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# Effect of Celebrity Endorsements on Treatment Choices Made by Professionals and Parents with Children Diagnosed with ASD

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EFFECT OF CELEBRITY ENDORSEMENTS ON TREATMENT CHOICES MADE BY  
PROFESSIONALS AND PARENT WITH CHILDREN DIAGNOSED WITH ASD

by

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B.A., University of South Carolina, 2005

A Thesis Submitted in Partial Fulfillment of the Requirements  
for the Master of Science

Department of Rehabilitation

in the Graduate School

Southern Illinois University Carbondale

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A Thesis Submitted in Partial

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TITLE: EFFECT OF CELEBRITY ENDORSEMENTS ON TREATMENT CHOICES MADE BY PROFESSIONALS AND PARENTS WITH CHILDREN DIAGNOSED WITH ASD

MAJOR PROFESSOR: Dr. Joel Ringdahl

ABSTRACT: The Center for Disease Control and Prevention recently estimated that one in 50 children are diagnosed with Autism in the U.S. Now, parents out there not only have to face a doctor's diagnosis, but also a flood of confusing promises for recoveries and miracle cures. Parents have to sift through recommendations made by media, celebrities, professionals, and many, many more. The purpose of this study is to examine what influences the choices parents make involving treatment for their children diagnosed with Autism Spectrum Disorder.

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## CHAPTER 1

### INTRODUCTION

Autism is a spectrum of developmental neurobiological disorders that is more common in males than females. Its overall prevalence has increased dramatically in recent years (Bryson & Smith, 1998), increasing from 1 in 500 in 1995 to 1 in 50 in the most recent data released by the Center for Disease Control and Prevention . Knivsberg (1995) stated autistic syndromes are characterized by impaired social, communicative, and imaginative skills. The exact cause of these abnormalities remains unknown, but is being actively researched. Researchers have found that chromosomal abnormalities and other nervous system problems are also more common in families of individuals with autism. Hypothesized causes for autism have include diet, mercury poisoning, digestive tract changes, vaccine sensitivity, and the body's inability to properly use vitamins and minerals are at the top of the list ( Knivsberg 1995). However, none of these have proved conclusive, and some (e.g., vaccine related causes) have been dismissed or proven not to be a factor.

As stated, more and more children are being diagnosed with autism spectrum disorders (ASD). A report released by the U.S. Centers for Disease Control and Prevention (CDC) suggests that autism and related disorders are more common now than previous years. The CDC reported that it is unclear whether this increase in prevalence can be attributed to an increasing rate of the illness or an increased rate of the ability to diagnose the illness. Some doctors believe that the increase in diagnosis of autism is due to newer definitions characterized in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition-Revised (DSM IV-TR). Diagnostic Criteria for the disorder include: “impairments in the use of multiple nonverbal



behaviors such as eye to eye gaze, facial expressions, body postures, and gestures to regulate social interaction, failure to develop peer relationships appropriate to developmental level, lack of social emotional or social reciprocity (p. 69-70).”

Founders of Autism Speaks, Bob and Suzanne Wright state, “most parents of autistic children notice symptoms at the age of 18 months.” Parents notice difficulties in pretend play, social interactions, non-verbal and verbal communication, unusual distress due to routine change and repeated body movements. These symptoms can range from moderate to severe.”

### **Treatment Options for Individuals with Autism**

#### **Empirically Supported**

Parents of children with autism face the overwhelming task of selecting a treatment for their child. Parents may find this task difficult because there are numerous, contradictory professional and non-professional recommendations related to effective treatment (Miller et. al 2011). One treatment option for autism supported by scientific research is Applied Behavior Analysis (ABA). This approach to therapy is based on the principles of learning derived from behavioral (operant) psychology. ABA-based therapy works to systematically change behavior, including reinforcing and increasing or maintaining appropriate behavior and reducing (through extinction or mild punishment strategies such as Time Out from Reinforcement) inappropriate behavior (Autism Speaks). Behavior Analysts may work with other disciplines, such as Speech Pathology and Occupational Therapy, to implement treatment strategies and teach new skills and behavior.

Today, there are thousands of those diagnosed with Autism Spectrum Disorder receiving ABA based treatment. This approach to treatment has been endorsed by a number of state and federal agencies, including the U.S. Surgeon General and the New York State Department of

Health. In January 2013, President Obama signed a bipartisan legislation creating a one-year trial expanding ABA care to all military families through TRICARE, the Pentagon's healthcare program (Autism Speaks) ABA principles and techniques foster basic skills such as looking, listening, and imitating, as well as complex skills including reading, comprehension, and holding conversations with others.

**Complementary and alternative medical treatments (non-empirically supported).**

A number of alternative treatments exist and have been implemented to change behavioral, cognitive, and other symptoms related to autism. Perrin (2012) reported that approximately 28% of children with an autism diagnosis participate in these types of therapies. The percentage of individuals receiving such treatments decreases as age increases. Such treatments include: chelation, sensory integration, diet, and the use of a hyperbaric chamber.

Chelation therapy is an alternative treatment that is on the rise for treating children with autism. Chelation involves administering chemicals aimed to bind to heavy metals and eliminating them from the body. Chelation has been used in the treatment of lead or mercury poisoning, but there is no scientific research that says chelation is safe or effective for treating those with ASD. Chelation therapy is also a potentially dangerous therapy. In 2005, a child with autism died from this type of chelation therapy when a chelating agent administered bonded with the calcium in his body causing his heart to stop (Autism Science Foundation, 2012).

Dr. Mark Geier, a self-employed American geneticist, developed a treatment called the Lupron protocol. He and his son, David, reported treating autistic children with a hormone product, leuporelin acetate, used in the treatment of precocious puberty and prostate cancer, as well as for the "chemical castration" of sex offenders. Dr. Mark Geier and David believed that testosterone magnifies the toxic effects of mercury in those diagnosed with autism and claim that

the drug produced “very significant overall clinical improvements” with “minimal” adverse effects. However, there is no scientific evidence stating that Lupron is a safe or effective treatment for those diagnosed with autism. In addition, side effects of taking Lupron include hives, difficulty breathing or swallowing, numbness, tingling, painful urination, blood in urine, and many, many more (Deer, 2007).

Another fad treatment on the rise is the Hyperbaric oxygen therapy treatment (HBOT). HBOT is proven effective for gangrene, carbon monoxide poisoning, and various other conditions related to oxygen in the blood. In an article published by Medical Gas Research in 2012, Rossignol and colleagues reported that most studies of HBOT in children with ASD examine changes in behaviors and reported improvements in several behavioral domains, however many of these studies were not done in a controlled environment. In the reviewed studies, HBOT had a minimal adverse effect, but studies which used a higher frequency of HBOT sessions (i.e. 10 sessions per week as opposed to 5 sessions per week) reported significant improvements. However, they reported that the studies had limitations that lead to inconsistent findings.

Perhaps the most popular alternative treatment for ASD is the Gluten Free-Casein Free (GFCF) diet. Promoters of the GFCF diet claim that children with autism have “leaky guts” that allows opioids to escape into the bloodstream, where they travel to the brain, causing autistic behaviors (Autism Speaks).

One common etiological theory implicates insufficient enzymatic activity, increased gastrointestinal permeability, and the absorption of toxic byproducts of incompletely digested proteins from dairy (casein) and cereals (gluten). In typical functioning gastrointestinal tracts, enzymes break proteins into peptides, and transform peptides into amino acids. The intestinal

lining then absorbs the amino acids into the blood stream, which carries the amino acids to the rest of the body, providing nutrition. ASD can result from disruptions to this process; some individuals suffer from inadequate production of gluten- and casein-related digestive enzymes. Without adequate levels of digestive enzymes, peptides derived from gluten and casein fail to become amino acids in large numbers. These individuals also suffer from increased gut permeability, which then allows the peptides to leak into the blood stream where they circulate and eventually cross the brain–blood barrier. Symptoms of ASD are theorized to result from peptides’ attaching to opioid neuro-receptors. Different researchers investigating aspects of this theory often obtain conflicting results. In 1999, Horvath et al. examined the upper gastrointestinal tracts of 36 children with ASD who were experiencing chronic gut related symptoms (e.g., diarrhea, constipation, and/or bloating) and found that 85% of the children suffered from at least one gastrointestinal problem compared to 12% of a control group of children without ASD. In contrast, Black et al. in 2002, found no evidence that children with ASD were more likely than children without to have had gastrointestinal disorders at any time before their diagnosis. As Metz et al. (2005) noted the potential relation between gastrointestinal problems and ASD, even if prevalence is significantly higher in ASD groups than in control groups, is still a correlation at best and has not shown to be causal.

Abnormal urinary peptides are in part derived from gluten, gliadin, and casein. Gluten and gliadin are found in the most common grains and cereals, and casein is found in milk products. Elevated levels of peptides indicate insufficient breakdown of the proteins and may be the result of genetically based peptidase deficiencies (Reichelt, 1990). The idea that food can affect childrens’ behavior gained popularity in the early 1970s when California allergist Benjamin Feingold claimed that the behavior of many of his young patients improved when he

placed them on special diets to treat their food allergies. Feingold blamed food additives—especially food dyes—as well as salicylates, which are chemicals that occur naturally in most fruits. Since then, several studies have looked at whether food dyes or ordinary foods worsened behavior in children with autism. Studies compared regular diets to ones free of additives like food dyes, preservatives, and caffeine. Others put kids on highly restricted diets and then took them off by feeding them food dyes or foods like milk or wheat that typically cause food allergies. Some of the studies demonstrated significant improvement in the behavior of children when their diets were changed, or deterioration in their behavior when they were given food dyes, milk, or wheat.

The removal of gluten and/or casein from the diet of people with ASD has, for many years, been reported by numerous parents as being related to significant improvements in behaviors associated with autism. The results from dietary intervention with people with autism (Knivsberg et al., 1990; 1995) have shown significant improvements in the behavioral and cognitive functioning of participants involved on the gluten- and casein-free diet, with regression reported following the suspension of the diet. Parents were given information on the types of foods to avoid and details of alternative, gluten-free foods.

Very little research exists to support the use of restrictive diets and the correlation between diet and behavior. The GFCF diet intervention has received much attention recently owing largely to a high frequency of anecdotal reports from parents. Unfortunately, few controlled efficacy studies are currently available.

### **Celebrity Endorsement**

Unfortunately, one trend that has been noted in the media is the emerging access to celebrity opinion related to treatments relative to autism. Fad treatments are interventions that

use scientific jargon, sound logical, are supported by celebrities, and are discussed in the media and on the internet where many parents can be exposed to them. Fad treatments have no substantial body of research showing that they are effective in treating any aspect of autism. Thus, there is little confidence that they are effective in treating any aspect of autism (Zane et.al 2008).

However, the influence of such celebrities as Jenny McCarthy and Holly Robinson Peete may sway parents toward trying these non-empirically supported treatments in an attempt to do anything to help their children.

Former Playboy Playmate, Jenny McCarthy spoke on Larry King Live in September of 2007 about her son, Evan, and his Autism diagnosis. In the interview McCarthy spoke about how kids can “recover” from Autism through biomedical intervention. McCarthy started her son on a gluten-free, casein-free diet and reported that in just two weeks he had doubled his language and claims that his eye contact came back. McCarthy also claims that by giving Evan anti-fungal medications and using the diet, he became “typical.” In an interview with Oprah Winfrey, also in September of 2007, McCarthy promoted the GFCF diet and stated that only certain doctors can detoxify autistic children.

Parents are not the only group of care providers interested in identifying effective treatments for children with autism. Because children spend many hours a day at school, teachers may also be keenly aware of and interested in implementing treatments that will improve symptoms related to autism. U.S. Office of Personnel Management (OPM) said that it has determined there is enough evidence behind the use of ABA therapy to deem it a medical rather than an educational service.

“The OPM decision directly contradicts a long-standing insurance industry claim that ABA therapy is not ‘medical,’ but rather ‘educational’ — provided by the schools at taxpayer expense,” said Peter Bell, executive vice president for programs and services at Autism Speaks. “Now, tens of thousands of families will have better access to more affordable, critical ABA treatment.”

Currently, 30 states require that health insurance plans include ABA therapy, according to Autism Speaks, which has lobbied heavily for such legislation. In addition, schools often incorporate CAMTs into their curriculum. A study by Tomchek and Dunn (2007) indicated that 90% of schools incorporate sensory integration therapy (a non-empirically supported CAMT) into their curriculum as a treatment approach for those with autism.

## **CHAPTER 2**

### **PREVIOUS RESEARCH**

#### **Discounting**

The influence of celebrity and other (e.g., medical professionals) endorsements of treatments may vary as the stated likelihood of success varies. The impact of these two variables (i.e., endorsement and probability of effectiveness) may be able to be evaluated using a discounting procedure.

Discounting procedures include probabilistic discounting and delay discounting. Studies on delay discounting have shown that animals and humans tend to alter their preference from a larger delayed reward to a smaller immediate reward as the amount of time to receive the delayed reward increases (Rachlin & Green, 1972; Rachlin, Raineri, & Cross, 1991). This type of responding is often termed impulsivity and can be contrasted with self-control. Self-control occurs when the individual or organism chooses a larger delayed reward over a smaller immediate reward (Dixon, Rehfeldt, & Randich, 2003; Rachlin & Green). Treatments based on the outcomes of delay discounting-based assessments have been used effectively to change behavior exhibited by individuals who are pathological gamblers (Dixon, et. al 2003) and substance abusers (Reynolds, 2006). Researchers have also used delay discounting procedures to assess the behavior of individuals with ASD.

In a study done by Dunlap and colleagues in 1987, researchers examined whether the classroom and work performance of three autistic children could be maintained in community settings under conditions of delayed and infrequent contingencies. The subjects were three male children ages 6 to 17 years old. Each child was diagnosed with autism using the criteria of the U.S. National Society for Children and Adults with Autism. The subjects lived at home with their



parents because community placement was jeopardized due to self-stimulatory behavior and failure to meet teachers' and supervisors expectations. Subject 1 was considered untestable with standardized testing procedures. He had no functional expressive speech and had very low receptive language. Subjects 2 and 3 could understand simple directions and had some basic language skills. Their functional age was tested to be at 3 and 5 years old.

Two of the subjects were treated in their school classrooms equipped with table and chair, stimuli, and teacher stations. Students worked independently or in small groups throughout the classroom, while the teacher rotated amongst them. The child to teacher ratio was 5:1 in small group activities and 4:2 with an aide occasionally assisting in the larger classroom. The tasks consisted of performing geometric and geographic puzzles, coloring, handwriting, etc. Subject 3 was treated in a community workshop staffed by mildly handicapped adults. The subject was seated in a room with 30 to 35 other employees and one supervisor who periodically rotated between rooms. None of the settings provided specialized training for severely handicapped individuals. None of the teachers or supervisors had specialized training in the areas of behavior modification or autism.

The authors used a multiple baseline design, with a four-step treatment process that was implemented to promote durable responsive performance. The dependent variable for all the subjects was on task behavior, defined as appropriate task related activity involving task materials or interactions with teachers, peers, or supervisors. Gazing, stimming, and nonproductive repetitive manipulations of task materials were considered off task behavior. Results from the Dunlap and colleagues showed that the therapist could be removed from the learning environment and that the children would demonstrate appropriate behavior with intermittent and delayed contingencies.

Reed and Martens (2011) sought to determine the efficacy of an adapted discounting procedure for children. The procedure incorporated shorter delays and smaller reward values by making hypothetical choices more similar to the kinds of temporal sequences and monetary amounts with which children may have experience. They studied 46 sixth graders who completed a brief discounting assessment and were then exposed to a class wide intervention that involved both immediate and delayed reinforcement in a multiple baseline design across classrooms. During the first phase, participants completed a brief temporal discounting assessment individually in the hallway outside their classrooms. During the second phase, the experimenter implemented a class wide intervention in the participants' math class. Results showed that this study demonstrated that a hypothetical monetary-choice temporal discounting assessment can yield estimates regarding the degree to which delay of a reward de values it in a choice task.

Weatherly et al. (2011) demonstrated a delay-discounting framework to study decisions about six social policy issues and one monetary outcome. Participants received extra credit for completing the study in their psychology class. The participants received a questionnaire packet that had several items on it including an informed consent sheet, demographic information, and a delay-discounting task.

The authors used a factor analyses that indicated that discounting of social policies outcomes was not independent of discounting money. Results showed that participants placed the most value on money and the least value on expanding legalized abortion. Three different approaches were used. The first was to compare discounting of social policy outcomes with discounting of money when nearly all participants displayed some level of discounting for those outcomes. The second was to compare discounting of a broader range of social policy outcomes

with discounting of money, ut to limit the comparison to a subsample of participants who displayed some level of discounting of all outcomes across all participants. Results from the first two approaches were similar. In both, participants displayed the least amount of discounting for the hypothetical monetary amount of \$100,000.

The results also indicated that the issues of abortion, gay marriage, and potentially affirmative action were valued differently that the other outcomes. The overall goal of the study was to demonstrate the traditional value of research using a delay discounting outline. This study demonstrates that delay discounting can be extended to social relevance and that the data can potentially provide useful information as to how those outcomes are grouped and which demographics correlate to what social issues.

Lerman, Addison, and Kodak (2006) evaluated behavioral sensitivity to differences in the amount and delay of tasks as part of a preliminary study on self-control. The purpose of this study was to evaluate behavioral sensitivity to differences in the amount and delay of tasks as part of a preliminary study on self-control. The participants were two children, John and Archie, with Autism who engaged in aggression and disruption maintained by the escape function. Both participants were four years old and relatively high functioning. John's sessions were conducted in an unused room at his school, while Archie's sessions were conducted in a therapy room at a university-based early intervention program.

The results showed a lack of self-control with respect to choosing between two aversive tasks and suggested potential strategies for increasing self-control. During the initial analyses of magnitude and delay, John consistently chose the small task over the large task and the delayed task over the immediate task. These results indicated that the tasks functioned as aversive events. Archie also consistently chose the delayed task over the immediate task and the small task over

the medium task during the initial analyses of magnitude and delay. These results indicated that the tasks functioned as aversive events. Unlike John, Archie did not show self-control in the first phase of the self-control analysis. He consistently selected the medium delayed task over the small immediate task.

Neef, Bicard, and Endo (2001) examined a combined approach of manipulating reinforcer dimensions and delay fading to promote the development of self-control with three students diagnosed with ADHD using an analogue task. Kent was an 11-year-old African American boy who had been diagnosed with developmental handicaps and was receiving special services in a self-contained class. He was not receiving medication at the time of the study. Raoul was a 9 year old African American boy who had been referred for special education services. He was not receiving medication at the time of study either. Lynn was a 9 year old African American girl. At the time of the study, she was prescribed 10-mg of methylphenidate per day and was receiving special education services. Her school records indicated that she was performing below grade level in all academic areas and that she had been removed from the classroom for discipline problems on three occasions during the past year.

There was a brief computer-based assessment to determine the relative influence of reinforcer rate, reinforcer quality, reinforcer immediacy, and effort on the students' choices between simultaneously presented math problems. Next the authors implemented a self-control training procedure in which immediate reinforcement competed with another influential dimension. Finally, they re-administered portions of the assessment to examine choice patterns reflecting impulsivity versus self-control with untrained dimensions.

Results from the study showed that the three students with ADHD were influenced by immediate access to terminal reinforcers relative to those that were delayed and that required less

response effort to obtain. Each of the students demonstrated impulsivity, consistent with their ADHD diagnostic criterion.

### **Purpose**

Given the prevalence of complementary and alternative approaches to the treatment of ASD, the emerging endorsements of celebrities related to these treatments, and the interest parents and professionals such as teachers take in identifying and implementing treatments for children with ASD, the purpose of this study was to evaluate whether celebrity endorsement of CAMTs affected parents and professionals likelihood to indicate they would try the treatment. This question was evaluated by comparing participants' responses to a monetary discounting questionnaire with answers provided on a discounting questionnaire that included cost of treatment, likelihood of success, and expert and celebrity endorsement.

## **CHAPTER 3**

### **METHODS AND PROCEDURES**

#### **Participants**

A total of 27 subjects participated in this experiment; Five parents of children with Autism Spectrum Disorder, five professionals in the field, and 17 graduate students at Southern Illinois University pursuing a Master's Degree in Behavior Analysis. All 17 graduate students had at least one year of experience working with children diagnosed with ASD. SIU graduate students and professional participants were combined into one group called "Professionals". All participants were contacted and given consent forms.

The parents were asked to complete a questionnaire that included information about (a) demographics of a child with ASD including age of child, sex, and age of diagnosis; (b) treatments recommended by professionals; (c) sources of information related to treatment of ASD; and (d) demographics of the parents including education level and average household income. The purpose of this questionnaire was to determine the confounding variables that could potentially affect the results of this research.

Similarly, the remainder of participants, were also asked to complete a questionnaire. The questionnaire included information about (a) level of education; and (b) age and severity of children with whom they work with; and (c) years of experience working with the ASD population.

#### **Measurement of parent information**

All five parent participants (N = 5) reported to be a parent of a child with ASD. All five participants were the mothers of the ASD child, and averaged 36 years old with at least a

bachelor's degree at some college or university. The five participants also reported that their family only had one source of income that ranged in the \$45,000-\$65,000 per year.

Amongst the professional group (N=22), 19 reported to have obtained their Bachelor's Degree, 17 (N=17) reported to have a Master's Degree, and two participants (N=2) had completed a Doctorate Degree.

Amongst professional participants, all had at least 1 year of experience working with children ages 3-22 with mild to severe Autism.

### **Measurement of child information**

Parents reported that 100% of their children with ASD were male and under the age of 7 years. The children received their diagnosis at the age of three by the developmental psychologist at Cincinnati's Children's Hospital in Cincinnati, Ohio.

After parents received their child's diagnosis, they were given pamphlets about Autism that included a variety of resources around the Greater Cincinnati area. All of the participants reported that they felt overwhelmed with all the information given and were discouraged by the hospital's lack of treatment of advice and were forced to turn to the internet for help.

### **Materials**

A questionnaire was devised to obtain demographic information related to children with ASD (age, sex of child, age of diagnosis), their parents (age, education level, parent income level), and source of information. The questionnaire also included inquiries of treatments that are currently in use or have used in the past, and through what modality was the recommendation made (i.e. medical professionals, professional articles/journals, celebrity endorsement, friend referral, etc.). Current treatments being used includes: Applied Behavior Analysis, gluten-

free/casein-free diet, chelation therapy, speech therapy, occupational therapy, and hyperbaric oxygen therapy. (see Table 1 for a complete list of treatments and descriptions used in the study).

### **Procedure**

A third party observer contacted participants via email, phone calls and/or face to face contact. After signing the consent form, the participants were allotted a three digit number randomly assigned by the third party observer. The third party observer's role was as follows: initial contact with the participants, assigning a three digit number to each participant, administering and collecting the surveys. This ensured anonymity for the researcher.

Paper questionnaires were available for each participant to complete. Participants filled out the surveys and either email the results or mail them to the third party observer. The parent questionnaire included information about their age, level of education, marital status, single or dual income home, age of child with Autism, age in which child received their Autism diagnosis, who diagnosed the child, any professional recommendations about treatment, any current or past treatments tried, if they have ever considered a treatment because a celebrity or a friend has suggested it, and if time and/or cost plays a factor in choosing a treatment.

Participants in the professional group were also asked to complete a questionnaire. Questions included information about their level of education, age and severity of child/children diagnosed with ASD that they work with, and years of experience in the field.

After completing the initial questionnaire, each subject was asked to complete two surveys about choice. One session (20 min long) was conducted with each participant. Before the session, participants were told that they would first complete a survey asking to make a choice between a hypothetical amount of money given immediately or after a delay. Participants were also informed that the rewards were hypothetical and that they would not receive the reward that



they chose. Along with those instructions, participants were told to choose the amount that they wanted and that there were no correct or incorrect responses.

When ready, the participants were asked to read the following instructions:

Today I am going to ask you to make some choices about money. You will not get the money that you choose, but I want you to make your choices as though you were really going to get the money. The amount on your left shows money that you can have today. The choice on your right shows money that you can get after you have waited for some period of time. So now you are being asked to choose between \$1,000 delivered today versus \$1,000 that you would get 1 year from today. Check the amount you would rather have.

The survey was arranged in front of the participant with the delayed amount always on the right side of the page in ascending order. Immediate amounts were arranged in descending order and arranged on the left side of the page.

The next survey asked subjects to choose between treatments that had been recommended by a celebrity that costs \$1,000/month versus a treatment that has been recommended by a professional in the field that also costs \$1,000/month while guaranteeing that the chance of child improvement is 100%. Within the survey, the researcher systematically decreased the percentage of treatment effectiveness (100%, 75%, 50%, 25%) and also the cost of the celebrity recommended treatment while the professionally recommended treatment costs remained the same. Participants were given a similar set of the instructions from the first survey for this survey.

### **Inter-observer Agreement**

Inter-observer agreement was collected during 100% of sessions by having a third party observer and the researcher record all responses made by the participant. Inter-observer agreement was calculated by dividing the number of agreements for immediate or delayed reinforcer by the number of agreements plus the number of disagreements and multiplying by 100%. Inter-observer agreement was 100%.

## CHAPTER 4

### RESULTS

Table 2 shows the indifference points obtained at each of the eight delays for parent and professional participants. Indifference points should decrease across each delay value; however there were several retreats from this pattern. The indifference points repeatedly remained the same across successive delays, but occasionally increased. This was observed in both groups, but more so in the parent group. One parent of a child with Autism Spectrum Disorder and one professional showed an unexpected pattern of responding. Pro 17 and P5 refused to accept any amount of money immediately, even when the delayed and immediate amounts were equal. Both participants preferred to receive \$1,000 after the delay than to receive \$1,000 immediately. This was left blank in Table 2.

The hyperbolic equation developed by Mazur (1987) was fit to the data for each participant with at least eight indifference points as long as the data was consistent with delay discounting. Pro 16, Pro 17, and P5 were excluded from the analysis because of insufficient data. Area under the indifference curve (AUC) is another measure of delay discounting that was calculated for each participant with at least eight indifference points. The AUC can range from 0, steepest discounting, to 1, no discounting (Dixon et. al (2006). The AUC should be lower for parents of children with ASD than for professionals if cost of treatment is a factor and will correlate with high degrees of delay discounting. The AUC means were .012 and .069 for the parents and professionals. After conducting an independent samples t-test, the difference in the means from the two groups was statistically significant, 0.256.

Similar to the previous table, Table 3 shows the indifference points obtained at each of the four probability discounts for parent and professional participants. P2, P4, and P5 said they would never choose a treatment recommended by a celebrity no matter what the cost, unlike P1

and P3. At 100% chance of improvement, P1 switched from a treatment recommended by a professional to one recommended by a celebrity at \$550/month, and also switched at \$10/month at 75%, 50%, and 25% chance of improvement. P3 only switched from a professional recommendation to a celebrity recommendation at 25% chance of improvement and \$550/month. Professionals in this survey were more likely to choose a treatment based on a celebrity recommendation depending on percentage of child improvement and cost of treatment per month.

There were fourteen participants that were excluded due to insufficient data. Area Under the curve (AUC) was calculated for each participant with indifference data points. The AUC means were .67 and 3.8 for the parents and professionals. After conducting an independent samples t-test, the difference in the means from the two groups was statistically significant .117.

## CHAPTER 5

### DISCUSSION

There were multiple measures of delay discounting that indicated that parents discounted delayed rewards more steeply than did professional participants. The mean of the individual AUC measures were slightly lower for parents than for professionals indicating that parents were more impulsive. This difference may be due to the relation between the expenses required to treat their child with ASD and wanting quick access to money.

According to the probability discounting survey, parents were less impulsive when they were asked about treatments as when they were asked about money. This data could be due to parent participants in this study already having been exposed to empirically supported treatments such as ABA therapy. Contrarily, professional participants were more impulsive about treatments than they were about money.

In this study, I investigated the probability discounting display by 27 individuals who provide care for children with ASD. In addition, I investigated delay discounting relative to money (\$1000) for this same sample. Results suggested that parents and professionals were unlikely to endorse celebrity-backed treatment over expert-backed treatment, regardless of the cost or likelihood of success. In addition, this small sample included individuals who display high and low impulsivity, with no relation to probability discounting as it relates to celebrity endorsement of autism treatment. These data seem to suggest that the trait of “impulsivity” is unrelated to celebrity endorsement and other factors such as experience with the disorder, etc. likely influence treatment decisions.

Autism continues to increase in prevalence and effective therapies are needed. The difficulties parents and others experience related to providing care for children with autism

makes exploration of non-empirically based treatments a likely event (Perrin, 2012). When McCarthy (2007) proclaims there is only a limited amount of time during which treatment will help improve a child with autism, pressure is added to these parents to do as much as they can as fast as they can. Due to these feelings of pressure and panic to get in as much therapy as possible while the child is young, Metz, et. al (2005) suggested that parents of children with autism are a magnet for all kinds of unsupported or disproved therapies. Many parents try multiple approaches, often doing them simultaneously, in hopes that one will work. A survey done by Green, et. al in 2006 suggests that the average parent of a child with autism has tried seven different therapies.

### **Limitations**

There were several limitations in this study. Sample size of participants was limited to parents of children with ASD as well as professionals that provide ABA treatment to those with ASD. Another limitation in the present study was due to the fact that parents that participated currently had their children in an ABA program. Most of the parent participants chose to pay for a treatment recommended by a professional despite the cost. This outcome may be due to feeling as though they were being judged if they had chosen a celebrity. Although all surveys were anonymous, the parent participants may made different choices if they had not known the researcher. It is also important to note that four professionals who had participated were also excluded from both surveys due to inconsistent responding during the surveys.

### **Future Research**

Future studies should include parents who have just received an ASD diagnosis for their child and who have not been exposed to evidence based practice. Another area of research that should be considered is sampling a population that has no experience with an ASD diagnosis.

In summary, the findings in the current study suggest that maybe there is enough information in the media provided by entities such as Autism Speaks and Autism Society to protect parents in choosing against fad treatments. Future treatments for autism needs to empirically supported before being widely circulated. ABA therapy has been shown to be an effective treatment for use with this population. Fad treatments can be dangerous because they have no database of quality research showing that they are effective in causing any positive change.

Table 1

*Interventions and descriptions*

Applied Behavior Analysis	A science based on behavioral principles that are used to systematically change behavior.
Speech Therapy	A licensed Speech Pathologist helps to improve a child's communication skills to allow him/her to better express his needs and wants.
Occupational Therapy	Often used as a treatment for sensory integration issues. An OT can teach skills that involve fine motor movements, such as dressing, cutting with scissors, and writing
Chelation therapy	Chelation involves administering chemicals aimed to bind to heavy metals and eliminating them from the body
Hyperbaric oxygen therapy	Involves spending time in a pressurized chamber while breathing pure oxygen
Gluten-free/Casein-free diet	A gluten free diet excludes proteins found in wheat; casein-free diets exclude milk products.



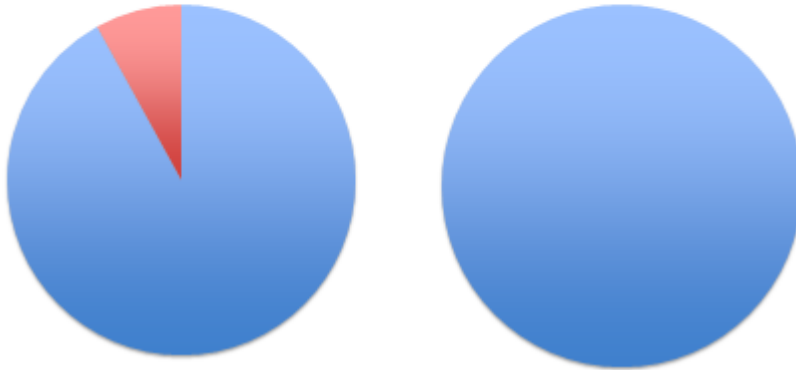
<b>NOW</b>	<b>1 WEEK</b>
<b>\$1,000</b>	<b>\$1,000</b>

*Figure 1.* Displays Delay Discounting survey where participants are offered a choice between gaining \$1,000 now or \$1,000 in a week.

# 100% Chance of your child improving

A treatment that has been recommended by a celebrity that costs \$920/month

A treatment that has been recommended by a professional in the field that costs \$1,000/month



*Figure 2. Probability Discounting Survey*

Table 2

*Indifference Points at Each Delay and Areas under the Curve (AUC) for Participants*

Professionals	1 week	2 weeks	4 weeks	12 weeks	24 weeks	52 weeks	156 weeks	520 weeks	AUC
Pro1	10	10	10	10	10	10	10	10	0.01
Pro2	10	10	10	10	10	10	10	10	0.01
Pro3	10	10	10	10	10	10	10	10	0.01
Pro4	10	10	10	10	10	10	10	10	0.01
Pro5	10	10	10	10	10	10	10	10	0.01
Pro6	10	10	10	10	10	10	10	10	0.01
Pro7	10	10	10	10	10	10	10	10	0.01
Pro8	10	10	10	10	10	10	10	10	0.01
Pro9	10	1000	1000	1000	10	10	10	10	0.042
Pro10	10	10	10	10	10	10	10	10	0.01
Pro11	10	10	10	10	10	10	10	10	0.01
Pro12	10	10	10	10	10	10	10	10	0.01
Pro13	10	10	10	10	10	1000	1000	1000	0.928
Pro14	750	150	10	10	10	10	10	10	0.011
Pro15	500	80	10	10	10	10	10	10	0.011
Pro16	960								
Pro17									
Pro18	800	550	10	10	10	10	10	10	0.012
Parents									
P1	550	300	80	10	10	10	10	10	0.012
P2	500	80	10	10	10	10	10	10	0.011
P3	800	50	10	10	10	10	10	10	0.011
P4	1000	10	10	10	10	10	10	10	0.011
P5									

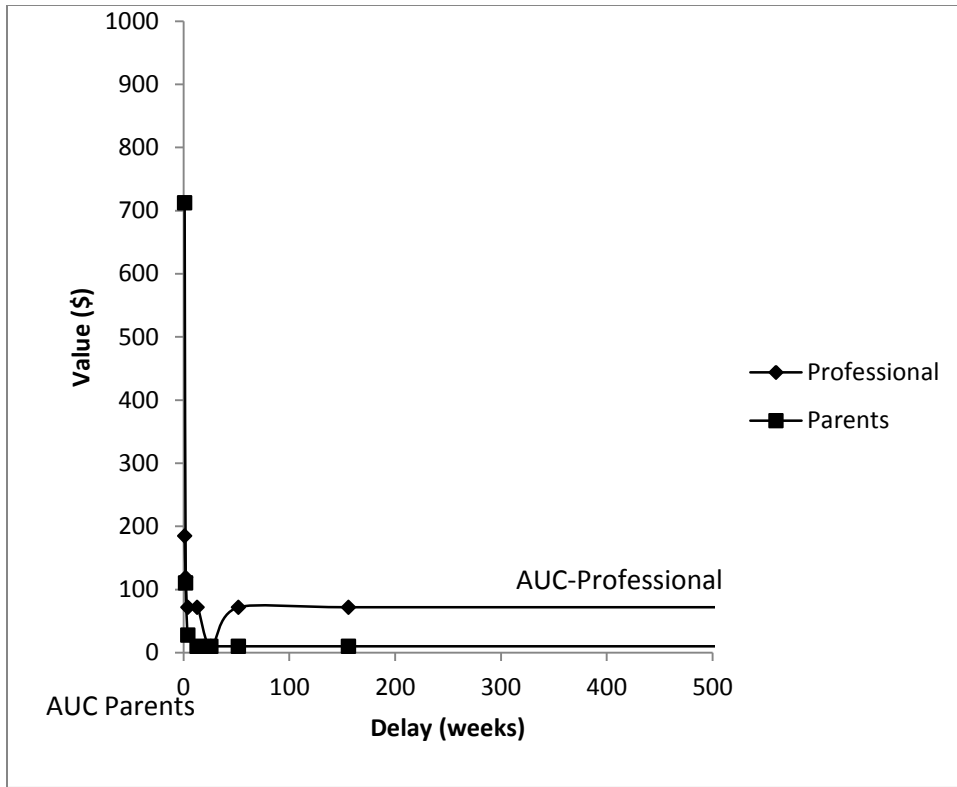


Figure 3. Data points show the means of the indifference points during delay discounting.

Table 3

*Indifference Points at Each Probability Discount and Areas under the Curve (AUC)*

Group Name	1	0.75	0.5	0.25	AUC
P1	\$550	\$10	\$10	\$10	0.44
P2					
P3				\$550	0.91
P4					
P5					
Pro1					
Pro2			\$960	\$10	3.2
Pro3					
Pro4					
Pro5					
Pro6	\$550	\$750	\$750	\$920	6.4
Pro7					
Pro8			\$750	\$800	3.83
Pro9					
Pro10	\$150	\$150	\$150	\$150	1.25
Pro11					
Pro12					
Pro13					
Pro14					
Pro15		750	960	1000	6.86
Pro16					
Pro17	\$500	\$500	\$650	\$920	5.36
Pro18				450	0.75

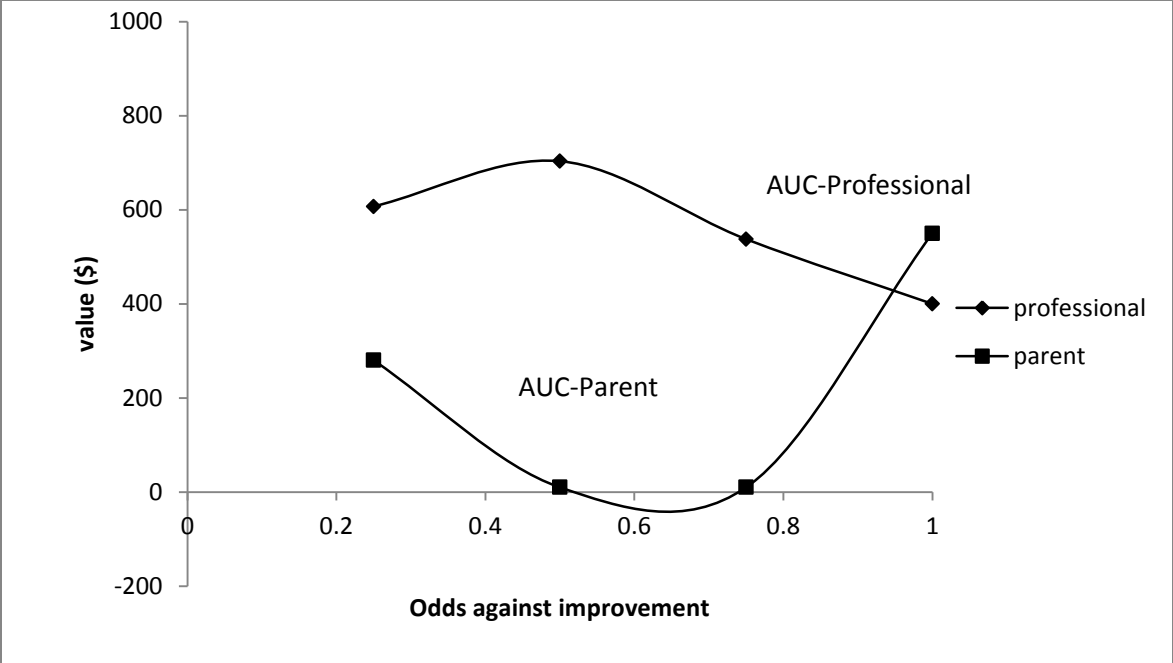


Figure 4. Indifference curves for participants during probability discounting.

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