

Comparative Analysis from Experimental Psychology:

Application of Behavior Modification Methods for Children with Down Syndrome Based on Islamic Value

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Abstract— The Holy Qur'an Surah An Nisa verses nine said that people must fear to let their child in weakly future even though they were special needs child. Statistics said that the presence of special needs kids have increased, particularly Indonesia. This research subjects are children with Down Syndrome. Down Syndrome is a congenital disorder arising from a chromosome defect, causing intellectual impairment and physical abnormalities. As a country with a largest Moslem netizen, the Moslem parents in Indonesia, especially the parents of Down Syndrome's child, must teach life skill which based on the Holy Qur'an and Blessed Sunnah such as *Thaharah* (purification). The method that was used is by Behavior modification through shaping and chaining. Shaping is a way of adding behaviors to a person's repertoar. Chaining is the reinforcement of successive elements of a behavior chain. The research method is an experimental psychology.

Keywords— toilet training; life skill; down syndrome; shaping; chaining method

I. INTRODUCTION

Each year, children with special needs in Indonesia have increased significantly. Data from the Population and Civil Registration Agency at 2015 indicated that there are 1.6 million children with special needs. Children with Special Needs or Extraordinary child is a child who deviates from the average normal children in the case characteristics of mental, sensory abilities, and neuromuscular physical, social and emotional behavior, communication skills, as well as combinations of two or more of the above matters; in so far as the child requires modification of school assignments, learning methods or other related services, aimed at developing the potential or capacity to the maximum [8]. One of the children with disabilities are *Down Syndrome (DS)*. DS is a genetic disorder that occurs on chromosome 21 or often called trisomy 21. DS have distinctive physical characteristics, such as facial Mongoloid, retarded physical and mental development. Intelligence Potential was classified *Intellectual Disability (ID)* [7].

The physical growth of a child with DS is usually too late and have health problems such as heart problems, vision, hearing, digestion, and so forth. They have limited intellectual

and mental development has been delayed, such as reasoning, abstract thinking, problem solving, planning, and hard to benefit from past experience. This caused them to have limitations in the academic field and the slow pace in understanding a thing. These limitations also resulted in the ability of daily activities include eating, dressing, using the telephone, and toileting [7].

Toileting is the basic capabilities that must be mastered by every individual even special needs. Toileting phase taught to children around the age of 2-3 years, but for individual with special needs, these capabilities can be learned in the long term. Often to teens, they have not yet mastered. Especially, if the child has growth disorders experienced quite complex and heavy.

As a country with a majority Moslem population, Moslem's parents in Indonesia have to educate and nurture their children with guidance to Islam, so that children can live in the way of Islam. One of the important education that is *Thaharah*, ritual purity or ablution in Islam. *Thaharah* terms of language means *pure and clean*, while the meaning of the term, *Thaharah* is pure and clean from the impurity. *Thaharah* is a very important key requirement for worship, especially in relation to prayer (*Sholat*), like the statement from Allah in the Holy Qur'an as follow

“ ... *Indeed, Allah loves those who are constantly repentant and loves those who purify themselves.*” (QS. *Al Baqarah*, 222)

In this experiment, children with Down Syndrome were taught *Thaharah* because Islam has detailed guidance as do all the activities consciously and starting and ending all activity with prayer. Children with special needs when taught regularly and continuously with special tricks and strategies so they can also hang like other individuals, as well as *Thaharah* that trained here is to urinate and defecate by using the method of Shaping and Chaining. Shaping is a procedure used to establish a behavior that is not presently performed by an individual. Shaping can be defined as the development of a new behavior by the successive reinforcement of closer approximations and the extinguishing of preceding approximations of the behavior

[9]. Chaining is a method of linking relatively simple behaviors to form a more complex task. Chaining is a way of linking the component steps that developed in task analysis into one fluid skill [17].

This study used three subjects DS those are N, boy 12 years, S, boy 8 years and K, girl 9 years. The age range was taken at this stage of the development of mid-aged children 6-11 years [5] where the child should have been able to perform activities of urinate and independently. If it is associated with cognitive stages of Piaget's theory that age into the concrete operational stage (ages 7-11 years), children are able to receive and use logical rules. Basically toileting taught at the age of 2-4 years and 4 years before the children can control the urinate. Toward the end of the fourth year, the three year old is beginning to sleep through most of night without bedwetting, although occasional accidents may still be common [16].

All three subjects have not been able to toileting independently even one of them still use the diaper at night or travel out of the house. Parents are trying to teach them over the years, but these skills are not possessed by children yet. In this research, teaching toileting used the method of Shaping and Chaining since this method seeks to break down complex skills into small steps then become simpler and mastered by the children. Skills are taught using this approach in such matters *Thaharah* in Islam. This research is important to see the effectiveness of this method in children with DS disorder.

II. THEORETICAL REVIEW

A. *Special Need Kids*

Special Need Kids is a child who needs special education and services to develop all their potential [4]. In general *special need* are grouped into five classifications of visual impairment (impaired function of the senses of sight), hearing impairment (impairment of hearing), mental retardation (mental retardation), quadriplegic (malfunctioning of motor movement), and emotional and social behavior disorders. Indonesian Ministerial of Healthy Decree number 70 of year 2009 classifies *special need* in more detail that is *blind, deaf, retarded, quadriplegic, learning disabilities, slow learner, autism, impaired motor skills*, and the other abnormalities [3].

B. *Shaping And Chaining Methods*

Method as a tool is indeed an integral part of scholarship. But most importantly for the integrity of the truth of science is the scientific attitude of scientists, to always keep your self have: curiosity, patience, objectivity, and change.

Shaping is a procedure used to establish a behavior that is not presently performed by an individual. Shaping can be defined as the development of a new behavior by the successive reinforcement of closer approximations and the extinguishing of preceding approximations of the behavior [9]. *Chaining* is a method of linking relatively simple behaviors to form a more complex task. Chaining is a way of linking the component steps that developed in task analysis into one fluid skill [17]. Let we see the steps in Shaping and Chaining methods.

If a behavior never occurs, we say that it is not in the person's repertoire. *Shaping* is a way of adding behaviors to a person's repertoire. Shaping is used when the target behavior does not yet exist. In shaping, what is reinforced is some approximation of the target behavior.

Approximation means any behavior that resembles the desired behavior or takes the person closer to the desired behavior. Successive approximations are steps toward the target behavior, the behavior want to shape.

Shaping and Chaining used to teach a complex skill. Complex skills can be simplified into steps smaller so easily dominated. This helps children with special need to master more easily and reduce frustration due to his inability to master the skills that will be given.

Every time a child successfully completes the tasks of approaching the task that should the children will be given positive reinforcement and with the passage of time, gradually he was able to complete the required task perfectly. For example, there are children who have not been able to express the desire to urinate so he was always wet the bed, and then his mother taught him that if he wanted to urinate then have to notify her mother with the words "urinate" and go to the toilet, but when the child is able to give a sign (although it is unclear pronunciation) and shows the toilet then the child is given a compliment invitation positive reinforcement. Child successfully behaves approached the targeted behavior. Chaining is a method that connects these simple steps towards such complex chain of behavior (behavior chain). There are three types of Chaining namely *Total Task Presentation, Backward Chaining, and Forward Chaining*.

III. METHODOLOGY

Experimental psychology is a branch of psychology that examines the process of sensing, perceiving, learning, and thinking about the world. In the context of positivism, or empiricism, observation of processes is done with the experimental method as a method or logic inquiry is relied upon to specify description, explanation, prediction, and control are increasingly accurate/precise processes itself as reality [6].

Experimental method is a methodology that contains elements of the sequence logic of inquiry from the elements identify problems and form hypothesis, experiment design elements, elements of conduct experiment, hypothesis test elements, until the write element research report. Experimental method of observation objective guarantees that observations independent of opinion or bias.

The fact interconnected even believed that the behavior must have a reason or determination. Some behaviors are not biased understood approaches tenacity, intuition, authority, even with rationalism, but the bias is explained by the experimental method. Therefore, psychological experiment is a way of acquiring knowledge about psychological realities.

For this research, besides the experimental method also used descriptive method that intend to organize a description or picture of a situation, event, or a collection of special

events/particular and inferential technique. Included into descriptive method are naturalistic observation, secondary records, and field studies consisting of at least four methods: *participant observation*, *survey* (survey, correlational studies, longitudinal and cross-sectional studies), *ex post facto studies*, and *meta-analysis*. Nevertheless, the experimental method also has the disadvantage that because they are often carried out in laboratories, the results are very exclusive, in the sense that can only be justified (legitimated) for the experiment only. Doubtful could use the results to a larger population.

Experimental design used in this research is the design equivalent time samples. The experiments were done by a series of measurements of the dependent variable against a group of subjects [14] as follow:

$$\text{Non R } O_1 \rightarrow O_2 \rightarrow O_3 \rightarrow X \rightarrow O_4 \rightarrow O_5 \rightarrow O_6$$

These design flaws are due to other factors, namely history, instrumentation (instrument measuring the same), and the interaction of the test did not participate measured. The design used is *A Basic Time Series Design*. This design is a development of the design of one group pretest-posttest. One group was given an early test repeatedly, given treatment and then given a final test repeatedly. Researchers will be more convinced of the effectiveness of the treatment given if the score that appears also increased. This design can be described as follows.

$$O_1 O_1 O_1 X O_2 O_2 O_2$$

In this experiment, we used the method of Shaping and Forward Chaining several ways that use visual aids in the form of stage pictures (sequences) of activity pup and urinate were put on the bathroom wall. The flow charts/tables stickers are also put on the wall if children successfully perform the required task. In this research, toileting steps are broken down into thirteen steps for children to stay motivated and easily mastered.

The steps of this experimental study as follows:

- Parent’s Anamnesis
- Make task analysis
- Prepare the appropriate media to be used
- Make the Chaining stages
- Determine reward
- Determine the base line of the basic abilities of children
- Implementation of treatment

While Chaining Forwards steps measured in this experiment for urination (urinate) and defecation (pup) are follows:

- Open the left leg pants with precedence
- Go to the bathroom by saying *Bismillah* and put the left foot

- Stand for urinate or squatting on the toilet for pup
- Shut quiet to finish
- Take the bailer/spray
- Directing and poured water over the pubic
- Clean by hand with a spray of water
- Flush dirt water used in the toilet
- Take a tissue/towel small
- Washing hands
- Use pants/skirt to put the right foot
- Tidy pants/skirt
- Exit the bathroom using the right foot and say *Alhamdulillah*.

In this study, the facilitator of the experiment is the mother and the therapist. Domineering mother every day to teach toileting steps to the child while participating observation therapist and begin training three times a week while the rest mothers bring their children go to therapy 2 times during the week. So basically the therapist almost every day also met with the subjects.

IV. RESULTS AND DISCUSSION

A. Results

This experimental study has been carried out for fourteen days. Every day, parents and therapists do habituation toilet training by teaching method chaining and shaping therapy. At every observation, there are thirteen steps (step 1 to step 13) to be taken by the subject. In the following graphs, the horizontal axis stating the number of days of the experiment and observation, while the vertical axis stating the number of steps that must be done by children in the process of toilet training.

1) Statistics Descriptive for Each Subject

For each subject we have the follow results. Figure 1 to Figure 3 show the trend of each subject.

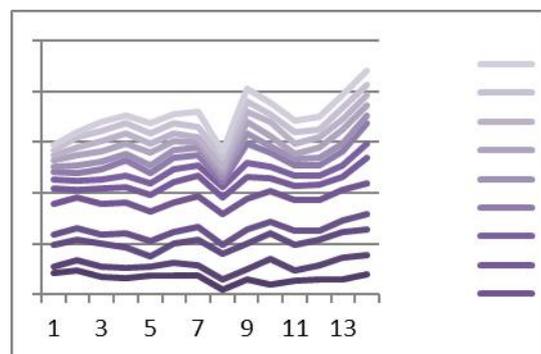


Fig. 1. Data for the First Subject (boy, 12 years old)

A line graph above shows that in general the development of the first subject is positive, especially on the steps 3, 4, 5, and 6. In step 7 to 13, particularly on day 8 occurred deprivation data. Unfortunately, there is no qualitative data that could explain these conditions. Furthermore, the additional data obtained in the form of descriptions that experienced by the subject during the experiment. This data is provided by a therapist.

Next, we explained for the second subject. A line graph below shows that in general the development of the first subject is positive, especially on the steps 2, 3, 4, and 5. In step 10 to step 13, particularly on day 9 until day 11 occurred surge quite significant. Unfortunately, there is no qualitative data that could explain these conditions. Furthermore, additional data obtained in the form of descriptions that experienced by the subject during the experiment. This data is provided by a therapist.

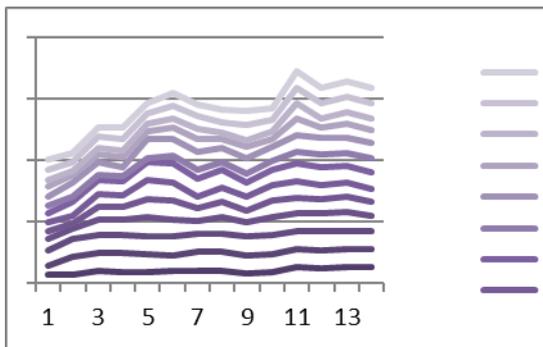


Fig. 2. Data for the Second Subject (boy, 8 years old)

Compared with the two previous subjects, a third subject has increased quite smooth. The progress achieved by the subject 3 throughout the experimental process of trend line look monotonous ride. This condition is evenly distributed to all the steps and throughout the day. Further descriptions of the data obtained during the experiment were sourced from the therapist.

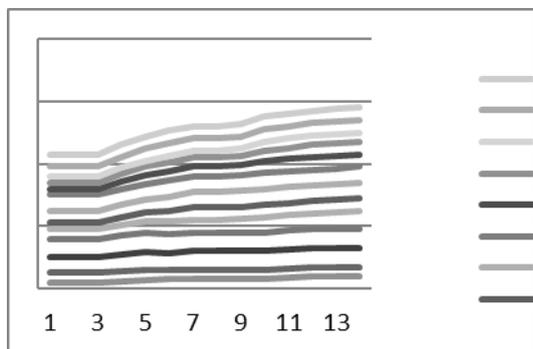


Fig. 3. Data for the Third Subject (girl, 9 years old)

Next, we will be descriptive statistics of the three subjects in the form of average, minimum and maximum score achieved during the experiment as well as the variance and standard deviation of the experimental data. Table 1 Contain the descriptive statistics for each subject.

TABLE I. DESCRIPTIVE STATISTICS

| | N | Min | Max | Mean | Std. Dev. | Variance |
|-----------|----|-------|-------|---------|-----------|----------|
| Subject 1 | 13 | 1.444 | 6.000 | 2.71960 | 1.273117 | 1.621 |
| Subject 2 | 13 | 2.85 | 5.93 | 4.4162 | 0.97030 | 0.941 |
| Subject 3 | 13 | 2.00 | 5.97 | 4.0645 | 1.16209 | 1.350 |

The first subject earned an average score of 2.7196 with 1.621 variance and standard deviation of 1.273. This shows that from the range of scores from 1 to 7, subject only received an average score of 2.7196 which is quite low. This is supported by the distribution curve that is loaded on the leftmost part of Figure 4, 5, and 6. However, among the three subjects, one subject showed the most significant developments. This is evident from the range of scores is the largest and the smallest score of 4.556.

The second subject had earned an average score of 4.4162 with a variance of 0.97 and a standard deviation of 0.941. It shows the average score obtained is good. The difference in scores and scores of the smallest in the second subject is not very significant: 3.08. It can be interpreted that basically skills second subject is already better than the first subject. This is also supported by the distribution curve shown in Figure 5.

Finally, the third subject earned an average score of 4.06 with a variance of 1.162 and a standard deviation of 1.35. As well as the subject of a second, a third subject also had an average score pretty good. It shows that the skill of the third subject has also been better than the first subject. This is also supported by the distribution curves in Figure 4, 5, and 6.

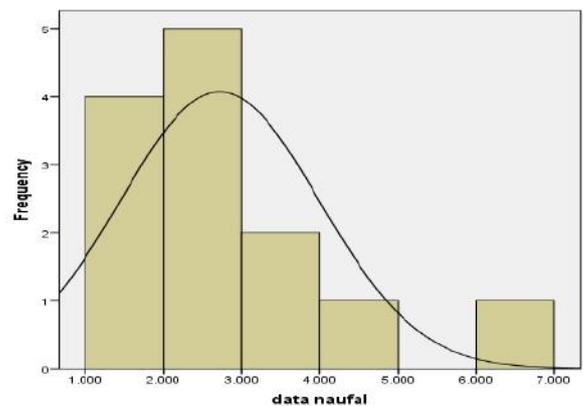


Fig. 4. Histogram for Subject 1

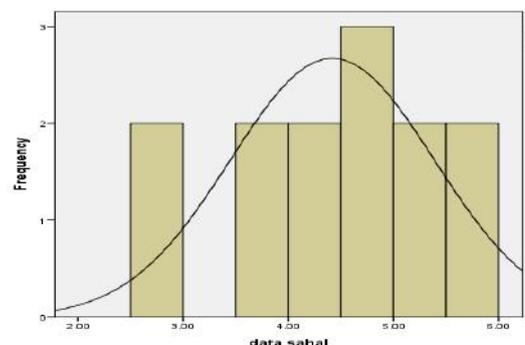


Fig. 5. Histogram for Subject 2

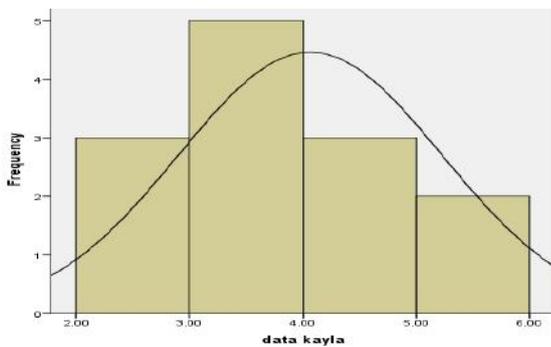


Fig. 6. Histogram for Subject 3

In Figure 4, 5, and 6 we compared to see scores of all three subjects through the distribution curves. The first subject has a distribution that tends to the left. The second subject has tended in the right distribution while the third subject follows a normal distribution. These differences are expected because there are different age when the subject began to be introduced with toileting. The first subject is the oldest among them.

2) Comparative Analysis

Simultaneously we can compare scores three subjects as demonstrated by the Analysis of Variance (Table 2). The significance value, i.e. *p-value* 0.001, showed that there is a significant difference between the three subjects. This difference is expected because the second subject and the third subject, they know toileting at a younger age than the first subject, so it's easier to accept the experimental method.

TABLE II. ANALYSIS OF VARIANCE

| | Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|----------------|----|-------------|-------|-------|
| Between Groups | 20.848 | 2 | 10.424 | 7.992 | 0.001 |
| Within Groups | 46.953 | 36 | 1.304 | | |
| Total | 67.801 | 38 | | | |

B. Conclusion

Interventions for Special Needs suggested as early as possible. There are some basic skills that are required under their control, one of which is Thaharah. Thaharah benefits in addition to teach self-reliance is also beneficial to health. In Thaharah Islam is the main thing that should be controlled by the individual if they want to practice their religion, especially prayer. Therefore Thaharah education should be controlled by children with DS from an early age.

In this study, three subjects with DS have limitations dominant in aspects of language, communication and intellectual capacity. Parents already teach toileting when aged under 5 years, but due to the limitations of children, and parents who do not fully teach you exactly, whether it was his strategy and consistency of parents to teach so that children

often helped perform toileting. This causes the child does not have a significant development. Shaping and chaining method is given because it provides concrete steps, by breaking down the steps into stages that are more simple and can be accomplished, accompanied by positive reinforcement to the child if successfully accomplish a given task.

During the two weeks of experiments conducted using the method of Shaping and Chaining result that they are making progress in the control toileting. Children also feel motivated to do it because it awarded the verbal and non-verbal (gift stickers and happy expressions of mothers and therapists) when the child managed to do. However, for children with DS, two weeks is a relatively short time. So this method should be continued until the child masters completely independently.

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