# The Effect of Modifications to a Token Board-Based Reward System on Motivation and Engagement of Students with ASD when Completing Challenging Activities at School

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Abstract

This study was completed to determine whether modifying the criteria for success using a token board reward system impacted the engagement in challenging academic tasks of two kindergarten students with autism. Engagement in the tasks was presumed to be related to students' interest or stress levels. Ideally, students begin to make the connection between their behavior and the rewards received from the use of the token board. The students in this study, who were 5 and 6 years old, attended a primary school for children with special needs focusing on autism and autism spectrum disorders (ASD). They were monitored to determine whether modifications to their token board demands affected ratings of their behavior (apparent motivation and engagement) and the number of rewards they earned. Modifications involved raising the required number of tokens for rewards from 5 to 8 over a one-week period each. The rewards and criteria were selected to encourage appropriate on-task behavior and were based on the researcher's familiarity with students' levels of stress and frustration during the activities. Mean total verbal prompts given and rewards earned and mean behavior ratings were compared across the 5 and 8 token conditions and across four activities of interest (morning meeting, read aloud, small group one, and small group two). Results indicated that token boards can have positive and negative effects on students' behavior. Results indicated that students earned more rewards when Threats to Validity 5 tokens versus 8 were required on the token boards. They also indicated that the mean incidence of problem behaviors monitored did not differ significantly across the different activities assessed with the exception of elopement, which occurred significantly more often during morning meetings than in literacy small groups. Due to the degree of stress that increasing the number of tokens required appeared to cause, the study was discontinued earlier than planned.

# CHAPTER I

# INTRODUCTION

## Overview

Students with ASD have difficulty dealing with situations that cause them stress which leads usually to anxiety. Communication is many times difficult, especially when they need to express their feelings and needs. Fien and Dunn (2007) state that "the social use of language, is a universal stumbling block for children with ASD" (p. 186). Many strategies have been developed to help students identify techniques that individually allow them to take control over their anxiety and succeed in completing activities independently.

Students with ASD need to learn strategies to assist them in becoming more self-sufficient in regulating their anxiety in various settings. This is important for these students because, as they develop, they will need to have a number of self-regulating skills to be able to handle daily situations.

## Statement of the Problem

This study attempted to provide an intervention to help students self-regulate their feelings of anxiety in a healthy way using a five-point scale to make them more independent.

## Hypotheses

The premise behind these hypotheses is that providing the structure and the concrete incentive of the token board/reward system (described in Chapter III and Appendix A) may help children with ASD succeed at school activities such as small group activities or other academic activities and reduce behaviors associated with anxiety/frustration. In particular, the researcher wanted to know whether adjusting the number of tokens earned affected students' ability to stay

on task during identified activities and, if so, how, in order to help understand and plan for effective instruction for two nonverbal students with ASD.

- The first hypothesis was that the mean total numbers of verbal prompts given when five tokens were required to earn a chosen reward would equal the number given when eight tokens were required to earn a chosen reward.

  *$ho_1$: Mean prompts with 5 tokens = Mean prompts with eight tokens*

- In addition to prompting required, actual success (rewards earned) was of interest. Thus, the mean number of rewards under each token condition was compared.

  *$ho_2$: Mean rewards earned with five tokens = Mean rewards earned with eight tokens*

- Comparisons were also made to determine whether the frequency of the four target behaviors was significantly different across the token conditions.

  *$ho_3$: Mean frequency of eloping with five tokens = Mean frequency of eloping with eight tokens*

  *ho4: Mean frequency of off task behavior with five tokens = Mean frequency of off-task behavior with eight tokens*

  *ho5: Mean frequency of verbal redirection given with five tokens = Mean frequency of verbal redirection with eight tokens*

  *ho6: Mean frequency of physical redirection with five tokens = Mean frequency of physical redirection with eight tokens*

- In order to also understand not only the reaction to the token change but also the impact of school demands on the students' behaviors, descriptive analyses and analyses of variance were computed to compare the frequency of prompts and rewards and of the

four behaviors tracked across the three types of sessions monitored (morning meeting, literacy small group, and read aloud).

- *$ho_7$: Mean prompts morning meeting = Mean prompts literacy small group = Mean prompts read aloud*
- *$Ho_8$: Mean rewards morning meeting = Mean rewards literacy small group = Mean rewards read aloud*
- *Ho9: Mean eloping morning meeting = Mean eloping literacy small group = Mean eloping read aloud*
- *Ho10: Mean off-task morning meeting = Mean off-task literacy small group= Mean off-task read aloud*
- *Ho11: Mean verbal redirection morning meeting = Mean verbal redirection literacy small group = Mean verbal redirection read aloud*
- *ho12: Mean physical redirection morning meeting = Mean physical redirection Literacy small group = Mean physical redirection read aloud*

**Operational Definitions**

The independent variable in this study was required number of tokens needed to earn rewards in the token board/reward system. In one condition, five tokens were required to earn a reward. In the second, eight tokens were required to earn each reward.

*Token boards* are a visual reward system which allows an individual to clearly see what he/she will receive after completing a certain amount of work. This encourages individuals' participation and good behavior. The token boards used in this study were made by the classroom teacher. Each board was designed specifically for the child who would be using it. The boards had Velcro on them to hold the tokens as students earned them during the specific

activities focused on in the study. The token boards are intended to help students easily transition throughout their day from home to school by decreasing the anxiety and stress students with ASD may develop in certain situations.

The dependent variables were the participants' engagement (measured by behavior ratings), the number of rewards earned each session, and the number of verbal prompts required by staff to assist students in successful task completion. Also measured to see whether they related to the tokens required or type of session were the frequency of elopement, off-task behavior, and the number of verbal and physical redirections needed to keep the students on task. The two students in this study have token board usage as part of their IEP. The purpose of the token boards is to offer the students a visual tool to help them stay focused on the task at hand and to remind them of the reinforcement they are working toward.

The term *Autism Spectrum Disorders (ASD)* describes some or all of the five pervasive developmental disorders (Turnbull, Turnbull, & Wehmeyer, 2010). *Autism* is defined as a lifelong, non-progressive neurological disorder typically appearing before the age of three years. The word *autism* means a developmental disability significantly affecting verbal and nonverbal communication and social interaction (http://www.autismawarenesscentre.com/what-is-autism).

In this study, focus was placed on four academic activities that occurred during the school day. Two were whole group activities (morning meeting and read aloud), and two were small group activities consisting of two to three students. Definitions are below:

- *Morning meeting* - The first academic activity of the day. Students gather at the front of the class on the rug and take attendance, go over the calendar and date, discuss the day's weather, and sing a song with which they are familiar.

- *1st small group session (Literacy small group)*- In dyads, students work with one teacher on phonics and handwriting skills that are individualized to the child's academic level based off of IEP goals.
- *Read aloud* - Students again meet as a whole group on the rug in front of the classroom. The students read one book for the whole week. Each day they build upon literacy and comprehension skills.
- *2nd small group session* - In dyads, students work with one teacher in one of three subjects (science, math, social studies) depending upon the day of the week.

  Note: The two students in the study are never in the same dyad due to the students' intense need for one-on-one staff attention.

# CHAPTER II

# REVIEW OF THE LITERATURE

This literature review discusses the possible benefits to the implementation of token boards with students with autism in the classroom to promote on-task behaviors during academic activities. Section one discusses autism spectrum disorders and provides definitions. Section two reviews ASD and the problems students with autism face, especially with regard to social skills. Section three explores anxiety associated with ASD and briefly discusses success in the school setting. In sections four, interventions for students with ASD are addressed.

## Autism Spectrum Disorders: Definitions

"Autism is a developmental disability that significantly affects a student's verbal and non-verbal communication, social interaction, and educational performance" (Turnbull et al., 2010, p. 13) Certain behaviors suggestive of autism can be seen in children beginning around the age of three such as engaging in repetitive activities and stereotyped movements. The child usually shows resistance to any change, especially changes in their daily routines and may show unusual reactions to sensory experiences. Autism falls under the umbrella of pervasive developmental disorders within the DSM-IV-TR (Turnbull et al., 2010). There are five pervasive developmental disorders that begin during childhood. They are autistic disorder, Rett's disorder, childhood disintegrative disorder, Asperger's disorder, and pervasive developmental disorder NOS. Autism Spectrum Disorder is the common term used by most professional educators and doctors to describe some or all of these disorders. This paper will focus on interventions that can assist children with autism to decrease their anxiety and develop better social skills.

It was originally thought autism was a condition caused by the birth mother and could be prevented. Autism was thought to be the product of mothers who were cold, distant and rejecting, thus depriving babies of the chance to "bond properly" (http://www.autism-help.org/points-refrigerator-mothers.htm). Autism was first diagnosed and described in the early 1940's (Turnbull et al., 2010). By the 1970's, it was determined that autism is caused by brain or biochemical dysfunction that occurs before, during, and after birth. In the past, Autism Spectrum Disorder was thought to be a low-incidence disability, only occurring 4 to 6 per 10,000 live births (Sansosti, 2010). However, in 2007, the Center for Disease Control and Prevention estimated that 1 in every 150 births would result in a child being born with autism, making autism the fastest developmental disability in the United States (Turnbull et al., 2010). According to Turnbull et al. (2010), "In 1977 The Autism Society of America concluded that no factors in a child's psychological environment were the cause of autism, meaning parents were not to blame for a child's diagnosis of autism" (p. 40).

Although the exact cause of autism is still unknown, researchers have explored many theories. For example, studies with twins show a strong genetic etiology for autism (Hymanm & Towbin, 2007). Children with siblings already diagnosed with autism are ten times more likely to have autism than children those without. There are even theories that the vaccines administered as early as an hour after birth to our children for protection could play a role in the onset of autism in children (Turnbull et al., 2010). One vaccine ingredient that has been studied specifically related to autism is thimerosal. Research done by the CDC several studies examining trends in vaccine use and changes in autism frequency do not support an association between thimerosal and autism (CDC, 2012).

A diagnosis of autism is usually made in the early childhood years through various types of evaluations. A medical diagnosis of autism requires that a doctor or psychologist administer the evaluation to assess if a person meets the diagnostic criteria of autism in the DSM-IV-TR. The six characteristics of autism are atypical language developmental, atypical social development, repetitive behavior, problem behavior, sensory and movement disorders, and differences in intellectual functioning (Turnbull et al., 2010). There is no one test that affords a conclusive diagnosis, but an example of a common test is the Autism Diagnostic Interview. This tool focuses on the child's social interaction, communication and language, and repetitive and stereotyped behaviors (Turnbull et al., 2010).

Atypical language and social development are the two characteristics that are most important to understand and focus on for this literature review, because language and social skills are how we interact with another. Deficits in the way we communicate and interact can cause anxiety in common everyday events. Because children with autism have difficulty initiating social interactions, interpreting others' perspectives, and functioning in reciprocal interactions, providing effective and realistic education or development programs to promote more appropriate social and language skills is critical to help them communicate better and lower their anxiety in social settings (MacMullen & Rotheram-Fuller, 2011). Some of the communication issues that children with autism deal with are difficulty focusing on more than one topic at a time, reversing pronouns, repeating or echoing other people's language, and difficulty with expressive language.

What is known about whether the practice of social skills and the implementation of Cognitive Behavior Therapy (CBT) or the use of five-point scales can help decrease or eliminate anxiety in children diagnosed with autism. "In clinical settings, anxiety-related concerns are

among the most common presenting problems for school-age children and adolescents with ASD" (Roberson-Nay & White, 2009, p. 1010). Specific anxiety disorders can include separation anxiety, school phobia, specific fears, obsessive worrying, and compulsive behaviors. Most of the anxiety issues happen in school settings but are usually dealt with in a more clinical and medical way and not implemented in the school environment. Usually treatment plans are created in a therapeutic setting and then hopefully parents utilize the techniques at home. Anxiety can have a huge impact on one's social skills and interactions with others.

## Social Skills and ASD

Social skills are the way we interact and communicate with one another. These are required to respond to and complete many classroom tasks successfully. In schools there is a hidden set of social norms known as "hidden curriculum" (Mazurik-Charles & Stefanou, 2010, p. 163). These are rules that are expected among us all but aren't usually directly taught. Children with ASD tend to have some difficulties interpreting these hidden rules. One reason behind inappropriate social skills in children with ASD is their delayed social development. Students with ASD have trouble understanding that their own beliefs, desires, and intentions may differ from those of others (Turnbull et al., 2010). Some of the behaviors that are most often focused on for better social interaction are decreasing repetitive and stereotypical behaviors, rigid routines, jerking or constant fidgeting, and inability to respond to situations in the appropriate manner.

Many educators have used social stories to help teach and allow safe opportunities to practice appropriate social skills. Social stories were developed to address the difficulties that children with ASD have in reading, understanding, and formulating appropriate responses to social situations. They accomplish this through a story that describes the appropriate social cues,

or response options or events or skills (Quilty, 2007). Just like other skills in life, there need to be opportunities to practice the new social skills learned. By practicing these skills, children with ASD will develop more self-confidence in social settings, decreasing their anxiety.

## Anxiety and Success at School

A review of clinical samples of youth with ASD found that between 11-84% of children with ASD had some form of impairing anxiety (Quilty, 2007). "Anxiety in ASD ranges from mild symptomatic impairment to severe" (Albano, Ollendick, Oswald, Scahill, & White, 2009, p. 79). There have been some connections between the anxiety levels, appropriateness of the social skill, and children with ASD. Hence, interventions that address social skills and anxiety might be helpful in school for children with ASD.

## Interventions Researched to Reduce Anxiety in Children with ASD

Some interventions offer promise for having a positive effect on the anxiety of children with ASD. This paper focuses on the use of one intervention that can help children with ASD decrease their anxiety in remaining and completing academic tasks. The intervention implemented in the current study is a five-stage token board.

## Cognitive Behavioral Therapy

Much of the research coupled social stories with a Cognitive Behavioral Therapy (CBT) emphasis. "CBT is a growing popularity as an effective treatment for a host of common psychological problems. A lot of research into CBT has focused on its use for the treatment of anxiety and depression in particular" (Branch & Wilson, 2007, p. 30). CBT is a non-pharmaceutical way of treating anxiety in children with ASD. Because of the increase in numbers of children with ASD, CBT is becoming a popular intervention. "Collectively,

applications of modified CBT in youth with ASD have shown promise in the treatment of anxiety" (Albano et al., 2009, p. 80). One intervention that is an extension of CBT is Multi-Component Integrated Treatment (MCIT). "This is a program developed for adolescents ages 12-17 with high functioning ASD. MCIT is a manual base intervention, based on the principles of CBT that integrates promising techniques for social skill development in high functioning ASD" (Albano et al., 2009, p. 80). The program includes individual therapy, parent education/involvement, and group therapy. After an 11-week study, it was found that this intervention did have some success in lowing anxiety in children with ASD.

## Social Stories

Social stories are a technique of modeling that involves very brief, often illustrated stories that model for the child the step-by-step performance of various social skills, basic self-help skills, safety, and hygiene (Kearney, 2008). Social stories have been used with great success with students with students with ASD to allow them to learn and practice appropriate social skills in a safe place. This type of intervention has been effective in improving mealtime behaviors, increasing on-task behaviors, improving social skills, and decreasing behavior challenges (Quilty, 2007). Many educators have used social stories to help teach and allow safe opportunities to practice appropriate social skills. Social stories were developed to address the difficulties that children with ASD have in reading, understanding, and formulating appropriate responses to social situations through a story that describes the appropriate social cues or responses options of events or skills.

As with all life skills, there need to be opportunities to practice the new skills learned. By practicing these skills, children with ASD can develop more self-confidence in social

settings, decreasing their anxiety. In the study mentioned above, paraprofessionals were trained to write effective social stories and then put them into action either one on one or in small groups. Although the sample group was very small, using social skills showed a positive effect on students developing proper social skills (Quilty, 2007).

## Paraprofessional Support

The last intervention researched was one that also used the talents of the paraprofessionals in the schools. Paraprofessionals play a critical role in the lives of children, especially those with special needs, but many times they are not trained appropriately for the specific children they teach. Using the people in the schools that students already have a trusting relationship with is a great to help students try new techniques. "This study was to investigate the effectiveness of the use of visual cueing for peer interaction and social skill reminders, delivered by trained paraprofessionals in the general education classroom, on teacher perceptions of the social responsiveness of children with ASD" (Mazurik-Charles & Stefanou, 2010, p. 40) Mazurik-Charles and Stefanou's (2010) study addressed three specific questions:

- Would paraprofessionals trained to deliver a set of interventions be able to do so in the general education classroom?
- Would teachers be able to detect changes in social responsiveness among their students with ASD as a result?
- Did the educational placement (partial or full inclusion) have an effect on teacher's ratings of progress of social responsiveness among these children?

Results varied but overall suggested that this intervention was effective in providing support for students with ASD and the classroom teacher when it comes to developing more acceptable social skills.

## Behavior Rating Scales

Five-point scales are visual systems that can help to organize a person's thinking when working through difficult moments, particularly those that require social understanding, as defined by the creator of the five-point scale (Buron, 2012). The scale is used as a behavior modification tool for students with ASD. This scale can help students better deal with anxiety-causing situations by reducing the child's anxiety level by teaching him/her various ways to use the five-point scale. Students use the scale when they are in situations that cause them anxiety by choosing which number on their scale their anxiety is. Once he/she matches the anxiety level to its number, he/she follows the coping strategy that he/she decided would work best at that level. An example of a five point scale can be found in Appendix B.

The scales are applicable for a variety of behaviors and responses to behaviors, including feelings of anxiety, obsessions, concepts of personal space, and feelings of anger. The five-point scale provides support at school, home, and community, but in the current study, school will be the only environment of interest.

Buron (2009) gives clear steps for a teacher to follow to create the five-point scale. In *The 5-Point Scale and Emotional Regulation*, she provides these steps to creating a five-point scale:

- 1st- Identify problem areas for this person.
- 2nd -Break the problem area into five parts clearly illustrating the degrees of the situation (less anxiety to highest anxiety level) and putting this information onto a visual scale, or self-made using a file folder and library pockets.

- 3rd -Make cards that can fit into the pockets with the situations written on each card (cards in this study will also have pictures along with them)
- 4th -Introduce the described scale to your child or student by using the activity to visually illustrate and clarify.
- 5th- Hand the person one card and either have him/her read it or you read it.
- 6th- Direct the person to then put the card into the number pocket that best describes how that situation makes him/her feel (as defined above).
- 7th-Once the person has rated a number of key situations, create a scale that clearly illustrates the results.

This scale provides the foundation of an emotional regulation program.

## Conclusion

Anxiety is common among people with ASD, but with research geared toward decreasing it, strategies are being developed to help children with ASD and the adults in their lives to better handle anxiety-related situations. No one intervention is the cure-all, because no two children are the same. However, CBT, social stories, five-point scales, and paraprofessional and other supports have been shown to have some success reducing anxiety and can be implemented easily into schools and classrooms. Five-point scales provide individualized strategies that offer students with ASD who have unique strengths and needs healthy ways to self-regulate their feelings.

# CHAPTER III

# METHODS

The study used a token board to keep kindergarten students with ASD focused on academic and transition tasks. The students had the opportunity to earn individual rewards that they chose to work for in conjunction with the token board. The rewards varied from child to child. Through their form of communication, students communicated what they wanted to receive for staying on task. The rewards varied from edibles to physical stimulation or toys. The token board had five tokens to be earned for each reward for one week (which is what is typically used), and then the number of tokens required to earn per reward increased to eight for a week. As the student stayed on task, he/she was prompted by staff to remain on task with very specific prompts (verbal, partial physical, full partial, or gesture are just some examples) about the behavior he/she was demonstrating. That student then earned a token. Once all five (or eight) tokens were earned, students received the previously agreed-upon reward and then the token board was reset and the process started once again.

Students had multiple opportunities to earn their desired reward during each activity. The frequency of resets to the token board was dependent on the number of times the student received a reward for reaching the specific number of tokens. The frequency varied for each student and each situation was different because a student may have needed a higher or lower amount of motivation during that task.

## Design

The study used a quasiexperimental design to compare whether the number of verbal prompts the students required in designated academic/transition sessions was impacted by requiring more or less tokens to earn rewards. Half of the sessions were conducted using the

token boards requiring five tokens per reward, and half were conducted using boards requiring eight tokens. The rewards were selected from the same pool for each of the two weeks' sessions so that the desirability of the rewards did not impact success. Session content was similar, and the sessions were same length across the two conditions as well.

The independent variable was the token board/reward system and how many tokens were required to earn rewards.

The dependent variables were the number of verbal prompts required to keep students on task in both conditions (token board with five or eight tokens required), teacher ratings of engagement in each activity, and the number of rewards earned each session. Sample data collection forms for these are found in Appendices B and C, respectively.

## Participants

The participants in this study were two male students out of a class of seven 5-6 year olds in a non-categorical/autism kindergarten classroom. There were six boys and one girl making up the class. The staff participants included one lead teacher, a teacher assistant, and four paraprofessionals. The lead teacher provided daily instruction and worked as a member on the IEP team. The teacher assistant worked closely with the lead teacher and provided instructional assistance in the classroom. The four paraprofessionals worked closely with one or two of the six students daily on more individual needs. The lead teacher or assistant teacher with strong data collection experience collected the daily data for each student.

## Instruments

Tools used included the token board/reward system. During the two week period, students were given a token board to monitor their daily success at half of the identified activities with the teacher. At the end of the study, behaviors during the activities, the number of prompts

(hypothesized to be inversely related to student success and independence), and the number of rewards earned were compared across token board use conditions and activities.

## Procedures

Token boards were used during two whole group (morning meeting and read aloud) activities and two small group academic activities (as described in operational definitions in Chapter I). The students were presented with the token board and given an opportunity to choose what they would like to work for right before each activity (i.e., fruit snacks, hugs, bubbles). The teacher randomly gave the student verbal praise on a specific behavior he/she was demonstrating that was keeping him/her on task and then physically added one token to the board and showed it to the student so that he/she was able to see the progress he/she was making and was reminded of the reinforcement he/she was working toward. When the student earned all five or eight tokens, he/she was given the reinforcement and the token board was reset. Comparisons were computed to determine whether there was a difference in the number of prompts, rewards earned, or on-task behaviors across the two token board conditions and perhaps across the session types.

## Intervention with Token Board/Reward System

Students used the board for each of the identified activities. Comparisons sought to determine whether the students' success in anxiety-provoking learning situations differed based on the number of tokens they had to earn to obtain rewards.

## CHAPTER IV

## RESULTS

The first hypothesis was that the mean total numbers of verbal prompts required to keep the students on task would be the same whether five tokens or eight tokens were required to earn a chosen reward *($ho_1$: mean prompts with five tokens=mean prompts with eight tokens).* Descriptive statistics and the results of a *t*-test comparing these means are presented below in Tables 1 and 2 respectively.

Table 1

*Descriptive Statistics for Total Number of Verbal Prompts when Using Five vs. Eight Tokens*

| | | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Number of Prompts Required for Rewards | 5 Tokens | 18 | 9.11 | 5.830 | 1.374 |
| | 8 Tokens | 27 | 9.63 | 3.543 | .682 |

Table 2

*Results of a T-Test for Equality Means*

| | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|
| | t | df | p | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | Lower | Upper |
| Number of PROMPTS | -.372 | 43 | .712 | -.519 | 1.395 | -3.332 | 2.295 |

Equal variances assumed, 2-tailed test

The significance of the *t* value ($p < .712$) indicated that the difference in the mean number of total prompts given using five vs. eight prompts was not large enough to reject the null hypothesis that the mean number of prompts was the same across token requirements.

Actual success (frequency of earning rewards) was also of interest *($ho_2$: mean rewards earned with five tokens = mean rewards earned with eight tokens).* Thus, the mean rewards earned per session under each token condition were also compared. Descriptive statistics and the results of a *t*-test comparing these means are presented below in Tables 3 and 4 respectively.

Table 3

*Descriptive Statistics for Number of Rewards Earned When Using Five vs. Eight tokens*

| Group Statistics | | | | | |
|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error Mean |
| Number Rewards Earned | 5 Tokens | 18 | 5.56 | 2.640 | .622 |
| | 8 Tokens | 27 | 4.41 | 1.338 | .257 |

Table 4

*Results of a* t*-Test Comparing Mean Rewards Earned for the Token Conditions*

| | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|
| | t | df | p | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | Lower | Upper |
| Number Rewards Earned | 1.705 | 22.880 | .102 | 1.148 | .673 | -.245 | 2.541 |

Equal variances assumed, 2-tailed test

Based on these results ($t$= 1.705, $p$ < .102), the null hypothesis that the number of rewards earned was the same across conditions was retained.

Mean behavior ratings were then compared across token conditions to test the following hypotheses to see if the conditions impacted any of them. Descriptive statistics and *t*-test results for each of hypotheses 3-6 follow in Tables 5 and 6 respectively.

*$ho_3$: Mean frequency of eloping with five tokens = Mean frequency of eloping with eight tokens*

*ho4: Mean frequency of off task behavior with five tokens = Mean frequency of off-task behavior with eight tokens*

*ho5: Mean frequency of verbal redirection given with five tokens = Mean frequency of verbal redirection with eight tokens*

*ho6: Mean frequency of physical redirection with five tokens = Mean frequency of physical redirection with eight tokens*

Table 5

*Descriptive Statistics for the Incidence of the four target behaviors*

| **Behaviors** | | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Eloping | 5 Tokens | 18 | 1.22 | 1.478 | .348 |
| | 8 Tokens | 27 | 1.37 | 1.363 | .262 |
| Off task | 5 Tokens | 18 | 1.00 | 1.029 | .243 |
| | 8 Tokens | 27 | 1.37 | 1.418 | .273 |
| Verbal Redirection | 5 Tokens | 18 | .94 | 1.259 | .297 |
| | 8 Tokens | 27 | .81 | 1.241 | .239 |
| Physical redirection | 5 Tokens | 18 | 1.44 | 2.093 | .493 |
| | 8 Tokens | 27 | 2.78 | 2.082 | .401 |

Table 6

T-*Tests for Equality of Mean Frequency of the Four Target Behaviors across Token Conditions (5 Vs. 8)*

| | *t*-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|
| | *t* | df | *p* | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | Lower | Upper |
| **Eloping** | -.345 | 43 | .731 | -.148 | .429 | -1.013 | .717 |
| **Off-task** | -.952 | 43 | .346 | -.370 | .389 | -1.155 | .414 |
| **Verbal Redirection** | .341 | 43 | .735 | .130 | .380 | -.636 | .896 |
| **Physical Redirection** | -2.101 | 43 | .042 | -1.333 | .635 | -2.613 | -.053 |

*Equal variances assumed*
*2-tailed tests*

The results of the four *t*-tests indicated that the mean frequency of three of the behaviors (eloping, off-task behavior and verbal redirection) did not differ significantly when five versus eight tokens were required to earn rewards (all probability values exceeded $p < .05$). Hence, the null hypotheses that the incidence of these three behaviors would be equivalent across token conditions were retained. The mean incidence of physical redirection, however, did increase when the number of tokens required was increased (from 1.44 per session when five were required to earn rewards to 2.78 per session when eight were required; $t = -2.101$, $p < .042$). Therefore, the null hypothesis was rejected in the case of physical redirection.

Finally, in order to understand not only the reaction to the token change, but also the impact of the school demands on the students, descriptive analyses and analyses of variance (ANOVAs) were computed to compare the frequency of prompts and rewards and the four behaviors tracked in each of the three types of sessions monitored (morning meeting, literacy small group, and read aloud). Those results are presented below and tested the veracity of the following hypotheses for this sample.

*$ho_7$: Mean Prompts Morning meeting = Mean Prompts Literacy Small Group= Mean Prompts Read aloud*

*$ho_8$: Mean Rewards Morning meeting = Mean Rewards Literacy Small Group= Mean Rewards Read aloud*

*ho9: Mean Eloping Morning meeting = Mean Eloping Literacy Small Group= Mean Eloping Read aloud*

*ho10: Mean Off-task Morning meeting = Mean Off-task Literacy Small Group= Mean Off-task Read aloud*

*ho11: Mean Verbal Redirection Morning meeting = Mean Verbal Redirection Literacy Small Group= Mean Verbal Redirection Read aloud*

*ho12: Mean Physical Redirection Morning meeting = Mean Physical Redirection Literacy Small Group= Mean Physical Redirection Read aloud*

Table7 (below) presents descriptive statistics for each of the variables/behaviors in each session type.

Table 7

*Descriptive Statistics for the Dependent Variables across Activities*

| | | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Range |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Lower Bound | Upper Bound | |
| **Number Prompts** | ***Morning meeting*** | 16 | 9.69 | 5.885 | 1.471 | 6.55 | 12.82 | 2-25 |
| | ***Literacy Small Group*** | 15 | 9.07 | 4.480 | 1.157 | 6.59 | 11.55 | 3-16 |
| | ***Read aloud*** | 14 | 9.50 | 2.822 | .754 | 7.87 | 11.13 | 6-15 |
| | ***Total*** | 45 | 9.42 | 4.540 | .677 | 8.06 | 10.79 | 2-25 |
| **Number Rewards Earned** | ***Morning meeting*** | 16 | 4.25 | 1.528 | .382 | 3.44 | 5.06 | 2-7 |
| | ***Literacy Small Group*** | 15 | 5.07 | 2.187 | .565 | 3.86 | 6.28 | 3-11 |
| | ***Read aloud*** | 14 | 5.36 | 2.274 | .608 | 4.04 | 6.67 | 2-11 |
| | ***Total*** | 45 | 4.87 | 2.018 | .301 | 4.26 | 5.47 | 2-11 |
| **Eloping** | ***Morning meeting*** | 16 | 1.81 | 1.601 | .400 | .96 | 2.67 | 0-5 |
| | ***Literacy Small Group*** | 15 | .53 | .990 | .256 | -.02 | 1.08 | 0-3 |
| | ***Read aloud*** | 14 | 1.57 | 1.222 | .327 | .87 | 2.28 | 0-4 |
| | ***Total*** | 45 | 1.31 | 1.395 | .208 | .89 | 1.73 | 0-5 |
| **Off-task** | ***Morning meeting*** | 16 | 1.00 | 1.211 | .303 | .35 | 1.65 | 0-3 |
| | ***Literacy Small Group*** | 15 | 1.73 | 1.486 | .384 | .91 | 2.56 | 0-6 |
| | ***Read aloud*** | 14 | .93 | .997 | .267 | .35 | 1.50 | 0-2 |
| | ***Total*** | 45 | 1.22 | 1.277 | .190 | .84 | 1.61 | 0-6 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Verbal Redirection** | ***Morning meeting*** | 16 | 1.06 | 1.482 | .370 | .27 | 1.85 | 0-5 |
| | ***Literacy Small Group*** | 15 | 1.07 | 1.280 | .330 | .36 | 1.78 | 0-4 |
| | ***Read aloud*** | 14 | .43 | .756 | .202 | -.01 | .87 | 0-2 |
| | ***Total*** | 45 | .87 | 1.236 | .184 | .50 | 1.24 | 0-5 |
| **Physical Redirection** | ***Morning meeting*** | 16 | 3.06 | 2.744 | .686 | 1.60 | 4.52 | 0-8 |
| | ***Literacy Small Group*** | 15 | 1.47 | 1.767 | .456 | .49 | 2.45 | 0-4 |
| | ***Read aloud*** | 14 | 2.14 | 1.512 | .404 | 1.27 | 3.02 | 0-5 |
| | ***Total*** | 45 | 2.24 | 2.165 | .323 | 1.59 | 2.89 | 0-8 |

A one-way analysis of variance was used to compare the means of the total prompts given, total rewards earned per session, and the four behaviors across the three session types. Results in Table 8 (below) indicated that the only variable among these six with significant differences in means ($p < .05$) across the session types (morning meeting, literacy small group) was eloping ($p < .023$). Hence, null hypotheses 7-8 and 10-12 were retained.

Table 8

*ANOVA Results Comparing Means across Activities*

| **ANOVA Results** | | | | | | |
|---|---|---|---|---|---|---|
| | | **Sum of Squares** | **df** | **Mean Square** | **F** | **p** |
| **Number prompts** | Between Groups | 3.107 | 2 | 1.553 | .072 | .930 |
| | Within Groups | 903.871 | 42 | 21.521 | | |
| | Total | 906.978 | 44 | | | |
| **Number Rewards Earned** | Between Groups | 10.052 | 2 | 5.026 | 1.248 | .297 |
| | Within Groups | 169.148 | 42 | 4.027 | | |
| | Total | 179.200 | 44 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Eloping** | Between Groups | 14.045 | 2 | 7.023 | 4.119 | .023 |
| | Within Groups | 71.599 | 42 | 1.705 | | |
| | Total | 85.644 | 44 | | | |
| **Off- task** | Between Groups | 5.916 | 2 | 2.958 | 1.886 | .164 |
| | Within Groups | 65.862 | 42 | 1.568 | | |
| | Total | 71.778 | 44 | | | |
| **Verbal Redirection** | Between Groups | 3.901 | 2 | 1.950 | 1.294 | .285 |
| | Within Groups | 63.299 | 42 | 1.507 | | |
| | Total | 67.200 | 44 | | | |
| **Physical Redirection** | Between Groups | 19.926 | 2 | 9.963 | 2.245 | .118 |
| | Within Groups | 186.385 | 42 | 4.438 | | |
| | Total | 206.311 | 44 | | | |

Post hoc testing (presented in Table 9 below) indicated the mean incidence of eloping differed significantly between the morning meeting (mean= 1.81) and literacy small group (mean=.53) sessions ($p < .033$), but not between any other combination of sessions. Hence, null hypothesis 9, that the mean incidence of eloping was the same across the three session types, was rejected, as the elopement rate did differ significantly between morning meeting (where it was highest) and literacy small group (where it was lowest).

Table 9

*Multiple Comparisons of Mean Frequency of Eloping across Activities*

| Scheffe | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dependent Variable | **Session type** | | Mean Difference | Std. Error | p | 95% Confidence Interval | |
| | | | | | | Lower Bound | Upper Bound |
| Eloping | **Morning meeting** | **Literacy Small Group** | 1.279* | .469 | .033 | .09 | 2.47 |
| | | **Read aloud** | .241 | .478 | .881 | -.97 | 1.45 |
| | **Literacy Small Group** | **Read aloud** | -1.038 | .485 | .114 | -2.27 | .19 |

*. The mean difference is significant at the 0.05 level.

# CHAPTER V

# DISCUSSION

In this study, two children with ASD from a class of seven who displayed anxiety at school used a token board reward system to encourage them to complete tasks successfully and with minimal verbal prompting from the instructor. The token boards were visual reward systems which allowed students to clearly see what they would receive after completing a certain amount of work. They are intended encourage students' participation and good behavior.

## Implications of Results

Initially, students were required to earn five tokens to get a reward, which was their existing token board plan. During the second week of the study, the token boards' criteria to earn rewards were increased to eight to see whether that impacted the students' ability to stay on task. Events and activities were identified in advance so that the activities and demands of each week were the same. The independent variable was the number of tokens required to earn rewards in the designated activities which included morning meeting, read aloud, small group one, and small group two.

The results of the study suggested a relationship did exist between how the token board was used and the students' on-task behavior. Due to the students' negative reaction to the increase of tokens to earn and based on consultation with administration, the intervention was not able to be implemented for the entire planned duration. However, data did suggest that the students exhibited more negative off-task behaviors when eight tokens were required versus five.

Results showed token boards can assist students with on task behavior but that the required number of token required must be great enough to motivate but not so high that it frustrates students. Observations and staff notes indicated that when the tokens required for

rewards was increased to eight, the participating students became frustrated, which took attention away from instruction.

Mean totals of prompts, rewards, and behaviors were compared across the three activities studied to gain a better understanding of the students' frustration and success in the particular activities and the impact of the two token methods on their ability to complete the tasks in each setting independently. The number of prompts given and rewards earned were not significantly different across the five or eight token conditions. However, when the token requirement was increased from five to eight, the frequency of physical redirection increased from a mean of 1.44 to 2.78 incidents per session overall ($p < .042$), which was statistically significant. The only behavior that differed significantly across the activities was elopement, which multiple comparisons indicated occurred significantly more ($p < .033$) in morning meetings (mean=1.81) than in literacy small group (mean=.53).

## Threats to Validity

The validity of this study was affected by several factors. One was the brief and interrupted interval of the study. The study focused on comparing the outcomes of rewarding students for on-task behavior by implementation of a token board with five tokens versus eight tokens for one-week periods each. Using a longer period and more variations of rewards and demands would likely have led to clearer conclusions about the impact of modifying the token board reward system.

Another factor that might affect the validity of this study is the frequency with which the rewards were given. If the frequency of the reward were done in timed intervals instead of when students reached a predetermined level of tokens, students might have worked hard when the intervals were short, or they may have stopped working when they realized rewards were

impossible to attain for an interval if they were able to predict when the reward was going to be given.

The small sample size clearly limited the ability to generalize the results of this study to others students with or without ASD. A larger study might compare groups of similar students and be less impacted by their idiosyncratic traits and preferences or their relationships with the staff implementing the token board programs.

## Implications for Future Studies

While the hypotheses for this study were not fully tested due to the interruption of the study, results did support the hypothesis that variation in use of a token board does have an impact on a students' behavior. Use of the boards to assist students' on-task behavior appears helpful at times but also resulted in frustration when the demands were apparently too high for students.

Future studies should use a larger sample of students over a longer period of time to help determine the appropriate level of required tokens to use to earn rewards when implementing token boards with students with ASD.

## Connections to Future Studies

As educators and doctors continue to study ways to assist students with autism self reflect they will discover more ways to that token boards can be used to stay on task during non-preferred activities.

## Conclusions

As stated in Chapter II, children with autism tend to have delays in speech and the ability to interpret others' emotions. The token board serves as a visual tool to help others convey

which behaviors are appropriate/on task and which or not. This gives students a way to visually and physically understand acceptable behaviors in specific situations.

It was observed that students experienced more success when they only had five tokens to work for versus eight tokens. With an increase in tokens required, physical aggression increased. Token boards have been a common tool used with children with autism to assist them in modification of behaviors in various situations. Each student will react differently to the token board, depending on his/her ability to understand the connection between his/her behavior and the number of tokens he/she needs to earn for his/her desired reward. As with all children, this strategy may and may not be the right fit for every child and must be tailored to meet individual student's needs.

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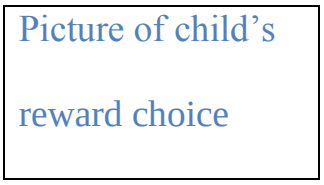
**Appendix A**

Description of token board/reward system

Token Boards are a visual reward system which allows an individual to clearly see what he or she will receive after completing a certain amount of work. This encourages individuals' participation and good behavior.

Example

I am working for




| | | | | |
|---|---|---|---|---|
| Token | Token | Token | Token | Token |

**Appendix B**

**Behavior rating forms for rating the engagement of students in the identified activities**

**Student Name_____ Date_____ Teacher_____**

| **Activity** | **Eloping** | **Off task (defined in students IEP)** | **Verbal redirection** | **Physical redirection** |
|---|---|---|---|---|
| **Morning meeting** | | | | |
| **1st small group session** | | | | |
| **Read aloud** | | | | |
| **2nd small group session** | | | | |

**Appendix C**

**Recording form for number of verbal prompts and notes during each identified activity**

**SO THIS WOULD TELL HOW MANY REWARDS PER SESSION**

| **With token boards** | | | | |
|---|---|---|---|---|
| **Activity** | **Verbal prompts** | | | |
| **Morning meeting *whole group*** | | | | |
| **1st Session small group *dyad*** | | | | |
| **Read aloud *whole group*** | | | | |
| **2nd Session small group *dyad*** | | | | |