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# The Effects of a Token Economy on Epileptic Seizure Rates

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# THE EFFECTS OF A TOKEN ECONOMY ON EPILEPTIC SEIZURE RATES

by

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DEDICATION

With a little help from my friends

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ABSTRACT

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on Epileptic Seizure Rates

by

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Past studies have shown that a relationship may exist between certain forms of epileptic seizures and specific environmental stimuli. This relationship is not well understood. The objective of this study was to assess this relationship by determining the effect of a selected token economy on seizure rates. The token economy utilized in this study may differ from token economies described in the literature as it employed certain punishers. This was done by dividing the study into three experiments.

During Experiment I three severe epileptics were exposed to a series of conditions including baseline, token economy condition and baseline. During the baseline conditions the epileptic subjects were placed on one of two general psychiatric wards. The emotionality of the epileptic subjects was concomitantly measured. Emotionality was measured by recording the number of token fines and the number of time-outs the epileptic received.

The emotional behaviors of the epileptics were compared to a number of nonepileptic subjects ($\overline{X}$=24), who also received most of the same experimental conditions as the epileptic subjects.

The results of Experiment I were: (1) The seizure rates of all three epileptics increased over the first baseline condition during the token condition; (2) the seizure rates for all three subjects returned to near baseline after the reversal; (3) the three epileptics received fewer fines and time-outs than did the nonseizure subjects during the first baseline; (4) during the token condition the three epileptic subjects received more fines and time-outs than the nonseizure patients. The results suggest that the token economy condition was accompanied by an increase in seizure rates and emotionality of the epileptic subjects.

Experiment II systematically replicated Experiment I by utilizing only one ward for all three conditions; baseline, token condition and baseline. The seizure rates of the two subjects increased significantly over that of the baselines.

Experiment III attempted to determine what parameter of the token economy accounted for the increased seizure rates. One subject was exposed to these conditions: (1) Standard token condition; (2) threefold increase of reinforcer prices; (3) no-token contingencies and (4) standard token condition. The seizures and

the behaviors (checked every half hour) of the subject were recorded. The results were: (1) The subject had the same amount of seizures during each standard token condition; (2) her seizure rate increased during the second condition and decreased during the third condition. Her percentage of appropriate behaviors were: (1) 26 percent during condition one; (2) decreased to 18 percent during condition two and (3) increased to 49 percent during condition three.

The conclusions drawn from this study were: (1) The selected token economy generated a higher seizure rate than did the general psychiatric ward procedures; (2) the seizure subjects had more seizures during the last weeks of the token condition than during the first weeks; and (3) concurrent with the increased seizure rates was a decrease in the number of appropriate behavior.

(78 Pages)

# CHAPTER I

## INTRODUCTION

The intent of this experiment was to ascertain whether epileptic seizure rates can be significantly altered by selected changes in the epileptic's environment. The environmental condition used as the independent variable in the present experiment was the presence or absence of a token economy. Data from preliminary research (Lindberg, unpublished) indicated a token economy system may be behaviorally detrimental rather than beneficial for epileptic patients.

The behavioral repertoire of epileptics may be dichotomized into nonseizure behaviors and seizures. The nonseizure behaviors of seizure patients are responsive to behavioral contingencies (Himler and Raphael, 1945). The seizures themselves are physiological in nature (Lennox, 1960), nevertheless, Efron (1957) established that seizures were responsive to behavioral contingencies. Most sources (Suinn, 1970; Penfield and Jasper, 1954; and Ullman and Krasner, 1969) indicated a variety of physiological etiologies of epilepsy--brain tumors, traumatic damage and inflammation or infection of the brain--without any mention of research to indicate a cause-effect relationship between environmental stimuli and seizure rates. Epilepsy has been almost exclusively researched in its relation to medication, surgery, electroencephalograms and areas of the

cerebral cortex associated with seizures. This author has found no operant research relating epilepsy or seizure rates to environmental stimuli.

The present experiment investigated the effects of a token economy on seizure rates. An important consideration related to this problem is that seizure rates may increase proportionally to elevations in emotional intensity. Ayllon and Azrin (1968) indicated that the token economy may generate an increase in emotionality. The present series of experiments attempted to provide data that suggested seizure rates increased when epileptics were placed on a token system and that concomitant with the increased seizure rate would be a decreased number of appropriate behaviors.

## Review of Literature

The token economy system was based upon the operant conditioning techniques discussed by Skinner (1938). In classical experiments Wolfe (1936) and Cowles (1937) first applied these principles to teach chimps to place tokens in a slot to obtain candy, and eventually to earn the token by engaging in a weight lifting task. Following the general paradigms of the classic animal studies, the initial token economy experiments were conducted to assess the efficacy of maintaining children's behavior over a protracted period

(Meyers, 1960). O'Leary and Drabman (1971) indicated token programs with human subjects should contain the following three ingredients:

1. A set of rules about the behaviors to be positively reinforced, those that are to be punished and those which are to be placed on extinction;

2. A method for making a potentially reinforcing stimulus (token) contingent upon behavior;

3. A set of rules governing the exchange of tokens for backup reinforcers (i.e., meals, activities).

A perusal of the literature on token economies indicates its efficacy with individuals manifesting a wide range of behavioral problems: Institutionalized retardates (Lent, Leblanc and Spradlin, 1970); mental patients (Ayllon and Azrin, 1965); normal classroom students (O'Leary and Becker, 1967); special education students (Birnbrauer, Wolfe, Kidder and Tague, 1965); and chronic mental patients (Ayllon and Azrin, 1965).

As with most techniques, the token economy does not prove beneficial with 100 percent of these populations. Ayllon and Azrin (1965) found their token economy to be ineffectual with approximately 15 percent of their population. Statistical comparisons revealed no age or diagnostic differences between the subjects who improved and those who did not improve within the token system. The only explanation offered by Ayllon and Azrin for this phenomenon was that nonfunctioning patients may

have extinguished many of the behaviors required by their token system due to their protracted hospitalization. On most psychiatric halls these patients are usually allowed to vegetate, resulting in a decreasing repertoire of appropriate behaviors as required on a token economy.

There still exists other possible explanations. The literature (Glaser, 1971) suggests seizures may increase in emotional situations. The token system may elicit emotionality in several ways. One way the token economy elicits emotion is that the structure of most token economies calls for a high density of reinforcement for desirable behaviors but few, if any, reinforcers for undesirable behaviors (i.e., patients receive social reinforcement for not engaging in self-destructive behaviors). The emotionality generated by the token economy system may interfere with any possible behavior being emitted by the epileptics.

A preliminary study conducted with a token economy established at the Wyoming State Hospital suggested the emotionality elicited by this token system may restrict the degree to which some patients function with the system (Lindberg, unpublished). From this preliminary study it was concluded that severe epileptics did not improve and, in fact, regressed behaviorally on this token system. A behavioral status quo seems to be maintained by epileptics on an

open ward. However, a notable decrease of appropriate behavior was found when the epileptics were placed on this token system. The patients also seemed to have more seizures on this token ward than on general psychiatric wards. The reason for this failure to improve may have been a function of the emotional situation generated by this token system. Aring, Lederer and Rosenbaum (1946) indicated the existence of a cause and effect relationship between emotionality and epileptic seizures. Penfield and Jasper (1954) suggested the frequency and severity of epileptic seizures can be partially controlled when emotional difficulties are properly managed.

Behavior Modification and Epilepsy

The following reports substantiate the aforementioned conclusions postulated by Glaser (1971), Aring et al. (1946) and Penfield and Jasper (1954), that seizure rates may be responsive to specific environmental stimuli.

Research has shown seizures may be elicited by various environmental stimuli (e.g., music, Daly and Barry, 1957; flickering lights, Mawdsky and Monc, 1961). Forster, Booker and Ansell (1966) successfully counter conditioned an epileptic patient to arrest a forthcoming seizure. The treatment program involved the presentation of the critical stimulus at subseizure threshold and gradually incremented until the critical stimulus

no longer possessed its original eliciting power. Efron (1956, 1957) utilizing Pavlovian principles conditioned a patient to arrest seizures after the appearance of the aura. Efron found the application of an odoriferous stimulus contingent upon the presence of an aura also arrested the seizure. An article of jewelry (conditioned stimulus) was paired with the odoriferous stimulus (unconditioned stimulus) and after eight days of such pairing the jewelry had obtained the same arresting powers (conditioned response) as the unconditioned stimulus.

Summary

Epileptic seizures may be elicited by specific environmental stimuli and may be counter conditioned by respondent conditioning techniques (Efron, 1957). A number of eliciting stimuli have been discussed in the literature (i.e., music, flickering lights), however, little has been accomplished in relating seizures to a token economy system.

Ayllon and Azrin (1968) found their token economy to be ineffectual with a number of patients. The reason for this failure to function has been hypothesized to be due to an emotional agent in the token system. A correlation between seizure rates and emotionality has been made (Aring et al., 1946). Preliminary research (Lindberg, unpublished) suggested that severe epileptics may not improve on the token economy

system established at the Wyoming State Hospital and that the seizure rates of these subjects may be increased while they are under the contingencies of this token system.

The present problem was divided into three experiments, each with a specific design and intent. Experiment I measured the seizure rates of severe epileptics. The seizures were recorded while the subjects were on three halls; two general psychiatric wards and a ward with a token economy. The assumed stress agent of the token system was concomitantly measured. Experiment II systematically replicated Experiment I. The subjects remained on one hall for the duration of the study. The systematic manipulation was the presence or absence of the token system. Experiment III attempted to discern what parameter of the token system generated the increased seizure rate by varying the price of the reinforcers. Each day of Experiment III an hourly behavior check was conducted to determine if a decrease in appropriate behavior occurred concomitantly with the increased seizure rate.

# CHAPTER II

# METHOD

## Experiment I

The intent of this experiment was to ascertain if severe epileptics had more seizures while living under the contingencies of the token economy than while living on two different general psychiatric wards. The emotionality agent of the token system was also measured. In order to record emotionality, specific behaviors were measured that were defined as "manifestations of emotionality." These emotional behaviors were generally of an undesirable nature, therefore, the subjects received time-outs or fines contingent upon these behaviors. The number of time-outs and fines were employed as the index of emotionality.

Subjects. Subjects were divided into two groups; seizure subjects and nonseizure subjects. Three severe epileptics served as the seizure subjects for this experiment. Subject 1 was thirty-three years old and was diagnosed as nonpsychotic organic brain syndrome with epilepsy. Subject 2 (age 34) was also diagnosed as nonpsychotic organic brain syndrome with epilepsy. These subjects scored in the borderline range on the Wechsler Adult Intelligence Scale. Subject 3 (age 44) was diagnosed as psychosis with epilepsy and scored in the average range of intelligence on the Wechsler Adult Intelligence

Scale. All of the diagnoses in this experiment were made in accordance with the Diagnostic and Statistical Manual of Mental Disorders (The Committee on Nomenclature and Statistics of the American Psychiatric Association, 1968), at a hospital psychiatric staffing meeting.

The nonseizure subjects were the remaining patients on the token ward. This population was transitory, i.e., a small percentage of these subjects were transferred on or off the ward each week. The average number of nonseizure subjects was 24. These subjects may be described collectively as chronic schizophrenics manifesting severe behavioral problems. These subjects were not designed to be used as a control group but rather for illustrative purposes.

Procedure. All subjects were on a general psychiatric ward during the first baseline. During this condition, the subjects were on the ward which became the token ward. The essential difference between the baseline condition and the token condition is the establishment of behavioral contingencies. On the general psychiatric wards, the subjects were given access to reinforcers (i.e., food, bed, activities) noncontingently and few, if any, demands were placed on the subjects to emit desired behaviors.

Token Condition. The token system established contingencies for desirable and undesirable behaviors. Tokens (Mexican five centavo pieces) were dispensed contingently for desirable behaviors. The tokens were then employed as negotiable tender in the purchase of the

backup reinforcers. The lack of tokens caused the subjects to go without a wanted reinforcer. Punishment, time-outs and fines, were issued contingently upon the occurrence of an undesirable behavior. The Appendix contains the contingencies for the behaviors and cost of reinforcers.

Baseline Condition. The reversal to baseline was achieved by transferring the seizure subjects to another general psychiatric ward. The standard operating procedures of this ward were equivalent to that of the general psychiatric ward utilized during the first baseline.

The behaviors measured were:

1. Seizure rates;
2. Tokens fined;
3. Time-outs.

Seizures were operationally defined to insure interobserver reliability. Three types of seizures were used; grand mal, petit mal, and akinetic petit mal. The occurrence of any one of these seizure types was scored as one seizure. In order for a grand mal seizure to be recorded the aide had to observe the subject in three of the four phases of a grand mal seizure; aura, tonic, clonic, and flaccid. The three phases most generally observed were the last three. Petit mal seizures were recorded if the subject momentarily lost consciousness. This was behaviorally defined

as a vacant stare in the eye. Akinetic seizures were recorded when the following was observed: The subject suddenly fell to the floor with an accompanying loss of consciousness.

Seizure rates and time-outs were recorded during all conditions except for each subject's first two weeks on the token ward. This period was used for the purpose of adaptation, for the seizures that occurred during this period may have been due to the strangeness of the ward to the subjects and not a function of any experimental condition. All three dependent variables, seizures, fines and time-outs, were recorded for the seizure subjects, however, only fines and time-outs were recorded for the nonseizure subjects. All subjects were fined tokens if they engaged in the following behaviors:

| Behaviors | Fine |
|---|---|
| 1. Hitting another patient | 5 Tokens |
| 2. Tantrum | 5 Tokens |
| 3. Pestering at the office | 1 Per Time |
| 4. Hoarding | 3 Tokens |
| 5. Sleeping other than at correct time | 5 Tokens |
| 6. Swearing at aides | 5 Tokens |

The subjects were placed in time-out for undesirable behaviors which were potentially injurious to themselves, other subjects or the psychiatric aides. These undesirable behaviors were:

1. Fighting with other subjects;
2. Hitting an aide;
3. Smoking outside of designated area;
4. Stealing cigarettes or food;
5. Attempting to elope;
6. Destroying hospital or private property;
7. Sexual activity--physical contact.

Time-outs were not recorded for all subjects during each subject's first two weeks on the hall. During this time many of the subjects spent most of their time in time-out. This was due to the frequent occurrence of behaviors that were either injurious to the subject or to other individuals on the hall. Administrative procedures, such as suicide or elopement precautions were frequently in effect during this period. A subject on either of these precautions had to spend 72 hours in time-out. The data was recorded by psychiatric aides without any knowledge of the experiment. In order to obtain a reliable recording of data, the psychiatric aides were given five one-hour lecture discussions on the token system and data collection. During the experiment, weekly one-hour discussions were held with the aides. Reliability checks were completed before the experiment began. During the reliability checks, the experimenter and each aide simultaneously recorded the same data; seizures, fines and time-outs.

These checks were eight hours in length (two hours per session) for each aide. The results for the observer reliability for the eight aides tested yielded scores ranging from 90 percent to 100 percent with a mean of 93 percent. The reliability scores for seizure rates were 100 percent. The reliability checks on fines and time-outs produced the variability in the interobserver reliabilities. The checks were made and assessed in accordance with Bijou, Peterson and Ault (1968). The reliability checks were completed before the experiment began. During the reliability checks the experimenter and each psychiatric aide simultaneously collected the same data; seizures, fines and time-outs. These checks were eight hours in total length (two hours per session) for each aide. The observer reliability was assessed by summing the number of behaviors recorded by each observer for each two hour session. The reliability quotation was obtained by dividing the smaller sum by the larger to obtain a percentage of agreement. The psychiatric aides were given additional training in data collection if after four hours of reliability checks the reliability agreement was not at least 85 percent. The psychiatric aide was dropped from further data collection if after eight hours of checks the percentage was not 90 percent.

Manipulation of the Independent Variable. The experimental design was an ABA design, the independent variable was the presence of absence of the token system. Paul (1969) states that the ABA design allows the behavioral change across subjects to be temporarily contingent upon the manipulation of the independent variable. The effect relationship between the studied variables may be established.

In order to be able to infer a functional relationship between the treatment and behavior, the behavior must reliably occur as a result of the treatment (Gentile, Roden and Klein, 1972). Bandura (1969) suggested the interpretation of the treatment effect is not difficult if the behavior change is rapid and consistent for many subjects. Problems arise, however, if the behavior change is not dramatic, rapid or consistent. The question then arises how large does the behavior change have to be in order to achieve significance. Gentile, et al. (1972) stated that interpretation may be achieved by utilizing statistics. The statistics employed in this study was Chi-square. It was utilized to ascertain if a significance existed between the baselines and the treatment condition for each subject. It was also used to determine if a significant difference existed between the baselines of each subject.

The design called for the epileptics to be exposed to a general psychiatric ward (baseline A) then to a token economy (token system B) and finally a reversal to baseline (A).

Subjects 1 and 2 received one exposure to the token system (ABA). Subject 3 received two exposures to the token system (ABABA). The nonseizure subjects ($\overline{X}$=24) received the first baseline condition and the first token condition concurrently with the seizure subjects. The nonseizure subjects were exposed only to the first two conditions (AB) and did not receive the reversal to baseline. The nonseizure subjects did not receive the reversal for two reasons: (1) The difficulty in terminating the token system and reinstating it, and (2) a large number of studies (Ayllon and Azrin, 1968) indicate that chronic schizophrenics have returned to baseline in similar studies.

Experiment II

Experiment I attempted to determine if severe epileptics had more seizures while living on a token economy ward than on two general psychiatric wards. The use of two general psychiatric wards introduced two independent variables in the experimental design; (1) token economy and (2) two general psychiatric wards. These two variables do not allow for a precise analysis (i. e., the change in seizure rate cannot be inferred to be a consequence of one manipulation).

Experiment II was conducted in an effort to attribute the change in seizure rate to one manipulation. This manipulation was the presence or absence of the token economy and was achieved by utilizing only one ward for all three conditions; baseline, token condition and baseline.

Subjects. The subjects were subject 2 and subject 4. Subject 2 was also used in Experiment I. Subject 4 was a 20 year old female. She had been diagnosed as grand mal and petit mal epilepsy, and scored in the mild range of mental retardation on the Wechsler Adult Intelligence Scale.

Procedure. During baseline both seizure subjects lived on the ward housing the token economy, however, subjects 2 and 4 were not placed on the token economy (i.e., the seizure subjects were not exposed to any of the contingencies of the token system). These subjects were allowed access to all reinforcers noncontingently. This means the subjects were allowed to: Rise in the morning at their leisure; make the decision to work or not to work; to groom or not groom themselves; and to act appropriately or not to act appropriately without behavioral consequences. Reinforcers (food, bed, activities) were dispensed noncontingently.

Token Condition. The subjects were exposed to the contingencies of the token economy during this condition. The token condition was the same as the token condition during Experiment I. The contingencies appearing in the Appendix were used.

The data collected were the number of seizures each subject had during each condition. The same operational definitions of seizures were used in this experiment as in Experiment I.

Baseline Condition. The reversal involved the seizure subjects being taken off the token economy contingencies and returned to the conditions of the first baseline.

## Experiment III

Experiment II attempted to determine if the epileptic subjects had more seizures while on the token economy versus not on token economy. Experiment III was designed with the intent of ascertaining what parameter of the token economy generated the increased seizure rate.

Subjects. Subject 1 was used as the only subject in this experiment. The experiment was divided into four conditions; (A) standard token contingencies (baseline), (B) increased token contingencies, (C) no token contingencies and (A) standard token contingencies. The standard token contingencies were the same

contingencies utilized in Experiments I and II. During the second condition the contingencies (prices) of all reinforcers were increased threefold but the amount of tokens paid for tasks on and off the ward were not increased. The following are examples of this manipulation:

| CONDITION A (standard token contingencies) | | CONDITION B (increased token contingencies) | |
|---|---|---|---|
| Item | Cost in Tokens | Item | Cost in Tokens |
| Meal | 2 | Meal | 6 |
| Room | 8 | Room | 24 |
| Cigarettes | 1 | Cigarettes | 3 |

Condition three consisted of no-token contingencies being placed on the subject. This condition was tantamount to the baseline in Experiment I and II. The fourth condition was a return to the standard token condition. During each condition behavior observations were recorded for subject 1 every half hour. These observations were conducted every half hour from 7 a.m. to 10 p.m., seven days a week. The observations were conducted in the following manner: (1) The aide observed the subject for a short period every half hour (10-30 seconds); (2) the behavior was recorded on the daily behavior sheet. The behaviors the subject might emit were coded into several categories on a behavior chart (Lindberg, unpublished). The behavior the subject was emitting at the time of the observation was found on the behavior chart and recorded on the daily behavior sheet in the coded form. The daily behavior sheet and behavior chart are found in Appendix E.

# CHAPTER III

# RESULTS

The Results section will be divided into Experiment I, Experiment II, and Experiment III.

## Experiment I

Experiment I was designed to ascertain if seizure subjects had more seizures while living under the contingencies of the token economy than while living on the two general psychiatric wards utilized for the baselines. The emotionality level of both groups of subjects was also measured.

The number of seizures for each of the three seizure subjects increased during the token condition. The seizure subjects also obtained more fines and time-outs than the nonseizure subjects during the token condition. The first data to be discussed in detail will be the indexes of emotionality.

Time-outs. The data on time-outs is presented in Figures 1 and 2. The number of time-outs for all three seizure subjects is presented collectively and the time-outs for all nonseizure subjects is also presented collectively. During the first baseline, the three seizure patients averaged one time-out per week and the nonseizure patients were placed in time-outs on the average of 3.2 times per week.

The number of time-outs increased for both groups during the first experimental manipulation. The nonseizure subjects increased from 2.4 to 3.2 time-outs. The time-outs increased fivefold for the seizure subjects and then decreased to the original baseline during the reversal. This data is presented in Figure 1. The nonseizure patients remained on the token ward and did not receive the reversal condition. This data is presented in Figure 2. The number of time-outs decreased slightly from that of the initial token conditions.

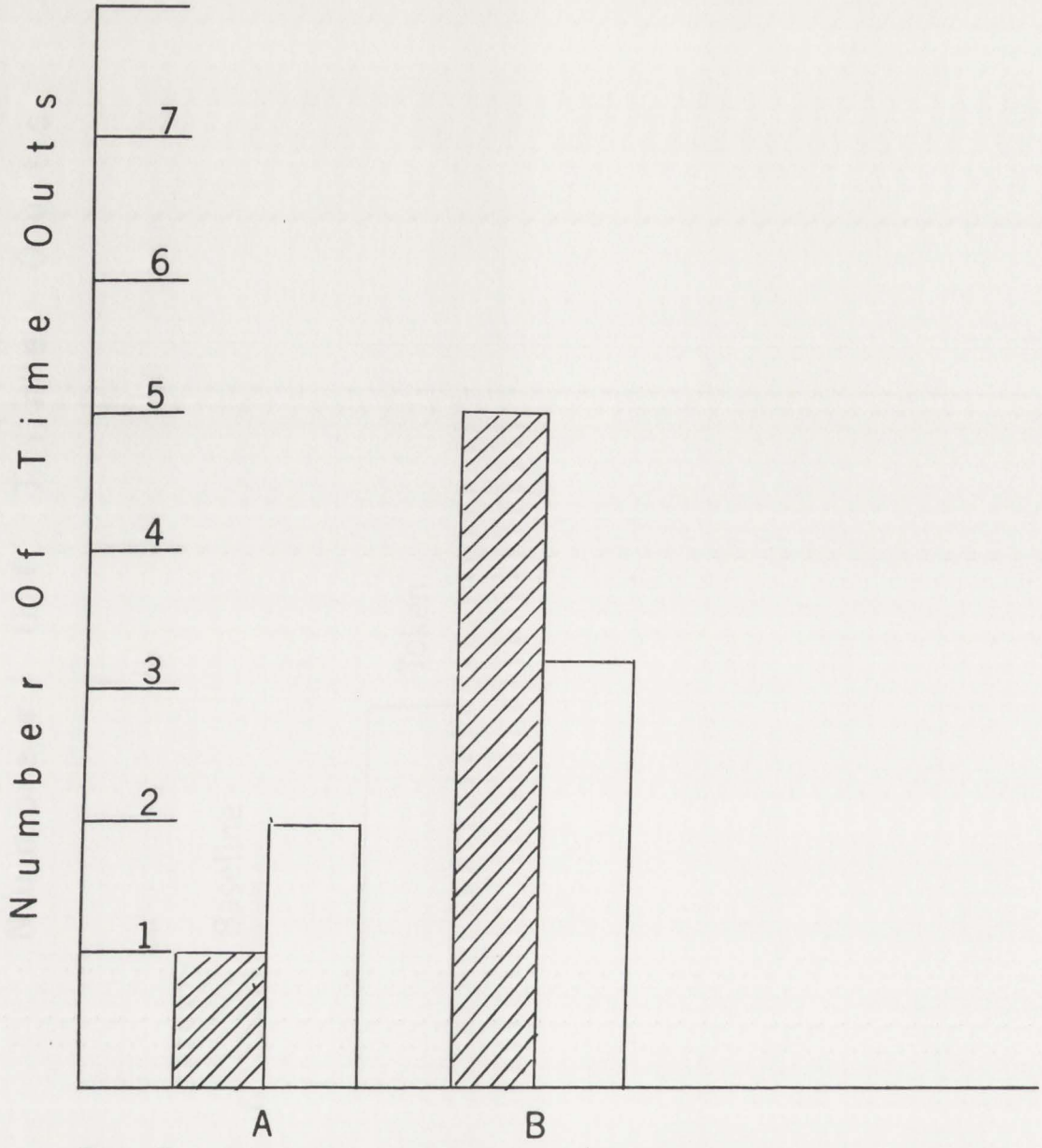



Fig. 1. Average number of time-outs per week for the seizure and non-seizure subject during the first baseline and token condition.

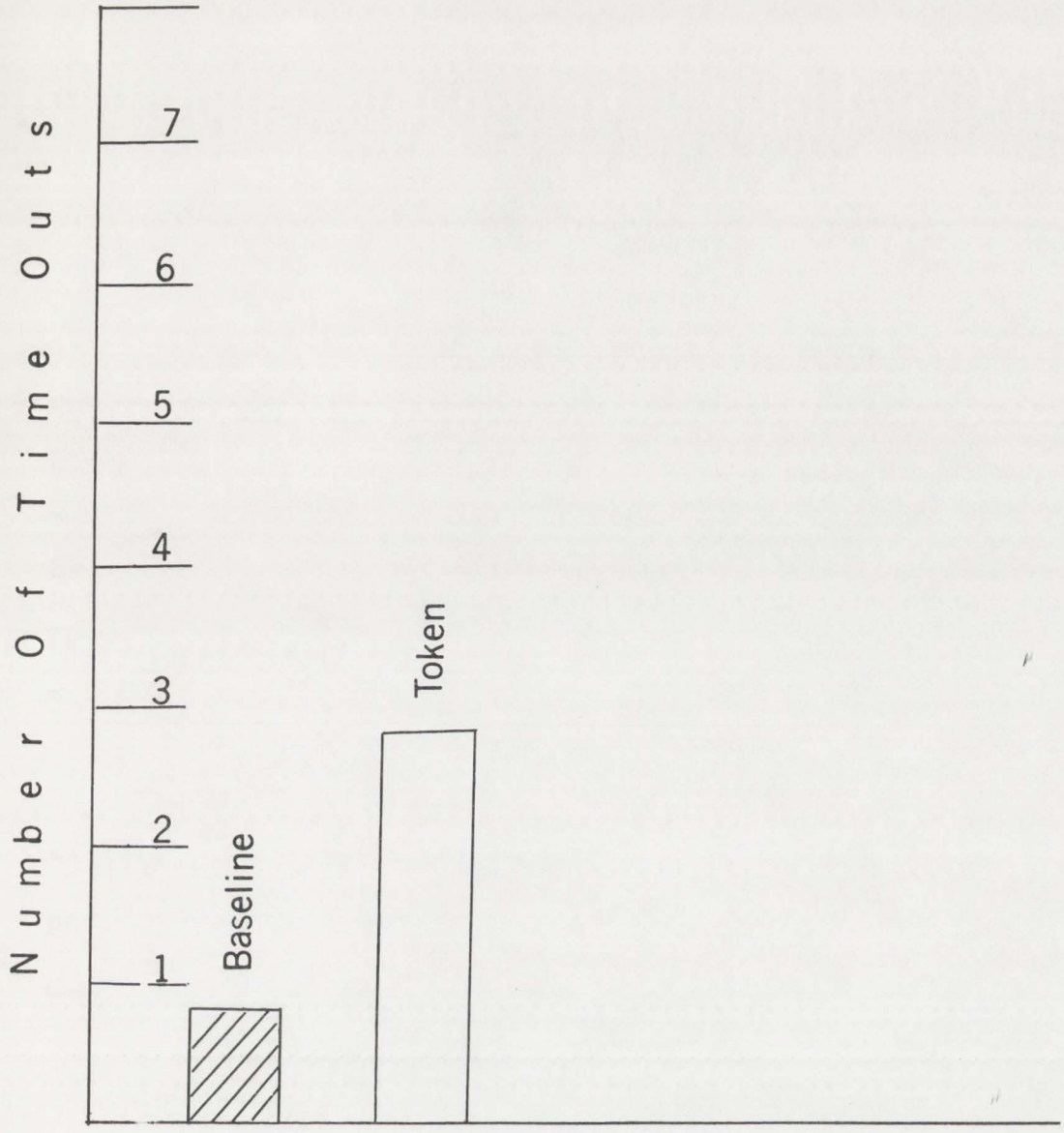
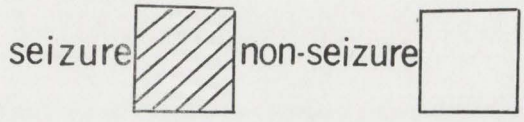



Fig. 2. Average number of time-outs for the seizure subjects during the return to baseline and average number of time-outs for the non-seizure subjects during the same period but while remaining on the token system.



Fines. Fines were recorded for all subjects only during the first token condition. This data is presented in Table 1.

Table 1

Average Number of Fines per Week during the Token Condition for the Seizure and Nonseizure Subjects

| SUBJECTS | NUMBER OF FINES |
|---|---|
| Seizure | 7.1 |
| Nonseizure | 3.2 |

The three seizure subjects obtained more than twice as many fines as did the remaining subjects. The seizure subjects averaged 7.1 fines per week while the nonseizure subjects received an averaged 3.2 per week.

Emotionality. The indexes of emotionality (fines and time-outs) indicates more emotionality was elicited during the token condition for the seizure subjects. The three seizure subjects, in fact, received more fines and time-outs than did the remaining nonseizure subjects ($\overline{X}$=24).

Seizure Rates. The first baseline for all subjects was eight weeks in duration. The length of the conditions after the first baseline were not equal. Subject 3's first token condition was only 21 days in length as her seizures were so frequent and severe. The first token condition was 95 days in length for subjects 1 and 2. The second baseline was 30 days in length for subjects 1 and 2. Subject 3 was on the second baseline condition for two months; 25 days on the second token condition and 30 days on the last baseline.

The data on seizure rates is presented in Figures 3, 4, and 5. When the token economy condition was introduced seizure rates increased for all subjects.

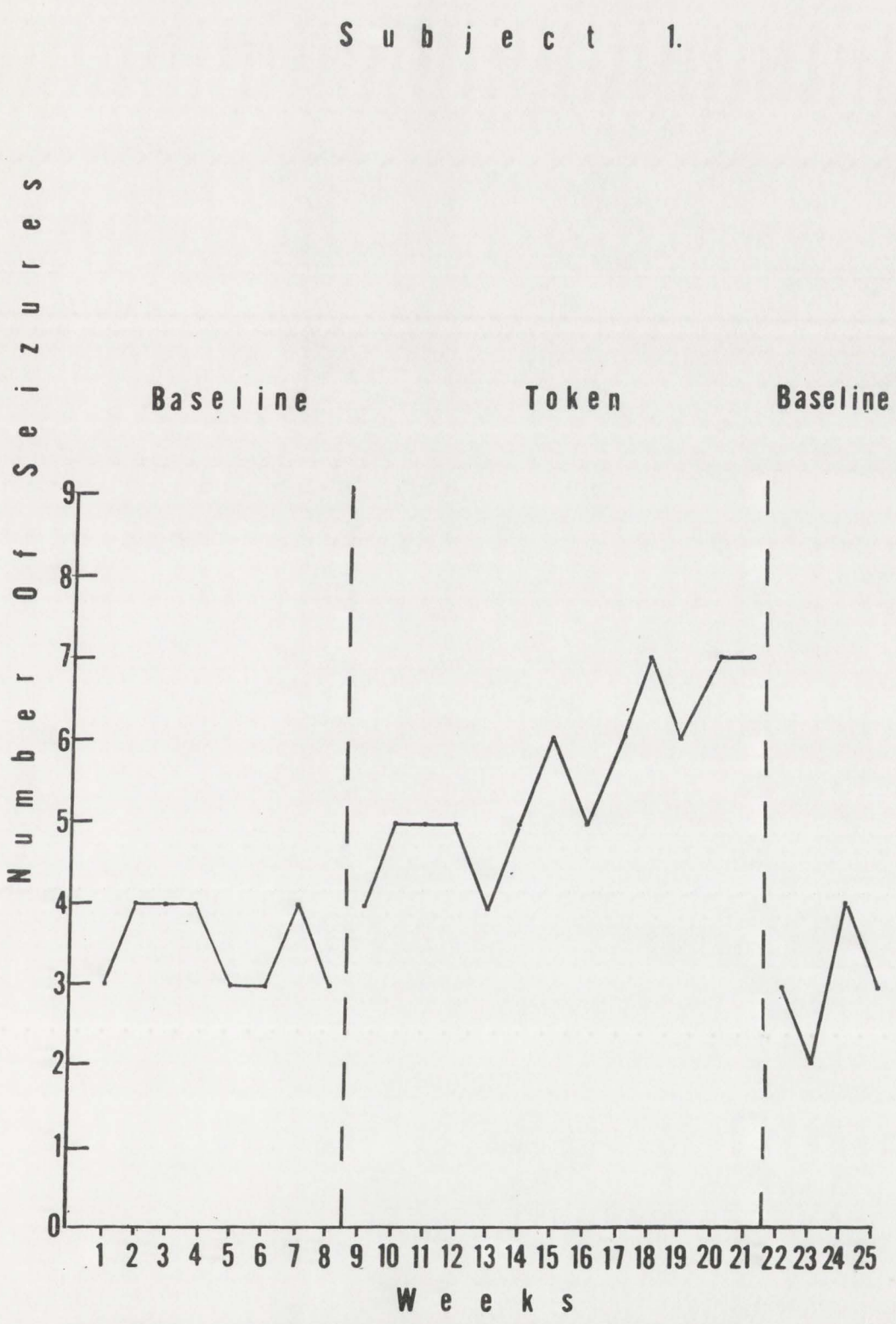



Fig.3. Number of seizures per week for each condition.

Subject 2.

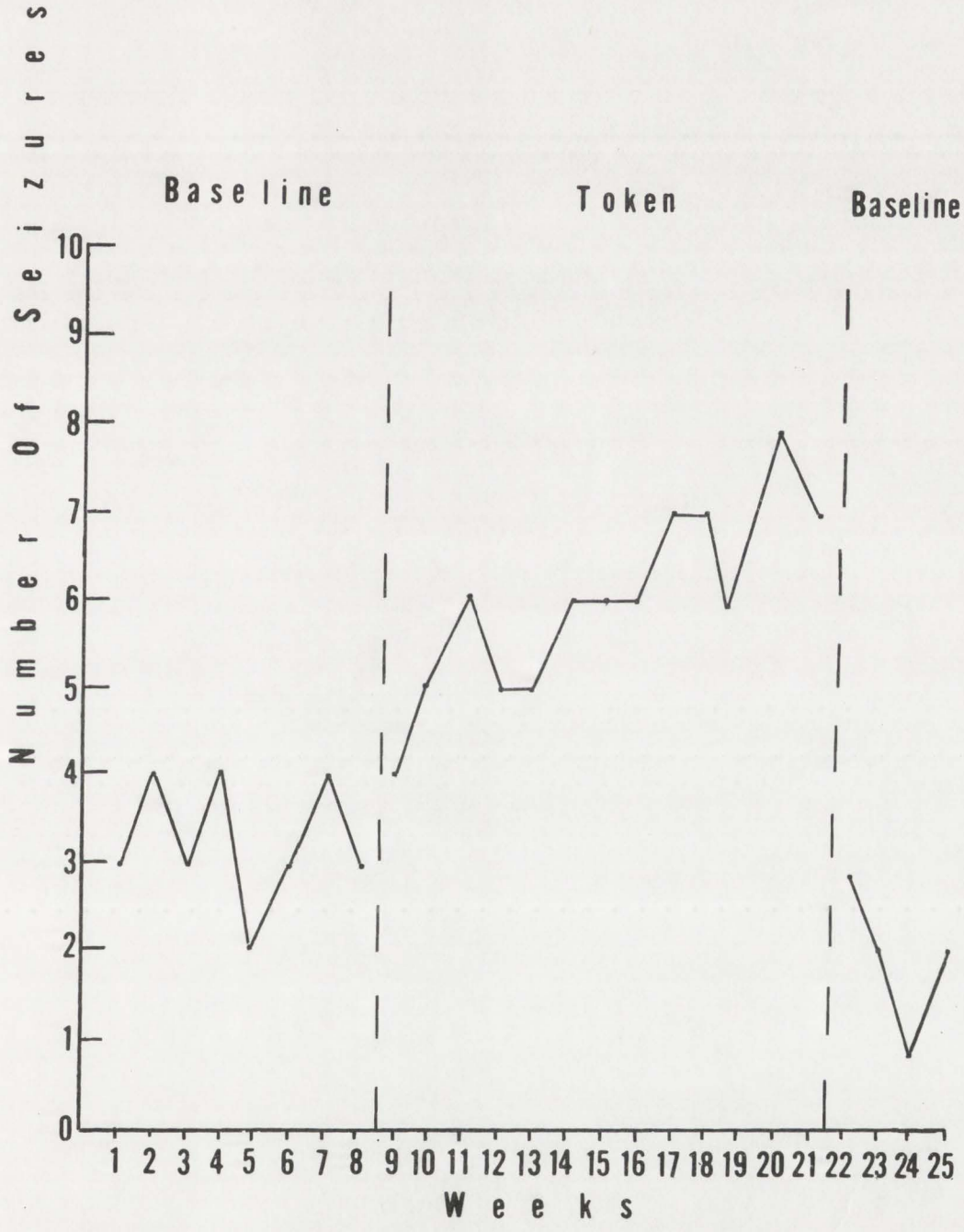



Fig.4. Number of seizures per week for each condition.

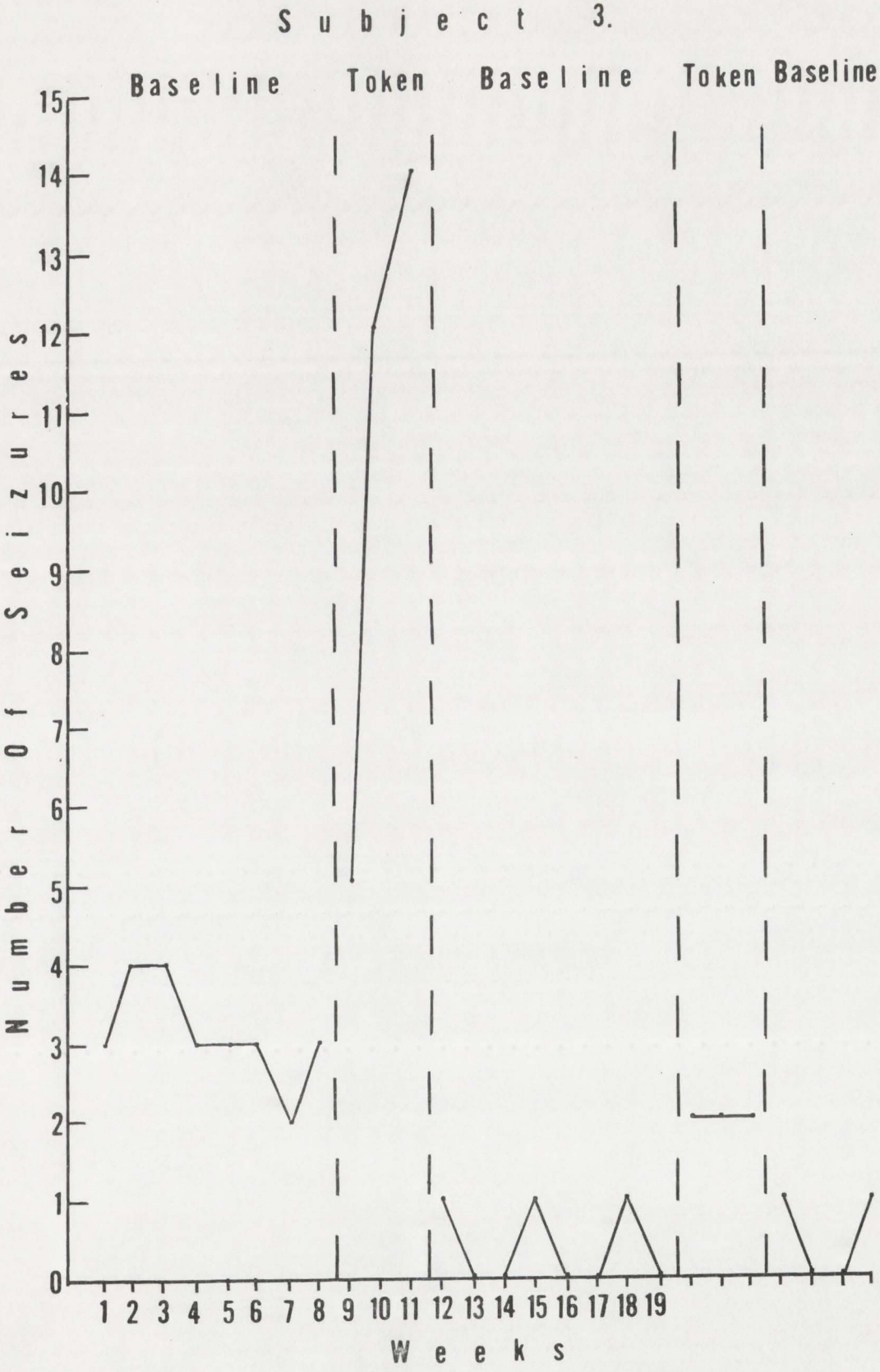



Fig.5. Number of seizures per week for each condition.

During the token condition, subject 1 had 28 seizures during the first baseline, 72 seizures during the token condition, and 12 seizures during the last baseline. She averaged 3.50 seizures a week for the first baseline, three for the last baseline and 5.50 during the token condition. Subject 2's results were similar. She had 26 seizures during the first baseline, eight seizures during the second baseline and 78 seizures during the token condition. This averaged to be 3.25 seizures a week for the first baseline, two a week for the second baseline, and six for the token condition. Subject 3's seizure rate increased the most during the token condition. She increased from 25 seizures during the first baseline to 31 seizures for the token condition. Her seizure rate dropped to three seizures for the second baseline. The reintroduction of the token condition increased her seizures to six. She had two seizures during the final baseline. Subject 3's weekly seizure averages were: 3.13 during baseline; 10.33 during token condition; .38 during baseline; 2.00 during token condition and .50 during baseline.

Statistics. The Chi-square comparisons of conditions is presented in Table 2.

Table 2

Chi-square Comparisons of Seizure Rates
for each Condition

| | CONDITIONS COMPARED | $X^2$ |
|---|---|---|
| Subject 1 | A & B | .461 |
| | A & C | .038 |
| | B & C | .755 |
| Subject 2 | A & B | .905 |
| | A & C | .297 |
| | B & C | 1.15 |
| Subject 3 | A & B | 3.85* |
| | A & C | 2.16 |
| | A & D | 2.50 |
| | A & E | 1.91 |
| | B & C | 9.25** |
| | B & D | 5.63** |
| | B & E | 8.93** |
| | C & D | 1.10 |
| | C & E | .016 |
| | D & E | .90 |

A=Baseline
B=Token
C=Baseline
D=Token
E=Baseline

*$p < .05$
**$p < .01$

From Table 2 it may be seen that the seizure rates during the baseline condition did not differ significantly for either subjects 1 or 2. The increase of subjects 1 and 2's seizure rates during the token condition also did not differ significantly from that of their seizure rates during baselines. Subject 3's increased seizure rate during the first token condition differed significantly from the first baseline ($p < .05$) and from the second baseline ($p < .01$) and the third baseline ($p < .01$). The two token conditions differed significantly ($p < .01$).

Experiment II

Figure 6 displays the daily seizure rate for subject 2. During the seven days of baseline, subject 2 did not experience any seizures. Her seizure rate increased to nine seizures for 11 days of the token condition. During the eight day reversal to the baseline conditions, subject 2 had one seizure. The data on subject 4's seizure rates is presented in Figure 7. Subject 4 had two seizures during the 17 days of the first baseline, 21 seizures during the 44 days of the token condition and one seizure for the two weeks of the second baseline. The token condition generated a seizure rate at least nine times greater than either baseline for both subjects. The differences between the baseline for each subject was not significant ($p < .05$), however, the token condition was significantly larger than either baseline for both subjects ($< .05$).

Subject 2.

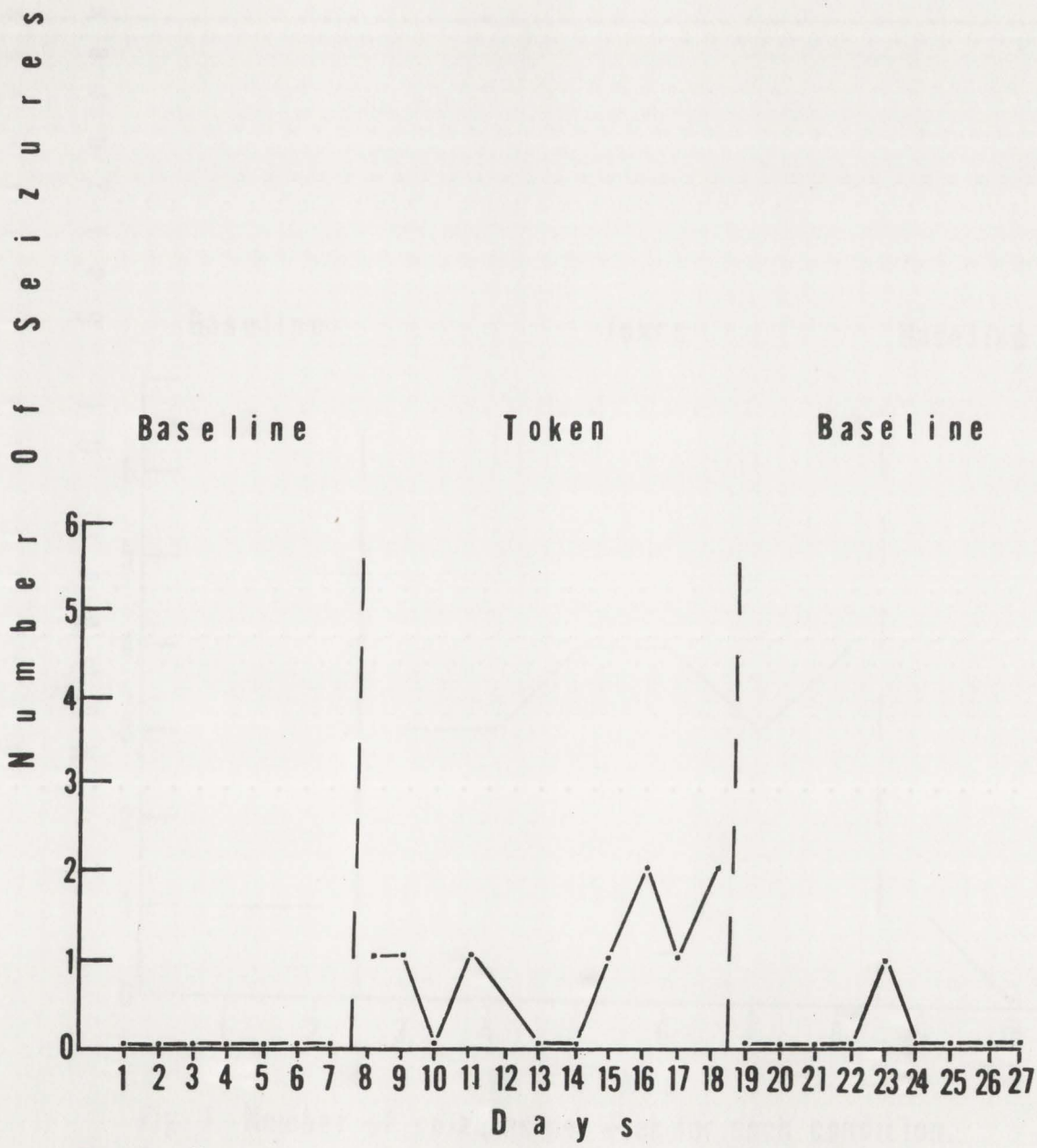



Fig. 6. Number of seizures per day for each condition.

Subject 4.

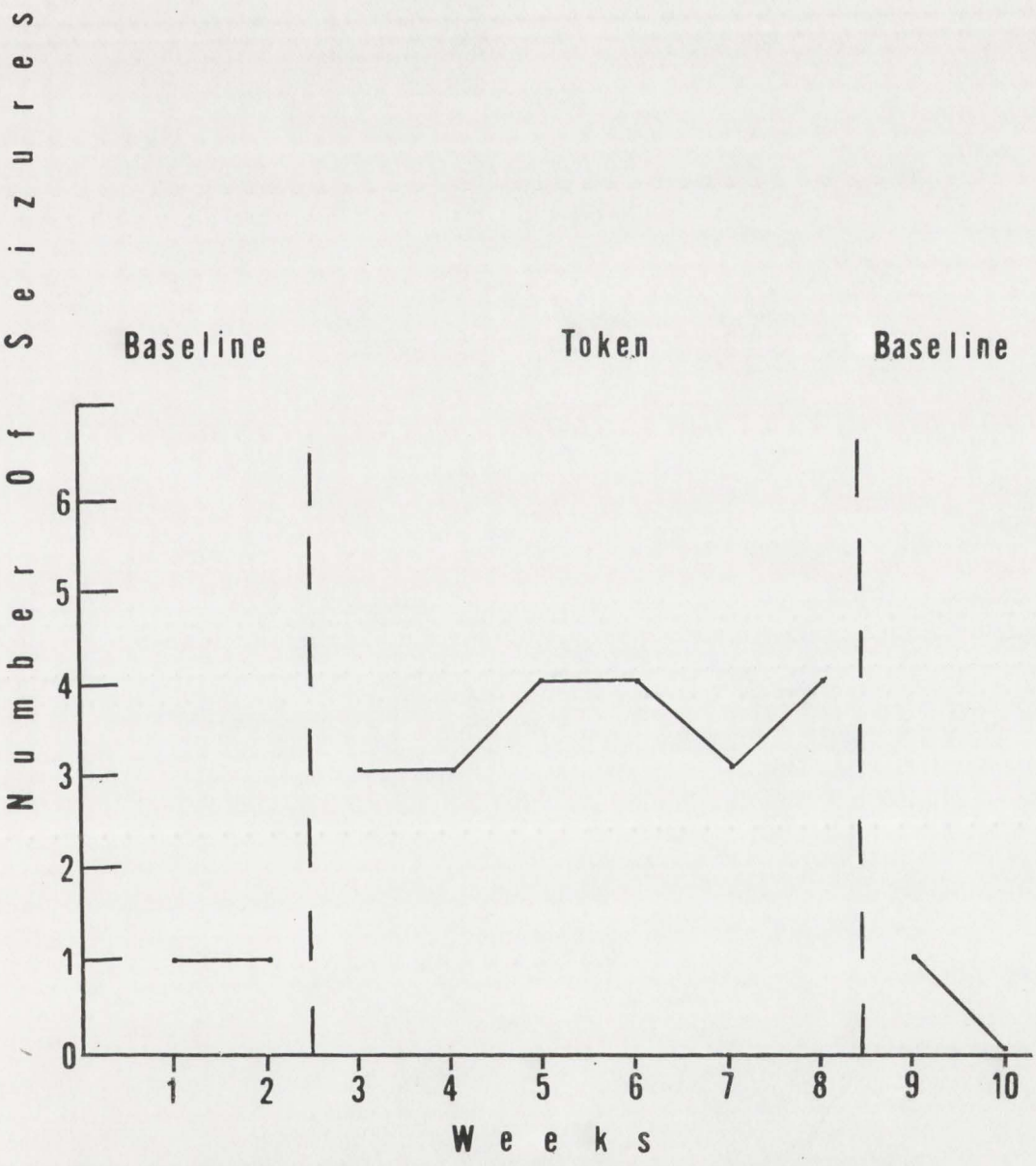



Fig. 7. Number of seizures per week for each condition.

The Chi-square condition comparisons are presented in Table 3. The trend of an increasing seizure rate during the latter portion of the token condition was obtained for both subjects. This trend was not as large as for the subjects of Experiment I.

Table 3

Chi-square Comparisons of Seizure Rates for each Condition

| | CONDITIONS COMPARED | $X^2$ |
|---|---|---|
| Subject 2 | A & B | 9.00** |
| | A & C | 1.00 |
| | B & C | 6.4** |
| Subject 4 | A & B | 15.7** |
| | A & C | .50 |
| | B & C | 18.18** |

A=Baseline
B=Token
C=Baseline

**p<.01

Experiment III

The data on subject 1's seizure rates is presented in Figure 8. During the seven days of the first standard token condition subject 1 had two seizures. The threefold increase of reinforcer prices during the seven days of the second condition generated five seizures. There was an increase of three seizures over that of the first condition. Subject 1 did not manifest any seizures during the third condition (no-token contingencies).

Subject 1.

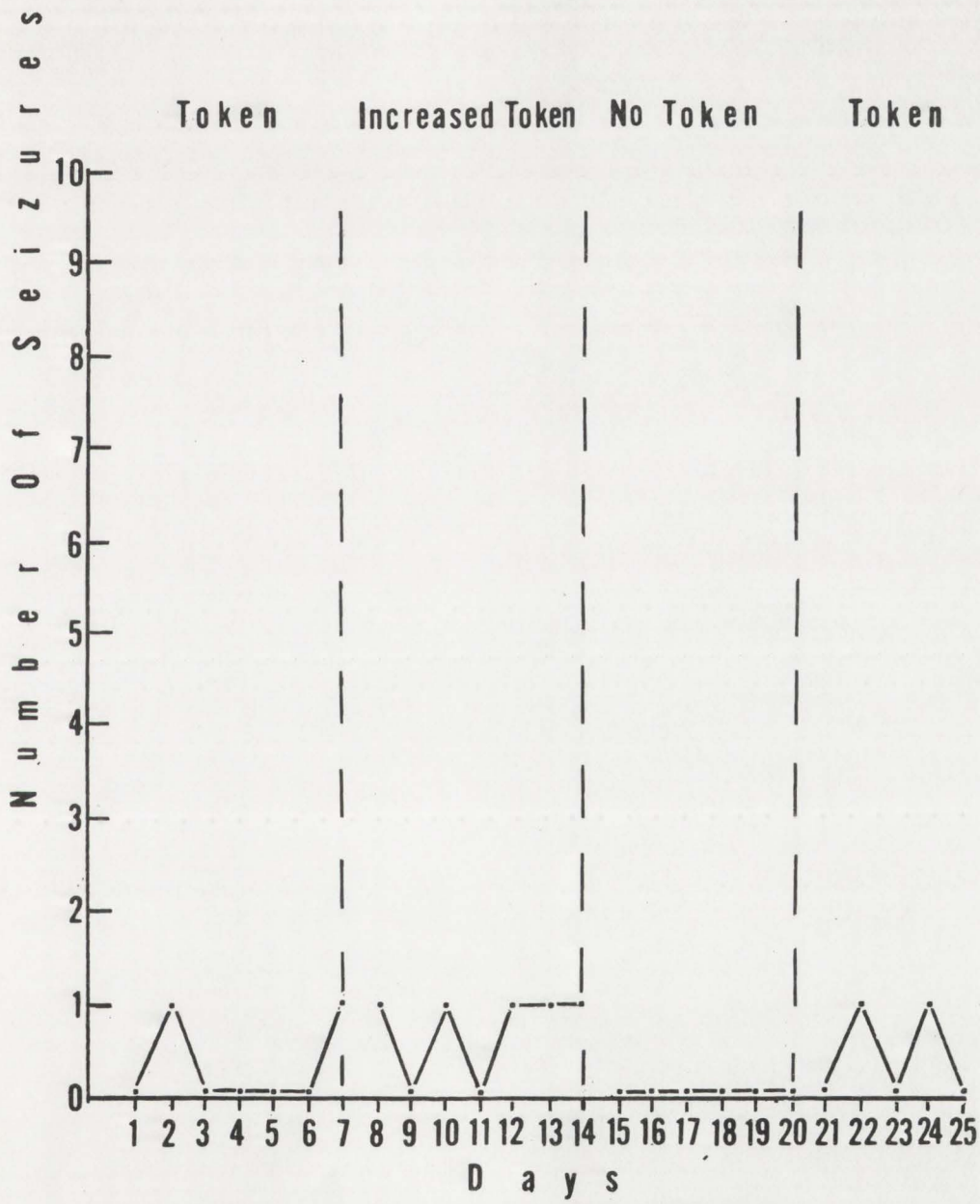



Fig. 8. Number of seizures for each condition.

During the second standard token condition subject 1 had two seizures. The Chi-square condition comparisons for subject 1 are presented in Table 4. The only significant differences were between seizure rates during the increased token condition and the no-token condition.

Table 4

Chi-square Comparisons of Seizure Rates for each Condition

| | CONDITIONS COMPARED | $X^2$ |
|---|---|---|
| Subject 1 | A & B | 1.254 |
| | A & C | 2.00 |
| | A & D | .00 |
| | B & C | 5.00* |
| | B & D | 1.254 |
| | C & D | 2.00 |

A=Standard Token
B=Increased Token
C=No Tokens
D=Standard

*$p < .05$

The percentage of appropriate behavior emitted by the subjects varied as a function of the experimental manipulations. This data is presented in Figure 9. The percentage of appropriate behavior subject 1 emitted during the first standard token condition was 24 percent. This percentage dropped to 18 percent during the increased token condition. The removal of the subject from the

token contingencies increased her percentage to 49 percent. The percentage of appropriate behavior was not recorded during the final standard token condition as the aide who maintained the records was on sick leave.

Thus, the results suggest that epileptics had more seizures while living on a token economy than while not living under the contingencies of the token system. An increase in the price of reinforcers also resulted in an increased seizure rate. Concomitant with the increase of seizures, epileptics manifest more inappropriate behavior and more emotionality while placed on this token system.

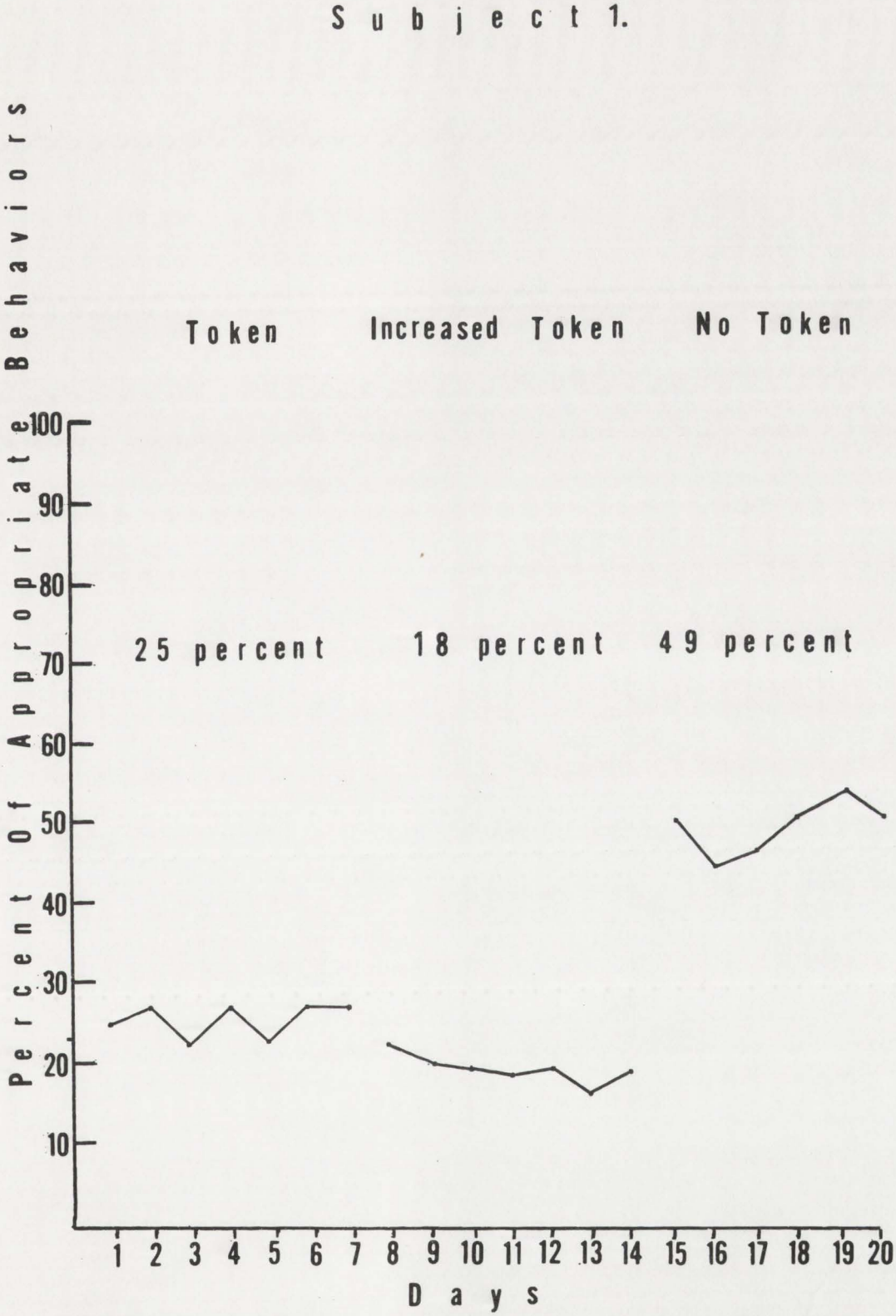



Fig. 9. Percent of approriate behaviors emitted by subject I. during each day of each condition.

# CHAPTER IV

## DISCUSSION

The present findings are of particular significance for individuals working in hospital settings and pose some interesting theoretical questions as well. It seems clear that the seizure rates of some epileptics might be effectively decreased by placing them on wards with conditions similar to those utilized during the baselines of Experiments I and II. There is a strong indication that seizure rates are related to conditions in the token economy.

Under the token contingencies each subject's seizure rate increased during Experiment I. Subject 3's seizure rate increased so greatly that she was transferred from the token condition after only 21 days. There may be multiple reasons for the increase in all three subjects seizure rates. First, all the subjects were given 25 free tokens at the beginning of each token condition. The subjects were able to purchase the wanted reinforcers with a minimum of work for several days and, in cases, weeks because they had free tokens. For instance, if each subject needed two tokens for a meal and had earned only one that day she was able to take a token from the 25 free tokens for the meal. Gradually, the 25 tokens were spent and consequently the subjects had to do without more and more reinforcers. This lack of positive reinforcers

may have elicited emotionality. The emotionality of all three subjects, as defined in Experiment I, increased as compared with the control group. This increased emotionality may, in turn, have accounted for the increased seizure rate. This study, however, did not establish a cause and effect relationship between emotionality and seizure rates. The findings of Experiment I were that the two behaviors covaried. There is some evidence (Penfield and Jasper, 1954; and Aring, et al., 1946) that seizure rates are related to the emotionality of the epileptic.

Other possible reasons might account for the subjects increased seizure rates during the token condition. One such explanation may be that severe seizure patients are assumed by most members of the hospital community to be long term patients that are refractory to therapy. This assumption causes the epileptic patient to receive differential treatment. The epileptics are given all they need, occasionally mollycoddled, and frequently ignored in therapy. Members of the staff frequently "give in" to seizure subjects in the fear that if the seizure patient were forced to complete a task or given a punisher, the patient may have a seizure. This condition causes many hospitalized seizure patients to extinguish many behaviors necessary to perform well on the token economy. When the contingencies of the token economy are placed upon the seizure

patient, they possess an extensive past history of reinforcement of obtaining the essentials of life without earning them. Subsequently, seizure rates may be increased as a result of the token contingencies.

The increased seizure rates of all subjects manifested themselves in a common trend. The number of seizures per week each subject had during the token condition increased. For example, during the token condition subject 3 averaged five seizures for the first week, 12 seizures for the second week, and 14 seizures for the third week. The increases for subjects 1 and 2 were not as dramatic but their seizure rates did manifest the same trend. This rising effect may be due to the continual and increasing deprivational level. The emotionality level may be increased by this growing lack of reinforcers and subsequently the seizure rates may be increased as a function of the rising emotionality level.

The number of time-outs for the three seizure subjects was less than the nonseizure subjects (mean=24 during the first baseline), however, the seizure subjects earned more time-outs during the token condition. The seizure subjects also obtained more fines during the token condition than did the nonseizure subjects. The high number of time-outs and fines are indicators of the level of emotionality elicited by the token condition. These punishers were dispensed contingently for behaviors involving a defined manifestation of emotionality. These data suggest severe epileptics may not function or benefit from a token

economy such as the one established at the Wyoming State Hospital. This inability to function on their token economy system was not found to be a commonality among all the members of any one diagnostic or age category. Ayllon and Azrin (1968) found 15 percent of their subjects did not function in their token economy system and the findings of this study indicate that severe epileptics may be members of one diagnostic category that manifest a commonality in that they do not function on token economies constructed as this one.

The decrease of subject 3's seizure rate to near zero during the second baseline may be due to many factors. Subject 3 was going through menopause during the entire experiment. This physiological state may have altered the seizure rate substantially enough to lower it to zero. However, the introduction of the token condition again increased her rate of having seizures. Thus, the data on her seizure rates may have been confounded during the baselines above and beyond the fact that she was on a different psychiatric ward for each baseline.

The differences in the conditions of the baselines during Experiment I may have confounded the data. Experiment II attempted to eliminate this difficulty by utilizing only one ward for all three conditions. The presence or absence of the token contingencies was the only experimental manipulation. Statistical analysis revealed no significant differences between the baselines of either subject but a

significant difference was found between each subject's seizure rate during the baselines and the token conditions. The differences between seizure rates during the baselines and token conditions then may be inferred to be a result of experimental manipulation (i.e., the token contingencies). The number of seizures subject 2 had during Experiment II was not as high as during Experiment I. However, the seizure patterns were the same. More seizures occurred during the token contingency and more seizures were recorded during the latter portion of the token condition.

Recent research has shown that certain types of seizures may be arrested after the appearance of the aura (Efron, 1957). These seizures are elicited by a specific known stimulus. Experiment II found that seizure rates are responsive to the presence of a token economy. Experiment III attempted to ascertain which parameter of the token economy generated the higher seizure rate. This knowledge would hopefully enable the staff to program the token economy to reduce rather than increase seizure rates. The seizure rate of subject 1 varied proportionally with the changes in the price of the reinforcers. A threefold increase in reinforcer prices generated more seizures than did the standard token condition. During the decrease in reinforcer prices (no-token contingencies) the subject did not have any seizures. The pressure to work caused by the increase in reinforcer prices may have generated a higher seizure rate.

Concomitant with the changes in seizure rates were changes in the daily percentage of appropriate behaviors emitted by subject 1. The highest percentage of appropriate behaviors was emitted by subject 1 during the no-token condition and the lowest percentage was emitted during the increased token contingencies. The percentage of appropriate behaviors emitted during the standard token condition was intermediate between the percentage of appropriate behaviors during the other two conditions. Seizure rates and percentage of appropriate behaviors covaried for subject 1. These data relate to the increase in emotionality and changes in seizure rates found in Experiment I. Indexes of emotionality (time-outs and fines) increased for all three subjects during the token condition of Experiment I. The behaviors for which time-outs and fines were dispensed were defined as inappropriate behaviors. The number of inappropriate behaviors increased during Experiment I, and consequently the number of appropriate behaviors decreased. On the basis of these data it might be predicted that the percentage of appropriate behaviors emitted by the subjects would vary with experimental manipulations, which is what was found in Experiment III. As with Experiment I, Experiment III did not ascertain a cause and effect relationship between inappropriate behavior and seizure rate. Future research

should attempt to determine a cause and effect relationship between emotionality and seizure rates. Perhaps this research could be oriented around inducing emotionality to see if the seizure rates increased.

The seizure rate of subject 2 during Experiment III varied proportionally to the increases or decreases in reinforcer prices. The cause for this relationship was not determined in the series of experiments. The two explanations, previously mentioned, may be involved in this relationship. The first explanation was that the token contingencies caused the epileptics to do without wanted items. This lack of wanted articles elicited emotionality and the emotionality generated the seizures. This explanation could account for the increased seizure rate during the threefold increase of reinforcer prices. The increased prices caused the seizure patient to do without more items in a shorter period of time. Consequently, a higher level of emotionality would be elicited and as a result the subject would have a higher seizure level. The findings of Experiments I and III lend support to this explanation. In Experiments I and III a higher level of emotionality was recorded for the subjects during the token condition and the level of appropriate behaviors emitted by the subjects in Experiment III decreased with the increase in reinforcer prices.

The present findings suggest that epileptic seizure rates may be lowered or maintained at a minimal hospital level by placing individuals on a ward where few, if any, contingencies are placed upon them. This situation is not optimal for remediating behavioral problems and for eventually removing an epileptic from the hospital setting. In this study the presentation of a token system was completed all at once. Perhaps the most therapeutic application of token contingencies or any type of demands on epileptics may be one that utilizes the techniques of fading (Terrace, 1963). Fading involves a presentation or removal of a condition (i.e., contingencies, in small sequential increments). In this way the subject is better able to adjust to the demands placed upon him. A presentation of the token contingencies might best be achieved by placing the contingencies on a epileptic for an appropriate behavior well established in the individual's repertoire. Tokens received for this behavior might be spent on a reinforcer highly desired by the subject (i.e., movie or canteen priviledges). Once this contingency has been well established, additional contingencies could be placed upon the subject. Gradually and sequentially the number of contingencies could be increased until the epileptic would be on the equivalent of the token economy system.

The theoretical implications of these findings are that seizure rates may be controlled by proper environmental control, although epilepsy is physiological in etiology. This etiology is an ubiquitous factor common for all seizures, however, each individual seizure may be triggered by a specific stimulus (i.e., flickering lights). In this study the triggering stimulus was inferred to be the presence of the token economy. In society seizures may also be triggered by specific stimuli with qualities like those of the token economy. A knowledge of these stimuli may be of use in lessening seizure rates. The present findings indicate seizure rates are effected by the epileptic's surroundings. A possibility also remains that the epileptic's surroundings may be effected by seizures. Specific stimuli causes an epileptic to seizure. These stimuli may be aversive to the epileptic as was the case in these experiments. The occurrence of the seizure results in the tmeporary removal of the individual from the assumed aversive stimuli. The seizure also obtains attention and occasionally sympathy for the epileptic. These social reinforcers, in addition to the escaping from the triggering stimuli, may result in an increase of seizures.

# CHAPTER V

## SUMMARY

Numerous investigators have reported a relationship between specific environmental stimuli and epileptic seizures. The evidence indicates certain stimuli possess the potential to elicit a seizure. This phenomenon has been documented with such stimuli as flickering lights. Respondent conditioning techniques have been found to be beneficial in counter conditioning a seizure when the eliciting stimuli has been presented. The literature also suggests seizure rates may increase while the epileptic is in an emotional state and that emotional behavior may be elicited by a number of types of stimuli.

The token economy is a motivating system used to modify the undesirable behaviors of chronic mental patients. The present series of experiments was conducted to determine the effect of the token economy established at the Wyoming State Hospital on the behavior and seizure rates of four severe epileptics. Experiment I was conducted primarily in an attempt to ascertain the effect of the token economy on the seizure rates of severe epileptics as compared to their seizure rates on two general psychiatric wards. Second, the emotionality of the seizure subjects was assessed and compared to the emotionality of nonseizure subjects. The experimental design was the ABA design. The seizure subjects were exposed to a number

of conditions; baseline, token condition and baseline. The baseline conditions involved placing the seizure subjects on two general psychiatric wards. The nonseizure subjects received the same first two conditions as the seizure subjects but were not exposed to a reversal.

Emotionality was assessed by defining certain behaviors as emotional. These behaviors were undesirable and were punished by either contingent time-outs or a fine. The number of fines and time-outs were then employed as an index of emotionality.

Interobserver reliability was determined for each psychiatric aide collecting data. This was achieved by having the experimenter and each psychiatric aide collect the same data simultaneously and calculating the reliability. The mean interobserver reliability was 93 percent.

The results were: (1) The seizure rates of all three epileptics increased over the first baseline condition during the token condition; (2) the seizure rates for all three subjects returned to near baseline after the reversal; (3) the three epileptics received fewer fines and time-outs than did the nonseizure subjects during the first baseline; (4) during the token condition the three epileptic subjects received more fines and time-outs than the nonseizure patients. The results suggest that the token condition concomitantly increased seizure rates and the emotionality of the epileptic subjects.

Experiment II systematically replicated Experiment I by utilizing only one ward for all three conditions. Two subjects were exposed to the three conditions; baseline, token contingencies and baseline. The seizure rates of both subjects increased significantly during the token condition. The seizure rates of both subjects returned to the original baseline level during the final condition.

Experiment III attempted to ascertain what parameter of the token economy accounted for the increased seizure rates. One subject was exposed to four conditions; standard token condition, threefold increase of reinforcer prices, no-token economy (equivalent of baseline during Experiments I and II) and standard token condition. Data was recorded for two categories of behavior; (1) seizures and (2) a behavioral check was made every half hour from 7 a.m. to 10 p.m. The findings were: (1) The subject had the same number of seizures during both standard token conditions; (2) the seizure rate increased during the increase in reinforcer prices; and (3) the seizure rate decreased to zero during the no-token condition. The percentage of appropriate behaviors emitted by the subject decreased during the increased token contingencies and increased during the no-token condition from the level of appropriate behaviors emitted during the standard token conditions.

From the findings of this study it may be inferred that the token economy increased the subjects seizure rate. The reason for this increase is not clearly understood. Further research should attempt to determine this relationship and also the relationship of seizure rates and emotionality.

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# APPENDIXES

# APPENDIX A

## Rules for Token Economy

## RULES

1. To earn tokens each step of your job must be done.

2. When done find monitor and have work checked.

   a. Tokens will be paid if you are passed by monitor.
   b. You get only one chance to be passed so be careful.
   c. If you are not passed the job must be completed anyway.

3. If you are passed--be at the office at appointed times--SEE BELOW.

4. Tokens can be saved only in bank--BANK WILL BE OPENED AT CERTAIN TIMES.

5. Tokens can be taken for certain behavior--SEE FINES.

6. All personal grooming and personal area work must be done by 8 a.m.

7. Come to office only when necessary.

   a. Example--MEDICINE--CIGARETTES.

8. Shock patients do not have to do anything until 11 a.m.

   a. At this time they must do personal grooming, work, etc.
   b. Tokens earned will be paid at 1:30 p.m.

---

## FINES

TOKENS WILL BE TAKEN FOR:

| | | |
|---|---|---|
| 1. | Hitting another patient . . . . . | 5 Tokens |
| 2. | Tantrums . . . . . | 5 Tokens |
| 3. | Pestering at office . . . . . | 1 Per time |
| 4. | Hoarding . . . . . | 3 Tokens |
| 5. | Stealing . . . . . | 5 Tokens |
| 6. | Sleeping other than at correct times . . . . . | 2 Tokens |

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## PURCHASE OF CARDS

### RULES

1. Must stay on original card for one month.

2. Next card costs:

    a. Red--free card
    b. Yellow--50 tokens
    c. White--60 tokens
    d. Pink--70 tokens
    e. Pink-Green--80 tokens
    f. Blue Companion--90 tokens
    g. Blue Solo--100 tokens

### CARD PRIVILEGES

Red--cannot leave hall--may receive six cigarettes.
Yellow--go to activities with aide--smoke off hall.
White--can go off hall with another white card (pink, pink-green, blue).
Pink--can leave hall alone--smoke off hall.
Pink-Green--can leave hall alone until 10 p.m.--smoke off hall.
Blue Companion--can go downtown with another blue companion or blue solo--smoke off hall.
Blue Solo--can go downtown alone--smoke off hall.

---

### TIMES

TOKENS EARNED WILL BE PAID AT:

8 a.m.--for grooming and sleeping area.
9 a.m.--for hall duties.
1:30 p.m.--for hall duties.
4 p.m.--for hall duties and industrial assignments.
7:30 p.m.--for hall duties.

BANK WILL BE OPENED AT SAME TIME TOKENS ARE BEING PAID

---

## TIMES FOR BUYING OF ITEMS

| | |
|---|---|
| Beds and bedroom items | 8 a.m. |
| Meals | at each meal |
| Activities | before activity |

# APPENDIX B

## Ways to Earn Tokens

# WAYS TO EARN TOKENS

| JOB DESCRIPTION | No. of Persons | Tokens Paid | Time Allowed |
|---|---|---|---|
| 1. Clean water fountain.<br>a. Gather equipment<br>b. Put ajax on<br>c. Clean well<br>d. Put equipment away | 1 | 2 per person | 30 min. |
| 2. Clean north hallway.<br>a. Gather equipment<br>b. Take black marks up<br>c. Wash floor<br>d. Rinse floor<br>e. Wax floor<br>f. Buff floor<br>g. Put equipment away | 2 | 5 per person | 1 hr. 15 min. |
| 3. Clean day room.<br>a. Gather equipment<br>b. Sweep floor<br>c. Dust<br>d. Water plants<br>e. Wash furniture<br>f. Wash windows<br>g. Move all furniture<br>h. Clean plastic rug runner<br>i. Do not move piano | 3 | 6 per person | 1 hr. 15 min. |
| 4. Clean kitchen.<br>a. Serve the food<br>b. Clean up dishes<br>c. Wash cups to be kept on hall<br>d. Wash stove, refrigerator, cupboards<br>e. Sweep and mop floor<br>f. Wash window sills<br>g. Wash coffee urn and make coffee | 2 | 12 per person | 2 hrs. |

WAYS TO EARN TOKENS (Continued)

| JOB DESCRIPTION | No. of Persons | Tokens Paid | Time Allowed |
|---|---|---|---|
| 5. Clean linen room.<br>a. Put linen away<br>b. Sweep and mop floor<br>c. Wax weekly | 1 | 5 | ½ hr. |
| 6. Defrost refrigerator (once weekly)<br>a. Take everything out<br>b. Place a bowl of hot water in refrigerator to help defrost<br>c. Wash and dry out<br>d. Put things away | 1 | 3 | 45 min. |
| 7. Clean southwest office.<br>a. Clean ashtrays<br>b. Dust<br>c. Dust and wet mop floor | 1 | 3 | 30 min. |
| 8. Clean womens toilet room.<br>a. Gather equipment<br>b. Clean stools<br>c. Clean sinks<br>d. Clean tile<br>e. Clean wall between stools<br>f. Clean mirrors<br>g. Put soap in dispensers<br>h. Put out paper towels<br>i. Put out toilet tissue<br>j. Wash floors<br>k. Clean pipes under sinks<br>l. Empty waste baskets<br>m. Put your equipment away | 1 | 7 | 30 min. |

WAYS TO EARN TOKENS (Continued)

| JOB DESCRIPTION | No. of Persons | Tokens Paid | Time Allowed |
|---|---|---|---|
| 9. Clean hallway to Albany Hall.<br>a. Gather equipment<br>b. Dust mop<br>c. Clean window sills<br>d. Clean windows<br>e. Mop floor<br>f. Put your equipment away | 1 | 3 | 30 min. |
| 10. Clean mens toilet room.<br>a. Same as number 8 | 1 | 7 | 30 min. |
| 11. Clean utility room.<br>a. Keep walls clean<br>b. Clean mop heads<br>c. Clean sink<br>d. Wash cupboards<br>e. Mop and wash floor | 1 | 3 | 30 min. |
| 12. Clean clothing room.<br>a. Make sure all boxes are clean and straight<br>b. Put things in right boxes<br>c. Dust mop<br>d. Mop and wax once a week<br>e. Includes washing any dirty clothing | 2 | 8 | when necessary |
| 13. Clean womens shower room.<br>a. Gather equipment<br>b. Clean shower room and stalls<br>c. Clean soap dishes<br>d. Clean taps<br>e. Mop floor | 1 | 7 | 30 min. |

WAYS TO EARN TOKENS (Continued)

| JOB DESCRIPTION | No. of Persons | Tokens Paid | Time Allowed |
|---|---|---|---|
| 14. Clean mens shower room.<br>a. Same as number 13 | 1 | 7 | 30 min. |
| 15. Clean center hallway.<br>a. Same as number 2 | 2 | 5 per person | 30 min. |
| 16. Empty waste baskets.<br>a. Empty into large basket in kitchen<br>b. Take outside<br>c. Wipe out all baskets<br>d. Put in clean liners | 1 | 3 | 30 min. |
| 17. Clean windows.<br>a. Gather equipment<br>b. Wash and wipe windows<br>c. Put away equipment | 1 | 2 | 20 min. |
| 18. Clean seclusion room.<br>a. Clean stool<br>b. Dust mop<br>c. Mop and wax floor<br>d. Wash window sill<br>e. Dust screen on window<br>f. Wax once a week (rooms 1, 2, & 3) | 1 | 7 | 1 hr. |
| 19. Clean entrance to Platte and Lincoln.<br>a. Gather equipment<br>b. Dust rails and window sills<br>c. Dust and mop floor<br>d. Wet mop floor<br>e. Put equipment away<br>f. Wax floor once a week | 1 | 5 | 30 min. |

WAYS TO EARN TOKENS (Continued)

| JOB DESCRIPTION | No. of Persons | Tokens Paid | Time Allowed |
|---|---|---|---|
| 20. Clean area around washer and dryer.<br>a. Gather equipment<br>b. Clean behind and under washer and dryer<br>c. Wash both<br>d. Clean inside of both<br>e. Put equipment away | 1 | 3 | ½ hr. |
| 21. Clean visiting room.<br>a. Gather equipment<br>b. Clean furniture<br>c. Clean and dust mop floor<br>d. Move furniture<br>e. Wet mop floor<br>f. Put equipment away<br>g. Wax once a week | 1 | 2 | ½ hr. |
| 22. Clean smoking room.<br>a. Gather equipment<br>b. Wash furniture<br>c. Dust and mop floor<br>d. Put furniture away<br>e. Arrange books<br>f. Water plants | 1 | 3 | ½ hr. |
| 23. Clean south hallway.<br>a. Same as number 2 and number 15 | 2 | 5 per person | 1 hr. |

WAYS TO EARN TOKENS (Continued)

| JOB DESCRIPTION | No. of Persons | Tokens Paid | Time Allowed |
|---|---|---|---|
| 24. Washing walls.<br>a. Gather equipment<br>b. Wash walls<br>c. Rinse walls<br>d. Put equipment away | 2 | 8 per person | 1 hr. |
| 25. Clean coat room.<br>a. Gather equipment<br>b. Dust and wet mop floor<br>c. Put equipment away<br>d. Wax once a week | 1 | 4 | ½ hr. |
| 26. Clean outside porch.<br>a. Gather equipment<br>b. Sweep porch<br>c. Put equipment away<br>d. In winter, put salt and sand on steps | 1 | 4 | ½ hr. |
| 27. Cigarette controller.<br>a. Collect tokens and pass out cigarettes<br>b. On duty 8:00, 10:30, 12:00, 2:30, 5:00, 9:00 | 2 | | |
| 28. Bed checkers.<br>a. See that all beds are made correctly<br>b. Nothing should be under beds<br>c. Night stands should be clean and straight<br>d. No lint under beds<br>f. Wash beds and clean linen once a week<br>g. Wash night stands once a week | 1 | 1 | 15 min. |

WAYS TO EARN TOKENS (Continued)

| JOB DESCRIPTION | No. of Persons | Tokens Paid | Time Allowed |
|---|---|---|---|
| 29. Hair dryer.<br>a. Collect 2 tokens from each person using hair dryer | 1 | | |
| 30. Patient helper.<br>a. Help patient to: wash, dress, and clean area as needed | 1 to 1 | | 15 min. |
| 31. Errands.<br>a. Privilege cards are to contact aides | 2 | 4 | |
| 32. Tour Guide on Hall (explain token economy).<br>a. Rooms<br>b. T.V.<br>c. Bank<br>d. Fines<br>e. Bulletin board | 1 | 10 | |
| 33. Hygiene assistance.<br>a. Check to see that all persons: comb hair, wash face with soap and water, brush teeth, are fully clothes and changed every day, have clothes ironed, have clean hands and nails, have legs shaved, have on shoes and socks. | 1 | 8 | |

WAYS TO EARN TOKENS (Continued)

| JOB DESCRIPTION | No. of Persons | Tokens Paid | Time Allowed |
|---|---|---|---|
| 34. Personal grooming.<br>a. Hair clean and combed (or in curlers)<br>b. Face washed with hot water and soap<br>c. Makeup on correctly<br>d. Teeth brushed with toothpaste<br>e. Dressed--all buttons buttoned, slips not showing, ironed and clean<br>f. legs shaved<br>g. Socks and shoes on correctly | All | 1 each item | |
| 35. Bed making.<br>a. Make own bed<br>b. Clean area around and under bed and on bed<br>c. Clothes all put away<br>d. Night stand tidy | All | 3 | |
| 36. Ward work monitor<br>a. Check ward work for completion<br>b. Check list for each job to see if each step has been completed | 1 | 12 | |
| 37. Industrial Assignment.<br>a. Laundry<br>b. Cafeteria<br>c. Nursing service | | | |
| 38. Token assistant.<br>a. pass out tokens | 2 | 8 | |

# APPENDIX C

Cost of Items

## COST OF ITEMS

| ITEM | COST |
|---|---|
| A. Bedrooms | |
| 1. Room 1--5 beds | 8 tokens per night |
| 2. Room 2--9 beds | 0 tokens per night |
| 3. Room 3--8 beds | 8 tokens per night |
| 4. Room 4--4 beds | 10 tokens per night |
| 5. Room 5--4 beds | 10 tokens per night |
| 6. Room 6--2 beds | 20 tokens per night |
| a. Night stands | 2 tokens per night |
| b. Chest of drawers | 4 tokens per night |
| c. Chair | 1 token per night |
| B. Meals (all three) | |
| 1. On hall | 2 tokens per meal |
| 2. Off hall | 2 tokens per meal |
| C. Leave from Hall | |
| 1. Outside | |
| a. With aide | 4 tokens per ½ hour |
| b. With privilege card | 4 tokens per ½ hour |
| c. With yellow card or above downtown | 15 tokens |
| 2. Inside | |
| a. With aide--Canteen, Country Store | 3 tokens per ½ hour |
| b. With privilege card--Canteen, Country Store | 3 tokens per ½ hour |
| D. Activities | |
| 1. On hall | |
| a. T.V. (1 hour) | 5 tokens |
| b. Listen to live music | 5 tokens |
| c. Card playing | 2 tokens per 2 hours |
| d. Cigarettes (6 per day) | 1 token each |
| e. Visitor room (alone) | 4 tokens |
| f. Smoking room (alone) | 5 tokens |

COST OF ITEMS (Continued)

| ITEM | COST |
|---|---|
| g. Smoking room (withsomeone) | 2 tokens |
| h. Typewriter | 1 token per hour |
| i. Radio | 1 token per hour |
| j. Reading material | 1 token per hour |
| k. Letter writing material | 1 token per hour |
| l. Occupational therapy (off hall) | 5 tokens |
| (on hall) | 1 token |
| m. Iron and board | 1 token |
| n. Cooking on weekends | 1 token |
| o. Nap (after I.A.) one hour | 5 tokens |
| p. Sitting doing nothing (for 20 min.) | free--<br>10 tokens after that |
| 2. Off hall | |
| a. Card playing | 4 tokens |
| b. Movie | 4 tokens |
| c. Dance | 4 tokens |
| d. Bingo | 4 tokens |
| e. Apparel shop | 1 token |
| f. Bowling | 1 token |
| g. Library | 1 token |
| E. Possession of Personal Items | |
| 1. Plants | 1 token |
| 2. Pictures | 1 token |
| 3. Radio--own | 15 tokens per week |
| 4. Personal items (from business office) | 15 tokens per week |
| F. Lessons | |
| 1. Piano | 5 tokens per time |
| 2. Card | 4 tokens per time |
| 3. Typing | 5 tokens per time |

COST OF ITEMS (Continued)

| ITEM | COST |
|---|---|
| G. More Activities | |
| 1. Tennis | 8 tokens |
| 2. Swimming | 8 tokens |
| 3. Snacks | 2 tokens |
| 4. Coffee | 1 token |
| 5. Religious service (on hall) | 4 tokens |
| (off hall) | 2 tokens |
| 6. Hoarding | 5 tokens |
| 7. Have clothes mended | 3 tokens |
| 8. Candy at 2:30 p.m. | 1 token |

# APPENDIX D

Facsimile of Data Sheet
Utilized in Present Study

| NAME | CARD COLOR | I. A. | HR. | TOKEN | DAY-DATE |
|---|---|---|---|---|---|

| PERSONAL HYGIENE | | | PERSONAL ROOM | | |
|---|---|---|---|---|---|
| Morning | | Evening | | | bed made |
| | hair | | bath | | nightstand |
| | face | | teeth | | drawers |
| | makeup | | makeup | | floor |
| | teeth | | (removed) | | clean linen |
| | dress | | | | clothes |
| | hands | | | | picked up |
| | socks-shoes | | | | |
| | legs | | | | |
| | | | | | |
| | Total | | Total | | Total |

| CIGARETTES | TOTAL |
|---|---|
| MEALS | BREAKFAST / LUNCH / DINNER |
| SNACKS | TOTAL |

| ACTIVITY | | | |
|---|---|---|---|
| On Hall | | Off Hall | |
| sitting | | gym | |
| lying down | | school | |
| o.t. | | bowling | |
| reading | | walking | |
| ironing | | canteen-store | |
| paper (writing) | | dance | |
| | | movie | |
| | | | |
| Total | | Total | |

ASSIGNED HALL DUTY

EXTRA HALL JOB

COMMENTS

| | |
|---|---|
| wash walls | |
| clean mess | |
| make pt. bed | |
| run errand | |
| wash window | |
| | Total |
| MISC. JOBS | |
| carry food | |
| push cart | |
| med. treatment | |
| | |
| Total | |

| TOTAL RETURNED | TOTAL RETURNED |
|---|---|
| lying down | Token Saved |
| pestering office | A.M. P.M. |
| hitting | |
| stealing | |
| seclusion | Tokens Earned |
| med. treatment | A.M. P.M. |
| | |
| Total | |
| | Token Spent |
| | A.M. P.M. |
| | |
| | |

# APPENDIX E

Behavioral Check List

Behavioral Check Sheet

# BEHAVIORAL CHECK LIST

Observer _____

| | A.M. | | | | | | | | | | P.M. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subject | 7 | 30 | 8 | 30 | 9 | 30 | . | . | . | 12 | 1 | 30 | 2 | 30 | 3 | 30 | . | . | . | 10 |
| 1 | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | | |

# BEHAVIOR CHECK SHEET

BEHAVIOR
abusive (self)
abusive (other)
aggitated
aggressive
bugging
crying
hallucinating
laughing
pacing
seclusion
sulking
tantrum
standing
sleeping
incontinent
talking
walking
jumping
looking out window
cooking

EATING
at cafeteria
on hall
snack
drinking fountain

HALL WORK
assigned
extra
cleaning mess
making bed

MEDICAL
clinic
dentist
Dr. on hall
eye Dr.
medication
therapy
TPR or BP
psych. testing
orientation
blood work
EST
treatment
seizure
NPO-seclusion (quiet)
NPO-seclusion(noisy)
with nursing student
exercising

OFF HALL
church
entertainment
errand
I. A.
school
sport
walk
therapy
beauty shop-barber
pin setting
canteen
apparel
business office
orientation
fire alarm
physical therapy
student nurse

SITTING
record-radio-piano
reading
talking
T. V.
writing
O. T.
handwork
smoking
doing nothing
sleeping
playing cards
homework
checkers
phone
singing
puzzle

ON HALL BUSINESS
in-service
patient government
tokens
bed
baking
music
visitor

OFF HOSP. GROUNDS
home visit
downtown pass
elope
camp

TOILET
bathing
combing hair
brushing hair
shower
sitting
dressing
shaving
hair dryer
shampoo hair
hair cut

# VITA

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Doctor of Philosophy

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