

## CHAPTER I

### INTRODUCTION

In general, learning in school is decided by the teachers and the curriculum set up by the ministry of education. Teachers usually instruct the students what they consider necessary and important, sometimes considering and at other times disregarding students' interest and learning abilities. Educational psychologists have tried to study and find out how learning goes during the developmental process of the children. Factors which seem to influence the learning process have been investigated thoroughly including cultural and environmental background of children.

After careful studies, educational situation has been positively changing. Much interest have been given directly to the learning process of the children due to the philosophical statement that the children can learn with their own capacities. Some researchers and some practical educators have proved that letting the children learn by themselves gain many positive outcome.

With close observation of the dedicated investigators, it has been discovered that the learning process is very complicated. Beliefs that learning can occur only through intentional behavior have been changed for the reason that learning does occur also through incidental behavior. Incidental learning plays a every important role in everyday life. Therefore, incidental learning should be studied along with intentional learning.

## Conceptual Definitions

Short - term memory (or central or intentional memory)

In the Encyclopedia of Psychology,<sup>1</sup> short - term memory is defined as "the information that may be held for a very short period of time (fifteen or thirty seconds)." Klausmeier and Ripple<sup>2</sup> described short - term memory as "The ability to recall the words and sentences of the last paragraph." According to Krech et.al.<sup>3</sup> "Intentional learning means acquisition that takes place when the learner has received instructions from the experimenter to learn the material or when there is an explicit mental set to learn." In this study, short - term or central or intentional memory was defined as the ability to recall a piece of information from a set that the subject was instructed to attend to.

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<sup>1</sup>H.J. Eysenck, W. Arnold and R. Meili, Encyclopedia of Psychology (London : Search Press, 1972), II, p.252.

<sup>2</sup>Herbert J. Klausmeier and Richard E. Ripple, Learning and Human Abilities. : Educational Psychology (3rd ed; Singapore : Harper International, 1971), pp.590-91.

<sup>3</sup>David Krech, Richard S. Crutchfield and Norman Livson, Elements of Psychology : A Briefer Course (New York : Knoff, 1970), p.237.



## Incidental memory

The Encyclopedia of Psychology<sup>4</sup> explained "Learning is incidental when no instruction is given to learn the material tested later." Krech et.al.<sup>5</sup> defined incidental learning as "acquisition that takes place when the learner has received no instruction from the experimenter to learn the material." Postman<sup>6</sup> proposed "Incidental learning is occurring in the condition that there is no intent to learn." Traverse<sup>7</sup> described incidental memory as "an ability to recall the knowledge that the subjects have acquired about some aspects of the material that were not relevant to undertaking the main task." In the present study, incidental memory was defined as the ability to recall the information that the subject was not instructed to attend to that was presented together with other information which the subject was instructed to attend.

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<sup>4</sup>Eysenck et.al., op.cit., p. 188.

<sup>5</sup>Krech et.al., loc.cit.

<sup>6</sup>Leo Postman, "Short - Term Memory and Incidental Learning" In A.Melton (Ed.), Categories of Human Learning (New York : Academic, 1964), p. 185.

<sup>7</sup>Robert M.W. Traverse, Essentials of Learning (2d ed; New York : MacMillan Company, 1967), pp.157-59.

## Serial position

In the experiment, serial position was defined as the order in which seven stimulus cards consisting of central information that the subject was asked to attend to, were presented. Primacy referred to the information on the stimulus card presented first; recency referred to the information on the stimulus card presented last, the middle-positioning referred to the average of the information on the third, fourth and fifth cards on each test trial.

## Development Studies

Central and incidental learning have been investigated by several American psychologists. The findings have revealed useful information to understand the development of selective attention and memory abilities. Hagen<sup>8</sup> has examined the development of selective attention through tasks on central and incidental memory. He studied children in grade one, three and seven by using stimuli containing two black line drawings pairing of animals and household objects. One picture of each pair was designated as central stimulus and other picture as incidental stimulus. The subjects were

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<sup>8</sup>J.W. Hagen, "The Effect of Distraction on Selective Attention," Child Development, 38 (1967), 685-94.

instructed to remember only animals or only objects from the set. Those who were asked to remember the animals had to recall the location of a certain animal after the presentation of the cards. At the end of twelve such tests of central memory, the subjects were asked which object went with a given animal. Since these subjects were not instructed to focus on objects, the learning of the objects were results of incidental retention. Hagen found that the performance on central memory increased as a function of age level, while the performance on incidental memory did not but declined at grade seven. He also found negative correlation between central and incidental memory scores at the oldest age level. From this, Hagen concluded that ability to process information increased with age.

Maccoby and Hagen<sup>9</sup> have studied central and incidental memory employing different materials. They tested children in first, third, fifth and seventh grades, by using a set of cards bearing different colors and different pictures. In central memory testing, the subjects were asked to focus on the color cards and recall the positions of them. After being testing on the color variable, they

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<sup>9</sup>Eleanor E. Maccoby and J.W. Hagen, "Effect of Distraction upon Central Versus Incidental Recall : Developmental Trends," Journal of Experimental Child Psychology (1965), 280-89.

were asked which picture went with a given color to test incidental memory. The findings indicated that the central memory score increased with age from six to thirteen years old while incidental memory score tended to be related to age in a curvilinear manner. The subjects showed little change on incidental performance across first, third and fifth grades, but showed marked decrease at seventh grade. The authors explained that the older children were more able than the younger children in focusing their attention selectively on central task and disregarding incidental stimuli.

Stevenson<sup>10</sup> studied incidental memory in children between the ages of three and seven years. The subjects were asked to play a game in which they could unlock boxes and find prizes. The results revealed that the performance on incidental memory increased with age from age three to seven years old.

In a separate research, Siegel and Stevenson<sup>11</sup> investigated incidental memory in children of age seven through fourteen years and in adults ages nineteen to thirty - five years. The procedure for the study was divided into three parts as follows: At first the subjects learned a standard three choice successive discrimination problem and followed by twelve presentation of each discriminative

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<sup>10</sup>H.W. Stevenson, "Latent Learning in Children," Journal of Experimental Psychology, 47 (1954), 17-21.

<sup>11</sup>Alexander W. Siegel and Harold W. Stevenson, "Incidental Learning : A Developmental Study," Child Development, 37 (1966), 811-47.



stimulus mixed in a stimulus complex. Then the subjects were tested incidental memory by presenting the surrounding objects of stimulus complex separately. The results indicated that there was a curvilinear relation between age and incidental recall scores, for the performance on incidental memory increased from age seven to twelve and declined from age twelve to age fourteen and then increased for adults. The researchers suggested that the increase in amount of incidental memory found between ages seven and twelve might be due either to an increasing ability to learn and retain or to an increasing tendency to attend to the incidental stimuli. The decline in the amount of incidental memory between ages twelve and fourteen might be attributed to the tendency of the older children to ignore irrelevant stimuli. Siegel and Stevenson also explained that the highest incidental scores of adults was probably because the test was extremely simple for them.

Druker and Hagen<sup>12</sup> examined the role of perceptual discrimination in the development of the abilities to process task - relevant and task - irrelevant information. They studied children at fourth, sixth and eighth grades by using test materials and procedure described by Hagen.<sup>13</sup> Test materials consisted of

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<sup>12</sup>Joseph F. Druker and J.W. Hagen, "Developmental Trends in the Processing of Task - Relevant and Task - Irrelevant Information," Child Development, 40 (1969), 370-82.

<sup>13</sup>Hagen, loc.cit.

a set of six cards with each card containing two black - line drawings of an animal and an object. The subjects were instructed to recall the location of the animals for central memory test. After the eight central memory test trials the subjects were tested for incidental memory by being asked to match the objects to the animals with which they had always been paired. At the end of incidental memory test all subjects were asked a series of questions about their manner of approaching the task. The findings of this research clearly substantiated the results of past research studies that central recall scores generally increased with age while incidental recall scores dropped with age relative to the total amount of information processed. The relationship between central and incidental recall scores was positive at the youngest age level but negative at the oldest age level. The results from the questionnaire revealed that the older children had more tendency to rehearse by saying only the names of central stimuli and looking at only the relevant item. The authors concluded that older children were more able than younger children to use rehearsal and encoding skills to focus their concentration on central information.

Wheeler and Dusek<sup>14</sup> in a recent study explored the effects of attentional and cognitive factors on children's incidental learning.

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<sup>14</sup>R.J. Wheeler and J.B. Dusek, "The Effects of Attentional and Cognitive Factors on Children's Incidental Learning," Child Development, 44 (1973), 253-58.



Their subjects were children at kindergarten, third and fifth grade levels. Test materials were similar to those used by Druker and Hagen.<sup>15</sup> For half the subjects, central and incidental stimuli, composed of line drawings of familiar animals and household objects, were spatially separated on the eight stimulus cards. For other half of the subjects, the stimuli were contiguous. The procedure in this study were similar to Hagen's.<sup>16</sup> Half the subjects were instructed to label the central stimuli as the cards were exposed but other half the subjects were not. The results indicated that central learning increased from kindergarten to fifth grade and the subjects who verbally labeled the central stimuli obtained higher central learning scores than subjects who did not verbally label. The research also revealed that the performance on incidental learning was constant across grade levels and the subjects who verbally labeled the central stimuli had lower incidental learning scores than subjects who did not verbally label while subjects who saw spatially separated stimuli had lower incidental learning scores than subjects who saw contiguous stimuli. Wheeler and Dusek concluded that labelling of central stimuli had a facilitative effect on central learning and a decreasing effect on incidental learning. Spatial separation of central and incidental stimuli had no effect on central

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<sup>15</sup>Druker and Hagen, loc.cit.

<sup>16</sup>Hagen, loc.cit.

learning but had a detrimental effect on incidental learning.

Kingsley and Hagen<sup>17</sup> conducted a study to examine the effects of labeling on central memory. Their subjects were children ranging in age from nursery school to grade five. Test stimuli consisted of a set of eleven animal cards. The subjects were instructed to remember the cards presented to them. Then, they had to find the presentation card which matched a cue card by turning up cards until they found the correct one for sixteen test trials. Half the subjects overtly labeled the stimuli and half did not label. The findings revealed that overt labeling facilitated largely the most recent serial positions but had little effect on primacy. Overt labeling facilitated central memory performance for subjects between ages six and eight years old but not for five year subjects.

From the studies described above it can be concluded that older children are more capable to focus their attention on central stimuli and to disregard the incidental stimuli than younger children are. The increasing ability to respond selectively with age may be due to the increase of using strategies involving rehearsal and verbal encoding.

Research discussed so far used only American middle - class children as subjects. In the United States age and formal education

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<sup>17</sup>P.R. Kingsley and J.W. Hagen, "Labeling Effects in Short - term Memory," Child Development, 39 (1968), 113-21.

are almost perfectly correlated from age four to eighteen years. Therefore it is difficult to conclude that the development of central and incidental memory is because of increasing age. Wagner<sup>18</sup> has conducted a cross - cultural study on the development of central and incidental memory in Mexico. He studied both urban and rural subjects. He used test materials that were adapted from Hagen's<sup>19</sup> research consisting of a set of seven animal - object pair cards. The subjects were tested on central memory by recalling the location of the certain pictures of only animals or of only objects. Then the subjects were tested on incidental memory by being asked to recall which animals went with which object if they had to focus on object for central memory test. On the other hand, the subjects were asked to recall which objects went with which animals if they had to focus on animals as central stimuli. The results revealed that the performance on central memory of the urban group increased from ages 7 - 9 to 25 - 27, but the performance of rural group increased from ages 7 - 9 to 10 - 12 and then decreased from ages 10 - 12 to 22 - 35. The incidental memory scores of urban subjects increased from ages 7 - 9 to 13 - 16 and then declined from ages 13 - 16 to 25 - 27 while incidental memory scores of rural subjects increased from ages 7 - 9 to ages 20 - 21 and then decreased at

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<sup>18</sup>Daniel A. Wagner, 1973 "The Development of Short - Term and Incidental Memory. A Cross - Cultural Study." (Report to Department of Psychology, University of Michigan).

<sup>19</sup>Hagen, loc.cit.

ages 22 - 35. Wagner concluded that age alone could not cause such development. He also studied the "extra" group of relatively unschooled urban adults and found that these subjects performed on central memory like unschooled rural adults. He concluded that formal education was a major factor in central memory development. The data from the "extra" group of unschooled urban adults showed that these subjects performed on incidental memory more like schooled urban subjects than unschooled rural subjects. Wagner concluded that cultural setting had an important role in the development of selective attention. He suggested that the effect of media in a cultural setting might affect the development of selective information processing.

Cross - cultural studies on the development of central and incidental memory are rarely conducted. There has been no investigations concerning this area of learning ability in Thailand. This is an arousal condition for the present study. In addition, a chance to compare the results with the American and Mexican samples is another motive. However, those two reasons for this study may be incomplete if eagerness for more knowledge which is a need of human being has been neglected.

#### Purpose of the Study

The present study was designed to examine the development of central and incidental memory of rural children in the northeast of Thailand. The effects of serial positioning (primacy - first stimulus, recency - last stimulus and middle - positioning) in the development of central memory would be explored. Also difference in central and incidental performances between males and females would be compared.

### Significance of the Study

The results of this study about the development of central and incidental memory may provide the information for establishing a possible model of learning and it will give a clear picture to understand the relationship between perception and learning. In addition, it may offer a pattern showing how children learn due to their development and this can provide teachers the information for teaching children.

### Delimitation

The present study explored development of central and incidental memory among rural Thais. Test materials for the experiment were adapted from Hagen's.<sup>20</sup> The picture used in test materials were familiar to the subjects of all age groups. The subjects of the study were 80 children and 20 adults from a village in the northeast part of Thailand ranging in age from four to twenty - one years. The subjects were tested for central memory by being asked to locate a particular central stimulus (an animal or object) among a series of seven cards that were briefly presented to the subjects, and then placed face down in front of the subjects.

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<sup>20</sup>Hagen, loc.cit.

The subjects were tested fourteen times for central memory. After that, the subjects were tested for incidental memory by being asked to recall which animals went with which objects in the central task. All the testing was conducted in Isarn Dialect. In addition, anytime a subject gave a correct response, the experimenter gave him a candy as a reinforcement.

### Hypothesis

Based on the results of the studies on the development of central and incidental memory in the United States and in Mexico, the following hypothesis were set up.

1. The performance on central memory task of rural Thai subjects will increase with age from ages 4 - 5 to ages 20 - 21.
2. The performance on central memory of rural Thai subjects will be higher on the recency (last stimulus) and lower on the primacy (first stimulus) and the middle positions (position 3, 4, 5).
3. The performance on incidental memory task of rural Thai subjects will increase from ages 4 - 5 till ages 14 - 15 and then decline at ages 20 - 21.
4. There will not be significant differences on the performance of males and females on both central and incidental memory tasks.
5. There will not be any relationship between central and incidental memory performance.