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Evaluation of a level system with a built in token economy to decrease inappropriate behaviors of individuals with mental retardation

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Evaluation of a Level System with a Built in Token Economy to Decrease Inappropriate

Behaviors of Individuals with mental Retardation

by

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Dedication

I would like to dedicate this study to my Mom, Dad, Danny, Jimi and the rest of my family. Thank you for your constant support and encouragement everyday; without all of you I would not have got to where I am today. Finally, to everyone who dedicates their time to improving the lives of individuals with disabilities.

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ABSTRACT

The level system is a behavioral procedure that alters the status of a participant contingent on his or her behaviors; within each level the amount of reinforcement is different. In most cases, level systems are paired with another form of treatment such as a token economy. In the current study, the effectiveness of a level system with a built in token economy was evaluated within three intensive residential group homes with 3 male participants. Each participant was diagnosed with mental retardation and behavioral issues. The level system was comprised of 5 different levels, each having different privileges and reinforcers. Each participant received token dollars for displaying replacement behaviors and the tokens were used to purchase items from a token store. A preference assessment was conducted to determine the items and their values. The results of the current study suggest that a level system with a built in token economy is an effective form of treatment in managing severe, inappropriate behaviors in individuals with mental retardation residing in a group home setting.

Introduction

Historically, token economies have been the most widely used behavior

management procedure in residential, in-patient, school, and correctional settings (Jones,

Downing, Latkowski, Ferre, & McMahon, 1992). Originally developed to manage

inappropriate or maladaptive behaviors within the institutionalized population, the token

economy has morphed its function to increasing pro-social behaviors and correcting

academic deficits as well (Allyon & Azrin, 1968; Birnbrauer, Wolf, Kidder, &Tague,

1965; Clark, Lachowicz, & Wolf, 1968; Jones et al., 1992; Kazdin & Bootzin, 1972;

Liberman, 2000; Wolf, Giles, & Hall, 1968). The token economy has been paired with

many other behavior management procedures; more recently the Level System (Cavalier,

Ferretti, & Hodges, 1997; Kerr & Nelson, 1989). The Level System is a behavioral

procedure that alters the status of participants contingent on their behavior; each status

"level" differs in the amount of reinforcement (Hagopian et al., 2002).

The token economy is a behavioral procedure that administers an exchange unit or

token (for example, a coupon, poker chip, a penny, a hole punch in a card or small

cardboard cutout) to an individual contingent on specifically defined behaviors

(Dickerson, Tenhula, & Green-Paden, 2004). The tokens become conditioned reinforcers

because they are then turned in at designated times for back-up reinforcers (Comaty,

Stasio, & Advokat, 2001).

The components of a token economy are very simple. First, the target behaviors

to be increased or minimized must be identified (Kazdin, 1982). This is the foundation of

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the token economy. Contingent on target behaviors to be increased or the absence of target behaviors to be decreased the participant will receive tokens.

Second, you must identify what you will use as tokens. The purpose of the token economy is to increase the occurrence of good behaviors and decrease the occurrence of bad behaviors. Each good behavior immediately receives a token and is exchanged later for a back-up reinforcer; because the tokens are paired with other reinforcers they become conditioned reinforcers which increase the likelihood of good behaviors occurring (Miltenberger, 2008). When choosing the back-up reinforcer to pair with the token it is important to choose items that are preferred by the participants; this will increase the likelihood of the participants engaging in the appropriate behaviors so that they will earn the items of their choice (Miltenberger, 2008).

Lastly, you must identify how the tokens will be earned and spent to access the back-up reinforcers. It has to be decided for what behaviors and under what conditions the tokens will be dispensed. These conditions must be consistent in order for the treatment to be effective. The same goes for spending the tokens. If the tokens are used to buy tangible items it is best to set-up a specific time in which the tokens can be spent and only allow spending at that time. This makes the reinforcing value of the tokens higher (Kazdin, 1982).

In order for the token economy to run smoothly, the observation, quantification, recording, and analyzing of the participant's data are crucial (Milby, Herman, Willcutt, & Hawk, 1973). The behaviors must be observed and the individual must immediately receive the token. Data collection is crucial in the implementation and analysis of the effectiveness of the token economy.

Since its development the token economy has been used across a range of settings and populations. Token economies have been implemented in schools, group homes, and correctional facilities. Studies have indicated that teachers, therapists, and ward personnel can produce changes in behavior by manipulating the consequences through a token economy (Phillips, Phillips, Fixsen & Wolf, 1971). Phillips (1968) conducted a study at Achievement Place, a community based, family style behavior modification program for pre-delinquents, and found the use of a token economy resulted in decreases in the instances of poor grammar and aggressive statements and increases in tidiness, punctuality, and the amount of work completed at home. At Achievement Place the participants earned tokens for specified appropriate behaviors and lost tokens for specified inappropriate behaviors. As the tokens were earned or lost throughout the day they were recorded on a 3 X 5 index card. At the end of the day the participants subtracted the total lost from the total earned and the remaining value was what was used to buy privileges for the following day (Phillips et al., 1971).

The use of a token economy has also been proven to be effective in treating problem behaviors of school children, mental health patients, and delinquent youths (Milan & McKee, 1976). Milan and McKee (1976) developed a token economy for the appropriate behavior of adult male felons in the prison system and the behaviors needed outside the facilities walls in order to prepare the felons for their release. The study focused on how various arrangements of behaviors and token reinforcement procedures affected the performance of activities centered on hygiene and orderly operations in large institutions. The results of the study suggested that a token economy could be effective even in a large institutional setting in maintaining appropriate behaviors. In correctional

facilities a token economy may be paired with an additional behavioral intervention procedure such as the Level System (Milan & McKee, 1976).

To date there are very few studies published on the Level System; however, for years educators have implemented level systems to motivate and encourage students with emotional and behavioral disorders to excel in the classroom (Morgan & Jensen, 1988; Scheuermann, Webber, Partin, & Knies, 1994). In the Level System the participant advances through the levels by displaying more appropriate behaviors and fewer problem behaviors. As the participant advances, access to more privileges and items of reinforcement that are found to be more desirable increase (Hagopian et al., 2002). However, if the participant engages in inappropriate and problem behaviors his or her status in the Level System drops. In the lower levels there are fewer privileges and more restrictions to preferred items (Hagopian et al., 2002).

Generally, Level Systems are used within groups of people to promote socially desirable behaviors and compliance with the rules of an institution (Hagopian et al., 2002). This behavioral procedure is used in schools, psychiatric hospitals, correctional facilities, and residential programs (Hagopian et al., 2002). Most Level Systems are designed so that the participants advance or drop levels based on identical contingencies (Hagopian et al., 2002). For example, in order to advance from Level 3 to Level 4 each participant must have independently made their lunch by 4 pm or, in order to advance from level to level, each participant must go the designated time without engaging in any inappropriate verbal behavior such as swearing or speaking in a loud voice while inside the house. The privileges accessed, generally, are also the same across participants; these privileges could include outings to specific places or access to television or radio. In the same respect, when participants engage in inappropriate behaviors, the response cost is

generally the same across participants, depending on severity of the behavior (Hagopian et al., 2002). Many Level Systems are designed so that the participant starts in the most restrictive level and by displaying the appropriate behaviors for a given period of time is then able to advance to higher levels.

However, within the published research there have been limitations to the implementation of a Level System. Many believe the Level System is not individualized enough for the participant, it cannot adequately treat all problem behaviors, and it is questionable in the eyes of the law (Scheuermann et al., 1994). Level Systems in the past have been applied only to group settings and not used as an individualized treatment (Hagopian et al, 2002). Therefore, this poses a problem because the treatment design is not based on functional assessment or preference assessment; two essential components of behavior analysis interventions (Hagopian et al., 2002). An additional limitation to most of the literature is that research is descriptive in nature and suggests outcomes that the Level System is an effective treatment option; however there has been a lack of empirical data and experimental control to support these claims (Bauer, Shea & Keppler, 1986; Klotz, 1987; Mastropieri, Jenne, & Scruggs, 1988; Smith & Farrell, 1993).

Although some literature exists on the use of level systems, this literature is limited by the fact that procedures are not described well, the programs are not individualized, and they are not evaluated through sound research designs. Therefore the purpose of this study is to utilize a within-subject experimental design to evaluate the effectiveness of a Level System with a built in token economy that is individualized to each participant yet conducted on a group level.

Method

Participants and Setting

Three adult males, all diagnosed with mental retardation and severe problem behaviors were chosen to participate in the current study; each of the participants has had some form of involvement in the criminal system. All three individuals currently reside in an intensive residential habilitation agency that specializes in aggressive and inappropriate sexual behaviors. The residences, located in the Tampa area, are three different group-homes located on one campus. Each group-home has 6 residents and is staffed at a 1:3 staff to participant ratio. The Adult Day Training (ADT) program attended by the individuals, which teaches horticulture and lawn care, is also located on the same campus.

Daniel is a Caucasian male in his late twenty's. He has been diagnosed with Fetal Dilantin Syndrome and Mental Retardation. Prior to his current placement, Daniel, served time at the state facility for individuals diagnosed with Mental Retardation who engage in criminal activity. On two separate occasions Daniel has had involvement with the Juvenile Court System. Both offenses involved him engaging in inappropriate sexual behaviors with a minor; the second offense resulted in a charge of a Lewd, Lascivious or Indecent Act with a Minor. Since his release to his current placement Daniel has engaged in serious problem behaviors such as inappropriate sexual behavior with and without contact, stripping, physical aggression, elopement, abusing the emergency response system (pulling the fire alarm), and property destruction, which includes damages up to

$1000. Daniel has the ability to communicate in complete sentences, ambulate independently, follow simple instructions and complete simple daily living skills with minimal prompting.

Doug is an African American male in his late twenties diagnosed with Moderate Mental Retardation and has a lengthy history of behavior problems. Information on his history is scanty but it was reported that Doug experienced developmental delays as a child. It was reported that he was placed in the care of an elderly neighbor at a young age, who was unable to manage his behaviors. As a result she placed Doug in a cage with dogs where he spent majority of his time. Doug was found by DCF when the death of the elderly neighbor was reported, naked in the dog cage with many forms of mutilation to his body from the dogs. From that point on Doug was placed in different families in the foster care system and other group homes until his placement at his current group home. At his previous placements Doug was found to be a high risk to others after engaging in inappropriate sexual behavior with two vulnerable peers. Previous to his current placement, Doug had served time within the judicial system after attacking a teenage girl in a mall bathroom. At his current placement Doug has engaged in inappropriate sexual behavior with and without contact, property destruction, and elopement. Despite his disabilities Doug can communicate in complete sentences, ambulate independently, follow simple instructions and complete simple daily living skills with minimal prompting.

James is a Caucasian male in his early twenties diagnosed with Mental Retardation. It is reported that James was placed in the custody of the State of Florida at a young age due to poor family conditions. While in the foster care system James was charged with several incidents of sexual misconduct resulting in him spending time at

juvenile detention facilities. After turning 18, James was placed at his current location

for treatment where he has engaged in inappropriate sexual behavior with and without

contact, physical aggression, property destruction and elopement. James has the ability

to communicate in complete sentences, ambulate independently, follow simple

instructions and independently complete simple daily living skills.

In addition to their severe problem behaviors, these three participants were chosen

for this study because they would not be leaving their current residential setting due to

court orders or having no other available placements that would meet their behavioral

needs at this time. In addition, each of the participants has had prior experience with a

level system at the state facility for those diagnosed with Mental Retardation that

engaged in criminal activity. It should be noted that none of the participants was

incarcerated during the study; however, all had the potential of being incarcerated if they

were to engage in a serious enough problem behavior, such as inappropriate sexual

behavior that included contact towards a minor. To prevent the possibilities of

incarceration each participant received 24 hour supervision from their direct care staff.

Target Behaviors

The target behaviors to be decreased in this study were inappropriate sexual

behavior with and without contact, physical aggression, property destruction, stripping,

abusing the emergency response system (pulling the fire alarm) and elopement. Each

participant had an individualized definition for these behaviors that had been determined

during a functional assessment; the assessment suggested that the participants engaged in

these behaviors to access attention, tangibles, escape, and automatic reinforcement.

Table 1

Target Behaviors

Daniel	Physical Aggression: Hitting with an open or closed hand, kicking, flicking (snapping his fingers in a whip-like fashion) or attempting to punch or flick other individuals with enough intensity to cause reddening or bruising, using items such as his boots or lunch box to throw at others. (Access to tangibles and Escape) Inappropriate Sexual Behavior with contact: Defined as touching others inappropriately, engaging in forced, coerced or non-consensual sexual behavior and/or any other violations of the 5-Rules identified in HDC's Sexual Behavior Policy (appropriate place, appropriate time, partner over 18 years old and able to consent, consent of partner (no means no), and use of safe sex practices). (Automatic Reinforcement) Inappropriate Sexual Behavior without contact: Defined as making sexual comments or propositions to others, staring, leering or any attempt to groom others to engage in sexual behavior without contact, or a violation of another person's personal space (within arm's reach of the other person when the situation does not warrant close contact). (Automatic Reinforcement) Elopement: Leaving sight of staff by walking away from the worksite or the fenced area at Seffner campus. (Access to tangibles and escape) Property Destruction (High Intensity): Breaking items with his body, hands, legs, feet or any combination thereof, throwing objects in an attempt to break items, such as his bedroom window or van windshields. (Access to tangibles, Escape, and Attention) Property Destruction (Low Intensity): Spilling items such as shampoo, powder, or mouthwash, using anything readily available to cause minor (less than $5) damage to property, and throwing items on the roof (with the exception of his clothing, which is included in his stripping definition). (Access to tangibles, Escape, and Attention) Stripping: Daniel will remove any article of clothing or shoes in an any area outside his room or bathroom. At times Daniel may rip his clothes off with his hands. After taking off clothes or shoes Daniel may throw these articles of clothing on the roof. Abusing the Emergency Response System: Pulling fire alarm or calling 911/abuse when warranted.
Doug	Physical Aggression is defined as the act or attempted act of physical harm by hitting, kicking, or throwing objects at others with the intent to injure. (Access to tangibles, Escape, and Attention) Inappropriate Sexual Behavior with Contact: is defined as 1) any non-consensual sexual contact including the touching of others private areas without permission, coercing others to participate by providing gifts or money in exchange for sexual favors, attempting to engage in horseplay with others, or grooming in preparation for sex with anyone, 2), rubbing his own chest while staring at others, grabbing genital area with or without clothing, or any attempt to approach a child, 3) any violations of the rules identified in HDC's Sexual Behavior policy which include (1. Adult person18 years or older, 2. Must use a condom, 3. Keep it private, 4.During non-obligated time, 5. Must be agreed each time, 6. No means no). (Automatic Reinforcement) Inappropriate Sexual Behavior Without Contact: is defined as staring and/or leering at children or animals either through a media source or while out in the community. Having possession of items that contain children or animals. An exposing himself to others. (Automatic) Property Destruction: is defined as the act of hitting or kicking objects with the intention of breaking them. (Access to tangibles, Escape, and Attention) Elopement: Leaving sight of staff by walking away from the worksite or the fenced area at Seffner campus. (Access to tangibles and escape)

James	Physical Aggression is defined as the act or attempted act of physical harm by hitting, kicking, or throwing objects at others with the intent to injure. (Access to tangibles, Escape, and Attention)
	Inappropriate Sexual Behavior with Contact: is defined as 1) any non-consensual sexual contact including the touching of others private areas without permission, coercing others to participate by providing gifts or money in exchange for sexual favors, attempting to engage in horseplay with others, or grooming in preparation for sex with anyone, 2), rubbing his own chest while staring at others, grabbing genital area with or without clothing, or any attempt to approach a child, 3) any violations of the rules identified in HDC's Sexual Behavior policy which include (1. Adult person18 years or older, 2. Must use a condom, 3. Keep it private, 4.During non-obligated time, 5. Must be agreed each time, 6. No means no). (Automatic Reinforcement)
	Inappropriate Sexual Behavior Without Contact: is defined as staring and/or leering at children or animals either through a media source or while out in the community. Having possession of items that contain children or animals. An exposing himself to others. (Automatic)
	Property Destruction: is defined as the act of hitting or kicking objects with the intention of breaking them. (Access to tangibles, Escape, and Attention)
	Elopement: Leaving sight of staff by walking away from the worksite or the fenced area at Seffner campus. (Access to tangibles and escape)

The target behaviors to be increased included the following replacement
behaviors: appropriate sexual behavior (6 rules), manding for attention, avoidance skills,
manding for tangibles, manding for escape from aversive situations, and manding for
escape from tasks. Each definition for these behaviors had been determined based on the
results of a direct observation functional assessment.

Table 2

Replacement Behaviors

Daniel, Doug, and James	Appropriate Sensory - 6 Rules: Appropriate masturbation and sexual behavior that follows the 6 rules for appropriate sexual behavior (which includes: 1. Adult person18 years or older, 2. Must use a condom, 3. Keep it private, 4.During non-obligated time, 5. Must be agreed each time, 6. No means no).
	Manding for Attention: Participant will appropriately access attention by calling others by their name or saying "excuse me".
	Manding for Tangibles: Participant will appropriately ask for the item he is requesting by saying "Excuse me, may I have that?" or "I would like that, please".
	Manding for Escape from Task: Participant will ask "May I take a break?" or "Can I work on this in a few minutes?" and walk away from the task.
	Manding for Escape from Aversive Situations: Participant will ask "Can we

	leave?" or "Can I go and do something else?" and walk away from the situation. Appropriate Sexual Behavior- Avoidance Skills: When a child or when media that possess a child (such as television/movies or magazine pictures) are present, Participant will turn his head, look away, or leave the area.

Data Collection

Staff documented the frequency of problem behaviors and replacement behaviors on a data sheet throughout the day. Each time a problem behavior occurred the staff placed a checkmark next to the following categories on the ABC (Antecedent-Behavior-Consequences) data sheet: the setting in which the problem behavior occurred, the antecedent to the problem behavior, the problem behavior topography, the time it occurred, and the consequence to the behavior. The ABC data sheet was specific to each participant's problem behaviors (See Appendix 1).

Each time a replacement behavior occurred the staff placed a checkmark next to the following categories on a replacement behaviors data sheet: the setting in which the behavior occurred, the behavior topography, whether the behavior occurred independently, and the type of reinforcer earned for the behavior. The replacement behavior data sheet was specific to each participant's behaviors (See Appendix 2).

At the end of each day, staff documented on graph paper the current level each participant was on. The graph displayed the participant's level for each day in the month.

The primary investigator, at the end of the day, reviewed all data sheets and graphed the behaviors using Excel.

Interobserver agreement

On at least 33% of the days a second observer scored the responses simultaneously but independently on an identical antecedent-behavior-consequences

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(ABC) data sheet. Interobserver agreement was calculated by dividing the number of

agreements by the number of agreements plus disagreements and multiplying the total by

100. An agreement is defined as the recording of the same behavior by both observers

within a one minute time difference. Mean interobserver agreement for problem

behaviors was 93% for Daniel, 90% for Doug, and 78% for James. Mean interobserver

agreement for replacement behaviors was 98% for Daniel, 91% for Doug, and 93% for

James.

Treatment Integrity

Both staff implementing the Level System and participants participating in the

Level System were monitored by a Behavior Analyst or a Behavior Specialist throughout

the day (See Appendix D). If at any point during implementation the staff were observed

implementing the Level System incorrectly they were immediately retrained and tested

before being allowed to continue implementation of treatment. In addition, staff were

tested weekly on the Level System and required a score of at least 90% to continue with

implementation (See Appendix E).

Observations conducted by the primary researcher and the trained behavior team

reported the Level system being correctly implemented 94% of the time. Each incident

of incorrect implementation was stopped and the staff immediately retrained on the spot.

The average score for the weekly Level System test by staff was 85%. When tested, staff

generally missed 1 or 2 questions, on the bed time or television/radio privileges, giving

them a score of 85%. This resulted in the immediate retraining of the Level System.

After completion of re-training, the staff answered questions by the trainer, or primary

investigator, to demonstrate they understood the Level System. This generally involved

them repeating the question and answer back to the primary researcher. If the staff had

additional questions or it was decided further training was needed, the primary

investigator continued with the training session until the staff had a thorough

understanding of the Level System.

Procedure and Design

An ABAB design was used to evaluate the effects of a token economy with a

Level System, with A being baseline and B being the treatment phase, for two of the

participants (Daniel and Doug). An AB Within-Subject design was used for the third

participant (James). Prior to baseline a preference assessment was conducted. Following

the completion of each baseline phase, staff training was conducted prior to

implementation of the intervention (Level System).

Preference assessment. A preference assessment was conducted for each

participant. First, the staff who frequently work one to one with the participants was

interviewed to identify several stimuli that are preferred by the participant. Second the

participants were interviewed to identify several stimuli that are preferred by them. Each

participant was then shown 10 pictures of stimuli identified during the interview and

asked to rank them in hierarchy of most preferred (wanted most) to least preferred

(wanted least). For all participants, food items were the most preferred items.

The preference assessment was conducted in this fashion to minimize the

occurrence of problem behaviors. Based on knowledge of these participants, it was

hypothesized that the presence of the actual stimuli in a preference assessment would

result in the participants' attempts to steal the item or engage in problem behaviors when

immediate access to the item was denied. Also, each participant had the intellectual

ability to rank the items in hierarchical order.

Baseline. During baseline the participants had no intervention for problem behaviors in place other than the standard procedures used in the agency. The standard procedures were Stop- Redirect-Reinforce; which consisted of stopping a dangerous behavior by least-to-most intrusive methods, redirecting the participant to another activity and then reinforcing the participant's appropriate behavior through verbal praise, a tangible item, or special privilege. For example, if a participant engaged in physical aggression a staff member provided the verbal prompt stop first then proceeded to physical techniques to prevent further harm to the participant or another if necessary. The participant was then redirected to an appropriate activity in another room and after 15 minutes of engagement in the appropriate activity given verbal praise for the appropriate behavior. Ignore-Redirect-Reinforce consisted of ignoring the problem behaviors, redirecting the participant to another activity and then reinforcing the participant's appropriate behavior. Planned ignoring consisted of providing no attention to the individual engaging in the problem behavior and then providing reinforcement for appropriate behavior once the problem behavior had stopped. Finally, community restrictions were employed to ensure the safety of others if a participant engaged in inappropriate sexual behaviors with or without contact.

Treatment. The treatment phase consisted of staff training followed by the implementation of the token economy and Level System. Each participant started treatment on Level 2 (described below). The rational for starting on Level 2 is to allow the participants to experience the reinforcing value in engaging in appropriate behaviors and the reinforcers that come along with the higher levels. As the participants engaged in the appropriate behaviors and followed the rules of the Level System they advanced through the treatment. A requirement to advance within the Level System of the current

study was to receive signatures for each awake shift from staff. The signatures

represented the participants' appropriate behavior and completion of required tasks for

the day. Each Level required a particular number of signatures in order to advance.

Initially, the participants could lose their signatures if they engaged in inappropriate

behaviors such as inappropriate social behaviors or antagonizing their peers. These

behaviors were not considered serious enough to result in a Level Reduction but serious

enough to not earn additional privileges or the signature for the day. .

Training Staff and Participants. Each staff member and participant was trained on

the Level System by the Master Trainer. The Master Trainer for the purpose of this study

was the author. The training was based on the Level System manual. Both staff and

participants needed to demonstrate 80% accuracy when taking the written/verbal exam on

the Level System prior to implementation. Both staff and participants were retested

weekly on the Level System; staff were required to demonstrate 90% accuracy to

continue implementation.

Token Economy. A token economy was implemented in each participant's

residence during the treatment phase. Once the participant was placed on the Level

system, he was informed he would now be able to earn token dollars that could be used to

shop in the token store. Each participant received tokens in the form of paper play

money for completing his hygiene, chores, making his lunch for ADT the next day, and

engaging in replacement behaviors. Specific amounts were predetermined for each

chore. Additionally, the participants had the opportunity to earn additional token dollars

for appropriate behaviors and completing extra activities outside their daily routine; such

as an additional chore, skill acquisition, or learning activity like math skills (See

Appendix C). The token dollars were then spent at the token store, when on the

appropriate levels (Level 2-4), at 8 pm each evening and at an additional time on

Saturdays and Sundays at noon. The token store was filled with the items determined

from the preferences assessments. The pricing of the items was determined by the order

of most preferred to least preferred item for the participant. Most preferred item had the

higher token price. The Level System was implemented in the context of the ongoing

token economy; in order to advance through the Level system each Level had a token fee

that was required to be paid by the participant. For example, to advance from Level 1 to

Level 2 a fee of 200 token dollars was required.

Level System. Each participant participated in the same "Level System" which

was taught based on a Level System Manual. The Level System Manual is a training

manual designed from existing Level Systems that are being implemented by Sunland of

Marianna, the Mentally Retarded Defendant Program, and the Human Development

Center, Inc. The Level System used consisted of five different levels (Level "O", level 1,

Level 2, Level 3, and Level 4). The level status was contingent on the participants'

problem behaviors. Within each level the number of privileges and reinforcing

contingencies increased. The Level System did not specifically address the functions of

the behaviors. However, within the Level System each participant engaged in

individualized skill acquisition sets, which are a set of questions and role plays specific to

the problem behaviors and their maintaining functions.   Each participant practiced with

staff the skill acquisitions twice a day. To address behaviors that function for attention,

verbal praise was given contingent on all occurrences of appropriate behavior throughout

the study.

Problem behaviors that were categorized as *dangerous behaviors* resulted in a

level drop to "O". The behaviors that were categorized as *dangerous* were any behaviors

for which the participant could be arrested according to the law, including inappropriate

sexual behaviors with and without contact, physical aggression, stripping abusing the

emergency response system (pulling the fire alarm), property destruction and elopement.

Due to the seriousness of the target behaviors levels did not drop in sequence, for

example from Level 3 to Level 2. If the participant engaged in dangerous behaviors he

was reduced to Level "O" immediately.

Table 3

Level System

Level:	Level "O"	Level 1	Level 2	Level 3	Level 4
# of Days:	2	5	14	21	N/A
# of Signatures to Advance	4	6	10	14	N/A
$ Token Dollar Amount to Advance	100	200	500	1000	N/A
Off-Campus/On-Campus Activities	Only Medical/Legal Appointments No Access to Club House	Only Medical/Legal/ Training Activities No Access to Club House	All Scheduled Activities and Medical/Legal/ Training No Access to Club House	All Scheduled Activities and Medical/Legal/ Training and Day Home-Visits Allowed in Club House 1 night a week	All Scheduled Activities and Medical/Legal/ Training and Over-Night Home-Visits Free Access to Club House
Pay Check Limitations	100% Deposited in Bank	75% Deposited in Bank	50% Deposited in Bank	25% Deposited in Bank	100% Choice
Television/Radio/ Computer/Video Game Access	None	Can purchase: 1 hour per day for 100 token dollars	Can purchase: 2 hour per day for 200 token dollars	Unlimited Access	Unlimited Access
Ability to Shop in			8 pm week nights	8 pm week nights	8 pm week nights

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Token Store	None	None	12pm, 8 pm Sat. & Sun	12pm, 8 pm Sat. & Sun	12pm, 8 pm Sat. & Sun

Results

Figure 1 shows the results for Daniel's behavior and level in each phase of the study. During the first baseline, Daniel engaged in a serious problem behavior on two thirds of the days. Initially, when the first phase of treatment was implemented Daniel engaged in problem behaviors every 3 days; however, as treatment continued the number of days that elapsed between problem behaviors went from 3 days to 6 days to 11 days, allowing him to reach Level 2 before treatment was removed and baseline was initiated again. The second baseline phase was longer than the first; with 9 days elapsing before a serious problem behavior occurred. Once three problem behaviors occurred, which was within two days, Daniel was placed back on the Level System. Once Daniel was placed on the Level System for the second time his frequency of problem behaviors dropped to zero and remained there for the rest of study allowing him to achieve and maintain Level 4. Daniel refrained from engaging in serious problem behaviors for 46 days before data collection ended on the 89th day, he was hospitalized for health issues.

Figure 1. Daniel's Level System graph which includes all target behaviors that were engaged in. Closed Squares = Level, Diamonds= Reducible Behaviors.

Figure 2 displays the results for Doug's behavior and level for each phase of the study. During the first baseline phase, on average Doug engaged in serious problem behaviors every two days. Initially, when the first phase of treatment was implemented Doug engaged in problem behaviors every 3 days; however, as treatment continued the number of days that elapsed between problem behaviors went from 3 days to 7 days to 13 days, allowing him to reach Level 2 before treatment was removed and baseline was initiated again. The second baseline phase was longer than the first, with 12 days elapsing before 2 serious problem behaviors occurred and then another the following day before being placed back on the Level System. Once Doug was placed on the Level System for the second time he averaged an occurrence of problem behaviors every two days for almost a week. After the initial week of being placed back on the Level System Doug's frequency of problem behaviors dropped to zero and remained there allowing him to advance to Level 4. Note: Doug was having difficulty with the pace of level advancements. In order to increase the value of the reinforcers in the higher Levels Doug

was advanced when he displayed at least 6 consecutive days of good behavior rather than 14 days that were initially required. Doug's problem behaviors remained at 0 with him at Level 4 for 18 days; with a total of 43 days in which he refrained from engaging in the targeted behaviors.

Doug Level System Graph

Figure 2. Doug's Level System graph which includes all target behaviors that were engaged in. Closed Squares = Level, Diamonds= Reducible Behaviors.

Figure 3 displays the results for James' behavior and level for each phase of the study. James had a longer baseline phase than Daniel and Doug. On average James engaged in problem behaviors every 10 days. Initially, when the Level System was implemented in the first treatment phase, James engaged in serious problem behaviors 2 times in the first 10 days and then went 15 days before engaging in problem behavior more frequently again. However, James remained on Level 0 for an extended period of time, as a result of him not earning his signatures to advance due to engaging in inappropriate social behavior or antagonizing his peers. On the 69th day of the study a change was made and James no longer lost his signature for the day preventing his advancement to the next Level for these non-serious behaviors. As the graph indicates after the modification was implemented James refrained from engaging in serious

problem behaviors and began advancing through the level system. He refrained from

engaging in the targeted behaviors for 35 days and made it to Level 3.

Figure 3. James' Level System graph which includes all target behaviors that were

engaged in. Closed Squares = Level, Diamonds= Reducible Behaviors.

For Doug and James, the procedure of losing the ability to earn shift signatures

for engaging in inappropriate social behaviors was changed in the second treatment

phase. From direct observation it was hypothesized that these two participants were

receiving attention for antagonizing their peers and losing their signature for the day.

This form of attention was acting as a more potent reinforcer than receiving their

signature for the day that applied towards advancement in the Level System. The change

issued involved staff ignoring the inappropriate social and antagonizing behaviors

completely and only withholding the signature for the day if the participant engaged in a

serious or reducible behavior. In these cases, substantial praise and attention were

provided for receiving their signature, no longer for not earning their signature due to

antagonizing others. This change resulted in both participants advancing to the higher

Levels and demonstrating more replacement behaviors.

Figure 4 displays the results of Daniel's replacement behavior and level for each phase of the study. During the first baseline phase Daniel engaged in an average of 2.7 replacement behaviors per day. The average increased to 4.1 replacement behaviors per day during the first phase of implementation of the Level System. In the second baseline phase Daniel engaged in an average of 3.2 replacement behaviors per day. Once the Level System was re-implemented Daniel engaged in average of 4.6 replacement behaviors per day. The data also reveals, as Daniel advanced to the higher Levels he engaged in more replacement behaviors each day.
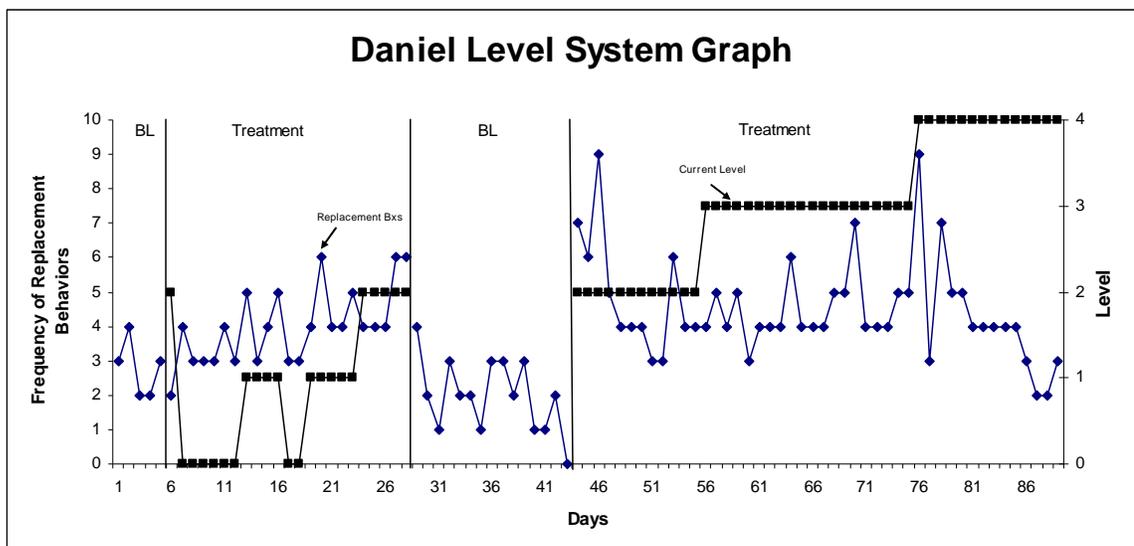
Figure 4. Daniel's Level System graph which includes all replacement behaviors that were engaged in. Closed Squares = Level, Diamonds= Replacement Behaviors.

Figure 5 displays the results of Doug's replacement behavior and level for each phase of the study. During the first baseline phase Doug engaged in an average of 2.3 replacement behaviors per day. The average increased to 3.7 replacement behaviors per day during the first phase of implementation of the Level System. In the second baseline phase Doug engaged in an average of 2.5 replacement behaviors per day. Once the Level System was re-implemented Doug engaged in average of 5.3 replacement behaviors per

day. Like Daniel the data also reveals, as Doug advanced to the higher Levels he

engaged in more replacement behaviors each day.
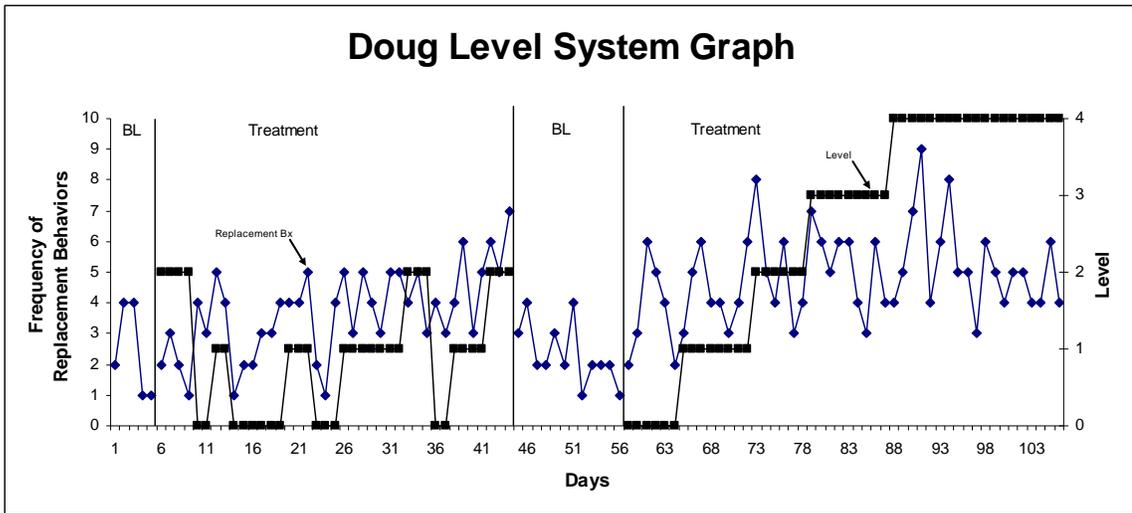
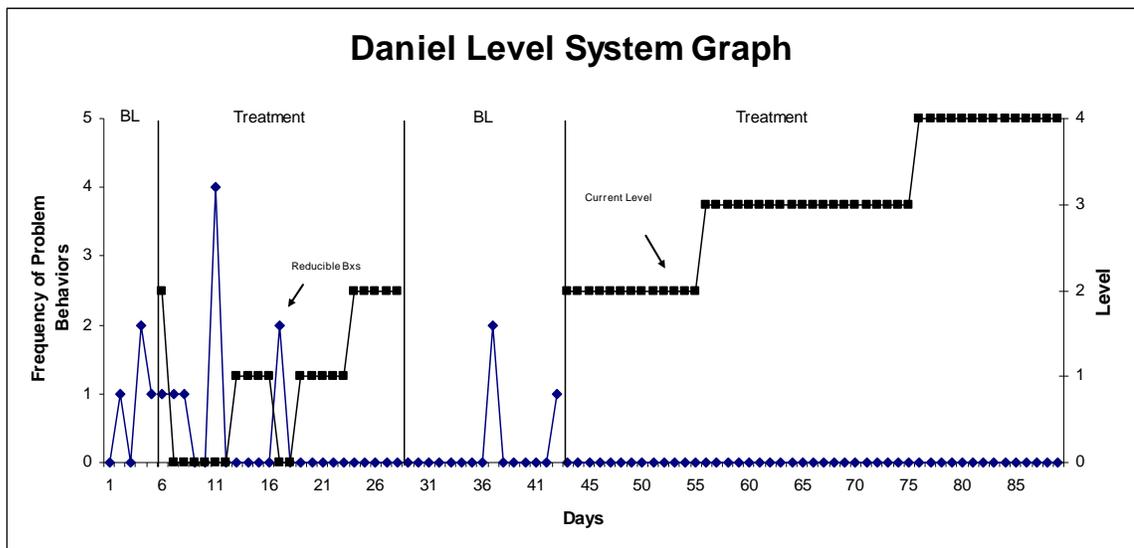*Figure 5*. Doug's Level System graph which includes all replacement behaviors that were

engaged in. Closed Squares = Level, Diamonds= Replacement Behaviors.

Figure 6 displays the results of James' replacement behavior and level for each

phase of the study. During the baseline phase James engaged in an average of 2.2

replacement behaviors per day. The average increased to 2.6 replacement behaviors per

day after implementation of the Level System. Like Daniel and Doug, the data also

reveals, as James advanced to the higher Levels he engaged in more replacement
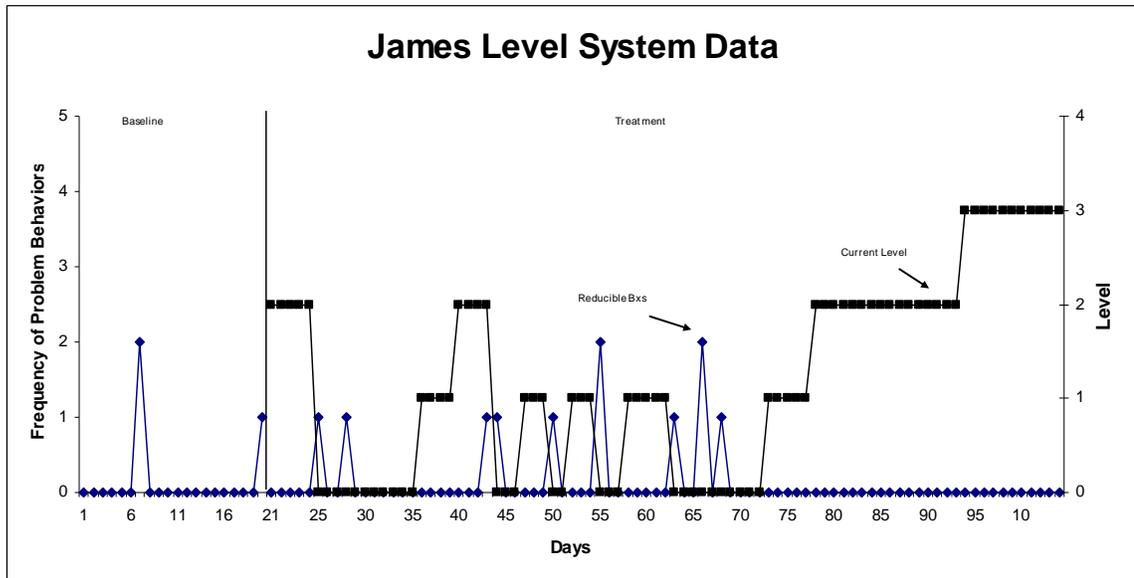
behaviors each day.
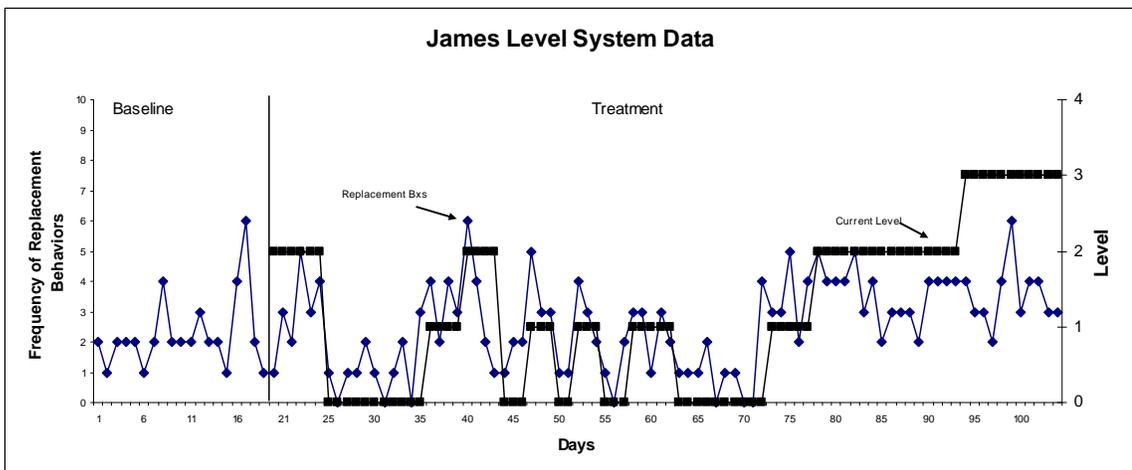
Figure 6. James' Level System graph which includes all replacement behaviors that were engaged in. Closed Squares = Level, Diamonds= Replacement Behaviors.

Discussion

The results show a Level System with a built in token economy was an effective form of treatment for two of the participants in an ABAB design. The data are simply suggestive for the third participant (James) in an AB design. The Level System, which was developed to be used at a group level, was individualized in the current study in the following ways: the token stores were made up of the items identified by each participant in their preference assessment, the behaviors targeted were specific to each participant, and each participant was reduced (moved back to level "O") based on his own behavior- no one participant's behavior affected the other participants' level. Although it took substantial time for the participants to advance to the higher levels, once the higher level was reached they were able to maintain that status for a lengthy period of time, refrained from engaging in the targeted behaviors, and increased their engagement in replacement behaviors.

As the results show, in the first phase of treatment, the frequency of targeted behaviors was higher than in the second treatment phase. Each of the participants had been previously exposed to a Level System; some were even removed from a Level System to start baseline for the current study. It is hypothesized the higher frequency of targeted behaviors in the first phase may be due in part to an extinction burst. Direct observations by the researchers throughout the study suggest that the previous Level Systems were not followed consistently by staff, causing an increase in target behaviors once the current Level System was implemented and followed. The previous

inconsistency may have caused an increase in the frequency of target behaviors engaged in by the participants (because the behaviors had been intermittently reinforced), resulting in them remaining at lower levels. This inconsistency was rectified and procedural drift was reduced with constant monitoring by those implementing the Level System.

For Daniel and Doug, the data demonstrate some degree of experimental control within the ABAB reversal design and show that both Daniel and Doug were able to make it to and maintain Level 4 status for weeks. During the course of the study, the decision was made to employ only an AB design for James. Because James had an extended baseline and then frequently engaged in problem behaviors during the first half of the treatment phase, substantial time had elapsed before the behavior stabilized at zero in the treatment phase. Due to the extended time he had been in the study and the concerns about his behavior should the intervention be withdrawn, the decision was made not to withdraw the intervention, even though it resulted in the inability to demonstrate experimental control for this participant.

In addition to the limitation of an AB design with James, another limitation is the seeming increase in the problem behavior in the first half of the intervention phase. Direct observation suggested that James was not receiving his daily signatures to advance as a result of engaging in inappropriate social behaviors and was receiving excessive amounts of attention from staff for these behaviors. Although, inappropriate social behaviors were not targeted behaviors for reduction, the participant could lose the ability to earn his shift signature by engaging in this behavior. Failure to earn the shift signature then prevented the participant from advancing levels which may have contributed to further problem behaviors. During the intervention phase for James a modification was implemented; staff began ignoring these behaviors and no longer denied James his

signature for inappropriate social behavior and instead provided substantial verbal praise for engaging in appropriate behaviors. This change resulted in James advancing to the higher levels and exhibiting a consistent decrease in the targeted behaviors.

Although the results suggest that the level system was effective, a major limitation of the study was the relatively low level of the target behavior in baseline, especially for James. A baseline of three behavior problems was chosen for James due to the high intensity, low frequency of the problem behaviors. The behaviors targeted were very serious behaviors such as inappropriate sexual behavior against vulnerable adults and minors, physical aggression, property destruction, and elopement; all of which could have serious consequences. For that reason, the researchers could not allow several of these behaviors to occur with no response or consequences to the behavior. In society, these behaviors would normally result in jail time or involvement of the judicial system. A longer baseline with more instances of the behavior may have been preferable from an experimental design perspective, but from an ethical perspective, the decision was made to proceed to the intervention.

The Level System is a complicated system to implement that requires substantial staff involvement, monitoring, and clarity. One limitation discovered in the current study was that the descriptions of some of the topographies of the behaviors were not precise enough. In order for there to be consistency across staff the definitions needed to be clear and concise so that staff knew exactly when the targeted behavior occurred. For example, when James engaged in blowing in other people's ears; it could be interpreted as an inappropriate sexual act but this was not described in the definition. In these instances this behavior was not recorded by the researchers but was responded to by the staff.

An additional limitation is the amount of time required to fully train and monitor staff implementing the level system. Constant monitoring was required to ensure implementation was correct and no coercion was being used. It would be very easy for staff to threaten Level Reductions or bargain Level Advancements for work to be completed. In an industry that is known for frequent staff turnover, the Level System is a time consuming treatment to train and implement.

One suggestion for future research in the area of Level Systems would be to increase the length of data collection. It is hypothesized that at least a year of data collection would be needed to show control and indicate that the Level System is a highly effective form of treatment for individuals at a group level. A further suggestion would be to increase the potency of reinforcers for each Level and individualize them more for each participant. This modification would not only increase the effectiveness of the treatment but it would better individualize the Level System.

Another limitation of the current study, which may be inherent in any level system or token economy, is the fact that the intervention is not a function based intervention. Although appropriate behavior was reinforced with level advancements and problem behavior was punished with level decreases, the functions of the problem behaviors were not addressed in the intervention. In fact, it is not known to what degree problem behaviors continued to be reinforced while the participants were in baseline or while the level system was being implemented. However, each part of the individualized treatment each participant received included skill acquisition training twice per day that centered around the functions of the behaviors. For example, Daniel engaged in property destruction to access a tangible. Twice per day the staff sat with Daniel, asked him a set

of questions on how to appropriately access an item, and then role-played by having him demonstrate this skill.

Future research might further investigate the influence of problem function on the effects of a level system. Alternatively, future research might integrate the use of a functional approach to assessment and intervention with the level system to see if the effects can be enhanced.

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Appendices

Appendix A: Target Behavior Data Sheet

Target Behavior Form

Instructions: Place the date, time, and check marks in the corresponding boxes when the target behavior occurs.

Client Name:

Date																													
Time																													

Location																													
Kitchen																													
Porch																													
Bedroom																													
Living Room																													
Van																													
Community																													
ADT																													
Outside																													
Antecedent																													
Denied request																													
Alone																													
Delivered instruction																													
Staff interacting with others																													
Provoked																													
Other																													
Behaviors																													
Inappropriate Sexual w/contact																													
Inappropriate Sexual w/o contact																													
Property Destruction																													
Physical Aggression																													
Consequence																													
Escape from Task																													
Prompted to Same Task																													
Attention																													
Tangible																													
Staff initials																													

Appendix B: Replacement Behavior Data Sheet

Replacement Behavior Form

Instructions: Place the date, time, and check marks in the corresponding boxes when the target behavior occurs.

Client Name: Participant 1

Date																														

Location																														
Kitchen																														
Porch																														
Bedroom																														
Living Room																														
Van																														
Community																														
ADT																														
Outside																														
Prompts																														
Independent																														
Verbal																														
Modeling																														
Physical																														
Replacement Bx																														
Approp. Sexual Behavior (6 Rules)																														
Attention																														
Avoidance Skills																														
Manding for Tangibles																														
Escape from Task																														
Escape from Aversive Situations																														
Consequence																														
Verbal Praise																														
Tangible																														
Natural Reinforcement																														
Attention																														
Other																														
Staff initials																														

Appendix C: Token Prices

Hygiene Completion
    - No Verbal Prompts…………………………………………… 150 Token Dollars
    - 1 Verbal Prompt………………………………………………. 100 Token Dollars
    - 2 or More Verbal Prompts……………………….…..... 75 Token Dollars

Chore Completion
    - No Verbal Prompts……………………………………. 150 Token Dollars
    - 1 Verbal Prompt…………………………………………. 100 Token Dollars
    - 2 or More Verbal Prompts……………………….…..... 75 Token Dollars

Lunch Completion
    - No Verbal Prompts……………………………………. 150 Token Dollars
    - 1 Verbal Prompt…………………………………………. 100 Token Dollars
    - 2 or More Verbal Prompts……………………….…..... 75 Token Dollars

Extra Chore……………………………………………………...50 Token Dollars
Replacement Skills………………………………………………20 Token Dollars
    (Manding for Tangible, Attention, Escape Appropriately)
Ignoring Others Problem Behaviors……………………………….50 Token Dollars
Room Cleanliness………………………………………………….50 Token Dollars

Staff Monitoring
Level System

Staff Name:
Date:

Did staff review with the participant his current Level?

       Y   N

Did staff provide immediate reinforcement (tokens) for chore completion?

       Y   N

Did staff provide immediate reinforcement (tokens) for hygiene completion?

       Y   N

Did staff provide immediate reinforcement (tokens) for lunch completion?

       Y   N

Did staff provide reinforcement (verbal/token) for replacement behaviors?

       Y   N

Did staff use coercion?

       Y   N

Did staff document participant's current Level at the end of shift?

       Y   N

Did staff implement Level System correctly throughout shift?

       Y   N

Human Development Center, Inc.
Level System and Token Economy Competency Drill

Staff Name:_____

Position:_____

Evaluator: _____

Position:_____

Date: _____

Score:_____

Cleared to Implement Level System: Y   N

1. Staff is able to identify the location in the residence and the function of the following:

Level System Manual	**Y**	**N**
Advancement Contracts	**Y**	**N**
Warning Tickets	**Y**	**N**
Token Points	**Y**	**N**
Token Store Values	**Y**	**N**
Grievance Procedure	**Y**	**N**
All Client Current Levels	**Y**	**N**
House Meeting Minutes	**Y**	**N**

2. Staff are able to identify the 5 levels.   Y   N

3. Staff are able to identify the bedtimes for each level.   Y   N

4. Staff are able to identify money/paycheck limitations for each level.
Y   N

5. Staff are able to identify off/on-campus activity privileges by level: Y   N

6. Staff are able to identify the number of signatures needed to advance: Y   N

7. Staff are able to give an overall description of the Level System with an emphasis on reinforcing the appropriate behaviors.   Y   N

8. Staff are able to identify when/how to issue token points: Y   N

9. Staff are able to describe the procedure for advancement: Y   N

10. Staff are able to describe a warning ticket: Y   N

11. Staff are able to role-play how to complete a Level Reduction: Y   N

12. Staff are able to identify the level of supervision required for an individual on Level "O" and why this is important: Y   N

13. Staff are able to explain how reinforcement is used in the Level System: Y   N