کارگاه‌های آموزشی مرکز اطلاعات علمی

مقاله نویسی علوم انسانی

اصول تنظیم قراردادها

آموزش مهارت های کاربردی در تدوین و چاپ مقاله
The Effect of Social and Token Economy Reinforcements on Academic Achievement of Students with Intellectual Disabilities

S. Mahmood Mirzamani, PhD1
Mohammad Ashoori, MSc2
Narges Adib Sereshki, MSc3

1 Islamshahr Islamic Azad University, Islamshahr, Iran
2 Department of Psychology and Exceptional Children Education. University of Social Welfare & Rehabilitation Sciences, Tehran, Iran
3 University of Social Welfare & Rehabilitation Sciences, Tehran, Iran.

Corresponding author:
Seyed Mahmood Mirzamani, PhD
Islamshahr Islamic Azad University, Islamshahr, Iran
Email: irzamani2033@gmail.com

Objective: This study investigates the effect of social and token economy reinforcements on academic achievement of 9th grade boy students with intellectual disabilities in an experimental science class in Tehran Province.

Method: The method used for this study was experimental by pre-test, post-test with a control group. The boy students with intellectual disabilities from three junior high schools participated in this study. The sample consisted of thirty, 9th grade boy students with intellectual disabilities in the selected schools; the schools were chosen by the multi-stage cluster method. To measure the progress of students in the science class, a teacher made test and the Wechsler intelligence test for matching the groups for IQ were used. To ensure validity, the content validity criteria depended tests calculated by the Lashe method and teachers' perspective were used. The reliability coefficient was obtained by the reliability coefficient of related tests; the percent agreement method and the obtained data were analyzed using one-way variance analysis and Shefe prosecution test.

Results: The results showed that there was a significant increase in academic achievement of students with intellectual disabilities when using token economy than using social reinforcements compared with the control group. Also, when using social reinforcements, the academic achievement of students was more than the control group.

Conclusion: Token economy and social reinforcements increased the academic achievement of students with intellectual disabilities in the science class; and also the effect of token economy reinforcements was more than social reinforcements on the subjects.

Key words: Educational status, Intellectual disability, Reinforcements, Reward, Token economy

Iran J Psychiatry 2011; 6:25-30

Those with significant limitations in intellectual functioning and adaptive behavior whose problems are created before they reach 18, are categorized as having intellectual disability (1). This group form about 2 to 3 percent of the population of every society (2). Due to the fact that mentally retarded students have difficulty learning abstract material, objectivity should be emphasized in their training, and they must observe the outcome of their behavior immediately (3). Therefore, educational methods that emphasize the objectivity and outcome of behavior for mentally retarded students will have more occasions. In operant behaviorism, outcomes play an important role in learning a new behavior (4). In operant behaviorism, motivation comes in from understanding the relationship between behavior and outcome (5). In this approach, the outcome of behavior will be reinforcement that in general can be divided in two categories of internal and external, and may be positive or negative. External reinforcement includes the types of phenomena, objects and events that are outside the individual, such as score, money, food, etc (4). They may also be called rewards (6). The positive reinforcements can be defined as social reinforcements and token economy reinforcements.

Social reinforcements (including attention, appreciation and encouragement), which are often rewarded by toys or food are more valuable. Other samples, fondling, and referring to the shoulder like to encourage students, encouraging words (fore others), to sign consent nod, or smile and smile with approval means a lot that can be (7). All teachers know when students appreciated because of their positive behavior; they tend less to search and considering in appropriate behavior. In contrast, when a student trying to be overlooked considering, the probability of learning disturbance increases (8). In exchange for giving the award to
achieve optimal activity and a strong tendency towards it has caused many researchers to think that instead of just the main stimulus causing extraneous stimulus to motivate the students to be (Weeks, 2006). If teachers give more attention and care to mentally retarded students, they will progress better in their class activities (9).

Token economy reinforcements can be a piece of paper, stars, chips, nuts (metal, wood or plastic) which are given to students after they have shown a desirable behavior; and later, they can exchange it for food, cookies or other favorite reinforcements (10). An example for the token economy system in schools for students with special needs can be as follows: the student receives a special sign or mark due to a favorable performance, and when he/she reaches a certain level of seals, he/she can change them with a prize, or cash are edible (11). If the students properly recognize the consequences of their various behaviors, reinforcements will be delightful to them, so the golden point is that teachers should make it clear for students how they can be admired or how to acquire the chips (12).

Thomson (2006) offered six key factors for successful economic system chips, and they are as follows: chips can be counted; the clear definition of target behavior; the need to strengthen supplement; a system for exchange of chips; systems for data entry and ability to perform by the staff. While that is used special class token economy system and to load has brought favorable results (13). One of the first uses of token economy was academic achievement for mentally retarded students that needed a comprehensive system designed for timing, use of continuous and appropriate related behavior because the chips should be easily accessible, can dispense and are related to try and make visible progress (14).

Long ago, professionals were interested in education to strengthen the relationship between students' reinforcement and their academic achievement. Hardman et al (2007) studied 27 subjects with mental retardation and used chips which were interchangeable with candy, whistle or trinket. They found that this method had prominent effects on the academic skills of these students (15).

Kord (2003) in a research which was conducted in Boukan city with a sample of 140 individuals, found that the results of feedback, in a variety of ways, including verbal, written, or combined, effected academic achievement. They further noted that written feedback is more effective compared with verbal feedback (16).

Abarqouie (1998) in a research to determine the effectiveness of token reinforcement to reduce educational failure and increase motivation in a group of 40 guidance school students (20 male and 20 female), indicated that using the method of token reinforcement in which the cards are given by delayed is more effective than lack of using this method (17).

Haji Ali Mohammadi (1994) found that the application of token reinforcements on academic achievement in social sciences was effective; also he found that token reinforcements will increase the academic achievement motivation of students who have problems in academic advancement (18).

Although Lipman and Goldberg (1973) had suggested that reinforcements are positive, (especially social reinforcements and token economy reinforcements are more important for mentally retarded children than normal children (19), no research was done to investigate the effect of social reinforcements on the academic achievement of students with mental retardation. In general, in previous studies, effectiveness of a positive token economy reinforcements on achievement have been documented, but no research was found on the effect of social reinforcements on academic achievement either on normal students or on mentally retarded. In addition, no study has been conducted about which group of reinforcements effect academic achievement more (especially academic achievement of mental retardation).

In fact, the present study is going to answer the following question: whether the effectiveness of token economy reinforcement and social reinforcement on achievement is different for students with mental retardation in a science course?

Materials and Method

This study is an experimental designed pre-test - post-test, with a control group.

Subjects

The population of the study included 98 mentally retarded male students in the third grade at guidance schools in Tehran province 2009-2010 school year. Students' selection was done through a multistage cluster; a sample of 30 mentally retarded students was selected. In the sampling process, three cities of Varamin, Rey and Karaj were randomly selected form cities of Tehran province. Then a school was selected from each city, and 10 students with the age range of 13 to 17 years whose IQ was between 60 to 70 were randomly selected from each school. The subjects did not have any disabilities other than mental retardation.

Instruments

The Wechsler Intelligence Scale for Children -Revised: This scale includes sub-tests that are conducted individually and offers three IQ scores: 1) verbal IQ; 2) non-verbal IQ; 3) general IQ. A Persian version of scale was prepared for normal children aged 6 to 13 years (original version for ages 6 to 16 years and 11 months). Reliability coefficient was calculated by two half way methods for sub-tests of non-verbal and verbal (other than numerical memory, which is made up of two different parts, and encoding which is a speed test), using Spearman Brown corrected correlation coefficient, which were from 0.42 to 0.98 with a median coefficients of 0.69. Reliability coefficient of the test was calculated through test retest.
that ranged from 0.44 to 0.94, and only two cases (account sub-test and encoding) were below these values. The obtained reliability coefficient median was 0.73 (20).

To determine validity; Shahim et al., compared this scale with the Wechsler Preschool and Primary Scale intelligence and obtained correlation coefficients of verbal, non-verbal and global IQ to be 0.84, 0.74 and 0.85 respectively (20).

Achievement tests in science class: Chapter 3 of the science book for the 9th graders contains eight lessons. This chapter was selected and parallel tests were designed for each lesson that the questions were descriptive, and each test included 6 questions. A total of 16 teacher-made tests that were similar for all the three groups were used to evaluate students' progress in learning chapter 3 of the science book. To evaluate the validity of the tests, the content validity criterion-related tests and opinion of several teachers who taught this level were used. The Lashe method was used to calculate carcass content validity index. The validity coefficients for the eight tests of the first forms were: 0.94, 0.96, 0.92, 0.95, 0.92, 0.90, 0.89, 0.92, respectively; and for the eight tests of the second form they were: 0.93, 0.93, 0.95, 0.97, 0.91, 0.91, 0.91, 0.94. To determine the reliability criterion-related reliability coefficient tests, percent agreement method was used, because the tests used in this study were criterion-related. The reliability coefficient for the eight tests of the first form was: 0.89, 0.86, 0.91, 0.84, 0.87, 0.90, 0.89, 0.92; and the reliability coefficient for the eight tests of the second form was: 0.88, 0.94, 0.93, 0.93, 0.89, 0.90, 0.87, and 0.91.

Procedure
To conduct the research, a referral was obtained from the management of special education department of districts of Tehran. Then, using multistage cluster sampling, three cities from Tehran province were chosen, and a school from each city was also selected. Finally, 10 students whose age range was from 13 to 17 and their IQ was between 60 to 70 were randomly selected. They did not have any disabilities other than mental retardation. Then, each student was assigned in one of the following three groups: token economy reinforcements; social reinforcements; and control group. Then, the third chapter of the science book for the ninth grade class that included eight lessons was selected. Then, the procedure of teaching the eight lessons of chapter3 was taught to the three selected teachers in two sessions. The three teachers were taught how to use the lecture method, talk to students about the course subjects, ask questions, conduct experiment for them, and to show them samples and models. In other words, integrated method was used for training (21). Before teachers start teaching the first evaluation of achievement in science course (it was mentioned in the instrument section) conducted in three days for all three groups of the students. It included eight tests for eight courses of the chapter. The mean scores of the eight tests were calculated and considered as a pretest score. At the next step, it was explained to the students how and when they will receive reinforcement, and the conditions of receiving it. In addition, a list of reinforcements and how they will receive them was provided to students in the token economy and strengthen social reinforcements group. The type of token was determined for the token economy reinforcements group, and the procedure of exchanging the token to reinforcements was clearly explained. In order to determine which student and to what extent to be strengthened, an absolute criterion was used in which four grade of A, B, C, D, and E were given to students according to percentage of their correct answers. Grade "A" was given to those students who scored 90% or more; grade "B" to those who provided correct answers to 80 to 89% of the questions; grade "C" to students who provided correct answers to 70 to 79% of the questions; grade D to those who provided correct answers to 60 to 69% of the questions; and grade "E" was given to the students who provided correct answers to less than 60% of the test questions (4). In this study, reinforcement was provided only to students who have obtained grades A, B and C. In the next step of this research project, the lesson was taught and reinforcement was provided to the token economy and social reinforcement groups by trained teachers. The teachers in both groups of the token economy and social reinforcements taught each lesson in two sessions. At the beginning of the third session, the students were evaluated and then the new lesson was taught. The tests were checked and scores were given by three science teachers, and the mean of these scores was considered as the score of the student in that lesson. At the beginning of the next session, those students whose score was A, B or C were given a chance to choose a reinforcement from the list, and then the teaching continued. It should be mentioned that reinforcements were not provided to the control group. Of course, the token economy reinforcement group could keep their chips and replace them with their precious reinforcements (from their perspective). The teacher in the control group did not provide reinforcements to the students; however, the same method of teaching, number of training sessions and exams were provided for all the three groups of students. Table 1 and 2 provide more details about social and token economy reinforcements, respectively. Finally, the content of the eight lessons were taught to students in 16 sessions. At the end, the mean score of the students in three groups in eight tests of academic achievement was considered as posttest. The difference between the scores of pretest and posttest was calculated; and using one-way analysis of variance and Shefe prosecution test, the obtained data were analyzed.

Results
The age range of three groups is indicated in Table 3. The comparison of the mean scores of achievement in
Table 1. List of Social reinforcements

| Score A                                      | Score B                                      | Score C                                      |
|----------------------------------------------|----------------------------------------------|----------------------------------------------|
| Appreciation with install photo in board    | Appreciation on the whiteboard              | Responsible for collecting                   |
|                                              |                                              | work units                                  |
| Appreciation in school web site             | Designing a class or hall bulletin board     | Responsible for the presence and present in class |
|                                              |                                              | Responsible assignments                     |
| Appreciation morning program                | Encourage in class                           |                                              |
| Appreciation parent meeting                 | Educated in class                            | Responsible for bringing                    |
| Latter sent home                            | Performed stunt in class                     | Going out first                             |
| Membering on group hymn of school           | View game in class                           | First performed                             |
| Membering on sport team of school           | View computer game in class                  | Reading books with high vocal               |
| Working at the school store                 | Helping the teacher                          | Sitting at the teachers desk                |
| Working at the library                      | Helping in another classroom                 | Writing or drawing on the blackboard        |
| Hygiene assist                               | Reading the morning announcements            | Using more library                          |
| Sport assist                                 | Becoming representative of class             | Give extra time out                         |
| Protects of school                          | Becoming moderators                          | Calling home                                |
| Trophy                                       | Allowing a extra activity on class such as   | Encouragement verbal with confirm           |
| Plaque                                       | birthday                                     | Care plant class                            |

Table 2. List of Token economy reinforcements

| Gift              | Token | Gift              | Token | Gift              | Token |
|-------------------|-------|-------------------|-------|-------------------|-------|
| Raisins           | 3     | Stickers          | 9     | Pencil chains     | 16    |
| Peanuts           | 3     | Notebook          | 10    | Gloves            | 16    |
| Hazelnut          | 4     | Shoulder          | 1     | Flaks single      | 17    |
| Pistachio         | 5     | Toothbrush        | 11    | Jump Rope         | 17    |
| Cake              | 5     | Toothpaste        | 11    | Cinema tickets    | 18    |
| Cookie            | 5     | Puzzles           | 11    | Sunglasses        | 18    |
| Biscuit           | 5     | Socks             | 12    | Wristwatch        | 19    |
| Milk              | 5     | Bubble pipe       | 12    | Football goal     | 19    |
| Fruit             | 6     | Key chains        | 12    | T-shirt           | 20    |
| Water Fruit       | 6     | Yoyo              | 13    | Sneaker           | 20    |
| Decal             | 6     | Note pads         | 13    | Tennis paddle     | 20    |
| Whistle           | 6     | Novel             | 13    | Sport paddle      | 21    |
| Pencil            | 7     | Spray             | 14    | Light reading     | 21    |
| Lathe             | 7     | Different films   | 14    | Sports clothing   | 22    |
| Eraser            | 7     | Wallet            | 14    | White board       | 22    |
| Pens              | 8     | Belt              | 15    | Travel blanket    | 23    |
| Ruler             | 8     | Colored pencils   | 15    | Field trip        | 23    |
| Caddy             | 9     | Boxes of crayons  | 16    | Camera            | 24    |

Table 1. The age range of three groups

| Group          | No. | Minimum | Maximum | Mean  | SD  |
|----------------|-----|---------|---------|-------|-----|
| Token          | 10  | 13      | 17      | 14.60 | 1.26|
| Social reinforcements | 10  | 13      | 17      | 14.40 | 1.34|
| Control        | 10  | 13      | 16      | 14.70 | 1.15|

Table 2. Comparison of pre-and post-test mean achievement test in science class experiment three groups; Token, Social reinforcements and control

| group           | test | No. | Mean | SD  | Differences between Means | f   | p-value |
|-----------------|------|-----|------|-----|---------------------------|-----|---------|
| Token           | pre  | 10  | 3.4  | 1.34| 13.28                     |     |         |
|                 | post | 10  | 16.01| 0.848|                          | 33.26| <0.001  |
| Social reinforcements | pre | 10  | 3.5  | 1.58| 11.02                     |     |         |
|                 | post | 10  | 14.52| 0.62|                          |     |         |
| Control         | pre  | 10  | 3.4  | 1.42| 10.21                     |     |         |
|                 | post | 10  | 13.61| 1.27|                          |     |         |

Table 3. Scheffe test results for comparison of mean achievement scores in science class experiment three groups; Token, Social reinforcements and control

| Target group    | Compared group | The mean difference | standard error | p-value |
|-----------------|----------------|---------------------|----------------|---------|
| Token           | Social reinforcements | 2.26 | 0.841 | 0.002  |
|                 | Control        | 3.07 | 0.841 | <0.001 |
| Social reinforcements | Control | 0.81 | 0.841 | 0.021  |
science course between the three groups of the mentally retarded students (the token economy reinforcements, social reinforcements and control groups) are presented in Table 3. In addition, because of differences between the groups, Shefe prosecution test was used, and the results are presented in the Table 4. According to Table 3, there is a significant difference in academic achievement between the three groups of the token economy reinforcements, social reinforcements and control (p<0.001). Table 4 demonstrates the difference between groups.

As demonstrated in Table 4, the mean scores of achievement in science course was significantly higher in the token economy reinforcement group than the social reinforcement group (p=0.002) and the control group (p=0.001). Furthermore, the mean scores of achievement in the science course was significantly higher in the social reinforcement group than the control group (p=0.021).

Discussion
This study aimed to compare the effectiveness of social reinforcements and token economy reinforcements on academic achievement of mentally retarded students in a science course. According to findings of this study, mentally retarded students in groups of token economy reinforcements and social reinforcements have indicated more academic achievement in the science course than the control group. Also, the token economy reinforcement group has indicated more academic achievement in science course than the social reinforcement group.

The results of the first section of the present research (indicating token economy reinforcements group make more academic achievement) is consistent with previous research findings. Scott and Porter have investigated the effect of token reinforcement on behavioral discipline, active participation and academic achievement of normal students and mental retarded students in regular primary and secondary levels in a sample of 750 students. Based on the findings of their research, academic achievement in normal students and mentally retarded students increased significantly in regular primary and secondary levels (22). Keller in a research found that food as a token economy reinforcement has the most impact on academic achievement (23). Hardman et al., in a research study on 27 mentally retarded subjects used tokens that could be exchanged with sweets, whistles or costume jewellery. They found that the token economy reinforcement has a significant effect on academic skills (15).

Kord investigated the effect of feedback reinforcements on academic achievement of a science course of 140 male students at the fifth grade of elementary level. He found that the feedback reinforcements in various forms, including verbal, written or a combination are more effective on academic achievement (16). Abarquie found that token economy reinforcements were effective to decrease the educational failure and increase motivation of academic achievement of 20 boy and 20 girl students (17). Soltani in a study found that sport rewards were effective on academic achievement of 32 students of the fourth level of elementary school (24). Haji Ali Mohammadi, found that the token economy reinforcements were effective on academic achievement of a social science course; also he found that the token economy reinforcement method increased motivation of academic achievement of failed students (18).

The more effectiveness of token reinforcements on academic achievement in a science course of mentally retarded students may be justified by noting that mentally retarded students consider material reinforcements more important, and social reinforcements are less attractive to them.

Limitations
Small sample size is the most important limitation of the present research. Irregular presentation of students in class is another limitation of the present study. Also, only boys were included in this study. Future research could provide further enquiries regarding the relationship between different reinforces and academic achievement, particularly in mentally retarded boys and girls students.

Conclusion
Token economy and social reinforcements increase the academic achievement of students with intellectual disabilities in the science class; and also the effect of token economy reinforcements is more than social reinforcements on students. Appreciation and thanks We sincerely thank the respected management of exceptional training department of city of Tehran province and respected management of Noor-e Islam in Varamin, Taher in Ray ;and the Parsi Arbabi in Karaj exceptional schools helped us in implementation of the research.

References
1. American Association of Mental Retardation. Mental retardation: definition, classification, and systems of supports, 10th ed. Washington, DC: American Association on Mental Retardation; 2002.
2. Hallahan DP, Kauffman JM. [Exceptional Children: Introduction to Special education]. Translated by Javadian M, 5th ed. Mashhad: Astan Quads Rezavi & publication Company; 1994.
3. Seif Naraghi M, Naderi A. [Psychology and Education of Exceptional Children]. Translated by Javadian M, 5th ed. Mashhad: Astan Quads Rezavi & publication Company; 1994.
4. Seif A. [Psychology of learning and teaching], 16th ed. Tehran: Agah Publication; 2006.
5. kadivar P. [Educational Psychology], 7th ed. Tehran: samt publication; 2001.
6. Afrooz G. [Introduction to psychology and education of mentally retarded children]. 2nd ed. Tehran: Tehran university publication; 2000.

7. Jacobson MF. Constructive Classroom Rewards: Promoting Good Habits While Protecting Children’s Health. Center for Science in the Public Interest; 2004. Retrieved from: www.cspinet.org/nutritionpolicy/constructive_rewards.pdf.

8. Johnson R. Tools for effective classroom management; 2006. Retrieved from: http://tsn.custhelp.com/app/answers/detail/a_id/1066/~/tools-for-effective-classroom-management.

9. Zecker SG. Underachievement and Learning Disabilities in Children Who are Gifted. Center for Talent Development; 2000. Retrieved from: http://www.nldline.com/gifted_and_ld.html.

10. Algozzine R, Algozzine B, Ysseldyke J, Ysseldyke JE. [Teaching students with mental retardation: a practical guide for every teacher]. Translated by Khorzadeh H, Mohammad Arya A. Tehran; 2006.

11. Turnbull A, Turnbull R, Shank M, Leal D. Exceptional Lives: Special Education in Today’s Schools, 2nd ed. Upper Saddle River, NJ: Merrill; 1999.

12. Ommrod JE. Educational Psychology: Developing Learners, 3rd ed. Upper Saddle River, NJ: Merrill; 2000.

13. Knapczyk DR, Livingston G. Self-recording and student teacher supervision: variables within a token economy structure. J Appl Behav Anal 1973; 6: 481-486.

14. Lieberman RP. The Token Economy. Am J Psychiatry 2000; 157: 1398.

15. Hardman ML, Drew CL, Egan MW. [Human exceptionality: Society, school, and family]. Translated by Alizadeh H, Gangi K, Yousefi Looyeh M, Yadegari F. Tehran: Dangeh Psychology, University of Quds Razavi & Publication Company; 1986.

16. Kord B. [The feedback effect in developmental assessment in experimental science class for fifth grade elementary school students in Bukan city]. Master of Educational Psychology thesis. Allame Tabatabaee University; 2003.

17. Abarqouie S. [Review the effectiveness of the method of reducing a loss token economy and increasing academic achievement motivation in elementary school students covered by the Imam Khomeini Relief Committee in Abarkouh city]. Thesis for Master of science. Tehran: Department of Psychology, University of Allameh Tabatabaee; 1998.

18. Mohammadi F. [Token economic used primary schools in Tehran]. Thesis for Master of science. Tehran: Department of Psychology, University of Allameh Tabatabaee; 1994.

19. Robinson NM, Robinson HB. [The mentally retarded child: a psychological approach]. Translated by Maher F, 5th ed. Mashhad: Astan Quds Razavi & Publication Company; 1986.

20. Shahim S. [Standardization of Weckleser Intelligence Scale Revised for Children in Iran]. Shiraz: Shiraz University publication; 1994.

21. Khakzad S, Vosoughi F. [Experimental Sciences and Health Education pre professional 9th grade]. Tehran; 2009.

22. Porter SM. The Impact of a School-Wide Token Economy on Behavior, Attendance, and Academics at Morgan High School. Masters in Education, Marietta College; 2007.

23. Sidman M. Fred S. Keller, A Generalized Conditioned Reinforcer. Behav Anal 2006; 29: 235-242.

24. Soltani E. [Exercise effect on reward academic achievement of selected group of elementary students in the fourth son in Anzali city]. Thesis for Master of science. Tehran: Department of Psychology, University of Allameh Tabatabaee; 1996.
کارگاه‌های آموزشی مرکز اطلاعات علمی

مقاله نویسی علوم انسانی

اصول تنظیم قراردادها

آموزش مهارت های کاربردی در تدوین و چاپ مقاله