosen, Tulpen, … alle Kinder setzen sich / *Game: "Rose, Tulip…All children sit down"*
17. Spiel: Sonne, Erde, Wasser (Kinder sind Blumen, Sonne: zum gelben Ball laufen; Erde: hinlegen; Wasser: zu den blauen Matten laufen / *Game: "Sun, Earth, Water" (Children are flowers. When session leader says, "Sun," children run to the yellow ball, "Earth" they lay down, and " Water," they run to the blue mat)*
18. Alle Blumen fest durchkneten, immer wieder / *Push flowers together, repeat several times*

TAKTILER BEREICH / *TACTILE AREA*

19. Kopf abklopfen, zusammen drücken und strechken / *Briskly massage child's head with fingertips, make body tense and stretch*
20. Mit verschiedenen Materialien abreiben / *Rub different materials on the child's skin*
21. Massieren / *Massage hands and feet*
22. Mit Blumen kitzeln, Köperteile benennen / *Point to child's body with the flower while the child names the body parts*
23. Verschieden Blumen erfahren, Farben benennen / *Present different flowers to the child, name colors*
24. Blumen halten Winterschlaf in der Erde: In Decke, einwickelm, versuchen sich alleine herauszuwinden / *Flowers hibernate in the ground: Wrap the flower in a blanket and have child search for it on her own*

KÖRPER-KONTROLLE / *BODY CONTROL*

25. Vierfüsslerstand: Arme und Beine homo/hererolateral heben / *Stand on all fours: Raise arms and legs homo/hetero-laterally*
26. Ellbogenstütz: Nach einer Blume greifen / *Lay on floor propped up with the elbows: Grab the flower placed in front of body*
27. Ein Tuch rund herumgeben, werfen und fangen / *Pass a handkerchief around, throw and catch*
28. Im Tuch einen kleinen Ball hüpfen lassen (zu zweit) / *Put a small ball on a handkerchief and make it bounce (bounce it to the next person's handkerchief)*
29. Tuch versuchen mit den zehen aufzuheben / *Pick up a handkerchief with the toes*
30. Spiel: Tücher fangen / *Game: Catch the handkerchiefs (drop from high above child)*
31. Kinder liegen: Wer Tuch spurt setzt sich hin / *Child lays down: When the handkerchief touches the child, she sits up*

OLFAKTORISCH UND GUSTORISCH / *OLFACTORY AND TASTE*

32. Verschiedenen Obst und Gemüsesorten riechen, kosten, Farben benennen / *Smell, taste, and name the colors of different types of fruits and vegetables*
33. An verschiedenen Blumen riechen / *Smell different flowers*
34. An verschiedenen Duftölen riechen / *Smell different fragrances (fruits, peppermint…)*
35. Sprachanbahnung: Schmetterlinge/Blumen / *Match colors of the butterfly to the flower*

VISUELL UND VISUELL-MOTORISCH / *VISUAL AND VISUAL-MOTOR*

36. Blumenmandalas anmalen / *Paint flower design*
37. Spiel; Blume, Blume du musst wandern / *Game: "Flower, Flower, you must wander" (One child has the flower. Ask the other children who has the flower.)*
38. Einer blume nachschauen in verschiedenen Richtungen / *Therapist moves flower in different directions while child follows it with eye gaze*
39. Löwenzahn ins Wasser geben, beobachten / *Put a dandelion in water, observe*

AKUSTISCH UND AKUSTISCH-MOTORISCH / *AUDITORY AND AUDITORY-MOTOR*

40. Alle krabbeln zur roten, blauen…Blume / *All children crawl to red flower, blue flower…*
41. Alle laufen zu roten, blauen…Blume / *All children run to the red line, blue line…*
42. Blume auf Musik weitergeben-Stop-andere Richtung / *Walk in a circle around the flowers while music plays. When the music stops, go the other direction.*
43. Hörtraining / *Auditory therapy*

PROZESS- UND SPRACHVERSTÄNDNIS / *PROCESS AND SPEECH COMPREHENSION*

Etwas sum Muttertag basteln (Blumenkarte, etc.) / *Make something for Mother's Day (a card with a flower on it, etc.)*

Gestützte Kommunikation (passend zum Thema Blumen und Farben) / *Practice good communication (relevant to theme of flowers and colors)*

Session 2

II. Thema: FLIEGEN / *Theme: THINGS THAT FLY*

EINSTIMUNG ATMUNG STIMME / *ASSOCIATION-BREATHING-VOICE*

1. Schaukeln, entspannen, Suggestion, Vorstellungen / *Rocking, relaxation, suggestion, mental imaging*
2. Imagination / *Imagination*
3. Rotationen / *Rotation exercises*
4. Progressive sensomotorische Stimulation / *Progressive sensory-motor stimulation*
5. Lateralität (swischen immer wieder) / *Lateral movement back and forth*
6. Geräusche nachmachen: Flugzeug, Vogel, Biene... / *Imitate noises: airplane, bird, bee…*
7. Hohe/tiefe Töne von sich geben / *Practice making high and low tones*

VESTIBULÄRER BEREICH / *VESTIBULAR AREA*

8. Robben, rollen, rutschen, krabbeln, auf den Knien gehen, laufen, hüpfen / *All children crawl on bellies, slide, crawl on hands and knees, walk, run, hop on one foot*
9. Um die eigene Achse drehen / *Rotate around an axis*
10. Um den Betreuer „fliegen"- Blickkontakt / *Children "fly" around the therapist making eye contact*
11. Einen „Flieger" machen / *Make a paper airplane*
12. kinder schaukeln, in die Matte fliegen lassen / *Swing child and throw her on the mat*
13. Kinder „fliegen" mit den Matten um / *Children "fly" around with the mats*

PROPRIOZEPTIVER BEREICH / *PROPRIOCEPTIVE AREA*

14. Einer „Raketenstart" machen / *Pretend to be a rocket take off*
15. Von hohen/tiefen Gegenständen herunterspringen / *Jump from high and low places*
16. Sich tief beugen/ganz hoch hinauf strecken / *Bend down low and stretch up high*
17. Sich fest mit Händen/Füssen abstossen / *Push hands and feet together hard (apply pression and tension)*
18. Mit den Gewicheten laufen, hochstemmen (ganz hoch), nach unten geben (ganz tief), schlenkern, einander zurollen, beschweren, ... / *Run with a water-filled weight, hold it up high, hold it down low, swing weight, roll it on each other, lift up and down…*

TAKTILER BEREICH / *TACTILE AREA*

19. Fest durchkneten, Kopf abklopfen, kitzeln / *Massage , briskly massage head with fingertips, tickle*
20. Fussroller / *Roll feet on wooden foot massager*
21. Mit verschiedenen Materialien abreiben / *Rub different materials on child's skin*
22. Massieren / *Massage child's hands and feet*
23. Spiel: Wie wiel Raben sitzen / *Game: "How many birds sit…"*
24. Fingerkuppen, Hände, Unterarme aneinanderdrücken / *Press fingers together, hands together, lower arms together*
25. Ausströmende Luft aus Ballon am Körper erspüren lassen / *Let air leak out of a balloon on different parts of child's body*

KÖRPER-KONTROLLE / *BODY CONTROL*

26. Luftballon einander zuwerfen und fangen, Ballon im Kreis in der Luft halten, rund um Körper geben, ... / *Children play catch with balloons, make circles with the balloon in the air, pass the balloon around their bodies*
27. Luftballon an einer Schnur--versuchen zu erreichen / *Place a balloon on a rope–try to keep in on the rope*
28. Ballon mit der Nase wegschieben, wegblasen / *Bounce a balloon on the nose, blow it away*
29. Ballons im Tuch "fliegen" lassen / *Bounce balloons in parachute*
30. Tuch ganz hoch und tief halten; Tuch "fliegen" lassen / *In a group, lift parachute high and then let it go down low; lift parachute and let go on command, letting it fly in the air*
31. Einen Flieger aus Papier basteln / *Make a paper airplane*

OLFAKTORICSCH UND GUSTORISCH / *OLFACTORY AND TASTE*

32. Verschiedenen Obst- und Gemüsesorten riechen, kosten, benennen / *Smell, taste, and name different fruits and vegetables*
33. Salz, Zucker, Bitterstoffe, Essig, riechen, kosten / *Smell and taste salt, sugar, bitter materials, vinegar*
34. Mundmotorische übungen / *Mouth-motor exercises*
35. Solettis ohne Hände essen / *Eat snack without using hands*

VISUELL UND VISUELL-MOTORISCHE / *VISUAL AND VISUAL-MOTOR*

36. Luftballon von der Treppe fliegen lassen, nachschauen / *Drop balloons from the top of the staircase and watch them fall*
37. Flieger von der Treppe fliegen lassen, nachschauen / *Fly paper airplanes from the top of the staircase and watch them fly*
38. Propeller fliegen lassen, nachschauen / *Fly whirligig (toy propeller) and watch it fly and land*
39. Blätter zu visuell motorische Koordination / *Visual-motor coordination worksheets*

AKUSTISCH UND AKUSTISCH-MOTORISCH / *AUDITORY AND AUDITORY-MOTOR*

40. Spiel: Es fliegt, es fliegt... / *Game: "It flies, it flies…"*
41. Alle „fliegen" zum roten, blauen, ... Luftballon / *All children "fly" to red balloon, blue balloon…*
42. Lieder singen: Kommt ein Vogel..., Alle Vöglein..., Vogelhochzeit; dazu klatschen, klopfen, etc. / *Song: "Come bird…, all little birds…, into pairs;" then clap, knock, etc.*
43. Hörtaining / *Auditory therapy*

PROZESS- UND SPRACHVERSTÄNDNIS / *PROCESS AND SPEECH COMPREHENSION*

Papiermasché: erfahren, kneten, einen Vogel oder Flugzeug, etc., formen / *Paper-maché: knead, experience the feeling of the paper-maché, make a bird or airplane*

Gestützte Kommunikation / *Practice good communication*

Session 3

Thema: HOLZ / *Theme: WOOD*

EINSTIMMUNG ATMUNG STIMME / *ASSOCIATION-BREATHING-VOICE*

1. Schaukeln, entspannen, Suggestion, Vorstellungen / *Rocking, relaxation, suggestion, mental imaging*
2. Imagination / *Imagination*
3. Rotationen / *Rotation exercises*
4. Progressive sensomotorische Stimulation / *Progressive sensory-motor stimulation*
5. Lateralität / *Lateral movement back and forth*
6. Alle blasen ein Wattebällchen weg / *Blow a ball of cotton away*
7. Regelmässig tief ein und ausatmen / *Regulate breathing in and out*

VESTIBULÄRER BEREICH / *VESTIBULAR AREA*

8. Alle robben, rutschen, krabbeln, gehen, laufen, hüpfen um die Wippen herum / *All children crawl on bellies, slide, crawl, walk, run, hop around the see-saw*
9. Schlangenlauf um die Wippen herum / *Slither like a snake around the see-saw*
10. Wippen: liegend, sitzend, stehend staukeln / *See-saw: lay, sit, stand on see-saw*
11. Spiel: Was müssen das für Bäume sein (um die Wippen herum gehen) / *Game: " What is it like to be a tree?" (go around the see-saw)*
12. Spiel: Wettlauf um die Wippen herum / *Game: Musical chairs with see-saws*

PROPRIOZEPTIVER BEREICH / *PROPRIOCEPTIVE AREA*

13. Eine Wippe tragen / *Carry a see-saw*
14. Einen Stuhl tragen / *Carry a chair*
15. Unter einen Stuhl, Tisch durchkrabbeln / *Crawl under a stool, table*
16. Spiel: Baumstammflössen / *Game: "Wooden rafts"*
17. Gross machen wie win Baum, klein wie eine Maus / *Be big like a tree, small like a mouse*
18. Sprossenwand: Hinaufklettern, sich hinhängen (zählen), hin- und herklettern / *Climb up bars on the wall and hang*

TAKTILER BEREICH /*TACTILE AREA*

19. Durchkneten, kitzeln, Kopf abklopfen / *Massage, tickle, briskly massage child's head with fingertips*
20. Fussroller erfahren, darüber rollen / *Roll feet on wooden foot massager, roll foot-massager all over body*
21. Mit verschiedenen Materialen abreiben (rauh und glatt) / *Rub different materials (rough and smooth) on child's skin*
22. Massieren / *Massage child's hands and feet*
23. Verschiedenen Materialen aus Holz erfahren, riechen / *Experience different materials made out of wood; smell materials*
24. Holzklötzchen auf Körperteil legen, benennen / *Put a small wooden block on different parts of child's body; child names body part*
25. Verschiedenen rauhe und glatt Materialien erfahren / *Experience different rough and smooth materials*

KÖRPER-KONTROLLE / *BODY CONTROL*

26. Einen Stuhl schieben, ziehen, hochstemmen / *Push a chair, pull chair, lift it up high*
27. Spiel: Mein rechter Platz ist leer / *Game: "The place to my right is empty"*
28. Spiel: Wettlauf um die Stühle / *Game: Race around the chairs*
29. Einen Turm aus Holzklötzchen bauen / *Build a tower out of small wooden blocks*
30. Holzklötzchen bauen / *Balance wooden blocks on hands and back*
31. Um den Baum herum tanzen / *Dance around the tree*
32. Im Kreis um den Baum herumgehen, zusammenlaufen / *Go around the tree in a circle, run around the tree together*

OLFAKTORISCH UND GUSTORISCH / *OLFACTORY AND TASTE*

33. Salz, Zucker, Bitterstoffe, ... riechen, kosten / *Salt, sugar, bitter…smell and taste*
34. Schnäuzer: Spatel zwischen Oberlippe und Nase geben / *Hold a spatula between the upper lip and nose*
35. Spatelwippen / *Rock spatula back and forth*
36. Backerbsen ohne Hilfe der Hände vom Teller essen / *Eat peas from a plate without the help of hands*

VISUELL UND VISUELL-MOTORISCH / *VISUAL AND VISUAL-MOTOR*

37. Turm aus Holzklötzchen umwerfen / *Children work together to build a tower*
38. Holzreifen wegrollen, nachschauen, holen gehen / *Roll big wooden rings, watch them roll, go get rings*
39. Holzreifen drehen, zuschauen bis er liegt / *Spin wooden ring, watch until it is still*
40. Blatt zur visuell-motorischen Koordination / *Visual-motor coordination worksheets*

AKUSTISCH UND AKUSTISCH-MOTORISCH / *AUDITORY AND AUDIO-MOTOR*

41. Alle laufen zum Schwebebalken, Stuhl, Tisch, Langbank... (Holzgegenstände) / *All run to the balance beam, chair, table, Langbank (stand by the wood)*
42. Mit Holzklötzchen im Takt klopfen / *Keep rhythm with wooden blocks*
43. Trommeln / *Drums: each child makes up rhythm and other children imitate*
44. Hörtraining / *Auditory therapy*

PROZESS- UND SPRACHVERSTÄNDNIS / *PROCESS AND SPEECH COMPREHENSION*

Blüten (aus Watte) für den Holzbaum basteln, an den Baumhängen / *Stick blooms (cotton balls) on the felt tree*

Gestützte Kommunikation / *Practice good communication*

Session 4
Thema: Fische und Farben / *Theme: FISH AND COLORS*

EINSTIMMUNG ATMUNG STIMME / *ASSOCIATION-BREATHING-VOICE*

1. Schaukeln, entspannen, Suggestion, Vorstellungen / *Rocking, relaxation, suggestion, mental imaging*
2. Imagination / *Imagination*
3. Rotationen / *Rotation exercises*
4. Progressive sensomotorische Stimulation / *Progressive sensory-motor stimulation*
5. Lateralität / *Lateral movement back and forth*
6. Fische in den See blasen / *Blow fish in the water*
7. F-I-SCH buchstabieren, mehrmals wiederholen / *Spell F-I-SCH (fish), repeat several times*

VESTIBULÄRER BEREICH / *VESTIBULAR AREA*

8. Robben, rollen / *Crawl on bellies, roll*
9. Um die eigene Achse drehen / *Rotate around a single axis*
10. Um die Fische herum krabbeln, gehen, laufen, hüpfen, tanzen, ... / *Go around the fish: crawl on hands and knees, walk, run, hop, dance…*
11. Schlangenlauf um die Fische herum / *Slither like a snake around the fish*
12. Kinder abwechselnd in Tuch/Decke schaukeln / *Children alternate rocking in cloth swing*
13. Im Stehen schaukeln (Schluss) / *Rock in place*

PROPRIOZEPTIVER BEREICH / *PROPRIOCEPTIVE AREA*

14. Fische vom Boden aufsammeln, dabei bücken / *Bend over and collect fish from soil*
15. Sich nach einem Fisch strecken / *Stretch and reach for fish*
16. Im Kreis um die Fische weit auseinandergehen / *Get in a circle around the fish and spread out*
17. Fische im Tuch springen lassen / *Let fish bounce on parachute*
18. Tuch: Farben benennen, durchkrabbeln / *Parachute: Name colors on parachute, crawl underneath*
19. Staffellauf: Fische übergeben / *Relay race: run with fish and then hand it off to next person*
20. Spiel: Fische aus dem Wasser ziehen / *Game: "Pull fish out of the water"*

TAKTILER BEREICH / *TACTILE AREA*

21. Durchkneten, Kopf abklopfen, kitzeln / *Massage, briskly massage child's head with fingertips, tickle*
22. Gross machen wie ein Hai, klein wie eine Sardine / *Make yourself big like a shark, small like a sardine*
23. Fussroller verwenden / *Use foot massager*
24. Mit verschiedenen Materialien abreiben / *Rub different materials on child's skin*
25. Massieren / *Massage child's hands and feet*
26. Fisch erfahren, Farben benennen / *Experience the fish, name colors on fish*
27. Fische auf Körperteile legen, benennen / *Lay fish on different parts of the child's body; child names body part*

KÖRPER-KONTROLLE / *BODY CONTROL*

28. Fisch auf Handinnenfläche und Handrücken balancieren / *Balance fish on the palm and back of the hand*
29. Fisch auf Rücken, Kopf balancieren / *Child balances fish on her back and head*
30. Fische rund um den Körper geben / *Child passes fish around her body*
31. Fische über den Kopf geben, von rechts in die links Hand / *Child holds fish over head and passes it from the right to the left hand*
32. Vom Elbogenstütz aus nach einem Fisch greifen / *From laying position propped up on elbows, child reaches for fish in front of her body*
33. Fische springen von Teich zu Teich—Störche müssen sie versuchen zu fangen (blaue Matten) / *Fish jump from pond to pond–Storks must try to catch them*

OLFAKTORISCH UND GUSTORISCH / *OLFACTORY AND TASTE*
34. An einem Stück Fisch riechen, essen / *Smell a piece of fish, eat fish*
35. Goldfischli ohne Hilfe der Hände vom Teller essen / *Eat goldfish crackers without the help of hands*
36. Spiel: Fische angeln / *Game: " Fish for fish"*
37. Mundbewegung eines Fisches nachmachen, Zähne zeigen wie ein Hai / *Make a mouth like a fish, show teeth like a shark*

VISUELL UND VISUELL-MOTORISCH / *VISUAL AND VISUAL-MOTOR*
38. Speil: Fischlein du musst wandern / *Game: "Little fish, you must wander"*
39. Umriss des Fisches mit Zeigefinger erfahren / *Outline the fish with index finger*
40. Blatt zur visuell-motorischen Koordination / *Visual-motor coordination worksheets*
41. Umriss des Fisches nachzeichnen, ausmalen, Farben benennen, asstechen, ... / *Make an outline of a fish, color, name colors, color background*

AKUSTISCH UND AKUSTISCH-MOTORISCH / *AUDITORY AND AUDITORY-MOTOR*
42. Fisch im Kreis zur Musik weitergeben—Stop andere Richtung / *Pass fish around the circle while the music plays; when the music stops, change directions*
43. Alle laufen zum roten, blauen,...Fische / *Everyone run to red fish, blue fish…*
44. Hörtraining / *Auditory Training*

PROZESS- UND SPRACHVERSTÄNDNIS / *PROCESS AND SPEECH COMPREHENSION*
Papiermasché kneten, Fische daraus formen / *Paper-maché: knead, make a fish shape*
Gestützte Kommunikation / *Practice good communication*