The Token Economy: A Recent Review and Evaluation

Christopher Doll [1]; T. F. McLaughlin [2]; Anjali Barretto [3]

[1] Gonzaga University, East 502 Boone Avenue, Spokane, WA 99258-0025, USA
cdoll2@zagmail.gonzaga.edu

[2] Gonzaga University, East 502 Boone Avenue, Spokane, WA 99258-0025, USA
mclaughlin@gonzaga.edu

[3] Gonzaga University, East 502 Boone Avenue, Spokane, WA 99258-0025, USA
barretto@gonzage.edu

Abstract – *This article presents a recent and inclusive review of the use of token economies in various environments (schools, home, etc.). Digital and manual searches were carried using the following databases: Google Scholar, Psych Info (EBSCO), and The Web of Knowledge. The search terms included: token economy, token systems, token reinforcement, behavior modification, classroom management, operant conditioning, animal behavior, token literature reviews, and token economy concerns. The criteria for inclusion were studies that implemented token economies in settings where academics were assessed. Token economies have been extensively implemented and evaluated in the past. Few articles in the peer-reviewed literature were found being published recently. While token economy reviews have occurred historically (Kazdin, 1972, 1977, 1982), there has been no recent overview of the research. During the previous several years, token economies in relation to certain disorders have been analyzed and reviewed; however, a recent review of token economies as a field of study has not been carried out. The purpose of this literature review was to produce a recent review and evaluation on the research of token economies across settings.*

Key Words – *Digital Search; Future Research; Literature Review; Research; Token Programs*

1   Introduction

This article presents a recent and inclusive review of the use of token economies in various settings. Digital and manual searches were carried using the following databases: Google Scholar, Psych Info (EBSCO), and The Web of Knowledge. The search terms included: token economy, token systems, token reinforcement, behavior modification, classroom management, operant conditioning, animal behavior, token literature reviews, and token economy concerns. The criteria for inclusion were studies that implemented token economies in settings where academics were assessed.

2   History of Token Systems

Token systems, in one form or another, have been used for centuries and have evolved notably to systems used today. Clay coins, which people could earn and exchange for goods and services, in the early agricultural societies were part of the transition from simple barter systems to more complex economies (Schmandt-Besserat, 1992).   Before that, however, incentives- based structures were created and sustained in a variety of cultures and as part of many institutions within those cultures. Governments used the influencing abilities of rewards to shape behaviors in battle and throughout society.   Rewards have ranged from tangible prizes to socially significant titles (Doolittle, 1865; Duran, 1964; Grant, 1967). During the first century, Grant (1967) explained that accomplishments of gladiators were rewarded with property, prizes, and crowns. Carcopino (1940) described charioteers in Rome during that same time being rewarded with their freedom after repeated victories. In ancient China, soldiers received colored peacock feathers for bravery in battle (Doolittle, 1865).   Several military institutions in ancient civilizations utilized these systems of merit and rewards to incentivize behavior. From the Aztecs in the 15th century (Duran, 1964), as well as the militaries of modern times, the use of titles of distinction and medals to reward actions were common methods to promote certain types of behavior, or responses. Modern research peaked in the 1970's where there was substantial study surrounding psychiatry, clinical psychology, education, and mental health fields (Kazdin, 1977). Token economy systems have also been employed to modify animal behavior (Addessi, Mancini, Crescimbene, & Visalberghi, 2011; Malagodi, 1967; Sousa, Matsuzawa, 2001). Malagodi's (1967) study involving rats established a mechanism of exchange between marbles, which the rats earned through a dispenser, and an edible primary reinforcer. In that study, token reinforcement under fixed and variable interval schedules were shown to be as effective as the edible primary reinforcer to increase lever pressing. In another study, Wolf (1936) compared the effectiveness of exchangeable tokens, nonexchangeable tokens, and food to find that exchangeable tokens and food were comparable in reinforcing ability. These studies clearly show that tokens, when paired with a primary reinforcer are effective at modifying certain behaviors in animal subjects. Cowles (1937) found similar results with exchangeable tokens when he taught chimpanzees new learning tasks. In Sousa and Matsuzawa's (2001) study, not only did chimpanzees perform similarly with tokens as they did with direct food rewards, but the researchers found that chimpanzees were able to collect and save several tokens before exchanging them.

The military as well as mental health and educational facilities have increased their use of incentives to shape behavior. Tangible items given as rewards evolved to tokens which could be exchanged for certain privileges and rewards. This evolution of the token economy was a catalyst for increasingly novel and diverse utilization of token-reinforcement systems. One example of how token systems have been applied in an institutional setting was Alexander Maconochie's "Mark System" implemented with a prison population during the 1840's (Kazdin, 1977).   This token-based system improved the conditions under which many prisoners lived; furthermore, it attempted to create an incentive-driven system to reward positive behavior rather than give aversive consequences to prisoners. Within this "Mark System," sentences were converted to "marks" and the prisoners sought to reduce these "marks," or tokens, through good behavior within the prison system. Upon reaching a certain level of tokens, the prisoner could then be released. The prisoners exchanged their tokens for necessary items such as food, shelter, and clothes (Kazdin, 1977). A variation of the token economy under Maconochie was the inclusion of a response cost component where negative or institutionally-labeled aberrant behaviors resulted in the withdrawal of "marks." Unique approaches such as the Mark System have helped evolve the reward and cost structures resulting in "serious achievements in reform, rehabilitation, and token economies" (Kazdin, 1977).

3   Early History of Token Systems in the Schools

3.1   Token, tracking, exchange

Educational systems have employed token economies as a means to manage students for several decades (Kazdin, 1982). The need to educate large numbers of children and the demand for meaningful education helped to evolve the application of these token-based systems. As noted previously, titles of distinction as well as tangible property have all been used to incentivize individuals and their behavior. In schools, a variety of incentives have acted and continue to serve as the rewards earned for certain defined target behaviors (Boniecki & Moore, 2003; Lolich, McLaughlin, & Weber, 2012; McLaughlin & Malaby, 1975). As early as the 7th century, a monk in Southern Europe gave out biscuits of leftover dough, also known as "petriolas" or "little rewards," to give to children who learned their prayers (Kazdin, 1977). Later on in the 1100's, Birnbaum (1962) noted that using rewards such as nuts, figs, and honey were commonly implemented by educators as incentives for learning. In the 16th century, Skinner (1966) described instances where fruit and cake was advocated by Erasmus in order to help children learn Greek and Latin.

Within the past several centuries, the modern forms of the token economy have been increasingly used in the education of society. Two of those systems came to the United States during the 1800's. Joseph Lancaster's "Monitorial System" originated in England in the early part of the century and came to New York in 1805. This system, when implemented in New York schools, contained a more explicit use of tokens and of response cost. More-able peers were "Monitors" for less-able peers and each skill-group was awarded different sets of privileges and prizes, based on level. The Monitorial System allowed for the creation of helper teachers which allowed for the teaching of large numbers of students. The solution to this problem of larger classes helped to spread this program across the nation. A second system, Excelsior, established itself during the latter part of the 1800's when the United States was experiencing significant growth in the use of token economies (Kazdin, 1977). This system consisted of giving out "Excellent(s)" and "Perfect(s)" designations to students for pro-social and pro-academic behaviors. These "Excellents" and "Perfects" were exchanged for "Merits," which in turn were saved and exchanged for a special certificate from the teacher attesting to great performance. In both of these systems, prizes and rewards acted to make the token more powerful in affecting behavior. Furthermore, in both of these token-reinforcement systems, back-up reinforcers and prizes were integral in their setups and sustainment.

3.2   Definition of a Token System

Token economies have been extensively researched throughout the last several decades and applied in a variety of settings. Teachers and caretakers have used these systems in general education, special education, and community-based settings. Because of the variety of token-based systems and the ease at which teachers can implement them, token economies are widely used across the nation.

The behavioral principles employed in token systems are based primarily upon the concept of operant conditioning (Kazdin, 1977; McLaughlin & Williams, 1988). Within a token economy, tokens are most often a neutral stimulus in the form of "points" or tangible items that are awarded to economy participants for target behaviors. In a token-reinforcement system, the neutral token is repeatedly presented alongside or immediately before the reinforcing stimulus. That stimulus may be a variation of edibles, privileges, or other incentives. By performing this process of repeating presentations of neutral tokens before the reinforcing stimulus, the neutral token becomes the reinforcing entity. As the participants in the token experience the pairing of token and a previously reinforcing items, the token

itself may acquire reinforcing properties as a result. The token economy gains its utility and power to modify behavior when the neutral tokens become secondary reinforcers. The effectiveness of this process has been noted by Miller and Drennen (1970). They demonstrated that when praise is a neutral stimulus, it could become a conditioned reinforcer through pairing it with another reinforcing event.

3.2.1 Target behaviors of token economies

A token economy is often implemented because there are target behaviors that teachers would like to increase or reduce. These behaviors must be identified by those who work in such classrooms. Changes in these target behaviors often improve the classroom-learning environment or the needs for that specific institution. Token economies can be used to minimize disruptions in a classroom as well as increase student academic responding. This can depend on the classroom and the priorities of the teacher. However, most teachers employ a token system to manage both academic and social behaviors (McLaughlin & Williams, 1988).

In a token economy it is important to clearly outline the target behaviors for the students as well as the teacher (Kazdin, 1977). When a teacher is first implementing a token-reinforcement system it has been recommended that desired behaviors are orally communicated, written down, or otherwise clearly explained or modeled to the participants (Alberto & Troutman, 2012; McLaughlin & Williams, 1988). This communication with the participants is crucial and directly related to the effectiveness and efficiency of the system (Alberto & Troutman, 2012; Cooper, Heron, & Heward, 2007).

3.2.2 Tokens

In order to establish and sustain a token economy system there needs to be tokens. These tokens then serve as a way to provide consequences. Tokens can be tangible gaming-style chips, tickets, coins, fake money, marbles, stickers, or stamps (McLaughlin & Williams, 1988). They can also come in the form of more abstract items in the form of points or checkmarks given by the teacher or the economy's "manager." The choice of tokens can depend on the setting, population, manager's or teacher's preference, cost, among other considerations. Population and setting considerations are related to what type of tokens are going to be applicable for certain participants. A younger group, or students with developmental or cognitive delays, may well benefit from more tangible items like coins or cards, than more abstract items in the form of points or checkmarks (McLaughlin & Williams, 1988; Stainback, Payne, Stainback, & Payne, 1973). Tangible tokens provide a concrete representation of the number of tokens earned which can then be exchanged for rewards (B. Williams, R. Williams, & McLaughlin, 1989). When choosing tokens, the teacher's preference, especially in relation to cost, must be considered. Also, the choice of the token should include the difficulty or impossibility of the token itself being duplicated and flooding the classroom with tokens not under the control of the teacher. These factors must impact the types of tokens, which are used within the system, the frequency at which they are delivered, and ultimately the back-up rewards that are available to give value to the tokens.

3.2.3 Back-up rewards

Back-up rewards are the items that the students or persons have indicated they are willing to work. Their desirability has been used to assign the number of tokens that are needed to purchase or take part

in this reward (Kazdin, 1977). Without these back-up rewards, the tokens have no exchangeable value. Also, tokens without value can negatively alter an individual's motivation (Wolf, 1936). The more back-up rewards in the token system, the more substantial the reinforcing strength becomes through pairing of tokens and rewards (B. Williams, R. Williams, & McLaughlin, 1989). Back-up rewards have also been used in the home settings where they have included: ski trips, video games, movies, or lunch at a chosen restaurant (Rustab & McLaughlin, 1988). Even with this variety of back-up rewards, the monetary reward has been used very effectively (Jordan, McLaughlin, & Hunsaker, 1980). This is likely due to money's exchangeable abilities and its ability to act as one of the ultimate Generalized Conditioned Reinforcers.

3.2.4 The exchange

An important part of the token economy is the exchange of tokens for certain back-up rewards chosen by the economy's manager or students and in part by the needs and preferences of the participants. The value of the token is a function of the reinforcers which are able to back-up their value (Kazdin, 1977). At the end of the period where tokens have been given, the teacher will decide to begin the exchange process.

When a conditioned reinforcer like a token is exchanged for a variety of privileges and rewards, the token is referred to as a generalized conditioned reinforcer (Kazdin, 1977). Generalized tangible conditioned reinforcers, which can be exchanged for a variety of items, are used very frequently in behavior modification programs (Kazdin, 1977). Tokens or generalized conditioned reinforcers also come in the form of money used in society. The more items or rewards you can exchange for the token, the more powerful the token becomes. Money and other generalized conditioned reinforcers are more valuable than any single reinforce because they can purchase a variety of back-up reinforcers (Kazdin, 1977). The power of generalized conditioned reinforcers was assessed when Sran and Borrero (2010) compared behaviors reinforced by tokens which could be exchanged for a single highly preferred item with tokens which could be exchanged for a variety of preferred items. They found, while degrees of preference varied, all participants were shown to deliver higher rates of responding during sessions where tokens could be exchanged for a variety of preferred items.

During the early implementation of the token economy, especially for lower-functioning persons, it is important to have frequent exchange periods where participants can be quickly reinforced and target behaviors can increase (O'Leary & Drabman, 1971). Infrequent exchange periods at the beginning of a token economy's implementation may prevent this type of system from working effectively. It is important to determine and adapt the exchange period based on classroom needs (Kazdin, 1977; McLaughlin & Williams, 1988). For some participants, especially those with Attention Deficit Hyperactivity Disorder (ADHD), the immediacy in which a back-up reinforcer is received will be the most influential dimension a token economy, making the time between token and exchange crucially important (Neef, Bicard, & Endo, 2001; Reed & Martens, 2011). One of the important considerations when carrying-out a token economy is its impact on the classroom environment or setting. The exchange period should be quick to complete and not significantly impact the ability of the teacher to manage the classroom or particular setting. Based on these considerations, it is important to schedule exchange periods at the end of the class period, during a naturally occurring transition, or possibly at the end of the day or week.

There are many different ways in which a token exchange can take place. Many types of exchange systems have been implemented (Kazdin, 1977; McLaughlin, 1975). Tokens may be exchanged as soon as they are earned (Bushell, 1978), at the end of a certain time period (McLaughlin & Malaby,

1972), or after a variable time period (McLaughlin & Williams, 1988). At the end of the token-reward period, there may be a catalog of items and privileges, a "store" where the participant is able to exchange tokens or a predetermined back-up reinforcer. Additionally, free-time itself may function as its own generalized conditioned reinforce as it gives the participants access to a variety of back-up rewards.

When the system is in place, teachers may choose an exchange time based on classroom schedule or student needs. Token economy exchange periods could take place at the end of a 50-minute class throughout the day, daily, weekly, or biweekly. The effectiveness of the token economy may decrease as more if more time passes between presentation of the token and exchange for the backup reinforcers (Kazdin, 1977; Neef et al., 2001; Reed & Martens, 2011). Variability of the exchange times as opposed to fixed time periods where tokens are traded for back-up rewards have been shown to increase response rates as well as maintenance of the behavior (McLaughlin & Malaby, 1976). According to McLaughlin and Malaby (1976), executing variable exchange times within a token economy is effective and an important consideration for any teacher or economy manager to consider.

3.3   Variations of Token Economies

3.3.1 Response cost

During a response cost system, tokens are taken away as students engage in certain pre-defined behaviors. When tokens are taken from the student that is the cost of the behavior. In this variation of the token economy, each unwanted behavior will have a cost which results in the confiscation of a determined amount of tokens. Response cost is very commonly used to suppress behavior (Kazdin, 1977). The most commonly used form of response cost is the withdrawal of tokens or fines. Token economies are unique because tokens can be presented or removed (Kazdin, 1977; McLaughlin & Malaby, 1977a). Hall et al. (1972) employed response cost to reduce whining in a young child. The researchers used slips of paper given to the boy with his name printed on them. The slips were taken away for negative behaviors. Even when these slips had no apparent value, this response cost system drastically reduced negative behaviors. Iwata and Bailey (1974) compared token reinforcement and response cost in a special education classroom. Both were equally effective at improving behaviors. However, the teacher was more negative with the students when response cost was used in the classroom. In McLaughlin and Malaby (1977a), token reinforcement and response cost system was found to be more effective at increasing target behavior than token reinforcement alone. Achievement Place, (Kirigan, Braukman, Atwater, & Wolf, 1982), where at-risk youth are often sent to learn important social and academic skills, so they can be placed back into mainstream society, effectively implements a token reinforcement system with response cost to reduce severe behaviors while increasing pro-social and academic behaviors (Ayllon & Azrin, 1968; Bailey, Wolf, & Phillips, 1970; McLaughlin & Malaby, 1977a). In general, token economies with and without a response cost component have been effective in different settings. It is important to note; however, that a program solely reliant on response cost and punishment-oriented management are less likely to result in creating pro-social behaviors in the participants (Iwata & Bailey, 1974; Kazdin, 1977). This is interesting considering that, in some studies, there seems to be a preference by the teachers of response cost when compared to a token reinforcement only system (McGoey & DuPaul, 2000). In McGoey and DuPaul (2000), a preschool class compared stickers rewarded to students and stickers being removed for off-task behavior. They found them to be equally effective. This finding replicates Iwata and Bailey. However, it is important to consider that reinforcement for specific target behaviors is more likely to develop pro-social responses as alternatives for the behaviors to being suppressed (Kazdin, 1977).

3.3.2 Lottery systems

Instead of a token economy where behaviors earn tokens to be exchanged at later period, lottery-based systems add an additional component to the exchange period. In this type of economy, target behaviors are rewarded with a token, or ticket and at the end of the reward period there is a lottery to determine which individuals earn a backup reward. This can minimize the amount of backup rewards delivered in the token economy by choosing only a select number of tokens, or tickets, to exchange. A weakness of this type of system would be some ages and populations may be difficult to affect without a direct correspondence of tokens and backup rewards (McLaughlin & Williams, 1988).

3.3.3 Individual vs whole class

It will be up to the teacher or manager of the economy to determine whether tokens will be awarded to entire groups or to individuals within the group. The advantage of developing a group-oriented token economy is the ease of which teachers may implement and track tokens and rewards (Kazdin, 1977). These class-wide systems have also been well documented and seem to be useful in reducing unwanted behavior (Bushell, Wrobel, & Michaelis, 1968; Packard, 1970). Consequences in these class-wide economies can be group or individually administered, depending on the system chosen. Packard (1970) evaluated a token economy under a group contingency in four elementary school classes where off-task behavior was a concern. In Packard's study, certain class periods were chosen for each grade and a class goal was assigned to raise on-task behavior. When the class met the criteria for on-task behavior, they were given points which could then be exchanged for group or individually assigned rewards (Packard, 1970). The results in that study showed baseline levels of below 10% on-task behavior rise to between 70-100% on-task behaviors during class periods once the group-contingent token economy was implemented (Packard, 1970).

3.3.4 Level systems

Level systems are a variation of token economy. In these systems, different levels correspond to different degrees of participant behavior. For example, increasing preferred target behaviors may result in higher levels which then translate to higher rates of reinforcement and privilege while unwanted behaviors may result in a decreased rate of reinforcement or loss of privileges. In one level system, each participant was assigned a shape or character and every 2-4 hours, would be moved up or down the six-level system (Filcheck, McNeil, & Greco, 2004). Each system can be monitored differently; however, the movement from one level to another based on participant behavior which results in varying levels of reinforcement. Filcheck et al. (2004) compared a system where efficiency was a priority and all rewards were able to be dispensed within three minutes. The researchers found this efficient exchange to be beneficial during class times. The ability to efficiently dispense rewards and levels make these systems easily customized based on the needs of the setting.

3.4   Efficacy of Token Systems

3.4.1 General Outcomes

Research with individuals in classroom settings using token economies has been firmly established the efficacy of token reinforcement in altering a wide range of responses (Kazdin, 1977). There is a significant need for effective behavior management systems. Lavigne (1998) notes that children behavior problems are increasing, with estimates ranging from 2 to 17% of the population. This rate of children with behavior problems is highlighting the demand for behavior management systems which are data-based and effective. Token Economy systems are able to have a profound impact on schools, classrooms, and community-based settings. One variation of the token economy, a response cost system, is known to have produced higher levels of on-task behavior than when compared to medication (Rapport, Murphy, & Bailey, 1982). The structure and implementation of the token economy is important as noted by Kazdin (1977) where he describes the effectiveness of reinforcement depends on: the delay between performance of response and delivery of reinforcement, the magnitude and quality of the reinforcer, and the schedule of reinforcement. Many factors are important in the consideration of a token economy. Whether or not reinforcement takes place on a continuous or intermittent basis can impact the likelihood of maintenance (Kazdin, 1977).

3.4.2 Preschool

Token economies in the preschool setting have been utilized with a variety of modifications to this behavior-management system (Filchek et al., 2004; McGoey & DuPaul, 2000). As the need for behavioral interventions increase, it is important for preschool teachers to be aware of these token-oriented procedures, and using these systems classroom-wide may be a great pro-active benefit (Filcheck et. al., 2004).

Filcheck et al. (2004) compared the effectiveness of a class-wide token economy level system with parent-training techniques in managing aberrant behaviors. These authors note that class-wide application of the token economy has not been previously analyzed. However, group and individual application of token systems have effectively reduced disruptive behavior in other settings (Bushell, Wrobel, & Michaelis, 1968; Packard, 1970). The classroom in Filcheck et al. was described as "out of control" and was chosen for behavioral intervention. The token economy used was a level system where the top three levels included sunny faces which get increasingly happy, the center level is the starting point and is blank and white, while the bottom three levels include cloudy faces that get increasingly greyer and sad (Filcheck et al., 2004). In this system, promotion to different levels within the preschool class allowed participants to complete certain activities while other children, who were not promoted, were continuing with the pre-determined class schedule. Furthermore, at the end of certain activities, all participants with "positive" behavior levels receive additional rewards like stickers or activities with the teacher. In this system, the level system was found to decrease rates of inappropriate behaviors; additionally, when the parent training was implemented further decreases occurred (Filcheck et al., 2004). It is important to consider that in this study the training time necessary for each of the two behavior management tools. In this study, the Level System took 4 hours and 30 minutes to train staff on including all consultation and feedback time; however, the parent training took 11 hours and 30 minutes (Filcheck et. al. 2004). In term so effectiveness and time efficiency, the level system seemed to have the greatest rate of positive return.

Additional studies have shown rapid behavioral improvement when a token economy is implemented. A study involving a sticker chart in McGoey and DuPaul (2000) was managed by teachers placing

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stickers on a classroom board when they "caught" students being on-task. When a student earned a certain number of small stickers, they were rewarded with a big sticker (McGoey & DuPaul, 2000). For the response cost portion of this study, stickers were removed contingent on being off-task and when the session ended, the big sticker was kept or removed from the chart. These token economy and response cost systems resulted in large decreases of aberrant behavior (McGoey & DuPaul, 2000). Implementing token economies in a preschool setting, Sran and Borrero (2010) compared two variations of this behavior management system. In this study, tokens that were exchanged for a variety of preferred items were shown to be more effective than tokens that could only be exchanged for one highly preferred item. These results are consistent with previous research which shows generalized conditioned reinforcers are more reinforcing than a single reinforce (Kazdin, 1977).

3.4.3 Elementary school

Elementary school classrooms, based on research study volume, seem to be one of the most common settings in which token economy systems are used (Coupland & McLaughlin, 1981; Ruesch & McLaughlin, 1981; Thompson, McLaughlin, & Derby, 2011). Many studies exist which show the effectiveness of this type of behavior management tool. One of these studies, employed a free time reward when five tokens had been earned (Ruesch, McLaughlin, 1981). The rationale that free time would consist of a variety of reinforcers made it unlikely that satiation would occur (Kazdin, 1977). In Ruesch and McLaughlin, (1981) a clear increase in student assignment completion took place. When token economies were used to decrease inappropriate behavior by rewarding being on task, there is proven effectiveness with this behavior management system (Coupland & McLaughlin, 1981). Under a token economy with sixth grade participants, points were given and subtracted for appropriate and inappropriate behavior respectively (McLaughlin & Malaby, 1976).

McLaughlin and Malaby (1977a) compared token reinforcement with and without response cost in a special education elementary classroom. In McLaughlin and Malaby's (1977a) study, ten participants were asked to write letters for a several minute session where they earned no token reinforcement during baseline, token reinforcement during the next phase, and token reinforcement plus response cost during the final phase. The overall results were such that, in this elementary classroom, token reinforcement plus response cost resulted in higher rates of target behavior (McLaughlin & Malaby, 1977a). In another study, McLaughlin and Malaby (1976) analyzed assignment completion under different schedules of token exchange. During that study involving a fifth and sixth grade class, points were earned or taken away depending on whether children displayed appropriate or inappropriate behavior. The results showed that participants had higher rates of appropriate behavior, as measured through assignment completion, when there were a variable number of days between token award and exchange (McLaughlin & Malaby, 1976). According to the authors, McLaughlin and Malaby (1976) note that such a system where variable exchange days were implemented should be considered for any teacher or economy manager interested in impacting the rates of assignment completion.

3.4.4 Middle school

Middle school classrooms have seen many instances of positive behavioral outcomes as part of a token economy (Flaman & McLaughlin, 1986; Maglio & McLaughlin, 1981; Swain & McLaughlin, 1998; Truchlicka, McLaughlin, & Swain, 1998). Maglio and McLaughlin (1981) note the importance of a teacher's ability to manage the token system in their study where a student's partial self-management, with teacher supervision, of points along with back-up reinforcers resulted in a significant decrease of inappropriate behaviors. Besides social behavior, academic improvement has also been seen during

token reinforcement (Flaman & McLaughlin, 1986). Flaman and McLaughlin's study took place in a junior high school drop-out prevention program where the subject rarely completed an assignment unless given one-on-one assistance. In that study, correct answers on a worksheet resulted in 1-2 points per problem that could be exchanged for free-time on a classroom microcomputer. This study increased the rate of correct answers from 34% to 69% correct during the first phase, and to 79% during the second phase of token reinforcement (Flaman & McLaughlin, 1986). A second system where assignment accuracy was a concern included bonus points (Swain & McLaughlin, 1998). In that study, four middle school special education students which were previously being managed by a token reinforcement system were offered fifty extra bonus tokens or points for assignment scores greater than 80% (Swain & McLaughlin, 1986). This bonus contingency resulted in an increase of math accuracy. When response cost is implemented in a high school setting, positive results are possible (Truchlicka, McLaughlin, & Swain, 1998). Truchlicka et al. (1998) implemented a response cost to an already functioning token reinforcement system. In this system, an accuracy goal of 85% was required to earn token reinforcers; however, if that accuracy level was not reached, tokens were removed or privileges were denied. This study concluded that the response cost phase resulted in a higher rate of accuracy for each subject. The implementation of a point gain or point lose system had a greater impact than a token reinforcing system.

3.4.5 High school

Implementation of token economies in the high school setting occurs at a much lower rate than when compared to elementary school or middle school settings. This may be attributed to the fact that teachers are more apprehensive towards this type of system; alternatively, the lower rate of occurrence could be due to a perceived lack of effectiveness.

In a study by Crawford and McLaughlin (1982), token reinforcement was evaluated as a means to increase on-task behavior. This study was conducted in a high school within a self-contained special education classroom with a 15-year-old student. The student was given tokens and worked for a chosen back-up reinforce which cost 30-40 cents worth of tokens. In this study there was a clear increase in on-task behavior during the token-reinforcement phases. According to the study, on-task behavior from the student more than doubled when tokens were first introduced (Crawford & McLaughlin, 1982).

3.4.6 College or University

Token systems in college settings have also been assessed for effectiveness. Participation in class within all settings is a priority and a goal for many teachers and professors, and two studies specifically, aimed to analyze the impact of tokens on classroom participation in college settings. Jalongo (1998) determined that only approximately 10% of students voluntarily participate in class discussions. In one study, good questions that related to content, made sense, among other requirements, were rewarded with token slips that were exchanged for bonus course points (Nelson, 2010). This study involved 318 undergraduate students and reported that classes asked higher rates of questions when the token economy was implemented. An additional study involving token economies at the college level analyzed the impact of class participation before, during, and after implementation of the behavior management system (Boniecki & Moore, 2003). This study found that questions were asked, and classroom participation was greater, when a token economy was introduced. The tokens in this system were exchanged for .25% of additional credit towards the final course grade (Boniecki & Moore, 2003). Students were more than twice as likely to participate than before the token economy

system. Both token economy studies found an increase in classroom participation when a token reinforcer was introduced; notably, in both cases, the tokens were exchanged for extra credit towards the final grades in the classes. Grades could potentially be considered highly preferred items for college students seeking certain GPAs, job prospects, etc.

3.4.7 Community and home

Applicability of the token economy can also be found in home-based and community settings (Bippes, McLaughlin, & Williams, 1986; Jordan, McLaughlin, & Hunsaker, 1980; Rustab & McLaughlin, 1988). Token systems implemented at home can be effective at reducing or increasing similar behaviors that are found in the school setting, as well as social behaviors and task-related behaviors (Alvord, 1971; Arnett & Ulrich, 1975). Implementation in the community detention centers have also delivered increased rates of accuracy and target behaviors (Bippes, et. al., 1986). In Rustab and McLaughlin's (1988) study, inappropriate behavior and spelling accuracy were measured during baseline and post-token economy implementation. In this particular case, tokens were rewarded for every 5 minutes of appropriate behavior and tokens were exchanged weekly for privileges within and outside the home.   Inappropriate behavior immediately decreased once token reinforcement began. When target academic and social behaviors were only reinforced through tokens at home, the higher rates of on-task behavior and spelling accuracy at home were generalized to higher rates of the behaviors in school (Rustab & McLaughlin, 1986). Home-exclusive behaviors in the category of chores and social demands were also dramatically increased during another study (Christophersen, Arnold, Hill, & Quilitch, 1972). Home-based token economies using 1 cent per minute token rewards have been shown to increase on-task behavior (Jordan et al., 1980).

Token economies in the schools where consequences were dispensed at the participant's home have also resulted in improved classroom performance and study behavior (Bailey, Wolf, & Phillips, 1970). In this study, on task "yes'" were rewarded with privileges at home (Bailey et al., 1970). Partnerships between the classroom teacher and the home guardian of the participant can play an effective role in behavior modification. In many cases of children with severe behavior, classroom teachers may not be in possession of reinforcing contingencies, and, may require a parent or guardian to devise effective consequences (Bailey et al., 1970). Moreover, concerns of a lack of maintenance and participants being unable to generalize behavioral gains made in the school setting make home-involvement more attractive (Brown, Montgomery, & Barclay, 1969; Walker & Buckley, 1972). Involving the parents or guardians in such a way that they are dispensing the consequences for behavior occurring in other settings is an effective method to sustain a token economy (Bailey et al., 1970; Cantrell, Cantrell, Huddleston, & Woolridge, 1969; McKenzie, Clark, Wolf, Kothera, & Benson, 1968; Thorne, Tharp, & Wetzel, 1967).

3.5   Limitations and Ethical Concerns with a Token Economy

As with any system which has been widely implemented, token economies have been the target of ethical concerns as well as criticisms stemming from published and perceived weaknesses (Kohn, 1999). Doubts and concerns about token economies have existed since the behavior modification method has taken on a more mainstream role in society. Early criticism of Alexander Maconochie's "Mark System" described his program as indulging the prisoners rather than providing the punishment and social revenge usually accorded them (Kazdin, 1977). The tickets given out in New York City schools originating from Lancaster's "Monitorial System" of reward and punishment was withdrawn in the 1830's because the trustees believed that cunning behavior rather than meritorious behavior was

being rewarded (Kazdin, 1977). However, token-based reinforcement systems tend to be extremely effective as a method to modify behavior (Chance, 2006; Kazdin, 1977). Notably within a token economy, a large number of target behaviors, clients, and back-up reinforcers can be incorporated into a single, highly efficient method (Kazdin, 1977). A general concern inherent to any behavior management system is its ability to be fair, reliable, and functional. Stealing of tokens, lack of participation, token-economy sabotage by participants are some of the ways that this behavior management system may fail from within. It is vital that token economy managers are aware of these possibilities and take steps to pre-empt any of these negative consequences of poor planning (McLaughlin & Williams, 1988).

Modern critiques of the token economy have come from education professionals, administrators, and community members. This criticism has stemmed from philosophical opposition to token reinforcement. These critics have suggested that token reinforcement constitutes bribery or blackmail (Kazdin, 1977; Kohn, 1999). However, when one defines bribery in the correct manner, token reinforcement is not used to reward unethical or illegal behaviors. Therefore, labeling token reinforcement as bribery is totally inappropriate (Chance, 2006). Although social and philosophical opposition are fruitful topics for the media, the inappropriate use of such terms as bribery, rewards as suggested by Kohn (1999) is totally inaccurate. There have been concerns that students may become dependent on these systems and they will only constantly working for tangible tokens or backup rewards. Furthermore, there is criticism that these systems may undermine intrinsic motivation for students (Kohn, 2006). While intrinsic motivation may produce qualitatively different results, not all individuals possess such willingness and appropriate behavior must be more directly reinforced.

As part of the token economy, teachers and others use back-up reinforcers to give value or potency to the token (Kazdin, 1977). Some systems employ back-up reinforcers that are new to the environment, while others use back-up reinforcers that more naturally "fit," such as recess or a free break during class in a school setting (McLaughlin, 1981; McLaughlin & Malaby, 1972, 1975, 1976). An important component to remedy a loss of target behavior over time is to create token economies where the back-up reward is a natural reinforcer, where, instead of an external prize that costs money and is administered by the economy manager, the tokens could be exchanged for a rest period or a water break. Even when these two different forms of back-up reinforcers are dispensed, it is setting the occasion for the participant to be rewarded for certain behaviors, just as an employee would be rewarded with a paycheck, a participant would be able to earn tokens. Token-reinforcement systems can easily be compared to the adult world of work and society as a whole where certain work or behaviors are rewarded with tokens, or cash. Token-based programs can leave the participants dependent on earning rewards for target behaviors. Once tokens are withdrawn, desirable behavior may decrease or inappropriate behaviors increase (Kazdin, 1977). As a token-economy manager attempts to phase out the program, it is important that specific procedures are implemented in order to withdraw the economy without a loss of behavior gains. Kazdin (1977) and others note that creating a procedure where exchange periods become less frequent and increasingly variable may improve the likelihood of maintenance (McLaughlin & Malaby, 1972, 1975, 1976). Additionally, self-monitoring by the participant may also help the behavior to generalize across settings and even after tangible rewards are being exchanged explicitly by the manager (Turkewitz, O'Leary, & Ironsmith, 1975). These modifications have been shown to remedy these issues related to maintenance and generalization.

Another concern is that token economies are sometimes substantial work for the staff that administers them. Teachers are encountering larger classes with increasing numbers of behavioral issues; however, easily implemented systems can address their needs as well as the varied classroom management concerns (Barth, 1979). The degree in which a teacher can easily implement this token

economy strategy is an issue for teachers who are busy teaching. Often, it is difficult to engage in elaborate systems that mandate data collection, token management, and intricate exchange processes. While there are systems which are administratively more involved than others, it is possible to implement systems which are easy to implement and evaluate. A system of easy administration was studied in Rustab and McLaughlin's (1988) home-based system where a parent was able to administer the system without any outside help once the parent was trained on token reinforcement. Additionally, when a token economy was implemented to increase piano practice time, the parent was able to implement the procedures with little training and administrative struggle (Jordan, McLaughlin, & Hunsaker, 1980). Concerns over the administrative aspects can be mitigated with deliberate planning of the token economy. For example, response cost was preferred by teachers and sustained after research ended in a preschool classroom due to easier management (McGoey & DuPaul, 2000). In McGoey and DuPaul (2000), the researchers noted that catching individuals within a large class or group made a response cost system easier to implement. Making preferences for one system modification over another, especially when implementing a token economy with an entire classroom, will help teachers decrease administrative tasks inherent in some token economies while allowing this system to function as a behavior management tool.

Next, there are limitations of token economies, notably concerning participants who exhibit severe behavior in a class or group-home setting. These participants with severe behaviors may not be affected by a token economy system that would work for most other individuals (Kazdin, 1977). Some participants simply do not respond to the token economy for one or multiple reasons. Potentially, with severe behavior, other therapies may be implemented to decrease inappropriate responses. If the problem is behavioral it will be up to the manager of the system to determine whether certain modifications can be made to enhance the viability of the token economy. If a student is not responding to the token economy, then it would be necessary to evaluate the procedures used to give tokens, exchange tokens, as well as the actual rewards being given out in exchange for the tokens. For example, altering the back-up rewards where they are more reinforcing for an individual would be way to make the token economy more effective. As previously noted, if the classroom teacher is unable to dispense appropriate consequences which do have significant reinforcing qualities, involving those who can by communicating with the parent or guardian at the participant's home may result in a more effective token economy (Bailey et al., 1970).

Cost is a significant consideration when implementing a token economy, and can be a limitation when a teacher or other manager is beginning to plan the back-up reinforcers being used. This is especially true when trying to configure a genuinely reinforcing reward with the ability to drive behavior modification, a potentially challenging mission with increasingly older participants. There are several studies which aim to develop token economies which are effective and cost-conscious. The purpose of McLaughlin and Malaby (1977b) study was to evaluate the effects of a cost free token reinforcement program on special education students. Rewards included: recess, extra gym time, films, free time, special jobs, messenger, art projects, and buying the teacher lunch. It was shown that this system delivered an increase in the frequency of letters traced. The number of target responses varied from 15-84 during baseline, to 30-108 during the token phase (McLaughlin & Malaby, 1977b). It is clear that token economies can be effective at a low cost when certain rewards are used in the program. Free and low cost reinforcers are also a realistic option for token economy administrators of older and more sophisticated students (Crawford & McLaughlin, 1982). In Crawford and McLaughlin, (1982) a single cassette tape was purchased and listening time acted as a back-up reward; a cost effective reinforcer within that token economy increased levels of on-task behaviors. Ultimately, it is the responsibility of teachers and economy administrators to utilize the low cost and free options available to them and within their classroom and community.

These concerns and limitations of token economies are genuine and should be addressed in one way or another; however, they are no reason to cease implementation of a token economy. All concerns and limitations listed above and throughout this literature review can be mitigated through careful review and modification of the token economy. Concerns may be best addressed through meaningful communication between the token economy manager and the concerned individual. Communication an education of the teachers, parents, and community members may help reduce the concerns and likelihood that public distress may preemptively end the token economy in the classroom.

4   Suggestions for Future Research

It is important to elaborate on and conduct further research on token economies with a variety of settings, participants, and modifications. As this behavior management system has seen wide-range success in increasing target behaviors, while decreasing others, it is important to expand the scope of utilization of the token economy. More studies with older participants should be conducted. Notably, research should be completed with students in middle and high schools; in particular, research implemented with older students diagnosed with emotional, behavioral, and social disabilities would benefit students and teachers significantly.

Additionally, it is important to evolve teacher education programs to where new teachers have strong classroom management foundations. Successful classroom management techniques are crucial to successful teaching and student learning: token economies are an important aspect of classroom management which teachers could implement. Beyond learning the techniques available to teachers in their programs, instilling a meaningful knowledge of behavioral principles are important for successful classroom management and token economy implementation in particular.

Another suggestion for future research relates to maintenance of certain target behaviors which were reinforced in a token economy. Maintenance of skills is crucial for real world application and long-term success. Sustainment of behavioral gains is important to the teacher's target behavior goals, long-term success for the student, and various social rewards. Research which elaborates on maintenance realities of behavior post-token reinforcement would be helpful for practitioners on how best to continue the gains made during a token economy. Within the area of back-up reinforcers, the type of item used may help to strengthen the long-term sustainability and maintenance of the token system. Research which discusses whether more natural reinforcers, which are part of the setting in which the participants live, work, or are taught, are more effective and sustainable than more abstract or artificial rewards or reinforcers.

5   Analysis and Conclusions

Ultimately, token economies have been found to be an effective method of behavior management across various settings. This analysis has compiled evidence of effectiveness across school and community settings; however, token- reinforcement systems have seen remarkably diverse applications in prisons, military organizations, and psychiatric hospitals. Based on this collection of studies, it is important to note the trends which exist in the modern implementation of the token economy; particularly, the populations most often studied and the types of modifications implemented across varied settings. In order to effectively implement a token economy, it is important to fully understand the principles of behavior, the variety of token systems, and how to manipulate the conditions of the token economy in order to best serve the needs of a particular group or setting.

Based on the review of literature, it seems there has been a decline in the quantity of research articles of token economies throughout the past several decades. The works referenced in this review illustrate the great majority of articles are dated before 1990. Moreover, each decade from 1960, 1970, and 1980 resulted in an average of approximately three times the number of articles when compared to each decade after. Clearly, based on the references reviewed for this article and searches completed on various databases, token-economy research since the 1960's through 1980's has experienced a sharp decline. There may not be a single explanation why this reduction in research has occurred in this area; however, there are several possible reasons. One, the steep reduction of research could be a result of overwhelming data and research on the topic's effectiveness. Another possibility could be a decline in use as increasing numbers of school districts and communities have avoided using extrinsic rewards, and token economy systems, to manage classrooms. Third, the reduction in research of token economies could be attributed to researchers' concentration on novel management techniques or more unique learning strategies. While these given reasons may or may not be the actual reason for the decline in token research, they each have an important role in the discussion.

The reduction in research articles vetting the token economy since the around the 1970's leaves much work to be done. The effectiveness of these systems in middle and high school has been addressed only minimally. The same is true for higher education settings where token economies have shown to be, so far, highly effective. Specifically, research deficits can be cited with the lack of completed studies involving participants with emotional and behavioral disorders in the high school classroom. These deficits should be remedied, especially if one of the reasons for the decline in research was a result of the overwhelming attention the topic received in decades past. There are still areas within the token economy that have not been adequately addressed. While the token economy is widely known it is important to inform the education community of the potential for even greater utilization across an even larger number of settings and populations.

In the research on token systems, there are certain settings where a reader is more likely to find a study relating to the implementation of the behavior modification system. Elementary settings are much more likely to implement a token-reinforcement system, based on the articles reviewed, than middle or high school settings. The older and more senior a participant, the less likely there is to be a study on effective behavior modification using a token-reinforcement. Of particular note, classrooms composed of students with emotional, social, and behavioral disabilities have not widely implemented token systems. Research with these high-needs populations would add knowledge to the field and enhance behavior management in those classrooms. This could really be beneficial for those teachers working in such classrooms.

An additional area of noticeable weakness within token economy literature is related to maintenance and generalization of treatment effects both during and after program implementation (Kohn, 1999; Turkewitz et al., 1975). Varying schedules of exchange from fixed (once per period or week) to a more variable one (exchange from once a week to once every 3 weeks for example) may help to mitigate maintenance concerns. Variable exchanges have been shown to increase maintenance of the skill and to be effective (McLaughlin & Malaby, 1976). Also, additional research where the long-term assessment of such outcomes is employed is clearly needed.

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members.   Now teaching students with EBD in the Lake Washington School District. Requests for reprints should be addressed to Christopher Doll, MIT, Lake Washington School District #414, Juanita High School, 10601 NE 132nd St., Kirkland, WA 98034.

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