Reinforcements as an intervention in children with bipolar disorder

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REINFORCEMENTS AS AN INTERVENTION IN
CHILDREN WITH BIPOLAR DISORDER

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ABSTRACT

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The purpose of this study was to test social and token reinforcements as an intervention to help eliminate behavior problems that are common in children with Bipolar Disorder. The subject was a six-year-old Caucasian boy diagnosed as bipolar. The experiment was performed during eight non-consecutive group therapy sessions. It was hypothesized that there would be a significant difference in behavior from the baseline measures as compared to post-reinforcement measures. The hypothesis was proven wrong however, because results show the baseline and post-reinforcement measures were almost identical. It was concluded that although the results were not significant, the data shows there was a significant amount of positive change in behavior. Since the reinforcers were not implemented long enough to create any lasting effects, once the use of the reinforcements was ceased, behavior returned to the baseline level.
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I would like to thank Charlie for putting up with me and helping me do this thesis.

Without you I'd still be trying to find a topic.
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Chapter One

Need

In the area of childhood psychological disorders a great deal of attention has been focused on Oppositional-Defiant Disorder, Anxiety Disorders and Attention Deficit Disorder. More recently, Bipolar Disorder in children has been getting a lot of attention but relatively little is known about the disorder in children. Bipolar Disorder is, however, starting to be understood more completely and diagnosed more regularly in children. Bipolar Disorder is a disorder in which a person alternates frequently between two different states of mood, either overly elated or irritable (considered mania) or sad and hopeless (considered depressed), with relatively normal feelings and behavior in between.

In children, the disorder appears to manifest itself in more rapid shifts in mood, sometimes in minutes or hours or in response to environmental and social conditions such as not getting one’s way, being disappointed in some way or being pleased by some positive or desired outcome or situation. For instance, a Bipolar child may throw a severe tantrum or become very depressed if he or she does not get his way but then become immediately elated if given into. Though this is also true of typical kids or kids with other disorders, in children with Bipolar Disorder these moods are much more exaggerated and can be manifested by such behaviors as kicking holes in walls.
This study focuses on childhood Bipolar Disorder and two different reinforcing techniques that will be tested in order to determine how reinforcements work for this type of child for specific targeted behaviors.

Since a child with Bipolar Disorder often tunes adults out, resists following directions and tantrums when not getting their way or when frustrated, these behaviors will be selected as the targeted behaviors which will be focused upon. These behaviors, if not corrected, will create major adjustment problems for a child in the future. Two types of reinforcers will be implemented in order to assess their effectiveness in eliminating or changing the subject’s behaviors. One will be a social reinforcement and the other a token reinforcement. In examining if these reinforcers are effective, it could assist in choosing more effective treatment alternatives for this population. Future research projects could then examine to see if other populations respond in the same way.

Purpose

The main purpose of this experiment is to ascertain if the reinforcers will work to help eliminate some of the behavior problems that are common in a child with Bipolar Disorder. By examining this issue, it could assist not only parents, but also therapists and teachers as well to control these children when they start to lose control or resist direction.
**Hypothesis**

As mentioned above, two reinforcers will be used at different times to measure their effectiveness in eliminating some common behavior problems manifested by Bipolar children. This researcher hypothesizes the independent variables, (the reinforcements) will create a significant difference in behavior (the dependent variable) between the results taken at the baseline as compared to results taken post-reinforcement. In social reinforcement, the positive encouragement is very important in giving immediate reinforcement to the child, something that is crucial in enforcing positive behavior. In token reinforcement, it is known that children love to work towards things, and though they do not get the final prize immediately, this type of reinforcer would appear to them to be a double treat. By getting the token first and then the reward received by trading in the tokens, the child is, in essence, being reinforced twice, resulting in a more positive behavior change.

**Theory**

Bipolar Disorder is a disorder that effects close to two million people. As stated above, it is most commonly characterized by a person switching back and forth between two extreme moods, mania and depression. Research has until now claimed that Bipolar Disorder is not normally diagnosed until adolescence or early adulthood, yet current reports speculate that this disorder can be diagnosed much earlier and can often be misdiagnosed as something similar, such as Aspergers or ADHD. Bipolar Disorder is a
lifelong problem, and because of the attention it has been receiving from the medical community and the media world, more and more is being learned everyday.

According to the Mental Health Channel (2004), in the early 1900s, the German psychiatrist Emil Kraeplin was the first to formally describe Bipolar Disorder. He used the term "manic depressive" to explain how mania and depression both affect the patient. His work in the early 20th century led to advancements in classifying, treating, and predicting the course of mental illness, which ushered in the formal discipline of psychiatry.

Doctors and researchers don't know exactly what causes Bipolar Disorder. Research indicates that Bipolar Disorder has some genetic links and can be brought on by stress in people predisposed to the condition. A variety of biologic, genetic and environmental factors seem to be involved in causing and triggering episodes of this illness including drug abuse and stressful or psychologically traumatic events. A person diagnosed may vacillate between the two different types of moods, or in the case of children, anger or calmness very quickly. Though often some type of stressful event triggers it, other times it appears as though it were trigged by nothing at all.

According to the MayoClinic (2004) “Evidence indicates that differences in the chemical messengers between nerve cells in the brain (neurotransmitters) occur in people who have Bipolar Disorder. In many cases people with Bipolar Disorder may have a genetic disposition for the disorder. The abnormality may be in genes that regulate neurotransmitters.”

When symptoms of Bipolar Disorder first appear, it is often misdiagnosed as simply depression, or in children, as an Oppositional type of problem. In these children,
the behavior problems are the main focus during therapy. These children have a very
difficult time listening and following directions, responding and cooperating when talked
to, and have a very low frustration tolerance. They tend to exaggerate their responses to
minor inconveniences and disappointments and as a result throw frequent and intense
temper tantrums.

In adults, Bipolar is often characterized by an alternating pattern of emotional
highs (mania) and lows (depression). Common features seen in an adults during the
manic mood are feelings of euphoria, extreme optimism and inflated self-esteem, rapid
speech, racing thoughts, agitation and increased physical activity, poor judgment,
recklessness or taking chances not normally taken, difficulty sleeping, tendency to be
easily distracted, inability to concentrate, and extreme irritability. Common signs of the
depressed mood include, persistent feelings of sadness, anxiety, guilt or hopelessness,
disturbances in sleep and appetite, fatigue and loss of interest in daily activities, difficulty
in concentrating, and recurring thoughts of suicide.

In children, as stated above, the features are usually not as extreme and appear in
rapid succession. They tend to be so similar to those features of ADHD and Opposition
Defiant Disorder that often times they are given as a differential diagnosis.

Definitions

Bipolar Disorder- A psychiatric disorder marked by alternating episodes of mania and
depression. Also called Bipolar illness or manic-depressive illness. In children, mood
swings can include extreme responses to disappointment or adult direction accompanied by exaggerated anger, tantruming or rage.

**Reinforcement**- An environmental consequence that increases the probability that a behavior will occur.

**Social Reinforcement**- a reinforcement that is verbal or interpersonal in nature, such as touch or affection.

**Token Reinforcement**- reinforcement that uses a tangible item such as a coupon or trinket that might also be traded in for a larger tangible item such as a toy. In some cases the token can also be exchanged for privileges.

**Assumptions**

It is important to remember that throughout this experiment, there is only one subject being tested, which is significant for a number of reasons. First, an experiment that only uses one subject specifically chosen by this researcher does not allow for the random feature that most experiments require, such as varying geographic locations. It is reasonable, however, to assume that even though they were not chosen at random, this child is an adequate sampling of children with Bipolar Disorder.

Second, it is important to assume that this child has no personal circumstances that separate him from other children diagnosed with Bipolar Disorder, such as family problems, etc.
Third, because this experiment is occurring during group therapy sessions which include three other boys, it is important to assume that the subject's change in behavior is a result purely of the reinforcements, and not as a result of the subject attempting to "outdo" the other members of the group by gaining more reinforcements than them.

Lastly, we must also assume that this subject is typical of children this age who are diagnosed with Bipolar Disorder and that his reactions to the different reinforcers would also be typical of any and all children diagnosed with this disorder at this age.

Limitations

One obvious limitation in this experiment is the extremely small sample size. With any experiment, the more subjects that are involved increases the chance that the final results can be generalized to other subjects and groups. Results from a small sample may not be representative of a larger population or group. However, case studies can also lead to effective strategies, stimulate further research, and in the case of this study, show promise with other similar subjects.

Another possible limitation is that the child will be coming from a white, middle class background, and children of other ethnic, socioeconomic or racially different background may not respond in similar ways.

These limitations will not necessarily create insignificant or unreliable data, but ultimately, more studies would need to be performed with a larger, more divergent sample to help clarify and further validate the results.
Summary

Chapter Two will be reviewing the research pertaining to the topic of Bipolar Disorder, its history and characteristics. Chapter Three will discuss the actual experiment that is proposed in this paper. In Chapter Four, the results and data collected during the experiment will be recorded. Chapter Five will discuss the experiment's results and any implications of the study.
Chapter Two

This chapter discusses the topic of Bipolar Disorder. Included are many journal articles written on the countless facets of the disorder and a comparison of Bipolar Disorder and other, more well known, disorders. This chapter goes into detail on the two different types of reinforcements that were implemented during this experiment. Studies that have been done testing the effectiveness of each of the techniques were researched, explained, and compared to the current experiment.

Bipolar Disorder

In the past it was believed that only adults were affected by Bipolar Disorder, but we now know that children are also affected by this debilitating disorder. Bipolar Disorder in children has become alarmingly more common, if not particularly well understood. Studies indicate that “up to 16% of youth in child psychiatry clinics may have Bipolar Disorder” (Wilens et al, 2003), however “it is suspected that a significant number of children diagnosed in the United States with ADHD (Attention Deficit Hyperactivity Disorder) have early-onset Bipolar Disorder instead of, or along with, ADHD” (CABF, 2000-2002). Concurrently, the American Academy of Child and Adolescent Psychiatry says “up to one-third of the 3.4 million children and adolescents
with depression in the United States may actually be experiencing the early onset of Bipolar Disorder” (CABF, 2000-2002).

Current research shows, and it is crucial to mention, that the Bipolar affecting children is significantly different from that which affects adults. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM IV-TR) there are six different variations of Bipolar Disorder, each defined by varying combinations of mood strength and frequency of mood shift. (American Psychiatric Association 1994).

“Bipolar Disorder in adults is most commonly characterized by recurrent episodes of depression (extreme sadness or irritability accompanied by low energy) and mania (persistent states of extreme elation or agitation accompanied by high energy)” (Holt, et al, 2002) (CABF, 2000-2002). However characterizing Bipolar Disorder in children is far more difficult. Some key symptoms and corresponding age range, according to Thatcher (2003) are:

- 0–6 years: crying, overacting, demanding
- 7-10 years: irritable mood, social sensitivity
- 11-23 years: Mood changes and increase (or decrease) in activity
- 13-15 years: primary symptoms emerge: decreased sleep, excessive behaviors

The main key is that the child’s behavior is episodic in nature. (Thatcher, 2003).

Symptoms of children with Bipolar Disorder tend to be mixed, manifesting in both depressive and manic behaviors at the same time or in rapidly fluctuating moods. Bipolar children are prone to intensely angry and sometimes physical outbursts, “switching from a calm demeanor to absolute fury in a matter of seconds” (Schlozman,
In addition to a general level of irritability, "children with mania also present with extremely impairing dysphoric, explosive episodes that generally occur daily with little or no precipitant. These explosions can last up to an hour or longer and may involve destruction of property such as kicking holes in walls and throwing and breaking household items. During these rages, children are hard to calm and often lash out physically at those around them. Swearing and hostile comments are also common" (Wilens et al, 2003). "Descriptions of euphoric moods are generally elicited by inquiring for giddy, goofy, hyperexcited, silly states with laughing fits" (Wilens et al, 2003). Other symptoms of mania may include decreased need for sleep, grandiose delusions, excessive involvement in pleasurable but risky activities, poor judgment, racing speech and pressure to keep talking, and in severe cases, hallucinations (CABF, 2000-2002). The DSM-IV still requires that, for a diagnosis of Bipolar Disorder, adult criteria must be met. This makes the diagnosing of children much more difficult and illustrates the importance of learning what the warning signs of childhood Bipolar Disorder are.

Though there is currently no brain scan or blood test to help diagnose Bipolar Disorder (CABF, 2000-2002), neurologically there is evidence of Bipolar Disorder on the brain. When magnetic resonance imaging scans (MRI scans) have been conducted on children with Bipolar Disorder, there was found to be an increased occurrence of deep white matter on the brain. "In tests performed, the MRI scan results showed white matter hyperintensities in 67% of the Bipolar Disorder group, 37% of the schizophrenia group and 31% of the healthy comparison group, showing a statistic increase of white matter on the brains of those children diagnosed with Bipolar Disorder as compared with the schizophrenic and healthy children" (Wagner, 2003). There is also a theory that "initial
periods of cycling may begin with an environmental stressor, but if cycles continue to occur unchecked the brain may become 'kindled' or sensitized" (Thatcher, 2003). In other words, pathways inside the central nervous system become reinforced and future episodes of depression or mania will occur independent of outside stimulus with increasing frequency and intensity (Thatcher, 2003). In addition, differences were found when looking at pediatric MRI results in children with Bipolar Disorder and those children without it. These children tend to have smaller total cerebral volume, smaller total thalamus, smaller total hippocampus (resulting in trouble gating out stimulus and memory problems), there is a right sided amygdala cleft, inferior lateral ventricle, with a larger right side and a reversal of normal asymmetry (Thatcher, 2003).

Genetics, though not the only influencing factor in the forming of Bipolar Disorder, do play a primary role in the illness. According to the Child and Adolescent Bipolar Foundation (CABF):

- For the general population, a conservative estimate of an individual’s risk of having full-blown Bipolar Disorder is 1 percent. Disorders in the Bipolar spectrum may affect 4-6%.
- When one parent has Bipolar Disorder, the risk to each child is 15-30%.
- When both parents have Bipolar Disorder, the risk increases to 50-75%.
- The risk in siblings and fraternal twins in 15-25%.
- The risk in identical twins is approximately 70%.

There is also a higher incidence and an earlier age of onset of Bipolar Disorder and depression in every generation since World War II. On average, children with Bipolar
Disorder experience their first episode of illness 10 years earlier than their parents' generation did. The reason for this is unknown (CABF, 2000-2002).

Parents with children who have been diagnosed with Bipolar Disorder report that their children seemed different since early infancy. Some describe difficulty settling their babies, and they note their children as being “easily over-responsive to sensory stimulation” (NAMI, 2003). Sleep disturbances and night terrors are also commonly reported (NAMI, 2003).

Bipolar Disorder very rarely occurs in children by itself. Often, it can be accompanied by or misdiagnosed as a number of other symptoms and disorders, including Attention-Deficit-Hyperactivity-Disorder (ADHD), Oppositional-defiant disorder, Paranoid Schizophrenia, Depression, Catatonia, Conduct Disorder and Obsessive-Compulsive Disorder (OCD) (Wilens et al, 2003), (NASI, 2003), (Bleiberg, 1991).

**Bipolar Disorder and ADHD**

An estimated 50 to 80 percent of those children diagnosed with Bipolar Disorder have ADHD as a co-occurring diagnosis. Several studies have reported that more than 80 percent of children who go on to develop childhood-onset Bipolar Disorder have five or more of the primary symptoms of ADHD. Those symptoms include: distractibility, lack of attention to details, difficulty following through on tasks or instructions, motor restlessness, difficulty waiting one's turn, and interrupting others. “Very often Bipolar
Disorder is mistakenly diagnosed for ADHD because of the similarities in symptoms, and it may result from the fact that ADHD often appears before a clear development of the frequent alternating mood swings and prolonged temped tantrums that are associated with childhood Bipolar Disorder” (NAMI, 2003).

Some studies also claim that ADHD and Bipolar Disorder may be genetically linked. The Harvard Mental Health Letter (1997) states that, “children of Bipolar patients have a higher than average rate of ADHD.” They continue, stating, “Relatives of children with ADHD have twice the average rate of Bipolar Disorder, and when they have a high rate of Bipolar Disorder (especially the childhood onset type), the child is at high risk for developing Bipolar Disorder. ADHD is also unusually common in adult patients with Bipolar Disorder.”

Though ADHD and Bipolar Disorder share many of the same symptoms, the intentions of the child appear to derive from different places. In those children with Bipolar Disorder, the common destructiveness and misbehavior appears to be more intentional as compared to those children with ADHD whose actions appear to be simply a result of carelessness or inattention (NAMI, 2003). Similarly, the outburst and temper tantrums that are frequently experienced in both types of children appear to be activated by sensory and emotional overstimulation in those children with ADHD, whereas in Bipolar children limit setting, or simply being told “No” can cause it. (NAMI, 2003).
Bipolar Disorder and other mental illnesses

Sometimes severe manic or depressive episodes with psychotic features are often diagnosed as schizophrenia. This diagnosis is not very surprising to some, being that extreme flight of ideas, a characteristic common to children with Bipolar Disorder, "appears as incoherent thinking or looseness of associations" (Bleiberg, 1991). Also, "severe psychomotor retardation may resemble catatonia, while anger, suspicion, and irritability are mistaken for paranoid schizophrenia" (Bleiberg, 1991). Another misconception is that of Bipolar children "showing signs of chronic dysthymia or cyclothymia, with or without substance abuse" (Bleiberg, 1991). These children show evidence of "promiscuity, moodiness, grandiosity, pervasive patterns of affective instability, inappropriate and intense anger, and reckless spending. Such behavior invites a diagnosis of borderline or narcissistic personality disorder" (Bleiberg, 1991).

Correct treatment of childhood-onset Bipolar Disorder is still a hot topic in the medical world and largely debated. It is well known that pharmacotherapy is the primary form of treatment in helping to stabilize the rapid switching of moods and in controlling some previously uncontrollable behavior. Though still not heavily investigated for children and adolescents with Bipolar Disorder, some studies show the relationship of "negative expressed emotion to poorer outcome among Bipolar adults" (Geller et al, 1997). It is from these studies that the medical world is becoming more aware of the importance of psychotherapy and it's assisting in bringing these children with Bipolar Disease to the path of self-control and a more typical lifestyle.
Reinforcements

A reinforcer is “an environmental consequence that occurs after an organism has produced a response a makes the response more likely to recur” (Westen, 1999). There are many different types of reinforcers, all of which help to better modify a specifically targeted behavior. Two distinguished types of reinforcements are positive and negative.

Positive reinforcement is “the process whereby presentation of a stimulus (a reward or payoff) after a behavior makes the behavior more likely to occur again” (Westen, 1999). For example, a child who performs a specific behavior, and is then positively reinforced by either social praise or a treat, will then be more likely to repeat that behavior. In contrast, negative reinforcement is “the process whereby termination of an aversive stimulus makes a behavior more likely to occur” (Westen, 1999). In other words, positive reinforcers are “environmental consequences that, when presented, strengthen the probability that a response will recur,” (Westen, 1999) whereas negative reinforcers are “aversive or unpleasant stimuli that strengthen a behavior by their removal” (Westen, 1999). The focus of this experiment will be on positive reinforcements.

There are many different types of positive reinforcements, all which can have any number of effects on children and their behavior. Just as each child and situation varies, so does the use of different types of reinforcements. Not all reinforcements will work on all children, and it is important to understand what the child’s needs and problems are before attempting to help change that behavior. The two different types of reinforcements that were used in this specific experiment were social reinforcements and token reinforcements.
Social Reinforcement

Social reinforcements, as used in this experiment, were reinforcers that were verbal or interpersonal in nature, such as touch or affection. In this case it is important to note that social reinforcements do not include any concrete reinforcers such as objects or privileges. Social reinforcements are used very often in behavior modification, and many studies have been performed testing the effectiveness of social reinforcement.

One such study found in the Journal of Psychology, “Mediating Effects of Material Payment, Social Reinforcement, and Familiarity on Foot-in-the-Door Phenomena in Thailand” (Stimpson et al, 1987) was an experiment performed in Thailand to test which of three methods of reinforcement would have more of an effect on the Foot-in-the-Door (FITD) phenomena. The FITD technique refers to a “social influence process involving the elicitation of compliance to a minor request with the consequent enhancement of later compliance to a stronger request.” (Stimpson et al, 1987). In other words, the FITD phenomena measures the amount of a subject’s compliance to a requested behavior from a stranger based on a previous encounter with that same stranger. This experiment measured compliance based on three different types of reinforcements: Material Payment, Social Reinforcement, and No-Social Reinforcement.

In this experiment by Stimpson & Waranusuntikule (1987), 140 female students, ranging in age from 18-25 years, in a teacher’s college in Thailand, were randomly preassigned to one of nine conditions with 15 subjects in each experimental condition. The procedure was one where subjects were approached by an experimenter who introduced him or herself as someone who was working as volunteer for a specific club.
They told the subjects they were looking for students to fill out surveys on a specific idea, and asked if they would help. If the subject agreed they were given a survey. It was then that the different conditions were implemented.

Subjects in the material payment condition were told they would be receiving a pen for filling out the survey. Subjects in the social reinforcement condition received positive social reinforcements, such as smiles, eye contact, and verbal responses such as “thank you very much, you are so cooperative” (Stimpson et al, 1987). Subjects in the no-social-reinforcement condition received neither eye contact nor any social reinforcement, such as smiles or verbal response. The experimenter simply took the survey and walked away.

The experiment then continued 3 or 4 days later with those same subjects being approached again by either the same or different experimenters (to manipulate the familiarity variable). The experimenter would then introduce themselves, state their organization, and inform the subjects that they are looking for volunteers to help plant trees with them. If the subject agreed, they were asked how many trees they would like to plant.

The results of this experiment came out positive for the effects of social reinforcement as a significant variable for the FITD phenomenon in Thai society. According to the article, these results are consistent with those found in similar experiments performed in the United States. Additionally, social reinforcement has an effect on both verbal and behavioral compliance, however this is a result not widely researched (Stimpson et al, 1987). The other two variables, material reinforcement and familiarity had no significant effect on either verbal or behavioral compliance. This helps
to show that social reinforcements have a large effect on a person’s actions and opinions, whether in the United States or other countries around the world. Being praised is a universal enjoyment and as shown from this experiment those who are praised, whether verbally or otherwise, are more willing to help others and themselves.

Token Reinforcement

Another method of reinforcement is the token reinforcement, or token economy. A token reinforcement is one that uses a tangible item such as a coupon or trinket that might also be traded in for a larger tangible item such as a toy. In some cases the token can also be exchanged for privileges. Token reinforcements are used in a wide array of situations, however its main goal, in most occasions, is to help reduce the occurrence of a specific behavior. Many studies have been done testing the effects of token reinforcements, and comparing the token reinforcement to other types.

In “Token Reinforcement in a Pakistani Classroom,” from the Journal of Social Psychology (Oct. 1982), experimenters went into a classroom in a Pakistani school and tested the token reinforcement on 32 students in the second grade. They were looking to test the effects of this type of reinforcement on three different behavior problems: the rate of speaking out without permission, physical contact with other students, and leaving seats without the teacher’s consent (Saigh et al, 1982). Though the experiment was not on any type of child specifically, it is important to recognize that all three of the behavior problems are those that would be found in children with Bipolar Disorder, leading to the
belief that the results found from this experiment could yield the same results if tested on children diagnosed with Bipolar Disorder. Three different types of reinforcements were used. The children were baselined during a five-day period followed by ten days of the behavior modification technique.

The results of the experiment strongly suggest that the token reinforcement phase was effective in reducing the baseline rate of disruption for each of the target behaviors (Saigh et al, 1982). Additionally, significantly lower rates of talking out and physical contact which were observed under the ‘removal of contingencies phase’ as compared to the ‘baseline phase’ imply that the students may have learned to behave in an appropriate way without the aid of external motivations (Saigh et al, 1982). This article helps to demonstrate the potential effectiveness of token reinforcements as a behavior modification tool in children with Bipolar Disorder.

A common misconception is that a reinforcer is simply bribing the child to do what is requested or expected. However, as stated in an Intervention Tip Sheet on Positive Reinforcement: a proactive intervention for the classroom, authored by Kareen Smith of the Institute on Community Integration, “a bribe is something which is unacceptable or inappropriate (and illegal). Reinforcement is given to bring about desirable change and to teach students to take responsibility for behavior” (Smith). Smith offers intervention guidelines to help make positive reinforcement effective. Some ideas include that: 1) The reinforcement should be consistently delivered according to a planned reinforcement schedule; 2) The reinforcement should be delivered immediately followed the desired response; 3) Improvement should be reinforced. Do not wait for perfection, but instead recognize any improvement made; 4) You should not give
reinforcement because you feel sorry for a student. It will only teach the child that rewards are unrelated to behavior. Reinforcement must be contingent on behavior; 5) No matter what type of reinforcement technique being used, it is best to pair it with a social reinforcement; 6) Keep the social reinforcements clear, sincere, and easily identified to the specific behavior for which they are being delivered; 7) Reinforcements should be age-appropriate. Giving a reward is useless if it is of no interest to the subject. (Smith)

Another article written on reinforcements by Newby and Fischer (1991) outlines and discusses programs from clinical literature that deals with parent training for families of children with ADHD. It is important to remember that Bipolar Disorder is very closely related to ADHD, and it is therefore safe to assume the results found for those children with ADHD could resemble those found in children with Bipolar Disorder. In this article, they state, “concrete, predictable rewards can exert among the most powerful and immediate influences on the behavior of children with ADHD. Many children with ADHD thrive on token systems because parents give immediate concrete rewards, before the child’s short attention span and problems delaying gratification interfere” (Newby & Fischer, 1991). Though research has found that both social and token reinforcements help in behavior modification, it is this article that helps support the hypothesis of the current experiment.

Summary

Overall, many studies have helped this experimenter gain further insight on the topic of Bipolar Disorder, it’s manifestations and characteristics, and on the two different types of positive reinforcement that will be used during this experiment. According to
the research, both forms of reinforcement have the capability of helping to control behaviors. The results found in this experiment will assist in deciding if the reinforcers do in fact have an effect on modifying behaviors of a child with Bipolar Disorder.
Chapter Three

Subject

The subject used in this experiment was a healthy six-year-old Caucasian male. He lived with his biological parents in Southern New Jersey and was the younger of two children. He was raised in middle to upper class environment. He came to therapy with the therapist because of some severe behavioral problems. In the two years prior to therapy he had been removed from two preschools as a result of behavioral problems. He was initially given the diagnosis of Attention Deficit Hyperactivity Disorder, however after a few therapeutic sessions with the therapist the diagnosis was changed to Bipolar Disorder.

Procedures

This experiment took place over eight group therapy sessions consisting of the subject and three other boys of the same age with similar behavioral problems. So to not jeopardize the therapeutic process for the other members of the group the therapist used these reinforcements for everyone, however only took data on the subject being tested.

To begin the experiment, the therapist took a two baseline measures on the behaviors of the subject prior to implementing the reinforcements. This was done over two 50-minute group sessions. The therapist gave the subject one directive every five
minutes, noting if there was an immediate response (within 10 seconds) and then again 30 seconds later to see if he was still on task (if applicable) (see Appendix B). The therapist circled either a YES or NO depending on the response of the subject.

Over the next two sessions the therapist began implementing the first of two reinforcements, the social reinforcement. This was measured in the exact same way as the baseline however if the directive was followed with a positive response from the subject, the therapist supplied one of three following positive social reinforcements: “Very good!,” “Excellent!,” or “Well Done!”

Because of limited time and a missed session from the subject, the therapist was unable to baseline the subject again between the reinforcements. As a result, the therapist made those two weeks of no data taking the required time needed to help eradicate the behavior changes that were created from the social reinforcements. This researcher feels that is adequate time to have extinguished the social reinforcement’s effects.

In the two sessions following the two week break, the therapist began implementing the second of the two reinforcements, the token reinforcement. The therapist did this using an object he knew the subject and other members would respond to: mini matchbox cars. He explained to the group at the beginning of the sessions that each time they individually did something good that child will receive a popsicle stick. He explained that ten minutes prior to the end of the session, depending on how many sticks they had received they would be able to trade them in for a brand new car.

During that session, to keep the experiment consistent, the therapist gave the subject the same 10 directives given in the social reinforcement phase. Each time the subject followed the command, without speaking the therapist handed the subject a single
popsicle stick. This continued throughout the session, and with ten minutes left, the therapist, together with the subject, counted how many sticks he had received throughout the session. The therapist than gave the subject the toy he promised.

During the next two sessions with the subject, the therapist ceased the use of the positive reinforcement and in the same manner as throughout the experiment, gave 10 directives over a 50-minute group therapy session and recorded the results.

The therapist and this researcher then reviewed all the data inquiring whether the reinforcements worked to improve the behaviors from the baseline results as compared to the post-reinforcement baseline results.

**Hypothesis**

Null Hypothesis (H₀) - There was no significant difference in behavior between the results taken at the baseline, as compared to results taken post-reinforcement.

Alternate Hypothesis (H₁) - There was a significant difference in behavior between the results taken at the baseline, as compared to results taken post-reinforcement.

**Design**

This experiment was a single-subject design.
Analysis

In doing the applied behavior analysis of the results, this researcher used a two-way analysis of variance (ANOVA) for repeated measures. The experiment was a within-subject design of study and the data was taken repeatedly throughout the experiment, including the baseline and the two sessions post-reinforcement.
Chapter Four

The purpose of this study was to test reinforcements as an intervention to help reduce or eliminate behavior problems in children with Bipolar Disorder. This experiment consisted of one subject who was diagnosed as Bipolar by a licensed clinical therapist. The testing and data collecting occurred in a private practice setting during multiple group therapy sessions with the subject and three other children his age. The following chapter summarizes results obtained from the experiment and compares those results to the hypothesis given prior to the experiment. As stated previously, this researcher hypothesized there would be a significant difference in behavior between the results taken at the baseline, as compared to results taken post-reinforcement.

Findings

After the data was collected it was entered into the computer. For each session (Baseline, Social and Token) and each time limit, (both the w/in 10 seconds and w/in 30 seconds columns), all of the yes’s were added up and changed into a percentage out of 100. Each percentage was entered to compare the results pre-reinforcement with post-reinforcement results. (See Table 4.1)
Table 4.1
Results – Number of YES’s (in Percentages)

<table>
<thead>
<tr>
<th>Test</th>
<th>Base 1</th>
<th>Base 2</th>
<th>Social 1</th>
<th>Social 2</th>
<th>Token 1</th>
<th>Token 2</th>
<th>Base 1</th>
<th>Base 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 sec.</td>
<td>50</td>
<td>40</td>
<td>70</td>
<td>80</td>
<td>100</td>
<td>100</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>30 sec.</td>
<td>20</td>
<td>20</td>
<td>50</td>
<td>60</td>
<td>90</td>
<td>100</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

The test used to interpret the data was a one-way mixed analysis of variance (ANOVA). The results obtained from the data indicate that though the reinforcers created a significant change in behavior over time in the subject tested, there was no difference in the baselines taken pre and post reinforcements (F(8,7) = 41.250, p≤ .0001.)

As Chart 4.1 shows below, these findings failed to reject the null hypothesis that there was no significant difference between the results taken at the baseline and results taken post-reinforcements. Beginning with the first baseline, behavior improved with each subsequent reinforcement and then decreased dramatically during those sessions where the post-reinforcement baseline measures were taken.
Chapter Five

Summary

This experiment tested two types of reinforcements on a 6-year-old boy with Bipolar Disorder. The goal was to measure the two reinforcements' effects on changing specified target behaviors including tuning adults out, resisting following directions and tantrums when not getting their way or when frustrated. The two types of reinforcements were social reinforcement and token economy. The experiment took place over eight non-consecutive weeks of group therapy with the subject and three other boys his age with similar behavior problems.

The data found in this experiment agrees with the research discussed earlier. As found in the experiment by (Saigh et al, 1982), token reinforcement was an extremely effective method to reducing the baseline rate of disruption for each of the target behaviors also found in children with Bipolar Disorder. Additionally, significantly lower rates of talking out and physical contact which were observed under the 'removal of contingencies phase' as compared to the 'baseline phase' imply that the students may have learned to behave in an appropriate way without the aid of external motivations. Therefore, according to research the subjects in the token reinforcement groups should have the most improvement in behavior when comparing results from baseline testing to post-reinforcement testing. A difference, however, is the length of time these reinforcements were supplied. In the study mentioned, the reinforcements were give
over a long period of time, whereas in this study they were only given two times over two weeks. This leads to the conclusion that the length of time the reinforcements are given can greatly influence the reactions of the children.

Another study previously mentioned by Newby and Fischer (1991) wrote about teaching parents how to control their children with ADHD (a disorder closely related to childhood Bipolar Disorder. They stated that, “many children with ADHD thrive on token systems because parents give immediate concrete rewards, before the child’s short attention span and problems delaying gratification interfere” This also concurs with the current study in showing why token reinforcements are the more effective reinforcements for children of this age with this type of disorder.

Although this current experiment was not comparing social reinforcements to token reinforcements, when looking at the data it is evident that the subject reacted better to the token reinforcements. He enjoyed receiving the popsicle sticks each time he did something appropriately. He was looking forward to receiving the toy car at the end of the sessions, but receiving the sticks in between was an excellent way of reinforcing in the moment, which is when the research indicates is a crucial time children need to be reinforced. Letting them know as soon as it happens is a way to teach them exactly what behaviors are appropriate and are required in order to not get into trouble.

In terms of problems with this experiment, it was noted that the therapist was unable to take a baseline measure in between the two reinforcers. Though it is not believed to have had a large impact on this study, this researcher believes that by taking that data it could have improved the experiment and given more information as to possibly which of the two reinforcements worked better to change the subject’s behavior.
As shown in Chart 4.1, the reinforcements had a large positive effect on the subject’s behavior during this experiment. However, post-reinforcement data shows that the behaviors return to the baseline level pre-reinforcement. It is believed this occurred because the reinforcements were only supplied over a two-week period; not enough time to have any lasting effects on a six-year-old. In order to create longitudinal effects, these reinforcements would mostly likely have to be implemented for a longer period of time, and in an environment where the reinforcements would be given daily, as opposed to weekly which is what occurred in this experiment.

Conclusions

Overall, this experiment was successful in that we were able to test the subject on a specific issue and gain valuable data on the effects of the reinforcements on his behavior.

This experiment helped to show that reinforcements do have a positive effect on behavior, however the suspected hypothesis was proven false in that there was no significant change in behaviors when looking at the baseline measures versus post-reinforcement measures. This is believed to have occurred because of the small opportunity for growth with the use of the reinforcements. By only supplying them for two weeks, the subject did not learn the effects of good behavior, and therefore when the reinforcements and rewards were removed, there was no longer anything to work towards and the subject reverted right back to where he began.
It also helped to show, though not statistically, that token reinforcement does have a higher percentage rate of improving behaviors in children with Bipolar Disorder than social reinforcement. The subject enjoyed getting social reinforcement, especially when surrounded by a group of boys his age, but enjoyed physically getting something (the popsicle stick) when doing something good, and then being able to trade them in for something larger. It gave the subject something to work towards and look forward to, and those are all factors that could possibly help a child with this problem attempt to learn to control their behavior in order to gain these positive rewards.

Another interesting conclusion found during this experiment is that these reinforcers worked not only on the subject who had Bipolar Disorder, but also on all of the members of the group who had other behavioral problems. During this experiment it was noted by the therapist that all of the boys were much better behaved, working just as hard as the subject to do well, and looked just as happy to receive not only the popsicle stick and car that was supplied during the token reinforcement, but also the positive reinforcement. Just hearing the words “good job,” or “excellent” was enough to build up their esteem and believe they are doing something right as opposed to always hearing negatives and being scolded for doing something wrong. It is that reason this researcher believes positive social reinforcements are crucial to every child, behavior problems or not. Getting positive reinforcements teaches them that just because they do something wrong sometimes, they are able to make it up and be better the next time.
Implications

For a future study there are a number of things that should be altered. First, as mentioned above, whenever using more than one testing method, it is very important to baseline in between each of them to allow the effects to fade and not sway any data from consecutive measures. In this case, the amount of information received would increased had there been a baseline measure in between the social and token reinforcements.

Also, in a future study it would improve the reliability and validity of the experiment if there was more than one subject tested. Though it was assumed this subject was a typical sample of children with Bipolar, when doing an experiment the more subjects available, the more valid and reliable the study becomes.
Bibliography


22) Smith, Kareen. (No date). Positive Reinforcement... a proactive intervention for the classroom. *Institute on Community Integration, College of Education, University of Minnesota, Minneapolis*.


APPENDIX A
Informed Consent

I hereby agree to allow my child to participate in a study project that is being conducted by psychology graduate student Rachel Agin under the supervision of Dr. Charles Waitz, and her advisor, Dr. Dihoff at Rowan University. The purpose of this study is to evaluate different reinforcement techniques on specific behaviors in children with behavior problems. It is hoped that the information derived from this study will help in the treatment for this type of child in the future. A comparison will be made between social/verbal reinforcements and extrinsic token reinforcements on attending, on-task behavior, and cooperation.

I understand that this study will not effect my child’s treatment time with Dr. Waitz and will incorporate strategies that he might be utilizing in any event, even if the study was not being performed. Dr. Waitz will provide the therapeutic intervention as well as recording instances of behavior change while Ms. Agin observes.

The name of my child will not be used in any way or identified in any written results of the study. Confidentiality, name, and any other identifying information will be protected in any verbal discussion of the results as well.

I fully understand that my child’s participation in this study can be withdrawn at any time.

If I have any questions or problems concerning my participation in this study I may contact Dr. Charles Waitz at 609-953-1222, Dr. Dihoff at 856-256-4500 x3783, or Rachel Agin at 856-985-7557.

Parent’s or Guardian’s Signature(s)
APPENDIX B
1 Directive every five minutes for 50 minutes.
Compliance must be met within 10 seconds of directive.
Check 30 seconds later to see if subject is still on task.

<table>
<thead>
<tr>
<th>Directive 1</th>
<th>Time Given:</th>
<th>Compliance within 10 seconds?</th>
<th>YES / NO</th>
<th>Compliance within 30 seconds?</th>
<th>YES / NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directive 2</td>
<td>Time Given:</td>
<td>Compliance within 10 seconds?</td>
<td>YES / NO</td>
<td>Compliance within 30 seconds?</td>
<td>YES / NO</td>
</tr>
<tr>
<td>Directive 3</td>
<td>Time Given:</td>
<td>Compliance within 10 seconds?</td>
<td>YES / NO</td>
<td>Compliance within 30 seconds?</td>
<td>YES / NO</td>
</tr>
<tr>
<td>Directive 4</td>
<td>Time Given:</td>
<td>Compliance within 10 seconds?</td>
<td>YES / NO</td>
<td>Compliance within 30 seconds?</td>
<td>YES / NO</td>
</tr>
<tr>
<td>Directive 5</td>
<td>Time Given:</td>
<td>Compliance within 10 seconds?</td>
<td>YES / NO</td>
<td>Compliance within 30 seconds?</td>
<td>YES / NO</td>
</tr>
<tr>
<td>Directive 6</td>
<td>Time Given:</td>
<td>Compliance within 10 seconds?</td>
<td>YES / NO</td>
<td>Compliance within 30 seconds?</td>
<td>YES / NO</td>
</tr>
<tr>
<td>Directive 7</td>
<td>Time Given:</td>
<td>Compliance within 10 seconds?</td>
<td>YES / NO</td>
<td>Compliance within 30 seconds?</td>
<td>YES / NO</td>
</tr>
<tr>
<td>Directive 8</td>
<td>Time Given:</td>
<td>Compliance within 10 seconds?</td>
<td>YES / NO</td>
<td>Compliance within 30 seconds?</td>
<td>YES / NO</td>
</tr>
<tr>
<td>Directive 9</td>
<td>Time Given:</td>
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<td>YES / NO</td>
<td>Compliance within 30 seconds?</td>
<td>YES / NO</td>
</tr>
<tr>
<td>Directive 10</td>
<td>Time Given:</td>
<td>Compliance within 10 seconds?</td>
<td>YES / NO</td>
<td>Compliance within 30 seconds?</td>
<td>YES / NO</td>
</tr>
</tbody>
</table>