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A COMPARISON: THE EFFECTS OF DISCRETE TRIAL TRAINING ON
CHILDREN WITH AUTISM

A Thesis

Presented to

The Faculty of the Department of Special Education
San Jose State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by

Rafaella Tung

May 2005

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A handwritten signature in black ink, appearing to read "Dr. Peg Hughes", written over a horizontal line.

Dr. Peg Hughes

A handwritten signature in black ink, appearing to read "Hyun-Sook Park", written over a horizontal line.

Dr. Hyun-Sook Park

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APPROVED FOR THE UNIVERSITY

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ABSTRACT

A COMPARISON: THE EFFECTS OF DISCRETE TRIAL TRAINING ON CHILDREN WITH AUTISM

by Rafaella Tung

Replicated findings in literature indicate that children with autism in inclusion classrooms engage in less peer social interaction. While one-on-one educational settings which utilize Discrete Trial Training (DTT) try to address this area of concern, there was a certain apprehension as to whether or not this knowledge learned could be generalized into the less restrictive setting of inclusion classrooms. In studying this problem, the thesis examines and compares peer social interaction of children with autism with and without DDT instruction. Information was gathered through two phases of the research study utilizing surveys, phone interviews and classroom observations.

Research on this subject revealed that children with autism with DDT instruction engaged in less peer social interaction (i.e., non-verbal and verbal communication with peers) than children without DDT instruction. According to parental perceptions, other contributing factors towards their child's ability to socially interact with peers included: siblings, play dates, and parental involvement.

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CHAPTER I

Introduction

The opportunity for children to engage in social interaction with others is an extremely important step in the lengthy process of developmental growth. It is through social interaction that children begin to establish a sense of self, and establish an understanding of what others expect of them. While social interaction is limited to family members within the confines of the home, the school environment provides the child with a multitude of peers to learn from and play with. By playing with other children, the child learns appropriate social behaviors that act as a foundation for the future.

This same ideology is expanded to include children diagnosed with autism through the existence of inclusive classrooms. The major difference, however, lies in the fact that play skills and concepts of social interaction for children with autism are not innate, but need to be taught. A better comprehension of this notation could be granted through a brief explanation of autism.

Autism could be described as a developmental disability consisting of a cluster of abnormal behaviors. These abnormal behaviors could be summed up using three principal means: (a) the inability to acquire normal social relationships and social development, (b) the inability to acquire normal communication, and (c) the inability to expand interests and activities beyond a restricted and repetitive routine to include flexible and imaginative play (Baron-Cohen & Bolton, 2002).

These aforementioned conclusive traits of autism partially fueled traditional beliefs that this group of children was uneducable. However, this theory was soon refuted and replaced with the idea that children with autism obtain the greatest gains through highly structured teaching programs. Even more recently, researches on effective educational programs have expanded to include the idea of inclusion.

The idea of inclusion for preschool age children with special needs in classroom settings with typically developing peers has actually been evident since the early 1970s, however the emergence of it as a primary service option was not prominent until the 1990s (Odom, 2000). This seemingly immaculate concept of bringing together differences had undoubtedly made an impact, for in the present, it is a notion considered as “best practice” within the field of special education.

By reviewing previously published materials, one could easily predict that the presence of inclusion within the school system was inevitable. Results of standardized developmental measures have proven that children with special needs have the capability to perform as well, if not better, in inclusive settings when compared to traditional special education settings (Odom, 2000). Furthermore, the concept of inclusion is positively perceived by both parents of children with and without disabilities (Seery, Davis, & Johnson, 2000).

The truth is that despite all the positive outcomes that have surfaced in early childhood special education literature, inclusion is still a relatively new phenomenon. While there is undoubtedly hope that inclusion will bring about a thread of opportunity for children with autism to learn from, interact with, and form relationships with their

typically developing peers, certain unavoidable problems can not merely be disregarded. The main concept of inclusion is that if children with autism are to benefit from children with typical development, they must not only share the same time and space, but social integration (Odom, 2000). The problem with this concept is that unlike their typically developing peers, children with autism are born with a behavioral syndrome that impedes their ability to grasp the idea of normal social interaction. In order to alleviate the social impairments of children with autism, special education classrooms provide them with social skills training prior to their placement in inclusion classrooms.

Statement of the Problem

The most replicated findings in literature regarding preschool inclusion not only indicate that children with disabilities engage in less social interaction with peers, but they also suffer from a relatively higher risk for peer rejection when compared to typically developing children (Odom, 2000). This dilemma is too often linked to the assumption that when we place children with autism in close proximity to typical children we expect them to learn incidentally. Research on the topic of inclusion has indicated that a child with autism will most probably not acquire appropriate social skills unless their level of cognitive impairment is mild, and they are specifically taught the appropriate responses (Moreno, 1998). Here, we find that the existence of special education day classes, utilizing Applied Behavior Analysis (ABA), help in partially fulfilling this requirement.

Applied Behavior Analysis programs utilize an instructional method that introduces a stimulus to increase or decrease the likelihood of a behavior. A common

technique used within ABA programs is Discrete Trial Training (DTT). This type of technique is used to teach single units, broken into simplified steps, through intensive one-on-one instruction (i.e., one trained therapist to one student). The one-on-one educational settings used in DTT are considered highly structured and most effective in teaching children with autism. However, the organized classroom environment has both strengths and weaknesses when it comes to addressing the social aspect.

The strength of the program is evident in the active initiations of interaction between the teachers and the students. It is with the constant use of prompts and reinforcers that the likelihood of social interaction is increased. Furthermore, by basing the method of teaching on the knowledge that children with autism learn best when given concrete models and rules to follow, it is common for social interaction to be taught through the repeated practices of social questioning and appropriate answering. For example, when a child with autism is given the social questioning "How are you?" He or she may process this information and find a suitable answer based on what had been taught. The answer may very possibly be "I am fine thank you." Although this may seem somewhat effective, this systematic processing of information also has its limitations.

The weakness of the program is apparent because everyday instances of social interaction allow us to realize that there are no clearly articulated models or rules. People are often spontaneous when it comes to social interaction, and the lack of guidelines surrounding these social exchanges make it extremely difficult for children with autism to participate or act appropriately. Take the former reference of social questioning for

example. A child with autism is taught to respond to the social questioning of “How are you?” However, there are many other ways in which this question could be presented. Such as, “How is it going?” “How are you doing?” “What’s up?” and that is just to name a few. Without being taught all these other expressions, a child with autism is unable to generalize the use of an appropriate response.

By reviewing the information stated, there is a certain amount of apprehension that follows the placement of a child with autism in an inclusive classroom. Questions arise as to how the child will function socially with typically developing peers when moved from an environment that strives on prompting and reinforcing social behaviors to an environment where the ability to socially interact with others is taken for granted. Moreover, is the knowledge of social skills learned in one-on-one educational settings enough? And if this skill were supposedly mastered, would a child with autism be able to use generalization to include this new and drastically different educational setting as a place to demonstrate learned social behaviors? By looking at both children with DTT backgrounds and children who were not exposed to this type of instruction, it will hopefully give us some clarity in answering the many questions associated with the effectiveness of teaching social behaviors to children with autism.

Purpose of the Study

Despite extensive research and literature on the topic of children with special needs in inclusion classrooms, information specifically regarding social interaction between typically developing children and children with autism is still relatively limited. Furthermore, data connecting prior DTT instruction to the success of children with

autism in the use of social skills outside of that environment is practically non-existent. Considering the point at hand, the information gathered in this thesis seeks to expand on the already existing group of knowledge about children with autism.

The purpose of the study is to examine the differences between children with autism from DTT programs and children with autism without this educational background, in pertaining to their level of social interaction with typically developing peers in kindergarten or first grade inclusive classrooms.

Research Questions

This study is driven by the desire to answer the following questions through parental interviews and observations of children with autism in terms of their initiation, response to peer initiated social interactions, expansion/maintenance, and termination of interactions with their typically developing peers in classroom and playground settings.

- 1) According to parental perceptions, does the teaching structure of DTT programs hinder or assist in the development of social skills of children with autism?
- 2) Are children with autism who had previously received DTT instruction able to generalize their knowledge of social skills to inclusive classroom settings?

Definition of Terms

Applied Behavior Analysis (ABA): This is an instructional method that combines conditioning and modeling to increase or decrease the likelihood of a behavior shown by a child with autism.

Autism: According to the California Department of Education [CDE] (2000), autism is “a developmental disability that significantly affects a child’s verbal and nonverbal

communication and social interaction and is generally evident before the age of three; it adversely affects educational performance” (p.60).

Declarative language: Use of words for the purpose of socially sharing experiences with others.

Discrete Trial Training (DTT): Discrete Trial Training is often synonymous with Applied Behavior Analysis (ABA). It is a method used to teach one single distinct unit through intensive one-on-one instruction (i.e., one trained therapist to one student).

Generalization: The ability to transfer a behavior to other untrained settings or situations.

Imperative language: Use of words for instrumental purposes; such as: making requests, asking questions and making demands.

Inclusion: The placement of a student with special needs in a regular educational classroom.

One-on-one classrooms: A highly structured educational setting that promotes a ratio of one student to one teacher during work sessions.

Prompts: Physical or verbal assistance to help a child perform a task.

Reinforcers: A type of stimulus that increases the behaviors it follows. It is important to note that reinforcers differ according to individuals.

Social interaction: An exchange of verbal and/or non-verbal communication between people.

CHAPTER II

Review of the Literature

Introduction

Given the recent trend towards inclusion in general education, there is an increased number of children with autism being educated in the same classroom settings as their typically developing peers. As a consequence, considerable attention has been dedicated to promoting effective intervention techniques to enhance peer social skills among children with autism. As many children with autism acquire their social skills through intense Discrete Trial Training (DTT) programs prior to being placed in inclusion classrooms, much concern exists over the lack of generalization of learned social skills to include a new and different environment. Data connecting prior DTT education to the success of children with autism in the use of social skills outside of that environment is practically non-existent: therefore, the information gathered in this thesis seeks to expand on the already existing knowledge base about children with autism. This literature review includes the language and social-emotional development in infancy, toddlerhood, and early childhood, of typically developing children and children with autism. Peer interaction in inclusion classrooms will be examined, and the teaching strategies that facilitate language and social development in special education classrooms and inclusion classrooms will also be investigated.

Language Development of Typically Developing Children

The lengthy process of language development for typically developing children

begins through the earliest form of infant vocalization known as crying. Around 2 months of age, vowel-like sounds such as “oo” and “aa”, known as cooing, are observed in children. This is followed by the addition of consonant sounds around 6 months of age. The result are consonant-vowel combinations known as babbling, in which repetitions of syllable-like sequences such as “bababababa” or “mamamamama” are produced (Berk, 1998; Shaffer, 1999). By 7 months, infants begin to include sounds of mature spoken language amongst their babbling, and by 8 months, infants are able to demonstrate their ability to imitate sounds and intonation patterns of their language community. At the end of the first year, infants begin to use preverbal gestures to influence the behaviors of others (Berk). These sets of behaviors are known as joint-attention behaviors, and include actions such as pointing, showing and/or giving objects to another person in order to communicate (Baron-Cohen & Bolton, 2002). For example, a mother watched as her daughter, Larissa pointed to the refrigerator to indicate that she wanted some juice. By her mother recognizing the gesture and labeling it (“Oh, you want some juice”), and then providing Larissa with what she had requested, Larissa learns that the use of language leads to desired results. It is through the opportunities of interaction that typically developing children first gain a sense of the role of language in communication.

The beginning of the second year is usually one of excitement, as this is typically when children's first words emerge. With the attainment of first words, errors do tend to occur, and these are usually in the form of underextension and overextension. Underextension is defined as words being applied too narrowly. For example, Camden

uses the word “ball” only to refer to a small blue bouncy ball he keeps in his pocket for much of the day. Overextension is defined as the use of a word to describe a wider collection of objects and events than is appropriate. For example, Marcus uses the word “car” to refer to all wheeled objects, such as bikes, buses, trains, trucks, and fire engines (Berk, 1998). Yet according to Berk, there is no need for concern over these errors, for “at all ages, comprehension develops ahead of production” (p.167). In other words, the failure to say a word does not mean that the toddler does not understand it.

Following the initial stage of first word-utterances, the development of vocabulary for toddlers is relatively slow, with a sluggish rate of one to three words a month. However, when toddlers are between 18 to 24 months in age, they experience a vocabulary spurt with an addition of 10 to 20 words a week, and expanding their vocabulary from about 50 to 200 words (Barrett, 1985; Berk, 1998). By 20 to 26 months, toddlers are able to combine two words to generate simple sentences, such as “my ball,” “more juice,” and “want cookie” (Berk; Bukatko & Daehler, 1995). These two-word utterances are called telegraphic speech, because of its resemblance to the condensed language of telegrams where smaller and less important words are omitted (Berk, 1999). As the amount of telegraphic speech begins to increase, the amount of single word use begins to decrease, therefore allowing increasingly elaborate and sophisticated language (Glover & Bruning, 1987).

Between the ages of 2 and 3, children begin to use sentences that follow the basic word order of their native language. For example, English-speaking children use simple sentences that follow a subject-verb-object word order (“Mummy bake cookies”).

Following the ability to conform to rules of word order, they also begin to gain grammatical markers that enable them to express meanings flexibly and efficiently. For example, an addition of -s is used for plural (“dogs”), prepositions are used (“in” and “on”), and various tenses from the verb *to be* are formed (“is,” “are,” “were,” “has been,” “will be”). During this period, a display of effective conversational skills, such as turn taking and topic maintenance are also witnessed (Berk, 1998).

By the time children are 3 to 4 years of age, they have already acquired many important skills in language learning. Nevertheless, language development continues to grow (Glover & Bruning, 1987). Besides acquiring vocabulary and grammar, children must also learn the practical side of language, otherwise known as pragmatics. Pragmatics is defined by Berk (1998) as “the social side of language, that is concerned with how to engage in effective and appropriate communication with others” (p. G-10). At age 4, children already understand many culturally accepted ways of adjusting speech, whether it is to fit the age, sex, and social status of the speakers and listeners (Berk, 1998). For example, when taking turns role-playing in a hospital scene, Alex uses more commands when he is pretending to be a doctor (higher status male role), and then uses a more passive and polite pattern of speech when pretending to be the patient (lower status).

The development of language learning in infancy, toddlerhood and early childhood continues as it is further fostered by conversational give-and-takes with more skilled speakers. Language skills continue to develop as adults provide subtle and indirect feedback on the clarity of children’s utterances through expansions and recasts

(Berk, 1998). For example, if a child says, “I broke car,” the parent might respond, “Yes, you broke your new red car,” expanding the complexity of the child’s statement and recasting it into appropriate form.

From ages 5 to 6 the vocabulary of typically developing children reaches about 10,000 words (Berk, 1998), and by the time they enter elementary school, their oral language is very similar to that of adults (Shaffer, 1999). Although a lot of the elements pertaining to language have already been acquired, language development will continue from early childhood through adolescence and into adulthood.

Language Development of Children with Autism

Language development for children with autism differs drastically from those of typically developing children. These differences are observed in all forms of communication, whether it is pre-verbal, non-verbal, or verbal (Baron-Cohen & Bolton, 2002). As typically developing children begin to use many different types of preverbal communicative behaviors at the end of their first year, children with autism do not. One type of behavior they lack is joint-attention. Joint-attention behaviors include the use of eye contact, pointing, showing and/or giving objects for the social purpose of sharing experiences with others (Baron-Cohen & Bolton; Committee on Children with Disabilities, 2001). While typically developing children use joint attention as a way of preverbal communication, children with autism rarely show any of the actions associated with joint-attention behavior. Instead, when provided with an object of interest, they often grab the object and ignore the adult or the child possessing it (Baron-Cohen & Bolton).

In addition, non-verbal communication also indicates abnormalities in the language development of children with autism. While typically developing children learn to use facial expressions and gestures to accompany speech and enhance communication, children with autism tend to use facial expressions that often do not match intonations, or use gestures that are incongruent with speech (Baron-Cohen & Bolton, 2002).

However, some of the most prominent differences in language development between typically developing children and children with autism are in the area of speech. Although autism always involves some sort of delay in language, many children with autism never develop any useful speech. They never produce sounds that are recognizable as words. These children are typically described as “functionally mute” (Baron-Cohen & Bolton, 2002, p. 48). However, for those children with autism who do develop speech, language often includes unusual features such as echolalia, metaphorical language, neologisms, and pronoun reversal. Furthermore, abnormalities are also present in subsystems of speech such as phonetics, vocabulary, syntax, semantics, and pragmatics (Baron-Cohen & Bolton; Kohler, Anthony, & Steighner, 2001).

Echolalia is commonly demonstrated by typically developing children as well as children with autism. It is defined as the repetition of words or phrases either immediately after they are heard (immediate echolalia), or after a delay of some time (delayed echolalia) (Baron-Cohen & Bolton, 2002; Prizant 1983). Echolalia is a pattern of speech that is apparent in all children; however, it is important to remember that echoing that persists beyond the age of three is considered abnormal (Baron-Cohen & Bolton).

Children with autism also use metaphorical language. They use language that can only be clearly understood by those that are familiar with their communication style (Baron-Cohen & Bolton, 2002). For example, Rain would say, "Go green," if she wanted to play soccer out in the backyard. In this example, only those who are familiar with the phrase and the event pertaining to Rain could understand the use of her "metaphor".

Another characteristic feature of language in children with autism is the use of neologisms. Neologism literally means "new word." For example, Johnny would use the word "willip" to mean a piece of fluff. Although neologisms, like echolalia, are present in all children, the persistent use of neologisms by children with autism is recognized as an abnormality in speech (Baron-Cohen & Bolton, 2002).

Pronoun reversal is another one of those unusual features of language for children with autism. The concept of pronoun reversal refers to the tendency for children with autism to confuse first and second person pronouns in speech. For example, children with autism may use "you" to refer to himself or herself and use "I" to refer to his or her listener, and they may also use their first name when referring to themselves (Baron-Cohen & Bolton, 2002). Research on this topic suggests that pronoun reversal could simply be a linguistic confusion and may not specifically symbolize a deeper impairment (Layton, 1987).

Another difference between the language development of typically developing children and that of children with autism is in the areas of language subsystems, including phonetics, vocabulary, syntax, semantics, and pragmatics. An overview of the subsystems reflected abnormalities in phonetics due to odd intonations, delays in the

acquisition of vocabulary, and difficulties in the use of syntax – especially the deixis of speech, or parts of speech with shifting meanings (e.g., ‘here/there,’ ‘now/then,’ and ‘you/I’). In addition, problems also occur in semantics, as children with autism display difficulties in grasping the meanings of more abstract or figurative expressions, hence often understanding words only on a very literal level. For example, a phrase like “He cried his eyes out” provoked Ethan to look for eyes on the floor. In pragmatics, children with autism often display an inappropriate use of language within the social context. Children with autism often fail to recognize the intention behind someone’s speech. For example, if someone called the house and asked “Is your mummy home?”, typically developing children might give more than a “Yes” response. While in contrast, children with autism may say “yes” simply because they do not realize that the other person may expect more information (Baron-Cohen & Bolton, 2002).

Social-Emotional Development of Typically Developing Children

Before children acquire any form of verbal language, emotions are widely used as a way of communication. Many researchers have suggested that signs of almost all the basic emotions are present in the first few weeks of life. These basic emotions are defined as those that can be directly inferred from facial expressions, such as happiness, interest, surprise, fear, anger, sadness and disgust (Berk, 1998; Izard 1982). Between 2 to 3 months of age, infants begin to engage in social smiling and respond to an adult’s facial expressions. At the end of the 3 months, infants begin laughing at very active stimuli. By 6 to 8 months of age, infants are observed to form distinctive patterns in their face, voice, and posture that are clearly related to social events. Furthermore, infants begin to

show anger and fear in an increased frequency and intensity. For example, anger is shown when an object is taken away, when a caregiver leaves for a brief period of time, or if they are put down for a nap. Fear is shown especially through stranger anxiety and separation anxiety due to attachments to preferred caregivers. During the 8 to 10 months period, an infant's ability to detect the meaning of others' emotional expressions improves. In a study by Haviland and Lelwica (1987), mothers of 10-week-old infants were asked to talk to their babies while expressing different emotions including happiness, sadness, and anger. In response to their mothers' happy faces and voices, the infants smiled and cooed, and in response to their mothers' angry faces and voices, the infants furrowed their brows and looked angry. In response to their mother's sad faces and voices, the infants did not look sad, but they appeared to be distressed and increased their tendencies to mouth, suck, and chew. By the end of the first year, infants begin to engage in what is called social referencing. Through social referencing, infants "actively seek emotional information from a trusted person in an uncertain situation" (Berk, 1998, p. 181), and hence allowing them to learn through guidance.

In the beginning of the second year, between 13 to 18 months, toddlers begin to gain many skills associated with social-emotional development. These skills include actively joining the play activities of their siblings, recognizing their self-images in mirrors and on videotapes, showing signs of empathy, and their capability to comply. By the end of the second year, between 19 to 24 months, toddlers gain a higher-order set of feelings called self-conscious emotions, where, through self-evaluation, they provide injury to or enhancement of their own sense of self. These include feelings like shame,

embarrassment, guilt, envy, and pride. With the development of self-conscious emotions, toddlers acquire new emotional terms to add to their growing vocabulary, and they then begin to use their language skills in assisting with emotional self-regulation. Emotional self-regulation refers to the strategies used to adjust emotional states to a comfortable level of intensity. For example, while watching the cartoon movie “Lion King,” the villain, “Scar,” sang an eerie song in front of a scary backdrop of hyenas. Maylina whimpered, “Scar, scary.” This helped guide her mother to comfort her by holding her closer as they continued to watch the cartoon together. Children between the ages of 19 to 24 months also gain self-awareness; this self-awareness permits toddlers to compare and categorize themselves and others based on age, sex, and even goodness and badness (Berk, 1998). Although still relatively limited in the understanding of these social concepts, toddlers use their knowledge to organize their own behaviors, such as labeling their own gender and engaging in gender-stereotyped play (Berk; Fagot & Leinbach, 1989; Ragg & Rackliff, 1998). By building on the foundations of self-awareness, toddlers also gain a sense of self-control and are able to resist an impulse to engage in socially disapproved behaviors such as playing with electrical sockets and sharp objects. This capacity for self-control improves steadily into early childhood (Berk).

At age 2, the social-emotional skills of children begin to develop at a more sophisticated level. The development of self-concept and self-esteem begins; they begin to gain a better understanding of the cause and effect of basic emotions, and there is an obvious increase in empathy and gender-stereotyped behavior (Berk, 1998). As children gain skills in the areas of self-awareness, communication, and understanding of the

thoughts and feelings of others, their skills at interacting with peers improves dramatically. Social skill development marks a very important step in social-emotional development as peers provide learning experiences like none other. According to Berk (1998), “because peers relate to one another on equal footing, they must assume greater responsibility for keeping a conversation going, cooperating, and setting goals in play than when they associate with adults or older siblings (p. 251).”

It is believed that play is the dominant developmental activity in young children, as play supports the areas of intellectual, linguistic, emotional, and social development (Berk, 1998; Brown & Murray, 2001). Between the ages of 2 to 5 years, social development is observed in many different categories of play. At all age levels, children are noticed to display solitary play, where the child plays alone, and onlooker play, where the child watches other people play. At 1 to 3 years of age, children engage in parallel play, in which similar activities are pursued near one another but the children do not try to influence each other's behaviors. At 2 to 3 years, associative play is observed, where children engage in the same or similar activities, and interaction occurs through the exchanging of toys or comments. By 4 to 5 plus years, children begin to engage in a more sophisticated level of play known as cooperative play. Cooperative play is a more advanced form of play that requires children to work towards a common goal through rules, roles, and well-defined individual functions (Berk; California Department of Education, 2000).

As observed in the above developmental sequence of play, children at the ages of 3 to 4 begin to show a decrease of nonsocial activity and an increase in joint, interactive

play. At this age, they also start to form their first friendships, and show a preference for same-sex playmates. Although at this age level, the term “friendship” simply means pleasurable play; the sharing of toys, and, therefore, the relationship between peers, may shift constantly. For example, one day Jennifer could be heard declaring “Tania is my best friend,” but on other days when they are not getting along, she would state just the opposite - “Tania, you’re not my friend anymore” (Berk, 1998). Nevertheless, these friendships provide children with many opportunities to interact with one another and hence allowing them to make gains in their social-emotional development through their experiences.

Social-Emotional Development of Children with Autism

Children with autism experience difficulties in the area of social-emotional development (Baron-Cohen & Bolton, 2002); while typically developing children acquire sophisticated social skills with apparent ease (Kohler et al., 2001). Within the behavioral syndrome of autism, there is no one single social abnormality, but, rather, there are a cluster of them. This cluster includes, but is not limited to, impairments in social behavior, social orientation, joint attention, attention to distress, emotions, and theory of mind (Baron-Cohen & Bolton; Kohler et al.; Leahey & Harris, 1997; Yang, Schaller & Huang, 2003).

In examining impairments in the social behaviors of children with autism, descriptions produced by Leo Kanner in 1943 (as cited in Baron-Cohen and Bolton, 2002) provides a clear explanation through specific points and examples:

1) Unresponsiveness to people

Example: "He seems almost to draw into his shell and live within himself."

2) Lack of attention to people

Example: "When taken into a room, he completely disregards the people and instantly went for objects."

3) Treating parts of people as detached objects

Example: "When a hand was held out to him so that he could not possibly ignore it, he played with it briefly as if it were a detached object."

4) Treating people as if they were inanimate objects

Example: "He would, in playing, butt his head against his mother as at other times he did against a pillow."

5) Lack of behavior appropriate to cultural norms

Example: "At two years old, she was sent to a nursery school, where she independently went her way, not doing what the others did. She, for instance, drank the water and ate the plant when they were being taught to handle flowers."

6) Attention to the non-social aspect of people

Example: "... on a crowded beach, he would walk straight toward his goal irrespective of whether this involved walking over newspapers, hands, feet, torsos, much to the discomfiture of their owners. His mother was careful to point out that he did not intentionally deviate from his course to avoid them. It was as if he did not distinguish people from things, or at least did not concern himself about the distinction."

7) Lack of "savoir-faire"

Example: "Attending a football rally of his junior college and called upon to speak, he shocked the assembly by stating that the team was likely to lose—a prediction that was correct but unthinkable in the setting. The ensuing rounds of booing dismayed this young man, who was totally unable to comprehend why the truth should be unwelcome." (p. 41)

In addition to impairments in social behaviors, children with autism also have problems with social orientation. As social orientation impairment refers to the failure of children with autism to spontaneously orient to naturally occurring social stimuli in their environment. In typically developing children, the ability to orient to social stimuli emerges as early as five to seven months of age (Dawson, Toth & Abbott, 2004). However, in a current study which examined home videotape footage of eight to ten month old typically developing infants and infants later diagnosed with autism, results

indicated that infants with autism were much less likely to orient when their names were called (Werner, Dawson, Osterling, & Dinno, 2000). The impairments in social orientation do not necessarily mean that children with autism are completely unresponsive to others, for they do tend to respond when others take the initiative in making social contact. Nevertheless, there are also other ways in which children with autism are seen as unresponsive, such as their inability to attend jointly with others.

Joint attention impairment refers to the inability of children with autism to coordinate attention between interactive social partners with respect to objects or events in order to share awareness of the objects or events (Mundy, Sigman, Ungerer, & Sherman, 1986). Joint attention ability skills have been positively associated with language gains as well as social competence of children with autism (Dawson et al., 2004; Kohler et al., 2001). While typically developing children attempt to find out if what they are interested in is also of interest to others, or to see if someone is trying to show them something of interest, children with autism do not display such behaviors. However, on the rare occasions that they do, it is often in a very repetitive manner (Baron-Cohen & Bolten, 2002). For example, Joshua would repeatedly say, "I got new shoes," even though he had already informed everybody in the classroom more than twice.

Impairment in attention to distress has also been identified amongst children with autism. While typically developing infants respond differently to faces showing different emotions (e.g., happy, sad, and mad) by exhibiting more smiling towards happy faces than towards sad or mad faces (Haviland & Lelwica, 1987), studies have shown that

children with autism do not display the same attention to distress. Studies examining children with autism have indicated that when adults display facial expressions of distress, children with autism looked less at the adult and showed less concern than did typically developing children (Dawson et al., 2004).

Research also examined impairment of emotion for individuals with autism, and results have indicated that children with autism do not perform as well as typically developing children on perspective-taking and empathy-related tasks (Dawson et al., 2004; Haviland & Lelwica, 1987; Yang et al., 2003). Furthermore, the emotions children with autism show within relationships can be somewhat unexpected. Often these emotional displays are in situations in which typically developing children would not show them. For example, Kyle often laughs for no apparent reason. Although research has demonstrated that children with autism respond to training on contextually appropriate affective behaviors, such as talking about favorite things and showing sympathy, these behaviors are less likely used to convey communicative intent and be partner-related in comparison to their typically developing peers (Yang et al.).

The ability to predict the behavior of others is also a crucial component of social development that children with autism lack (Baron-Cohen, Leslie & Frith, 1985). While a typically developing 4-year-old is capable of having an explicit theory of mind (Berk, 1998), researchers believe that this ability is not developed in children with autism. Theory of mind refers to the notion that many children with autism do not understand the fact that other people have their own plans, thoughts, and points of view. Furthermore, it appears that they have difficulties in understanding the beliefs, attitudes, and emotions of

others (Baron-Cohen & Bolton, 2002; Edelson, 1995; Leahey & Harris, 1997). More graphically, some psychologists have described children with autism as suffering from “mindblindness,” in an attempt to convey how out of touch they are with what goes on in other people’s minds (Baron-Cohen & Bolton; Leahey & Harris). By not understanding that other people think differently than themselves, many children with autism have problems in socially relating and communicating with others. They may also not be able to anticipate what others will say or do in various situations. In addition, by having difficulties in understanding that their peers have thoughts and emotions of their own, they may thus appear to be self-centered, eccentric, or uncaring (Edelson, 1995).

An example of the inability of children with autism to take other people’s thoughts into account could be best understood through an examination of two studies. In the first study a short puppet story was used, and as the children watched, Sally placed a marble in the basket and then left the room. While Sally was out, Anne entered the room and moved the marble from the basket to the box. After Anne leaves, Sally returns, and the children were asked where Sally would look for the marble. By age 3 to 4, typically developing children know that Sally will look in the basket where she thinks it is; however, all but a few children with autism expected Sally to look in the box where the marble actually was (Baron-Cohen & Bolton, 2002, Leahey & Harris, 1997). In another study, which was conducted in Britain, “children were shown a familiar Smarties box that they expected to contain a popular M&M type of candy called Smarties. The box was opened revealing pencils instead of Smarties. The children were then asked what they thought the box contained before opening it, and what the next child would

expect to find in the box. Typically developing children answered “Smarties” to both questions; however children with autism answered “pencils” to both questions [instead]” (Leahey & Harris, 1997, p. 296). These studies clearly indicate the children with autism fail to take into account what another person thinks.

Peer Interaction in Inclusion Classrooms

The ability for children to relate socially to their peers has been considered a critical aspect of development during early childhood. These social interactions increase in frequency and complexity throughout the early childhood years, and provide children with an opportunity to acquire and elaborate on the essential developmental abilities such as social, language, and cognitive competencies. Furthermore, children’s peer-related social competence has been perceived as a fundamental developmental process of attaining peer relationships and friendships (Brown, Odom & Conroy, 2001). However, the problem lies in the fact that the most replicated findings regarding preschool inclusion not only indicate that children with disabilities engage in less social interaction with peers, but they also suffer from a relatively higher risk for peer rejection when compared to typically developing children (Odom, 2000). The concern over this matter is only increased by knowing that researchers believe that children who have difficulties in interacting and developing positive relationships with peers are at risk for behavioral and social maladjustment later in life (Brown et al.). Given the acknowledged importance of young children’s interactions with others, educators strive to provide best practice in both special education classrooms as well as inclusion classrooms to promote language and social-emotional development.

Teaching Strategies that Facilitate Language and Social-Emotional Development in Special Education Classrooms

Highly structured teaching programs have been claimed to produce the greatest gains in facilitating social and language development for children with autism (Baron-Cohen & Bolton, 2002), and within special education classrooms, usually done with the teaching strategies of Applied Behavior Analysis. Although many techniques are often used in ABA programs for children with autism, perhaps the most commonly used instructional method is Discrete Trial Training (DTT) (Schreibman & Winter, 2003). This type of instructional method involves one to one instruction (i.e., one trained therapist to one student). The teaching strategy of DTT involves: (a) breaking skills into smallest steps, (b) teaching each step in an intensive one-on-one manner until mastered, (c) providing lots of repetition, (d) prompting the correct response and fading the prompts as soon as possible, and (e) using positive reinforcement procedures. In using the DTT technique, each trial begins with an instruction; this instruction is then followed by the student's response; and the student's response is immediately reinforced or not reinforced. For example, during an ABA session, Rae was instructed to "touch cup," she touched the cup and was immediately reinforced with a candy, M&M. On the next trial Rae was instructed to "touch cookie," she responded by touching the cup, and was then immediately given the response "lets try again" and the reinforcer – in this case, M&M - was withheld.

Many studies that have examined the use of DTT techniques within ABA programs have resulted in promising findings (Koegel, O'Dell & Dunlap, 1988; Lovaas,

1987; McEachin, Smith & Lovaas, 1993). The research of Koegel et al. (1988) found that motivation in children with autism was increased by reinforcing their attempts to communicate. Moreover, a landmark study conducted by Dr. Ivan Lovaas (1987), which examined the effects of intense DTT treatment on children with autism, furthered the notion that ABA programs are beneficial. In his study, Lovaas compared three groups of 20 children with autism. Group one was the experimental group of children who received 40 hours of treatment per week. Group two was one of two control groups, and the children in this group received 10 hours of treatment together with a variety of treatment from other sources such as those provided by small special education classes. Group three, which was the second of two control groups, received no treatment at all. In describing his findings of the experimental group, Lovaas claimed that 47 percent of the children who received the treatment achieved such substantial gains that they no longer exhibited characteristics of autism; this percentage of children was fully mainstreamed into typical educational settings by first grade. Another 40 percent of the children who received treatment were noted to have made substantial progress, although they still displayed characteristics of autism. Only a small percentage of children, 10 percent, were recorded to have received little or no benefits from the treatment (Lovaas, 1987).

McEachin et al. carried out a follow up study in 1993, and results indicated that the majority had maintained their gains into adolescence. They appeared to be functioning normally and at blind interviews with clinicians were said to be indistinguishable from children with no history of autism.

According to Baron-Cohen and Bolton (2002), there are several reasons why the

structure of DTT programs may seem to be so effective. First of all, the active initiations of interaction between teachers and students minimize the opportunities for children with autism to drift away from social contact into a pursuit of repetitive patterns of behavior. Such behavior, by definition, is unproductive and allows for very little learning of new information. Second of all, children with autism tend to take to the methodical approach of DTT, where each and every task is broken down into simple and clear steps. Finally, due to the fact that children with autism tend to prefer predictability, the highly structured teaching method allows for little disturbance in routines.

Unfortunately, DTT programs are not without their shortcomings. According to Schoen (2003), there are many limitations in using DTT treatments with individuals with autism. These limitations include: (a) intensive and intrusive format and delivery which causes stress to the participants; (b) varying results, with participants responding to stimuli in one environment but unable to generalize the learning to other contexts; and (c) each participant is an individual with different needs and therefore the use of a single treatment would be poor advise. Schreibman and Winter (2003) expressed the same opinions when considering the limitations of DTT (i.e., unpleasant experience for the children and lack of generalization of acquired skills). Furthermore, they noted of additional weakness of DTT are lack of spontaneity and robotic responding.

Teaching Strategies that Facilitate Language and Social-Emotional Development in Inclusion Classrooms

Studies on early interventions such as the DTT program used in one-on-one educational settings have clearly demonstrated its benefits; however, as children with

autism move into an inclusion classroom, teaching strategies must change to facilitate learning in the new environment.

The concept of inclusion requires children with disabilities to be involved in activities and routines with their typically developing peers, and in addition, they must have opportunities to learn new skills within the context of those activities and routines (Hemmeter, 2000). An important dimension of inclusion is that children with disabilities attend the same hours in the same classroom as their typically developing peers; instruction should be presented in a naturalistic nature. The instructional approach has to blend with the activities and routines occurring in the classroom (Odom, 2000).

Naturalistic teaching involves a variety of techniques including milieu teaching, incidental teaching, time-delay prompting, natural language training, and activity based intervention (Brown et al., 2001; Hancock & Kaiser, 2002; Kohler et al., 2001).

According to Kohler and his colleagues (2001), these techniques share two common elements:

First is the use of environmental structuring tactics, such as permitting the child to make choices, arranging toys that evoke children's interests, placing materials out of children's reach, and planned forgetfulness and sabotage (i.e., neglecting to provide necessary materials or placing furniture upside down). A second critical component is the use of instructional tactics that match the children's interest and actions. For example, a teacher might join an activity and provide comments that relate to a child's ongoing actions and materials. These comments are designed to stimulate further interest and engagement on the child's part. Once the child is interested and involved in the activity, the teacher can provide encouragement, positive feedback, and related talk to promote social interaction with others.
(p.94)

Much research, both classic and current, has established naturalistic teaching as a recommended practice for facilitating children's language and communication skills. In a

classic study of incidental-teaching procedures, Hart and Risley (1968) successfully increased preschool children's use of adjective-noun combinations. The children were first taught adjective-noun combinations (e.g., "red truck") in a structured group setting. Then to increase the spontaneous use of the adjective-noun combinations to include the free play settings, access to desired classroom materials was made possible on the appropriate use of these combinations. In a follow-up study, Hart and Risley (1974) used incidental-teaching procedures to shape preschool children's use of compound sentences during free play. The children were progressively required to increase the complexity of their statements. For example, the children were first required to simply name the objects, and then they were to add a descriptive word. Finally, they were required not only to name the object but also to describe how they would use that object. Results of study were promising, as the children who participated increased their use of nouns, adjective-noun combinations, and compound sentences. Moreover, it was claimed that these skills generalized to other non-training situations in the classroom as well. More recently, Horn, Lieber, Li, Sandall and Schwartz, (2000) used a multiple case study method to assess teachers' planning and implementation, the impact on child attainment of target skills, and perceptions on the embedding strategy. Results from the case studies indicated that the teachers favored the strategy and perceived the strategies to be successful. The successful implementation of the strategy was further demonstrated by the increased use of targeted skills amongst the children after the embedded learning opportunities were introduced.

By reviewing the studies, it is clear that naturalistic teaching strategies are

valuable tools in inclusive settings because of several reasons:

- 1) The teacher is not required to step out of his or her role as the leader of the class to lead separate individual or small group activities (Odom, 2000).
- 2) Ongoing curriculum and classroom activities are not disrupted, but are enhanced through adaptations.
- 3) Additional staff is not required once learning objectives and opportunities have been described and embedding planned.
- 4) Opportunities to help develop many different types of functional and meaningful skills are increased through the molding of naturalistic teaching strategies to fit all classroom activities and areas (Horn et al., 2000).

Summary

As an increasing number of children with autism from special education classrooms, utilizing DTT programs, are placed in inclusive classrooms, these children need best practices in teaching to ensure continual developmental growth in the areas they lack the most: language and social-emotional domains. Much research, both classic and current, have focused on finding teaching strategies that best facilitate learning for children with autism. Despite the fact that highly structured programs claim to produce the greatest gains, research shows that DTT programs are not without limitations.

Different teaching strategies used with children with autism are currently present in both special education as well as inclusion classrooms; however, concerns exist over the lack of generalization of learned social skills to include a new and different environment. In studying this problem, the thesis examines and compares peer social interaction of

children with autism with and without DTT instruction.

CHAPTER III

Methods

Children with autism receiving inclusive education in general education classrooms engage in little peer social interaction. While one-on-one instructions utilizing Discrete Trial Training (DTT), attempt to teach social skills, there is little evidence as to whether or not the learned social skills are generalized into less restrictive settings such as inclusion classrooms. The purpose of the study is to examine and compare peer social interaction of children with autism with and without prior DTT instruction in inclusion classrooms. Research questions include:

- 1) According to parental perceptions, does the teaching structure of DTT programs hinder or assist in the development of social skills of children with autism?
 - 2) Are children with autism who had previously received DTT instruction able to generalize their knowledge of social skills to inclusive classroom settings?
- This chapter describes the method used in gathering pertinent information to answer the research questions.

Research Design

This project utilized a single subject design to gain both qualitative and quantitative data for examining differences between two groups: children with autism with and without prior one-on-one DTT instruction. There were two phases to the research study. In the first phase, 200 parents or guardians of children with autism were surveyed. According to an established criteria, six families from this pool of Phase I participants were selected to participate in Phase II of the study. In the second phase, a

structured phone interview with the parent or guardian, and a classroom observation of the child was conducted with each of the six families.

Independent and dependent variables. The study seeks to examine the presence of prior DTT instruction (independent variable) and its influence on parental perception of their child's social interaction with peers, and the child with autism's social interaction with peers (dependent variables).

Hypothesis. Two null hypotheses were formed: (1) No relationship exists between prior exposure to DTT instruction and peer social interaction of children with autism receiving inclusive education in general education classrooms. (2) No relationship exists between prior exposure to DTT instruction and the ability for a child with autism to generalize their learned social skills when later placed in an inclusive classroom setting.

Phase I

Participants

Parents and guardians. The purpose of Phase I of the study was to select individuals with similar characteristics to participate in Phase II of the study. Parents and guardians of children with autism were selected through convenience sampling. A mailing list of 229 families with children with autism, seven and under, was provided by a family resource center in the South San Francisco Bay Area. Of the 229 families, 200 were selected to participate due to their close residential proximity. Survey packets were mailed to the families, and participants were asked to fill out a ten minute survey in which they answered questions about their child's education in short response and

multiple choice format.

Description of Instruments

Survey. Contents of the survey for Phase I of the study were designed to select individuals with similar characteristics to participate in Phase II of the study (See Appendix A). The key criterion was to differentiate participants into two subsets, one of which has previously received DTT instruction and the other subset which did not.

At the beginning of the survey, participants were given an option to provide their contact information if they were willing to allow their child to participate in the second phase of the study where classroom observations would be conducted. Interested participants were instructed to provide their name, their child's name, and either a phone number or email address where they could be contacted at a later date.

The survey consisted of 11 questions in total, and these were divided amongst three sections: (a) Background Information, (b) Educational Background, and (c) Current Education. The first section, Background Information, consisted of four questions aimed at gaining general information about the child with autism, including age, gender, number of siblings, and diagnoses. The second section, Educational Background, consisted of three questions targeted to collect information about the past three years of the child's educational history, including services received, hours of services received, type of classroom placement and its teacher and student ratio. The third section, Current Education, consisted of the four remaining questions, and these were intended to obtain information on the child's current educational status, including grade level, services received, classroom placement, and time and subject(s) (English, math, art etc.) spent

each day in a general education classroom. Participants were asked to respond using multiple choice and short answer formats.

Drafts of the survey were distributed and critiqued on areas of content and format by a San Jose State University (SJSU) faculty member and graduate students with professional experience in the field of special education. Changes were made based on feedback and suggestions, and some items were reworded to avoid misunderstandings and misinterpretations. A final draft of the survey was distributed and critiqued by parents on “family-friendliness.” No changes were made to the final draft.

Data Collection Procedures

Survey. Survey packets were distributed to the 200 families of children with autism selected from the mailing list provided by the Bay Area family resource center. The packets contained: (a) a cover letter, (b) a letter from the CEO of the family resource center, (c) a consent form, (d) a copy signed and dated by the researcher for their records, (e) a survey, (f) a self-addressed stamped envelope, and (g) a sheet of stickers. The cover letter introduced the researcher, explained the nature of the study, provided an outline of what needed to be completed and returned, and reminded participants that a copy of the consent letter was enclosed for their records. The letter from the family resource center provided parents and guardians with an explanation as to why they were selected for the survey, and also included words of support and encouragement for recipients to participate. The letter of consent provided a more in-depth explanation of the research study, outlined the rights of the participants, explained possible risks and benefits, ensured confidentiality, and provided contact information for any questions or

complaints. The letter of consent also informed participants that as compensation for their participation in both phases of the study, they would receive gift certificates to McDonald's to enjoy with their child. A sheet of stickers accompanied each survey packet as a token of appreciation.

Upon returning the survey, participants received an "E-greeting" thanking them for their participation in Phase I of the study, and to inform them that data was currently being analyzed to select participants for Phase II. Participants were reminded that they would be contacted shortly if they met the criteria, and in the event that they did not, words of thank you and best wishes were also included for their willingness to help with the research study.

Data Analysis

Survey. Each survey was assigned a unique number upon receipt. Surveys were then individually examined to determine whether or not the child was currently in an inclusion classroom. Of those who met the criteria, their information was entered on a spreadsheet containing all the different items listed on the survey. The spreadsheet was then carefully examined to select six participants, three with prior DTT and three without, who closely resembled one another in most other aspects. Areas which were examined included: (a) background information such as their age, gender, and number of siblings; (b) information on the past three academic years such as, services received, number of hours those services were received each week, type of classroom placement and teacher to student ratio; (c) information on their current education such as grade level, services received, and subjects included during their time in general education classroom.

Results

Phase I of the study yielded six families to participate in Phase II of the study. The six families were selected from a group of 25 returned surveys, and the participants were determined by closely matching the background information, educational background and current education of the children.

Phase II

Participants

The purpose of Phase II was to gather data on peer social interactions of children with autism: parental perceptions of their child's ability in this area, as well as observations of the child in the school environment were obtained. Purposive sampling was used to select six families based on the data collected from Phase I to participate in Phase II of the research. The participants were determined by closely matching the background information, educational background and current education of the children. Phase II of the study consisted of two groups of participants: the parents or guardians and the children.

Parents and guardians. The six parents or guardians were requested to participate in a 30 minute phone interview where questions in Likert scale and open-ended format were asked. The questions investigated parental perceptions on areas related to their child's socialization with peers.

Children with DTT. The group of six children with autism consisted of three students who had had prior DTT instruction, and three students who had not. At the time of the study, all students were situated in a regular education kindergarten or first grade

classroom. These children were expected to interact and behave in their normal fashion during the classroom observation. Child 1, 2 and 3, had all previously received DTT instruction. They were all male, six years in age, and had either an older or younger sibling (See Table 1). They were all diagnosed with autism at the age of two or two and a half. All three children had received Occupational Therapy (OT) and Speech Language Pathology (SLP) services from year 2001 to 2003. Child 3 was also reported having Relationship Development Intervention.

Children without DTT. Child 4, 5, and 6, had not received any DTT instruction. Child 4 and 5 were male and six years in age; Child 6 was the only female and she was five years in age (See Table 1). Both Child 4 and 6 had a younger sibling, and Child 5 had none. Child 4 and 5 were diagnosed when they were five or five and a half, and Child 6 was diagnosed when she was 3. While both Child 4 and 6 were diagnosed as High Functioning Autism, Child 5 was given four different diagnoses (i.e., Pervasive Developmental Disorder, Pervasive Developmental Disorder – Not Otherwise Specified, Autism Spectrum Disorder, Autism) by four different professionals. Child 4 had not received any services from year 2001 to 2003. Child 5 had obtained SLP services. Lastly, Child 6 had received Physical Therapy (PT), OT, and SLP.

Setting

This Bay Area based research study was focused on the peer social interaction of children with autism in general education classrooms receiving inclusive education. As there are numerous school districts within the Bay Area, and each school district and its classrooms are different in varying degrees, a brief description of each school district

where observations were conducted will be provided.

The six classroom observations took place in six different schools and four different school districts. That is, two students (Child 1 and 3) were situated in school district A, another two students (Child 2 and 4) were situated in school district B, and the remainder two students were located separately in school districts C (Child 5) and D (Child 6). All students received public school education in elementary schools with grade levels kindergarten through fifth or sixth.

District A. Child 1 and 3 attended different schools in school district A. The two schools in District A have an enrollment number of 500 and above each, and a review of the student ethnicity shows a predominately European-American population (67%). Asian-American students make up 27 to 28%, Hispanic/Latino students make up 2 to 5%, and other ethnic groups include African American, Filipino, and Pacific Islander, each representing $\leq 1\%$.

District B. Child 2 and 4 attended different schools in school district B. The two schools in District B have an enrollment number of 400 to 500 students each. Of the two schools where observations took place, one has a predominantly European-American population (85%) with 11% being Hispanic/Latino students, and the other has a predominantly Asian-American population (77%) with 19% being White students and 3% being Hispanic students. Other ethnic groups include African American, Pacific Islander, Native American, and mixed race, each representing $\leq 1\%$.

District C. Child 5 attended school in school district C. The school in District C has an enrollment number of 700 plus students. A large percentage of the students are

Asian-American (68%), followed by 28% European-American, and 3% Hispanic/Latino. African American and Filipino ethnic groups make up $\leq 1\%$ of the school population.

District D. Child 6 attended school in school district D. The school in district D has an enrollment number of 400 plus students. A review of the ethnical makeup of the school shows great diversity: 26% Hispanic/Latino, 24% Filipino, 17% Asian-American, 13% mixed race, 10% European-American, 9% African American, and $\leq 1\%$ Pacific Islander and Native American (greatschools.net, n.d.).

Description of Instruments

To ensure content validity, the questions used during the phone interview, and the social skills checklist used during the classroom observation were derived from the literature review examining language and social-emotional development of typically developing children and children with autism. Two books were referred to most frequently in obtaining information about this topic, including: (a) *Development Through the Lifespan* (1998) and (b) *Autism: The Facts* (2002).

Phone interview protocol. The phone interview consisted of four sections (See Appendix B). All four sections were aimed at investigating parental perceptions on areas related to their child's social interactions with peers. The phone interview required the parent or guardian to score their child on areas concerning peer social interaction, explain what their child does that indicates peer social interaction, and express their perceptions on the contributing effects of DTT or other early intervention programs, and other contributing factors.

The questions within the four sections required participants to answer using Likert

scale responses and perception-based descriptive responses, such as providing opinions through detailed accounts of experiences. The first section consisted of four items, and required the parents or guardians to score their child in the areas of initiation, response to peer initiation, expansion/maintenance, and termination of peer social interactions using Likert scale responses. The participants were provided with Likert scale answers to choose from. These were as follows: never, seldom, sometimes, usually, and always. Interviewees were also encouraged to add additional comments if they wished to provide clarification of their answer. The second section consisted of five semi-structured questions, and required the parents or guardians to explain what their child does that indicates peer social interaction in the areas of initiation, response to peer interaction, expansion/maintenance, and termination. Elaborating and clarifying probes were used as sub-questions to elicit more information; that is, specific questions pertaining to what the child does non-verbally or says verbally were asked. The third section also consisted of semi-structured questions, and parents and guardians were requested to express their perceptions on the contributing effects of DTT or other early intervention programs. Finally, the fourth section consisted of an open-ended question, and parents and guardians were invited to share their opinions on other contributing factors towards their child's peer social interactions.

Drafts of the phone interview questions were distributed and critiqued on the area of content by a SJSU faculty member and graduate students with professional experience in the field of special education. Changes were made based on feedback and suggestions, and some items were reworded to avoid misunderstandings and misinterpretations. A

final draft of the phone interview questions was distributed and critiqued by parents on “family friendliness.” No changes were made to the final draft.

Social skills checklist. The social skills checklist used for the classroom observation consisted of two tables (See Appendix C). One table was used to record data on non-verbal communication with peers, and the other table was used to record data on verbal communication with peers. On the non-verbal communication table, observers recorded the purpose and frequency of non-verbal communication mode (i.e., shared eye contact, gesturing, touching, signing, and others). Observers recorded the intentions of interaction under “Purpose,” and the number of occurrences under “Frequency.” On the verbal communication table, information was also gathered on purpose (with addition of examples) and frequency, although these pertained to conversational purpose (i.e., initiation, response, expansion or maintenance of conversation, and termination).

A draft of the social skills checklist used for the classroom observations was given to a SJSU faculty member to be critiqued on content. Changes were made based on feedback and suggestions to ensure full data coverage of all important aspects. No further changes were made following those corrections.

Observer Training and Inter-Observer Agreement

Inter-observer agreement was used during two of the six classroom observations. A two hour training session was conducted by the researcher, and an observer was trained using videotapes of children with autism. The observer had graduated from college with a BA in Psychology. As a college student, she had written a 40 page paper on autism; however, that was nearly 35 years ago. At the time of the study, she felt that she had

minimal knowledge on autism; however, with the increased media coverage on the developmental disability, she felt that she knew what was current and given to the public. During the training session, the researcher and observer watched videotapes of children with autism, and observations were recorded on the social skills checklist until they reached a mean agreement level of greater than 80%. Agreement checks between observers were carried out at 15 minute intervals. Inter-observer agreement levels were calculated by summing the number of agreements (defined as the same data observed by both observers) and dividing that number by the sum of agreements and disagreements and multiplying by 100. Agreement level for all items listed on the social skills checklist averaged 80% (range = 75% to 100% for individual items).

Data Collection Procedures

Interview. From the pool of Phase I participants, six families were selected to take part in Phase II of the study. Families were contacted by phone or email, depending on their selected preference, and phone interviews were scheduled at a time which was most convenient for the participants. Each interview followed a set format. The preparation leading up to the interview included: (a) an explanation of the purpose of interview, (b) terms of confidentiality, (c) compensation for participation, (d) format of the interview, and (e) indication of how long the interview usually takes. During the interview, the researcher asked questions as stated on the interview protocol. For the first section, parents or guardians were asked to score their child on areas concerning peer social interaction. Instructions were given to the participants, and they were directed to respond using the provided Likert scale answers. These choices included: never, seldom,

sometimes, usually, and always. Interviewees were also encouraged to add additional comments if they wished to provide clarification of their answer. In the second section, parents or guardians were asked to explain what their child does that indicates peer social interaction. Elaborating and clarifying probes were used during the second section to elicit more information (i.e., examples of non-verbal and verbal peer social interactions). In the third section, parents or guardians were asked to express their perceptions on the contributing effects of DTT or other early intervention programs. Finally, in the fourth section, participants were invited to share their perceptions on other contributing factors towards their child's social interactions with peers. Upon completion of the interview, an allotted time slot was provided for interviewees to clarify any doubts about the interview. Information about their child's school, teacher and grade level was also gathered at this time in order to schedule classroom observations. A verification of their contact information provided the researcher with a mailing address to send the McDonald's gift certificates. The interview protocol ended with a reminder for the interviewer to be courteous and professional when the interview was over. All information gathered during the phone interview was recorded by hand on copies of the interview protocol. To ensure consistency in the way in which questions were delivered, the researcher conducted all six interviews.

Observation. Upon completion of the phone interviews, schools were contacted to schedule classroom observations. The letter of consent was shown as a verification of parental knowledge. A two hour classroom observation was scheduled at a time which was most convenient for the teacher. During the observation, the observers stayed at a

distance which allowed for the children to interact and behave in their normal fashion. The date, time and class period observed was noted. Data were recorded on the social skills checklist according to the categories listed, and information was gathered in the form of the coded key, tally marks, and additional written comments (See Appendix C). To ensure data reliability, inter-observer agreement was used during two of the six classroom observations.

Data Analysis

Interview. A coding system was used for section one of the phone interview, where participants were asked to express their answers using Likert-scale responses. Scores were coded as such: Never = 1, Seldom = 2, Sometimes = 3, Usually = 4, and Always = 5. The mean frequency of parental perceptions for each group, in terms of conversational purpose used with peers (i.e., initiation, response, expansion/maintenance, and termination), were gathered by summing up the answers for each conversational purpose and divided by 3 (i.e., number of participants in each group). The means were then compared to determine differences in parental perceptions of children with and without DTT instruction. Data gathered from section two to four of the phone interviews (i.e., examples of non-verbal and verbal peer social interactions, parental perceptions on the contributing effects of DTT or other early intervention programs, and other contributing factors) were expressed using written verbal descriptions of parental perceptions for the purpose of content analysis.

Social skills checklist. Data gathered from the classroom observations were in the form of coded keys, tally marks and written comments. The mode for the purpose of

communication (i.e., initiation, response, maintain/expand, terminate), expressed through coded keys and explained through written comments, was determined to represent the most frequently occurring reason for the need to communicate. Frequencies were calculated for both non-verbal and verbal communication skills, and were used to determine the amount of peer social interaction of children with autism in general education classrooms receiving inclusive education. Data from the two groups, children with and without DTT instruction, were then compared for differences.

Confidentiality

A great deal of attention was given to ensure the confidentiality of the participants, and to avoid any violations of their rights.

Phase I. For Phase I of the study, contact information was only requested as a means of getting in touch with participants who may be suitable for Phase II of the study. When the surveys were returned, the portion holding the contact information was separated from the rest of the survey. Each consent letter, contact information, and survey was then assigned a corresponding number, and a key was developed to link the information together.

Phase II. Participants were assigned a case number, and a key was developed to link the corresponding parent or guardian and child with the collected data. The inter-observer was only provided with the student's assigned number, and all other information pertaining to the student was kept confidential.

The key was stored separately from all other information, and all data was locked in suitcases when not being used for analytical purposes. Data were only reviewed by the

researcher in a locked room. No one other than the researcher had access to the raw data. All data would be destroyed after three years. Names of all institutions and participants in the study have been withheld to ensure anonymity.

Risks and Benefits to Participants

There were no foreseeable risks and discomforts for participants completing the survey, participating in the phone interview, or allowing their child to participate in the classroom observation. In choosing to participate in the research study, individuals have contributed to the growing knowledge on the effects early intervention programs, such as DTT, have on peer social interaction of children with autism. In addition, all participants were given stickers as a token of appreciation; for those participating in both studies, they received gift certificates to McDonald's to enjoy with their child.

Table 1

Participant Demographic Information

Age	Sex	Older siblings	Younger siblings	Age diagnosed	Diagnosis	Discrete Trial Training	Other services (2001-2003)
6	M	1	0	2	Autism	Yes	OT, SLP
6	M	0	1	2	Autism	Yes	OT, SLP
6	M	1	0	2 ½	Autism	Yes	OT, SLP, RDI
6	M	0	1	5 ½	HFA	No	None
6	M	0	0	5	PDD, PDD-NOS, ASD, Autism	No	SLP, RDI
5	F	0	1	3	HFA/AS	No	OT, PT, SLP

Key

AS – Asperger's Syndrome

ASD – Autism Spectrum Disorder

HFA – High Functioning Autism

PDD – Pervasive Developmental Disorder

PDD-NOS – Pervasive Developmental Disorder – Not Otherwise Specified

OT – Occupational Therapy

PT – Physical Therapy

RDI – Relationship Developmental Intervention

SLP – Speech Language Pathology

CHAPTER IV

Results

The purpose of the study was to examine and compare peer social interaction of children with and without Discrete Trial Training (DTT) instruction. Research questions include:

- 1) According to parental perceptions, does the teaching structure of DTT programs hinder or assist in the development of social skills of children with autism?
- 2) Are children with autism who had previously received DTT instruction able to generalize their knowledge of social skills to inclusive classroom settings?

Findings of the study will be addressed in this chapter through the two research questions.

Research Question 1: According to parental perceptions, does the teaching structure of DTT programs hinder or assist in the development of social skills of children with autism?

During a 30-minute phone interview, information was gathered on parental perceptions on the effects of DTT or other early intervention programs towards their child's ability to socially interact with peers; other contributing factors were also collected. Three out of five families had children with autism who received prior DTT instruction. On average, these children had received 15 hours of services each week over the last three academic years (i.e., 2001 to 2003). All three families perceived DTT as being extremely effective in helping their child in the areas of academics and comprehension. However, in considering its impact on their child's ability to socially

interact with peers, only one family expressed the program's effectiveness. The remaining two families believed DTT to be very limiting when considering the social aspect; that is, they found the program to be unnaturally strict in structure and difficult to generalize into other settings.

Out of the five families, two had children with autism who had not received prior DTT instruction. Both families reported that their child had not received any type of formal early intervention due to the fact that they had just been diagnosed a year earlier. One child had received an hour of speech-language pathology each week in year 2003. In addition, three months prior to this research study, the mother of that child had attended a four-day seminar to get trained in Relationship Development Intervention (RDI); although they had begun to incorporate it into their lifestyle (i.e., using exaggerated expressions when communicating with the child, using more declarative and less imperative language, and providing a lot of positive reinforcement for child initiated interactions), it was still in an informal manner. According to the mother, RDI was not implemented on a regular daily basis across all daily activities. Nevertheless, since the addition of RDI, the mother had noticed a significant increase in her child's ability to initiate social interactions. The other child was reported to have a lot of behavioral problems (i.e., no eye contact and difficulties with compliance); however, since September of 2004 the use of picture boards to indicate daily routines and a visual timer to indicate the amount of time allocated for each activity has greatly improved his behavioral problems. At the time of the study, the family was in the middle of getting appropriate help for their child.

Parental perceptions on other contributing factors towards their child's ability to socially interact with peers were tremendously similar between both sets of parents. These factors included: siblings, play dates, and parental involvement. Four out of five families had children with autism who had one sibling; two with an older sibling and two with a younger sibling. All four families felt that a special bond existed between their children. Of the children with autism who had an older sibling, the parents recognized that the elder helped the younger by teaching them social skills through a child's point of view; something which the parents were unable to provide. Of the children with autism who had a younger sibling, the parents felt that the younger was a buddy who constantly initiated play.

All five families had their children with autism involved in play dates. Parents reported that play dates with typically developing peers not only allowed their child to work on social skills, but also increased their child's level of comfort with same age peers. One family had occupied their child in team sports with non-disabled peers. Although it had proven difficult, the family strongly believed that his participation on the team had made him realize that he was not the only one.

In addition, all five families expressed the importance of parental involvement. Parents believed that they contributed to the development of social skills by teaching social appropriateness through daily examples (e.g., using eye contact when talking to someone; not interrupting others when they are talking) and encouraging their child's social interactions. Examples provided by the parents also indicated that they acted as mediators between their child with autism and typically developing peers. For example,

after watching the cartoon movie, “The Incredibles,” one of the children with autism initiated a conversation with a peer about the topic by saying, “Remember? Do you remember the part where...?” As no background information was provided to the peer as to what topic they were conversing over, the mother had to step in when the peer started looking confused to explain the situation to her child. In another example, a different child with autism would call his peers “stupid” or tell them to “go home” when they were better riding the bicycle or playing basketball. When supervising the activities, the parents would explain to the other children that their child did not mean it so as to not offend them.

Research Question 2: Are children with autism who had previously received DTT instruction able to generalize their knowledge of social skills to include inclusive classroom settings?

Interview Data

Parental perceptions of their children’s ability to initiate, respond, expand/maintain, and terminate peer social interaction after receiving DTT or other early interventions were gathered through Likert scale and open-ended questions (see Table 2). Group data and detailed accounts of each interview are provided below:

Findings from the interview showed that parents of children who received DTT perceived their child to initiate and expand/maintain less, but responded more to interactions with peers when compared to the group of parents of children who had not received DTT. In terms of termination, parental perceptions were similar; that is, both groups perceived their child to “never” or “seldom” appropriately terminate interaction

with peers.

Children with DTT. Parent 1 reported that, at present, her child “seldom” initiated social behavior towards peers. At the time of the interview, non-verbal communication which indicated to her that he was initiating social interaction included: going up to peers and getting in their faces, and/or getting in the way of whatever they were doing. As for verbal communication, the mother stated that he would say something he thought that peer would find favorable. For example, outside of the Applied Behavior Analysis (ABA) home program, a peer taught him how to make an explosion noise, so whenever he wanted to initiate social interaction with that particular peer, he would use that sound. Parent 1 stated that her child currently “seldom” responded appropriately to peer-initiated social behavior; although non-verbally, her child showed happiness during interactions by looking at peers and smiling. She mentioned that the previous ABA home program had utilized DTT in teaching her child to say “hi” and child’s name, if a child said “hi” to him. He had also been taught to say “yes” or “no,” or give short answer responses to questions. In terms of his current abilities to expand and maintain interactions with peers, his parent reported that he was “seldom” able to do so; however the parent shared that her child had been taught to maintain conversations through the previous ABA home program. Within the ABA home program, one of the DTT drills he had was “Finding out about someone,” and this included asking questions such as: “What’s your favorite drink?” “What’s your favorite movie?” and “Do you have a pet?” However, since the program was no longer in effect, the parent was uncertain as to whether or not her child was still able to use those previous learned skills. In considering her child’s present

ability to terminate peer social interaction, the parent stated that he was “seldom” able to do so; stating that he would turn away or walk away, and if the peer pursued him, he might shout “No!”

Parent 2 reported that, currently, her child “sometimes” initiated social behavior towards peers. These behaviors were typically non-verbal in nature, and included actions such as: moving closer in proximity to a peer, staring into their eyes, and laughing. The parent stated that these behaviors were not taught through the ABA program, but were instead completed on her child’s own accord. Parent also mentioned that her child verbally says “Hi” to peers, and she feels that the spontaneity in his greetings was owed to DDT instruction. Parent 2 also stated that her child currently “seldom” responded appropriately to peer-initiated social behavior; she mentioned that prompting was usually required. In expanding/maintaining interaction with peers, the parent noted that he “never” does so. It was also stated that he was “never” able to terminate peer social interaction; often saying “goodbye” when his peers are no longer present.

Parent 3 reported that, at present, her child “usually” initiated social behavior towards peers by calling their name; in the event that they did not respond, he would tap them on their shoulder. She stated that he “usually” responded to peer initiated social behavior by engaging in shared eye contact, physically joining in play, and/or verbally responding (e.g., saying “Cool!” or “Great idea!”). Parent expressed that the child “sometimes” expands/maintains interactions; she defined these occurrences to happen fifty percent of the time. When faced with familiar topics, he would talk about it; however when faced with unfamiliar topics, he would not pursue it and instead ignore or

walk away. In terminating interactions, the parent reported that, at the present, he “seldom” does so; stating that he usually walks away, but says “goodbye” and gives hugs when prompted. Parent 3 stated that the ABA program was helpful in providing her child with the skills he needed to succeed in school; however it was the play dates organized by the ABA program that had helped her child socially.

Children without DTT. Parent 4 reported that, at present, her child “usually” initiated social behavior towards peers. These behaviors included both non-verbal (i.e., giving high fives) and/or verbal forms of communication (i.e., asking another child to play). She stated that her child “sometimes” responded appropriately to peer-initiated social behavior by following their lead in play; “usually” expanding/maintaining play by sustaining the interaction. The child was reported to “seldom” terminate interactions with peers appropriately; he usually gets disinterested and finds something else that interests him, walks off, stops talking, and/or moves onto someone else.

Parent 5 reported that, currently, her child “sometimes” initiated social behavior towards peers; although preferring to interact with younger children. In her perception, he “never” responded appropriately to peer-initiated social behavior; stating that he rarely responded to anything verbal. At the same time, it was reported that he “sometimes” expands/maintains interactions with peers whom he is comfortable with; he would do so by asking questions about information they had shared with him, but seldom volunteer information about himself. Parent had reported that he “never” terminates interactions appropriately; typically just getting up and leaving. Termination of interaction, whether non-verbal or verbal, has to be prompted; although non-verbal gestures are often easier to

elicit. On occasions which the child does say “goodbye,” it is often performed without eye contact. Parent 5 felt that since the implementation of RDI, her child had improved in peer social interactions.

Observation Data

Information about the children with autism, in terms of their non-verbal and verbal communication with peers, was gathered using a social skills checklist during a two hour classroom observation. Data reported in this section include: comparison of non-verbal (see Table 3) and verbal (see Table 4) communication with peers between children with autism with and without DTT, as well as individual observation data collected for each child.

Findings from the observation, in considering non-verbal communication with peers, show that the different types of interactions (i.e., gesturing, touching, and signing) used for the different types of purposes (i.e., initiate, respond, expand/maintain, terminate) were somewhat similar between the groups of children with and without DTT instruction. The use of shared eye contact for the group of children without DTT instruction ($M = 8.5$) was slightly higher than that of the group of children with DTT instruction (6.67). In considering verbal communication with peers, the study found that the group of children without DTT ($M = 6.00$) initiated more than the group of children with DTT ($M = 3.33$). In examining the frequency of responses and expansion/maintenance of interactions, significant differences were observed between the two groups. The group of children without DTT instruction was recorded having a higher frequency rate in response ($M = 15.5$) and expansion/maintenance ($M = 20.5$)

when interacting with peers. This was compared to a group mean of 2.67 in response, and 0.67 in expansion/maintenance for children with DTT. Despite the significantly lower frequencies recorded for the group of children with DTT instruction, it is important to note that they had also demonstrated the abilities of responding and expanding/maintaining interactions, although theirs were mostly directed towards adults. Lastly, the frequency of termination of interactions only varied slightly between the two groups; the group of children without DTT instruction showed a faintly higher occurrence rate with a group mean of 1 compared to 0.33 for the group of children with DTT.

Children with DTT. In terms of non-verbal communication, Child 1 was observed to mainly use eye contact to initiate peer social interaction; although less frequently, this form of communication was also used when responding to and terminating interactions. In addition, gesturing in response to peer-initiated social behavior (i.e., pointing to achieve joint attention), and touching for the purpose of initiation and response was also noted by the researcher. In terms of verbal communication, Child 1 was documented to mostly initiate interactions with peers with the intention of sharing information. For example, while sitting at the listening station with five other peers, he said "Look, there is no volume!" For an example of a request, he went to the equipment shed during playtime and said to the children in charge: "My name is ----, room number ----. I want a ball." He responded appropriately to peer-initiated social behavior by answering direct questions such as "Do you want a cupcake?" ; however responses to verbal communication was inconsistent, as several interaction attempts made by peers were met with brief moments of shared eye contact before

turning away. Child 1 had not been observed to expand/maintain interactions with peers although opportunities were presented; however he had demonstrated this ability when interacting with a classroom aide. During the observation, he was not seen spontaneously terminating interactions with peers. It was observed that he used eye contact in saying “goodbye” on one occasion; however the gesture was made only after verbal prompting by the classroom aide.

Child 2 used non-verbal communication in the form of shared eye contact to initiate and respond to peer initiated social behavior; he used gestures to initiate (i.e., pointing and saying child’s name) and terminate interactions (i.e., waving goodbye); and he also used touching (i.e., patting them on their shoulder or knee) to initiate communication. During the observation, the researcher watched as Child 2 used eye contact while patting a peer on their shoulder; however when the peer joined him, he became disengaged and walked away. In using verbal communication, Child 2 mostly initiated interactions by saying the peer’s name. Examples of verbal response were not documented as his peers did not provide any opportunities for this type of interaction. For the same reason, Child 2 was also not observed expanding/maintaining interactions with peers. However, he was observed to respond appropriately to directions (e.g., “Can you turn off the lights for me?”) and questions (e.g., “Where are you going to sit?”) from adults. From the classroom visitation, it was documented that he used spontaneous termination by saying “goodbye,” and peer’s name, when he was leaving the classroom.

Child 3 used a fair amount of non-verbal communication in the form of shared eye contact when initiating and responding to peers. He was also observed gesturing

(i.e., nodding) in response to peer initiated social behavior. It was noted that he smiled and laughed with peers during social interactions. It was documented that few attempts of verbal communication were made towards peers; the few attempts included initiation (i.e., “Look where I’m going!” “Take a look at my pencil!”) and maintenance/expansion (i.e., “We have more yellow blocks.” “Ah! It is stuck to the table!”). It is important to note that many interactions which included responses and expansion/maintenance were observed, however the majority of these interactions were directed towards adults. Opportunities to witness his spontaneity in terminating interactions with peers were not presented during the observation.

Children without DTT. In terms of non-verbal communication, Child 4 consistently demonstrated shared eye contact across initiating, responding, expanding/maintaining and terminating peer social interactions. He was observed gesturing to peers with the purpose of initiating, responding (i.e., nodding, shrugging, pointing) and terminating contact. Furthermore, he used touching and signing as a way of initiation. In terms of verbal communication, he was observed initiating peer social interaction by asking questions (e.g., “What are you guys doing?”) and sharing information which invited play (e.g., “Hey, I’ve got a ball!”). He responded appropriately to peer initiated social behavior by joining their games (i.e., playing ball and playing tag). It was also recognized that he expanded/maintained peer social interaction. For example, after playing ball, he put his arm around a peer, then pointed and directed his peer to a nearby playground structure to continue play. Termination of interaction was also witnessed when he used eye contact, waved and said “bye” as a peer was leaving the

classroom.

In considering the use of non-verbal communication, Child 5 had used eye contact in all areas except terminating interaction. Gestures were used to initiate (i.e., pointing) and terminate contact (i.e., waving); touching was also witnessed as a form of initiation. It was noted that he smiled and laughed with peers during social interactions. In considering the use of verbal communication, he initiated play by first asking his peers if he could join them in their game; he then engaged another child by making statements pertaining to their play (i.e., "Look at what we're making.") and extending an invitation to their game (i.e., "Do you want to help him make that thing?"). He responded well to direct questions, as well as to social stimuli around him. For example, in the middle of pretend play, a peer asked "Can I come?" and he responded by saying "Yeh. You can come." In another example, a nearby peer was waving around a stick, and he responded by saying "Hey, stop doing that! It's dangerous!" On numerous occasions, he had demonstrated an ability to expand/maintain interactions by showing multiple turn-takes. These occasions included a peer initiated group discussion during lunch, and his display of making suggestions and giving directions to his peers during play. In addition, he was also observed to say "goodbye" without prompt, although this was completed without eye contact.

Summary

All families, with a child who received DTT instruction, reported the programs success in aiding their child in cognitive development; however, the same was not said for its effectiveness in promoting social growth. Only one family reported that DTT

played a significant role in helping their child develop social skills. Of the families with children who had not received DTT instruction, Relationship Development Intervention (RDI) was one of the early intervention programs that parents felt were effective in encouraging social skills development. Findings from the study show that all families agreed on several other contributing factors towards their children's ability to socially interact with peers; including: siblings, play dates, and parental involvement.

In comparing parental perceptions, the researcher found that parents of children who received DTT instruction perceived their child to initiate and expand less, but respond more, to interactions with peers when compared to the group of parents of children who had not received DTT instruction. No significant differences were found in comparing non-verbal communication with peers of children with and without DTT instruction; with the exception that a slightly higher frequency of shared eye contact was observed in the group of children without DTT instruction. In comparing verbal communication with peers, the researcher found that the frequency of initiation and termination of interactions only varied slightly between the two groups; the group of children without DTT instruction showed a faintly higher occurrence rate. However, in examining the frequency of response and expansion/maintenance of interactions, significant differences were observed between the two groups. The group of children without DTT instruction was recorded having a higher frequency rate in response and expansion/maintenance when interacting with peers

Table 2

Comparison of Parental Perceptions on Peer Social Interaction of Children with Autism
With and Without DTT

Type	Group Mean	
	DTT	No DTT
Initiation	2.67 (Seldom/Sometimes)	3.5 (Sometimes/Usually)
Response	3 (Usually)	2 (Seldom)
Expand/Maintain	2 (Seldom)	3.5 (Sometimes/Usually)
Terminate	1.67 (Never/Seldom)	1.5 (Never/Seldom)

Table 3

Comparison of Non-Verbal Communication with Peers between Children with Autism
With and Without DTT

Type	Group Mean	
	DTT	No DTT
Initiation		
Shared eye contact	6.67	8.5
Gesture	0.33	2
Touch	1.33	1
Sign	0	0
Other	0.33	1
Response		
Shared eye contact	3.33	6.5
Gesture	1	1
Touch	0.67	0
Sign	0	0
Other	0.67	1
Expand/Maintain		
Shared eye contact	0	6.5
Gesture	0	0
Touch	0	0
Sign	0	0
Other	0	0
Terminate		
Shared eye contact	0.33	0.5
Gesture	0.33	1
Touch	0	0
Sign	0	0
Other	0	0

Table 4

Comparison of Verbal Communication with Peers between Children with Autism With and Without DTT

Type	Group Mean	
	DTT	No DTT
Initiation	3.33	6
Response	2.67	15.5
Expand/Maintain	0.67	20.5
Terminate	0.33	1

CHAPTER V

Discussion

The purpose of the study was to examine and compare peer social interaction of children with and without Discrete Trial Training (DTT) instruction. This chapter will discuss findings, implications for parents and teachers, limitations and directions for future research.

Benefits of Discrete Trial Training

Findings from the study show that all participating families, with a child who received DTT instruction, found the program to be extremely effective in promoting cognitive growth. According to Baron-Cohen and Bolten (2002), there are several reasons as to why the DTT program has been claimed to produce such significant gains. First of all, the active initiations of interaction between teachers and students minimize the opportunities for children with autism to drift away from social contact into a pursuit of repetitive patterns of behavior; this means that unproductive behaviors are decreased while chances of learning new information are increased. Second of all, DTT promotes a very systematic approach, where each and every task is broken down into simple and clear steps; children with autism tend to take to this systematic approach due to its comprehensive simplicity. Finally, due to the fact that children with autism tend to prefer predictability, the highly structured teaching method allows for little disturbance in routines.

Limitations of Discrete Trial Training

Implications of problems with DTT, in terms of lack of generalization, were

evident through the research study. Findings from the research show that two out of three families with a child who received DTT instruction found the program to be very limiting in promoting social-skills development; the reason being that the families found the program to be unnaturally strict and therefore noticed difficulties in their child's ability to generalize into other settings. In examining the observation data, the researcher found that the frequency of response and expansion/maintenance of peer interactions were significantly higher with the group of children without DTT instruction. While the group of children who had DTT instruction also demonstrated these abilities (i.e., respond, expand/maintain), their interactions were mainly directed towards adults. Similar findings concerning lack of generalization were also reported by other researchers. Schoen (2003) reported that there are many limitations in using DTT treatments with individuals with autism. Some of these limitations indicated varying results for individual participants, with participants responding to stimuli in one environment but unable to generalize the learning to other contexts. Schreibman and Winter (2003) expressed the same opinions when considering the limitations of DTT (i.e., lack of generalization of acquired skills).

Implications for Parents and Teachers

Based on the data gathered during the phone interviews, there are actions which both parents and teachers can take to increase peer social interactions of children with autism. First of all, parents can help by encouraging siblings to interact with their brother or sister with special needs. Second of all, parents can increase their child's exposure to better social models by arranging play dates with typically developing peers. Lastly,

parents can use daily examples (e.g., use eye contact when talking to someone, not interrupting others when they are talking) to teach social appropriateness.

Findings from the interview suggest that parents are apprehensive about their child's ability to generalize learned social skills from DTT programs to general education classrooms; in addition, observation data shows that children with autism from DTT programs interact less with peers and more with adults. Although a system does not seem to be in place at the moment to lessen problems with generalization during transitions, perhaps, teachers from both special education and regular education can work together in finding a suitable method to aid the transition of their student from special education classroom to inclusion classroom settings. Furthermore, data gathered from the interviews and observations indicate that children with autism continue to require prompting from adults when interacting with peers; therefore, after the placement in a regular education classroom, teachers should continue to help their students with autism improve upon their deficits in peer social interactions within the inclusive environment. During the interview, all parents suggested that interacting with typically developing peers greatly contributed to their child's ability to socially interact. This idea could be brought into the general education classroom, with the approval from parents, by having regular education teachers talk about individual differences, and also asking typically developing peers to take an active role in socially interacting with their peers with autism.

Limitations

Several limitations were encountered while conducting the research study. One was the small sample size. Due to the multiple requirements asked of the participants

(i.e., survey, interview and observation), most families were reluctant to take part in it. In addition, of the surveys returned, only a small population of children with autism met the set criteria (i.e., children with and without DTT instruction in an inclusive kindergarten or first grade classroom). Moreover, the researcher had begun the study with six participants, but due to the reluctance of a school site in approving and scheduling a classroom observation, only five participants were included in the entire study.

Another limitation had to do with internal validity. The participants of the research study were not selected randomly, but instead Phase I participants were selected based on convenience sampling, and Phase II participants were selected based on purposive sampling. As Phase II participants were chosen based on information provided by parents through the Phase I survey, and no additional assessments were conducted, a major confounding variable may be that the children without DTT instruction had higher social skills to begin with.

Finally, due to insufficient time for the study, data was only collected on each participant during a two-hour classroom observation; therefore the results may not be representative of the children's true abilities in socially interacting with peers.

Directions of Future Research

This study raises a number of issues for further investigation. In hindsight, the researcher should have conducted language and social-emotional assessments of the children who participated, in order to obtain more information about similarities and differences within the sample. In addition, the time frame should have been expanded so that a longitudinal study could have been performed. This way, the researcher could gain

more specific information by following the participants' advancements from DTT programs, or other early intervention programs, into regular education classrooms.

Additional research questions for further investigation may include: What specific social skills are learned through DTT programs, and of these skills which ones are children with autism able to generalize into inclusive classroom settings?

In knowing the benefits of DTT (i.e., promoting cognitive development) in addition to its limitations (i.e., lack of generalization), other instructional methods that support peer social interactions of children with autism in different classroom settings should be investigated. These supplementary techniques should focus on providing tools that special education and regular education teachers, as well as children with autism, can use in generalizing social skills from one-on-one classrooms to inclusion classrooms. In addition, these new techniques should also encompass other contributing factors which parents had recognized as beneficial to their child's ability to socially interact with peers (i.e., combination of early intervention strategies, siblings, play groups, and parental involvement).

Summary

The research study set out to investigate the effectiveness of one-on-one instruction (that utilize the DTT approach) in the development of social skills of children with autism, as well as to determine whether social skills learned while receiving DTT instruction can be generalized when later placed in inclusive classroom settings. Findings from the study indicate that DTT programs are beneficial up to a certain extent; however due to lack of generalization, additional supplements are necessary in providing

children with autism assistance in the areas of social skills development. Despite the numerous early intervention programs currently available, there will be a continuing need to find more effective and more appropriate interventions that promote social-emotional skill development for children with autism.

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Appendix A

Survey on the Effects of Early Intervention Programs on Peer Social Interaction of Children with Autism

**Effects of Early Intervention Programs on Peer Social Interaction
of Children with Autism**

Sponsored by San Jose State University Student: Ms. Rafaella Tung

Email: rafaella_tung@sbcglobal.net

The purpose of this questionnaire is to gain information on early intervention programs and their effects on peer social interaction of children with autism. **Please provide contact information if you are willing to allow your child to participate in a second phase of the study where classroom observations will be conducted.** All information provided will be kept strictly confidential.

Contact Information

Please provide your contact information in the spaces provided below:

Name: _____

Child's name: _____

Phone: _____

Email: _____

Please contact me by:

() Email

() Phone

Section I. Background Information

The following questions should be completed by the parent or caregiver who spends the most time with the child with autism.

1) Please state your child's age: ()

2) Please state your child's gender:

☐ Male ☐ Female

3) Does your child have any siblings?

☐ Yes - *Please continue and answer questions 3a and 3b.*

☐ No - *Please skip ahead to question 4.*

3a) How many older siblings? ()

3b) How many younger siblings? ()

4) Has your child been diagnosed by a professional?

☐ Yes - *Please continue and answer questions 4a and 4b..*

☐ No - *Please skip ahead to the Section II.*

4a) If so, please state the age your child was diagnosed: ()

4b) Please state the diagnosis:

Section II. Educational Background

In the following questions, please answer according to the past three years of your child's educational history.

5) During the **last three academic years**, what type(s) of services did your child receive?

Please check all that apply.

☐ Applied Behavior Analysis (ABA)	☐ Physical therapy
☐ Assistive technology devices and services	☐ Speech-language pathology
☐ Audiology	☐ Vision services
☐ Occupational therapy	☐ Not sure
☐ Other - Please specify: _____	

6) For each service received within the **last three academic years**, please provide the **approximate number of hours received each week**. (*This information could be found on Form C of your child's IEP*).

Year 2003

Year 2002

Year 2001

() () () Applied Behavioral Analysis (ABA)

() () () Audiology

() () () Occupational therapy

() () () Physical therapy

() () () Speech-language pathology

() () () Vision services

() () () Other - Please specify: _____

() () () Other - Please specify: _____

() () () Other - Please specify: _____

7) In the **last three academic years**, what type(s) of classroom placement was your child in?

Please check all that apply. For each placement you checked, please state approximately how many teachers and approximately how many students were in the classroom.

☐ Home School

Approximate number of teachers () Approximate number of students ()

☐ Special Education Day Class

Approximate number of teachers () Approximate number of students ()

☐ General Education Classroom Receiving Inclusive Education

Approximate number of teachers () Approximate number of students ()

☐ Assisted Living

Approximate number of teachers () Approximate number of students ()

☐ Other - Please specify:

Approximate number of teachers () Approximate number of students ()

Section III. Current Education

In the following questions, please answer according to your child's current educational status.

8) What grade level (K, 1st, 2nd, 3rd, etc) is your child currently in? ()

9) Has your child's services changed since the last academic year?

☐ Yes - *Please continue and answer question 10.*

☐ No - *Please skip ahead to question 11.*

10) In the current academic year, what type of services is your child receiving?

Please check all that apply.

☐ Applied Behavioral Analysis (ABA)

☐ Physical therapy

☐ Assistive technology devices and services

☐ Speech-language pathology

☐ Audiology

☐ Vision services

☐ Occupational therapy

☐ Not sure

☐ Other - Please specify:

11) Is your child currently in a general education classroom receiving inclusive education?

☐ Yes - *Please continue and answer questions 11a and 11b.*

☐ No - *Thank you for taking your time to complete the survey!*

11a) How many hours a day is your child in a general education classroom?

☐ Fully included

or ☐ () hours a day

11b) What subject(s) (English, math, art, etc.) does your child participate in during his/her time in the general education classroom?

☐ My child is fully included

or ☐ My child is included during the following subjects: _____

Your participation in this survey is greatly appreciated!

By submitting this survey, it is understood that you have given your consent to participate
in this research study.

Developed by Ms. Rafaella Tung, San Jose State University, September 2004

Appendix B

Interview Protocol

Interview Protocol

Case number:

Date:

Time of interview:

Preparation

___ Explanation of purpose of interview

- Based on the survey about the effects of early intervention programs on peer social interaction of children with autism, you and your child have been selected to participate in the second phase of the study which includes a phone interview with you and a classroom observation of your child.

___ Terms of confidentiality

- I assure you that although results of this study may be published, no information that could identify you, your child or ward, or your family will be included. Any information gathered from this study will remain strictly confidential and will only be disclosed with your permission.

___ Compensation for participation

- As compensation for participation in both phases of the study, you will receive gift certificates to McDonald's through the mail.

___ Format of interview

- The first section will include 3 Likert scale questions, where you will be asked to respond using one of the following answers: never, seldom, sometimes, usually, or always. The other three sections will include questions about your

child's peer social interaction, and your perceptions on early intervention programs and other contributing factors. For those questions, you will be asked to use descriptive answers.

___ Indication of how long the interview usually takes

- The phone interview will take approximately 30 minutes.

1) In your perception, how does your child score on the following areas concerning peer social interaction?

Please respond using one of the following Likert scale answers: never, seldom, sometimes, usually, or always. Feel free to add additional comments if you would like to provide clarification of your answer.

	Please select the choice which best describes your child.					Comments
	Never 1	Seldom 2	Sometimes 3	Usually 4	Always 5	
(a) How often does your child respond appropriately to peer initiated social behavior?						
(b) How often does your child initiate social behavior towards peers? (Non-verbal or verbal)						

(c) How often does your child maintain/expand interaction with peers? (Non- verbal or verbal)						
(d) How often does your child terminate interaction with peers? (Non- verbal or verbal)						

2a) What does your child do that indicates that he is responding appropriately to peer initiated social behavior?

Non-verbal:

Verbal: What words does he/she use?

2b) What does your child do that indicates to you that he is initiating social interaction with peers?

Non-verbal:

Verbal: What words does he/she use?

2c) What does your child do that indicates to you that he is maintaining peer social interaction?

Non-verbal:

Verbal: What words does he/she use?

2d) What topics is your child interested in?

2e) What does your child do that indicates to you that he is terminating peer social interaction?

Non-verbal:

Verbal: What words does he/she use?

3) For parents of children with autism with previous ABA instruction:

To what extent do you feel ABA has helped in your child's ability to socially interact with peers?

or

3) For parents of children with autism without previous ABA instruction:

What types of early intervention programs has your child had?

To what extent do you feel these early intervention programs have helped in your child's ability to socially interact with peers?

4) What other factors do you think has contributed to your child's ability to socially interact with peers?

Closing Comments

___ Questions

- Do you have any questions concerning the study?

___ Information to do classroom observation:

Name of child:

School:

Teacher:

Grade level:

___ Verify mailing address to send McDonald's gift certificates.

Address:

Thank you for your cooperation and participation. If you have any further questions about the research study, please feel free to contact me at (408) 771-9524. Once again, thank you for your time and support.

Appendix C

Classroom Observation:

Social Skills Checklist

Classroom Observation: Social Skills Checklist

Case number:

Date:

Time of observation:

Class period(s) observed:

Non-Verbal Communication with Peer(s)

Types	Purpose	Frequency (use tally marks)
Shared eye contact		
Gesturing		
Touching		
Signing (ASL)		
Others – Facial expressions, Picture Exchange Communication Systems, etc. (Please specify)		

Abbreviations to be used in filling out the non-verbal communication table for “purpose” column.

I = Initiation R = Response E/M = Expansion/Maintenance T = Termination

Verbal Communication with Peer(s)

Conversation Content	Purpose +Examples	Frequency (use tally marks)
Initiation (e.g., "hi")		
Response		
Expansion/Maintenance (e.g., adding content to conversation)		
Termination (e.g., "bye")		