

Evaluating the effect difference of two methods of reinforcement on learning about recycling and urban cleaning in high school male students

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Abstract: The current study has been conducted in order to study the difference effect of two types of positive and negative reinforcement on recycling learning in high school male students. Thus 36 male subjects, who were educating in first grade of high school during the school year 2010-11, were chosen (by available sampling method) and were randomly classified into two groups. Recycling training with positive reinforcement was provided in a group and recycling training with negative reinforcement was provided in other group. After seven training sessions and in the eighth session, the subjects' learning was measured by researcher-made questionnaire (questionnaire of recycling learning by Taghizadeh-Khajeh-Sian) and subjects' anxiety level by subscale of Dass test anxiety. Results were measured by statistical methods of Student's t and analysis of variance. According to this study, different types of reinforcement have no different effect on learning the recycling (at the significant level 0.1) and providing different types of reinforcement for anxious and low-anxious groups will not lead to different learning of recycling (at the significant level 0.1).

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1. Introduction

Recycling is one of the welfare cases which play an important role in governing the urban affairs and protecting the public health. Waste Product per capita in today big cities is at the level under which not recycling makes a serious problem for citizens' health. Therefore, encouraging the citizens to start recycling from their houses is considered as a serious action to protect the citizens' health. However the prevalence way of this behavior among the citizens is considered as a serious issue. Participation behavior in recycling is not an instinctive action, but needs the long term education and planning. However, the people are usually more interested in short-term objectives and are more consistent in achieving them; therefore implementing the recycling planning is possible by consistent education of recycling behavior. (Kelly, 2011)

Social norms are among the most important factors in encouraging the people in recycling and it should be applied properly. (Fornara, 2011) Paying attention to issues which cause more effectiveness of educations in social matters and help the urban and social affairs directors to develop the social activities and public contributions is among the tasks which the social sciences researchers are responsible for. Current research focuses on the way of reinforcing the behaviors in training the recycling in order to help the higher effectiveness of this training by

understanding the factors which reinforce the behavior in this regard.

Research Expression

Because people usually give low priority to matters which have no self-interest and are less willing to spend time to pay attention and learn the issues related to these affairs, the education related to the social affairs should be motivating and transfer effectively the highest information to people. Moreover, we should reduce the costs related to training and advertising as well as finding the ways for making the education related to the social affairs more effective. Recycling is among the affairs which have been taken into account by civil affairs authorities in recent years. High volume of waste in Tehran is a kind of problems which this metropolis suffers from and resolving it is only possible by the public help in waste sorting and recycling them. For establishing this cooperation, the social education has been implemented either through the media or across the city and especially through the schools and teaching the children in order to inform people about this affair and its interests show the accurate ways of helping to recycle. According to Schackelford's point of view (2006), the social pressure is the best way to increase the social participation in waste recycling. However, this social pressure is useful in groups with sizes of 50 to 150 people not in the million-individual communities like metropolitans. Moreover, the problem in the way to measure the success of

learning these kinds of behavior is that the individual recycling behavior cannot be observed in the society and has no objective reflection (Schackelford, 2006).

Since reinforcing is considered as the important and effective variables in education, paying attention to the way of using the reinforcement as a driving factor of education related to urban waste recycling is the central issue of this study.

Given the above issues, the subject of current study is as follows: "For better impact on the people by our advertising and training in social issues, which have no personal interest, is it better to focus on the positive outcomes of running the programs or on the negative outcomes which implementing the programs may remove them?" To find the answer for this research question, the researcher uses a main hypothesis for conducting the study which is: "Different types of reinforcement have a variety of effects on learning the recycling among the male high school students".

Research Methodology

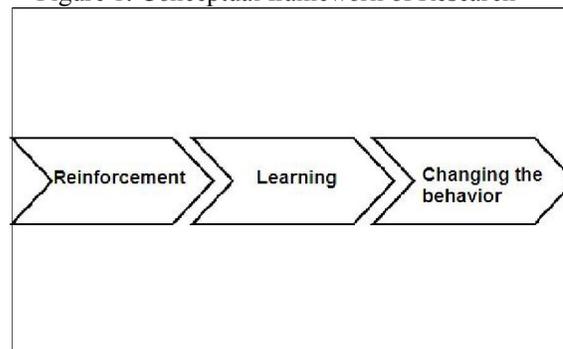
The research method used in this study is a semi-experimental method. This study consists of two major phases of theoretical design and operational implementation. There are three initial stages, i.e. document studies, preparing the conceptual framework and designing the research tool in the phase of theoretical design. Operational stages of this research include the implementation, conclusion and interpretation. The first operational phase of study is to select a school for conducting the research. The second stage is the preparation of the list of people participating in the study in order to conduct the random sampling by a table of random numbers and classify the individuals into two groups. At the third stage the groups are classified into two groups of positive and negative reinforcement by the coin. The contents were provided at the fourth stage of classes and the break times were used for providing them. Each session lasted about 10 to 15 minutes. For controlling whether the first or second break times makes a group superior, each group, which attended the class in first break in a session, would attend the second break time next session and vice versa. The fifth stage includes doing the test in eighth session which includes a researcher-made test of provided contents and subscale of anxiety over Dass test. The sixth stage was to evaluate the test papers; it should be noted that for enhancing the accuracy of test evaluation, the first question of all papers were first evaluated and then the second one and so on. The statistical analysis and obtaining the

results and statistical inference were conducted at the seventh stage under which the subjects were classified into two groups by the method of random assignment and by using the table of random numbers (from the list) and then the groups were divided into the positive and negative reinforcement groups by tossing the coin. Contents were provided for each group in the break time and for minimizing the impact of class time, the order of break time for each session was reversed and the class, which had the second break time in the first session, allocated the first break time for itself in the next session. The contents were provided for each class in seven sessions and then the test was done in the eighth session (without any provided contents in that day).

Research Theoretical Model

Given to what is mentioned about the subject of research, the theories (including the theory by Skinner and Thorndike) suggest that the reinforcement affects the learning. On the other hand, learning also changes the behavior (according to the definition of learning). Theoretical model of study is as follows:

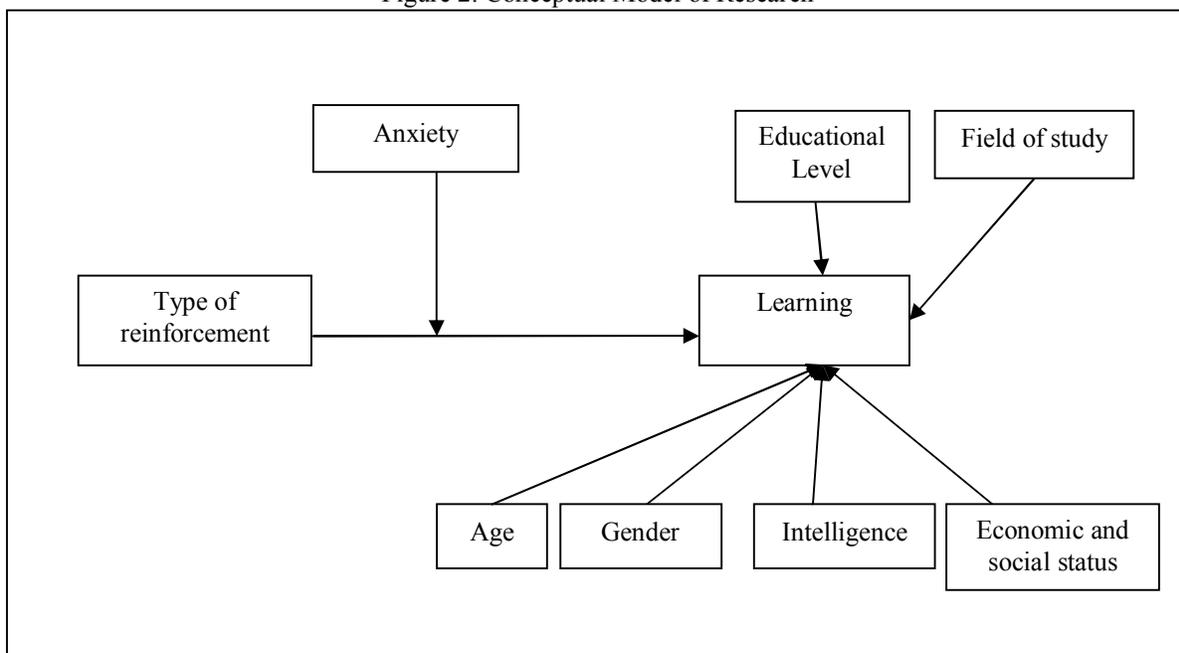
Figure 1: Conceptual framework of Research



3-5) the conceptual framework of study

Conceptual framework of research is to draw the relationships among the variables which make the research. Within this framework, each of the variables, which are being manipulated in the study (independent variable), and the variables, which are examined and measured by manipulating the independent variables (dependent variables), and also the variables, which can be finally effective (redundant variables), are identified and illustrated and then the relationships among them are expressed in a way that are measured and evaluated.

Figure 2: Conceptual Model of Research



The first independent variable of this study is the type of reinforcement which includes two types: positive and negative reinforcement. Dependent variable of learning which is expected to be influenced by the independent variable; Changing the behavior is also the learning dependent variable which is expected to be done by enhancing the learning. In this study, changing the behavior is in fact enhancing the students' ability to answer the questions and increasing their scores.

Statistical population of this research contains the male high school students in Tehran city. Its statistical sample includes 36 students at Danesh Rayaneh high school in District 2. Sampling method was in a way that Danesh Rayaneh high school was selected from the high schools in Tehran by available sampling method and 36 students were randomly selected (by the help of a random number table). 18 students were randomly assigned to the first group and others were assigned to the second group. One of the groups was randomly assigned to the positive group (by the coin toss) and the other was assigned to the negative group.

Data collection method was done through examining the subjects. A researcher-made short answer test from the items, which have been expressed in the classroom as the positively and in the other classroom negatively, has been formed. Validity of this test has been confirmed by the advisor and supervisor professor and its internal validity has been assessed by calculating Cronbach's alpha (alpha is obtained equal to 0.60). Moreover, the

variable of anxiety was measured by the subscales of Dass test anxiety in the same session.

Research Literature and History

Scientists have introduced a variety of ways for learning. Positive and negative reinforcement is among the ways which are used today as learning methods and appropriate stimulus for changing the behavior. These two reinforcements are defined as follows.

Positive Reinforcement

In operant conditioning a stimulus or event, which is the results in increased desired behavior, is provided after the behavior. "Positive reinforcement" is to provide the stimulus which increases the desired behavior and this stimulus or event is called the "positive reinforcement stimulus". For instance, feeding the starving animal that has done the desired behavior of experimenter, or teacher's attention and encouragement after a good behavior by the student are considered as the positive reinforcements. In operant conditioning, the reinforcement receiver depends on doing the behavior by the subject, for instance the food intake depends on the desired behavior by animal and the teacher's attention depends on the student's desired behavior. These behavior-dependent reinforcements make the behavior conditioning. (Kelly, 2011) Behavior conditioning reinforces the behavior and the behavior, which is reinforced, is more likely to be occurred. This represents learning the operant's

behavior because the reinforced behavior is a kind of change in potential behavior which is obtained by experience (Seif, 2010).

Negative Reinforcement

Unlike that positive reinforcement, in which providing the positive reinforcement (desirable event) after the behavior improves that behavior, in the negative reinforcement an adverse event is removed after doing the desirable behavior by the animal and this leads to increased learner's behavior (Stansbury, 2011) If we put a mouse into a test box, which its bottom is made of the metal, and plug in the electricity, which makes the electrical shock in mouse and pressing the lever inside the box by the mouse cuts the electricity, then the mouse learn quickly to press the lever for cutting the electricity. In this type of learning, removing the aversive stimulus after desired behavior is called the "negative reinforcement" and the aversive stimulus is called the "negative reinforcement". Negative reinforcement is the stimulus which the animal tries to avoid it by trying to do the operant's behavior (Seif, 2010: 96).

Punishment

The punishment means the authoritative implementation of a negative action in response to an undesirable behavior in order to reduce the likelihood of that behavior. (Hugo, 2010) For instance, if after a child's undesirable behavior, we want to reduce the possibility of this behavior incidence by beating, we have punished him it is unlike the (positive or negative) reinforcement which aims to enhance the operant's behavior. The aim of punishing a behavior is to reduce that behavior. The aversive stimulus is used both in punishment and negative reinforcement, but in negative reinforcement is provided in punishment after exhibiting the behavior by the person and its aim is to reduce the behavior negative reinforcement is presented which aims to reduce the possibility of behavior incidence, while in the negative reinforcement the negative reinforcer or aversive stimulus is removed after exhibiting the behavior by the individual and its aim is to enhance the possibility of behavior (Seif, 2010: 97).

For explaining how both positive and negative reinforcements affect the behavior, the cognitive infrastructure of learning should be examined.

Cognitive infrastructure of learning

Since learning at the level which we have considered is among the cognitive concepts, it is important to raise the issues about the cognitive issues and concepts involved in learning:

Hierarchy of Cognition:

1) Feeling, 2) Perception (if the sensory stimulation is taken into consideration), 3) Memory, 4) higher cognitive functions such as problem solving and decision-making creativity and reasoning of human and artificial intelligence (Stansbury, 2011)

In this study, we examine learning by the teacher-made test, which has been tried to be non-interpretive, and assess the students' knowledge practically and do not involve the higher functions of intelligence and consider the memory, which is the main point of our assessment, and the attention which is among the important cognitive processes in this hierarchy:

- **Attention**

Attention is a tool by which we processed a limited amount of information among the huge volume of information which is provided by the stored memory senses and other processes. Attention contains the non-conscious and conscious processes. (Kelly, 2011)

Utilizing the processes of attention has numerous advantages. It seems that the mental resources have been at least faced with the restrictions. Moreover, the amount of information, which can focus our mental resources on it at any time, is limited. Psychological phenomenon of attention provides this ability for us to use our limited mental resources reasonably. By reducing the attention to most of the external (sensory information) and internal stimuli (thinking and memory), we can pay much more attention to our favorite stimuli (selective attention). By this increased attention, the possibility to respond to desirable stimuli quickly and accurately is increased. Paying more attention also paves the ways for the process of memory. Therefore, we remember the information, which have taken into account, with higher possibility compared to the information we have ignored (Sternberg, 2006: 98).

- **Memory**

Memory is a tool in which we store our previous experiences and extract the already retained information for current use (Sternberg, 2006:226). Memory is a process which refers to the dynamic mechanisms related to information storage, maintenance and retrieval of past experiences. Particularly, the cognitive psychologists have introduced three types of shared memory operations as follows: Saving coding and retrieving any representation operation is a stage in memory processing. The sensory data are turned into the mental representations in coding. In saving, we keep the coded information in the memory. In retrieving,

you seek for the information stored in the memory (Sternberg, 2006:226).

- **Effect of mood factors on the individual cognitive factors**

Depression and anxiety are among the factors which affect the individuals' attitudes. Emotional insufficiency is the emotional disorder, so that in situations where the emotional reaction is expected, the individual shows the lethargy and depression. Such these people feel to have no power against the events. Studies have shown that the depressed individuals think that they have less control over the environment and less impact on it than others. (Johnmarshall Reeve, 2005) Anxiety informs the individual as a warning factor that the situation is not as it is expected. (Schultz, 2005) Anxious people see usual situations dangerous and avoid from attending these situations. (Haljyn and Winborn, 2003)

Several factors affect learning which are pointed out as follows.

1. Set or attitude

Differences in learning can be linked to the essential difference in the individuals. Richards (2010) argues that the individuals' learning, who have the positive attitudes, is more sustainable. This sustainability is probably because of significance of values and targeting them as well as trying to achieve them. (Richard, 2010)

Background of Conducted Studies

In a study entitled as "The children's response to the nurses' behavior, the role of gender and verbal positive and negative reinforcement in acceptance or denying them" Stansbury (2011) studied the effect of children's behavior and gender in accepting and adapting to her. By investigating the effect of children's reactions to male and female nurses and at the next stage by observing the effect of positive and negative reinforcement on children's responses to the education by the nurse, he indicated that the positive response encourages the children to follow the nurse's training. 23% of children responded to negative reinforcement, 33% to positive reinforcement; and the negative and positive reinforcement has no effect on other children. Moreover, the girls showed higher responses to nurses' behavioral changes than the boys.

In an article entitled as "The impact of negative and positive reinforcement on the accountability", Kelly (2011) expressed that the positive and negative reinforcement can cause different reactions. The negative reinforcement is effective for some of people, positive reinforcement

for the other people and both reinforcements are simultaneously effective for some of people. Studies have revealed that a mixture of both reinforcements can have the greatest impact on the individuals' accountability and integration of these two reinforcements will be approximately 50% more effective than when only a method is used.

In a research entitled as "A research on behavioral model of depression: The role of reinforcement and environmental punishment on self-reinforcing and self-punitive behavior", Alilou (2001) studied the role of reinforcement factors and also the disgraceful and punitive events on self-control behavior. According to the previous behavioral findings, it is predicted that the positive reinforcement and punishment imposed by the environment affect the self-reinforcing and self-punitive behavior. Two hypotheses were proposed in this regard and a 60-individual group of student subjects, classified into three 20-individual groups, was selected: Each group was randomly assigned to one of the experimental conditions and then the relevant tests were done. In general, the results of both research confirmed the hypothesis. Theoretical and practical implications of results have been investigated in details as declined discussion section in results. This study has sought to create a conceptual ring between Levinson's behavioral attitude (1974) and Rome's self-control theory (1977) about the depression.

Byrne and Rhamey (1973) conducted their study entitled as "Magnitude of positive and negative reinforcements as a determinant of attraction" with this hypothesis that the positive and negative reinforcement factors are significantly important in terms of personal characteristics, and hence make a greater impact on the attraction towards the reinforcers, which contain the similarities or differences of tendency, or in terms of impersonal topics. A 3 by 4 model, in which 4 levels of similarities and three levels of evaluation condition (positive, negative and control) were used, was provided for conducting the research for. Analysis of variance showed that the attraction was significantly influenced by both dependent variable ($p < .001$) and their interactions ($P < .01$). Effects of cases, related to the personal assessment, were identified higher than the impersonal cases ($P < .001$). It was proposed that the equation for the attraction law should include the weighted factors in order to find out the effect of reinforcement importance.

In a research for identifying the effect of positive reinforcement on suppressing the electrical activities of skin, May and Johnson (1969) classified 30 male students into three groups in order to test the reverse effects of reinforcement on suppression rate

of electric reactions. In the first group, first a period of positive reinforcement was provided and then a period of punishment (negative reinforcement) was performed. In the second group, first the punishment was carried out and caused the positive reinforcement that was the encouragement. No reinforcement was performed in the third group during the experiment. Results of first and second groups showed the increased reaction during the positive and negative reinforcement and suppression of skin electrical response during the negative reinforcement period and this was regardless of the order of reinforcement means which type of reinforcement should be first provided.

Foot et al (1994) provided an interactive approach in terms of judgmental behavior in cocaine methadone addicts in a research for identifying the effect of positive reinforcement in cocaine addicts who were treated for the addiction. This approach is based on the main principles of interaction such as avoiding from returning to drug, judgment rehabilitation and mental training; understanding of their vulnerability potential is also provided in this model. Modified approach strongly uses a positive reinforcement (this reinforcement in psychotherapy includes the care and respect) in order to keep the changes after the treatment period. Initial results showed that 63 percent of patients, who completed the six-month period, showed a significant decrease in cocaine consumption and also significant changes in the behavior of injecting the drug.

In comparing different patterns of social reinforcement in children's operant learning, Kelly and Stephens (1964) assigned the function of a machine as a task to the sample group in order to compare the effects related to the reward and criticism as the social positive and negative reinforcements for children. Statistical sample included 180 children in kindergarten. Before using the task as the criterion, 60 ones were reinforced for their performance in drawing, 60 ones were questioned, and 60 ones were also under neither of those two. In terms of doing the asked task, one-third of them were reinforced, one-third of them were criticized and other one-third ones were remained without reinforcement or punishment. The highest rate of action was seen in those who were criticized and the lowest rate of action was among those who were not faced with any of reinforcements. Results indicated that the reinforcement of previous stage had no effect on the next stage.

Research Findings

In the first step and by using a question, which was conducted to understand the students'

background, they were asked whether they have direct and active participation in activities related to recycling such as separating dry waste. The results of this survey are presented in the following table:

Table 1: Results of question about students' previous background

	Yes	No
Group of negative reinforcement	3	15
Group of positive reinforcement	1	17

As stated in the research methodology, the sample size was classified into two groups of positive and negative reinforcement in order to measure the different effect of discussed two reinforcement teaching methods with the aim to compare the results with each other between two groups. Questionnaire results of these two groups are presented as follows: Given the results obtained from the questionnaires, we can obtain parameters for descriptive statistics of tests as follows. These parameters are displayed in the following table.

Table 2: Descriptive parameters for Learning Test

	Mean	Variance	Standard deviation
Negative Reinforcement Group	10.06	4.75	2.17
Positive Reinforcement Group	9.59	4.35	2.08

For analyzing these numbers, first the Student's t statistics was used and the results of this statistics are shown in the table below.

Table 3: Student's t Table

Observed T	Critical T	Significant Level
0.88	1.69	0.1

Since the main hypothesis has two domains and its significant level is also equal to "0.1" in which $T_{(cr)} = 1.69$ and because the absolute value of $T_{(o)}$ is smaller than the absolute value of $T_{(cr)}$ (and the difference is very huge), the hypothesis (Different types of reinforcement have different effects on male high school students' recycling learning) on the statistical sample is rejected at the significance level of 0.1.

ANOVA of research main hypothesis:

To be more ensured, we have utilized the analysis of variance for statistical data analysis. The results are as follows (at the significant level 0.1):

Table 4: ANOVA of main hypothesis

Sources of changes	Total square	Degrees of freedom	Mean square	Observed F	Critical F
Intergroup	1	1	1	0.205	7.56
Intragroup	156	32	4.87		
Total	157	33			

Given the significant level of 0.1 and degree of freedom equal to 1 and denominator degree of freedom equal to 32, $F_{(cr)}$ which is extracted from Table becomes 7.56. As it is obvious, the absolute value of $F_{(o)}$ is smaller than the absolute value of $F_{(cr)}$ in the analysis of variance and this means that the main research hypothesis (Different types of reinforcement have different effects on high school male students' recycling learning) is rejected on the statistical sample and with this significant level.

ANOVA of subsidiary hypotheses:

The first sub-hypothesis expressed that "In high school male students, the positive reinforcement

causes better recycling learning than the negative reinforcement" and also the second sub-hypothesis was that "In high school male students, the negative reinforcement caused better recycling learning compared with the positive reinforcement". It is not confirmed according to rejected main hypothesis.

In order to study the third sub-hypothesis, "Providing different types of reinforcement for the anxious and low-anxious groups will lead to different types of recycling learning", bivariate analysis of variance was used and the results obtained from it is written in the following table.

Table 3: Bivariate Analysis of variance for Hypothesis 3

Sources of changes	Total square	Degrees of freedom	Mean square	Observed F	Critical F
Anxiety	18	1	18	0.46	4.494
Type of reinforcement	5	1	5	1.29	4.494
Mutual effect of anxiety and reinforcement	0	1	0	0	4.494
Treatment	68	3	2.26		
Error	62	16	3.87		
Total	688	19	3.62		

Given the significant level of 0.1 and degree of freedom equal to 1 and denominator degree of freedom equal to 16, $F_{(cr)}$ which is extracted from Table becomes 4.494. As it is obvious, the absolute value of $F_{(o)}$ is also smaller than the absolute value of $F_{(cr)}$ in the analysis of variance and this means that the main research hypothesis (Different types of reinforcement have different effects on high school male students' recycling learning) is rejected on the statistical sample and with this significant level.

Conclusion and Suggestion

We use the Analysis of Variance results for obtaining the answer of research hypotheses. Since the $F_{(observed)}$ is much significantly than $F_{(critical)}$, we conclude that the research hypothesis (Different types of reinforcement have different effects on high school male students' recycling learning) is rejected. This result is consistence with the result obtained from the Student's T test.

The findings of research led us to this conclusion that the positive and negative reinforcement in training the recycling have no

different effects and we cannot give the priority to one of these two methods of reinforcement. This finding, which was obtained from of interpreting two experimental groups, showed that the effect of positive reinforcement-based training has no significant difference with the effect of negative reinforcement-based training and neither of these two groups had clear superiority over the other group in terms of recycling learning. Therefore, the main objective of this research, which was to study the difference of these two types of reinforcement, was obtained and its result was no difference between these types of reinforcement in teaching the behavior. Obtained findings give this result that there is no need to emphasis on the type of reinforcement in the training patterns of recycling and the relevant decision makers should pay attention to other effective elements in this regard in educating and developing this case.

In compared to the research conducted by Alilou (2001), which *examined the role of environmental reinforcement and punishment on self-reinforcing and self-punitive behavior*, this study is

different because it has taken the cognitive aspects of learning into account, while Alilou's research has investigated the effect of reinforcements on the behavior. In the current study, the difference of positive and negative reinforcement effect has been studied, but Alilou has just studied the effectiveness of these two types of reinforcement or non-effectiveness of them. Alilou's research pay attention to the control behavior (as the dependant variable) and since all effects of environmental reinforcement (positive or negative), which have been considered in this study, will not be necessarily seen in the individuals' behavior, then we can expect that Alilou's research would not be able to consider most of the effects of reinforcement on the subjects, but because the current study pay attention to learning as a cognitive phenomenon (and not behavioral which has external objective aspect) and the recycling learning test in this study seeks to measure the easiest aspects of learning, thus the existing study can study and consider a wider range of reinforcement effects.

In May and Johnson's study (1969), which was conducted to study the effect of reinforcement type on reducing the electrical response of skin, the difference effect of various types of reinforcement has been studied like the current study. However, the effect of presence or absence of reinforcement (regardless of the type) is also studied with regard to the control group. In this study, the effect of reinforcement on electrical response of skin is confirmed regardless of the type, but no difference was seen between the effect of different types of reinforcement and this result is consistent with the results of current study. However, we need to repeat these studies on larger samples due to the small size of statistical sample in the current study and research by May and Johnson and for enhancing the accuracy of results and higher generalization ability.

In conducted by Foote et al (1994), who have studied the effect of providing positive reinforcement (attention and respect) for treating cocaine abuser on the recovery process in these individuals, the results suggest a positive reinforcement influence on individuals' recovery. But in this study, first the type of positive reinforcement is the positive immaterial reinforcement (attention and respect) while in the current study the material outcomes (economic interests) have been used as the positive reinforcement. Second, in the research by Foote et al, the effect of positive impact is only considered, while in this study, the different effect of different types of reinforcement has been considered. Third, the effect of reinforcement on the individuals' observable behavior has been considered in Foote's research, while in this study, dependent variable,

learning, is a cognitive and non-observable phenomenon.

Researcher's suggestions for future studies:

In this study, the subjects, which were provided in the second session, were continued in the third and seventh sessions, then the subjects were faced with the contents of second session for several times and sometimes the researcher has noted that this case has certainly left unwanted effects on the results of research. This condition can be repeated in other studies, in which the contents are in chain hierarchy and also the contents of each session or each chapter are associated with the contents of previous session or chapters, and bring unwanted results and reduce the accuracy of research. Therefore, it is recommended that the contents should have no chain and related status in order to reduce the repetition of effects.

Given the Gestalt approach in learning, it is better to conduct and design the research about contents which are new and make no integrated scheme with the individuals' prior knowledge because the individuals' knowledge and their mental organizing power are different and can make the interference. It should be noted that the subjects, which have no prerequisites, should be selected for learning these types of contents. In this case, the results of research can be interpreted with greater certainty of controlled effects of subjects' prior knowledge on the results of research.

Since receiving the sensory information through the sight and hearing may cause differences in learning, it is better to control this variable carefully, for instance the cases, which have been provided by the figure and diagram, and the cases, which have been provided only as the auditory cases, and the cases those provided only as the visual cases, should be separately analyzed. However, in these cases the researcher should be noted that the visual contents may affect learning the contents which are verbally presented and vice versa. Therefore, all these cases should be considered at the stage of curriculum planning and designing the assessment tool.

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