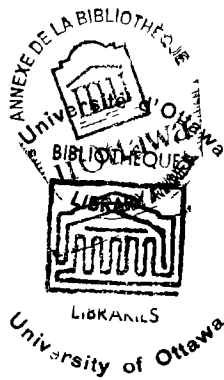


A RELATIONAL STUDY OF DELAYED  
GRATIFICATION AND TORRANCE'S CONCEPT OF  
CREATIVE THINKING AT THE GRADE EIGHT LEVEL

by Egerton G. Blackwood



Thesis presented to the school of  
Graduate Studies of the University  
of Ottawa as partial fulfillment  
of the requirements for the degree  
of Doctor of Philosophy.

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## CURRICULUM STUDIORUM

Egerton G. Blackwood was born June 15, 1932, in Jamaica, W.I. He received the Bachelor of Science degree in Chemistry from McGill University, Montreal, Quebec, in 1960. He received the Master of Education degree in Measurement and Evaluation from the University of Ottawa, Ottawa, Ontario, in 1970. The title of his upgrading paper was The Relationship Between Delayed Gratification and Locus of Control.

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## INTRODUCTION

The purpose of this study is to investigate the relationship between delayed gratification as presented by Rotter and Torrance's theory of creative thinking.

The problems of delayed gratification and highly creative pupils have observed by teachers and other educators for years. In the classroom teachers have been surprised at the unusual performance of the delayed gratifier. From the author's personal observation as a teacher, counselor and principal, he observed that pupils who delay gratification tend to be more divergent or creative in the production of answers. On the other hand those who accept gratification quickly, tend to solve their problems incorrectly or in a commonplace manner. This observation motivated the author to study the relationship between delayed gratification and creativity.

Although the concepts of delayed gratification and creativity have been investigated by several authors, very little effort has been directed towards an investigation of the relationship between the two variables. However, there is evidence both direct and indirect of the existence of a possible relationship between them (delayed gratification and creativity).

Nevertheless, the reality of the existence of a relationship between the variables of delayed gratification and creative thinking has not been sufficiently established by

experimental studies. Therefore, there is a need to study the relationship between the two variables.

This report should be particularly important from an empirical point of view in providing some direct and reliably measured evidence of the kind of relationship that exists between delayed gratification and creativity.

The report consists of three chapters. The first chapter is concerned with a review of the literature with respect to Rotter's concept of delayed gratification and Torrance's theory of creative thinking. A theoretical rationale is established for the prediction that delayed gratification is related to creativity. Next, the problem will be stated.

The experimental design used in the present study is presented in chapter two. Special attention is given to a description of the research subjects, the instruments used to measure 1) the ability to delay gratification, and 2) creativity, the procedure used for the collection of the data, and plan of the statistical analysis of the data.

The presentation and discussion of results are found in chapter three. The chapter begins with the statistical analysis. This is followed by a discussion of the results of testing the hypothesis.

The final section of the text includes a summary of the findings of the study, the major conclusions which have been drawn, and the appendices.

## CHAPTER I

### REVIEW OF THE LITERATURE

The object of the following review of the literature is to develop the theoretical framework within which will be pursued the study of the relationship between the ability to delay gratification and creative thinking.

More specifically, this chapter will deal intensively with Rotter's formulation of the ability to delay gratification and of Torrance's conceptualisation of creativity. The literature will also be examined for studies pertaining to variables related to both concepts: delayed gratification and creativity, such as locus of control (internal), general ability and anxiety (tension). Finally, evidence taken from studies that investigated possible relationships between the two major variables will be cited and evaluated in terms of their contribution to our own research.

#### 1. Delayed Gratification

In this section Rotter's formula for his Social Learning Theory will be presented. This will be followed by the definition of delayed gratification and other sub-variables. Next a discussion of behavior potential, expectancy, reinforcement value, locus of control, general ability and anxiety will be given.

One way of analyzing human behavior is to think of it as a number of choice situations to be resolved by the individual who has to make a choice between different alternatives. To a great extent then, predicting human behavior requires the predictor to identify correctly the alternative which the individual will choose in order to attain his desired goal. If the number of choices is greater than one, the ability to predict can be improved by additional knowledge with respect to the number of alternatives available, as well as their relative attractiveness to the choosing individual. It follows therefore, that as long as there are many alternatives there must be some formalized way of predicting among alternatives in order to be able to account for human behavior successfully.

One such formula states that behavior will be selected at a given point, such that, for each individual, it will have the highest expectancy for achieving the desired goal. A general statement of the formula is given by Rotter in terms of behavior potential, expectancy, reinforcement value, and the psychological situation.<sup>1</sup> It states that behavior potential is a function of expectancy and reinforcement value  $B.P. = f(E.\&R.V.)$ .<sup>2</sup> Behavior potential is defined as "the

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1 J.B. Rotter, Social Learning and Clinical Psychology, New York, Prentice Hall, 1954, p. 105-107.

2 J.B. Rotter, J. Chance and E. Phares, Applications of a Social Learning Theory of Personality, New York, Holt, Rinehart, 1972, p. 14.

potentiality of any behavior's occurring in any given situation or situations as calculated in relation to any single reinforcement or set of reinforcements."<sup>3</sup> It is positively related to reinforcement value and expectancy. Reinforcement value is "the degree of preference for any reinforcement to occur if the possibilities of their occurring were equal."<sup>4</sup> Expectancy is "the probability held by the individual that a particular reinforcement will occur as a function of a specific behavior on his part in a specific situation or situations."<sup>5</sup> Finally, the psychological situation is composed of cues which serve to arouse in the individual certain expectancies for reinforcement of specific behaviors.<sup>6</sup>

Hence, the probability of any behavior occurring in a given situation is some function of the expectancy that it will lead to a goal and the reinforcement of that goal. If the variations in expectancy and/or reinforcement value be considered, then a more specific formulation of behavior potential for any given situation would be:

$$B.P_{X,S_1,R_a} = f(E_{X,R_a,S_1} \& RV_{a,S_1})$$

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3 Rotter, op. cit., p. 105-107.

4 Idem, Ibid., p. 105.

5 Idem, Ibid., p. 105-107.

6 Idem, Ibid., p. 105-107.

The formula says that: "The potential for behavior X to occur, in situation 1 in relation to reinforcement a, is a function of the expectancy of the occurrence of reinforcement a, following behavior X in situation 1, and the value of reinforcement a in situation 1.<sup>7</sup> In any given situation, it is presumed that the behavior which occurs has the highest behavior potential.

The ability to delay gratification may now be interpreted in terms of Rotter's theoretical formulation. Delayed gratification may be defined as a form of behavior potential.

It can be conceptualized as an implicit behavior or tendency to engage in behavior that leads to long-range positive consequences, i.e., to major reinforcements which are expected to occur at some relatively distant point in time. Such point in time may be separated by a sequence of relatively unrewarding acts. Immediate gratification can be conceptualized as a tendency to engage in behavior which does not lead to long-range positive consequences, i.e., major reinforcements are expected to occur at a relatively close point in time. Such point in time may, indeed, be directly at the conclusion of a given act.<sup>8</sup>

The ability to delay gratification is, therefore, a selection of that alternative in a choice situation which has a greater reinforcement expected as a consequence of delay.<sup>9</sup> Immediate

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7 Idem, Ibid., p. 108.

8 J. Shybut, Delayed Gratification and Severity of Disturbance Among Hospitalized Psychiatric Patients, a doctoral dissertation presented to the Graduate Division of the University of Colorado, 1965, p. 4.

9 Idem, Ibid., p. 4.

gratification, on the other hand, is the selection of an alternative in a choice situation immediately, since the expectancy for receiving the reinforcement later is lower than for obtaining it immediately.

Having defined delayed gratification in terms of Rotter's formula, it is now possible to discuss behavior potential and the role of expectancy and reinforcement value in determining behavior.

The group of variables that enhance or weaken the relative strength of expectancy and reinforcement value will also be discussed. They are locus of control, general ability and anxiety or tension.

### Behavior Potential

The concept of behavior potential is a relative one. That is, one calculates the possibilities for any behavior to occur in relation to other alternatives that are open to the individual. Therefore it may be said that in a given situation the potentiality for behavior "A" to occur is greater than that for behavior "B". Thus in any given situation the behavior that occurs has the highest potential.<sup>10</sup>

Rotter states that his definition of behavior is general and includes all human responses that have an effect

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<sup>10</sup> J. Rotter, J. Chance and E. Phares, Applications of a Social Learning Theory of Personality, New York, Holt, Rinehart, 1972, p. 14-15.

on the environment. Thus any response to a meaningful stimulus that can be measured directly or indirectly would be included.

Behavior potential is a function of both expectancy and reinforcement value. Therefore, a prediction of behavior potential will involve either that expectancy or reinforcement value must be held equal while varying the other one.<sup>11</sup> For example, if the expectancies for any of five behaviors are equal, one could predict which behavior has the highest potential (will occur) by finding the different values of the reinforcements expected for each of the five behaviors. Reinforcement value would give, in this situation, a direct prediction of behavior potential. If, on the other hand, the reinforcements expected for all five behaviors were equal in value, one could predict behavior potential by measuring expectancies.<sup>12</sup>

Rotter states that behavior potential is higher when expectancy and reinforcement value are both high, or when one is high and the other is moderate, than when both are low. He further states that: "Neither reinforcement value, nor expectancy, nor the psychological situation taken

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11 Idem, Ibid., p. 16.

12 Idem, Ibid., p. 16.

alone seems as powerful in predicting behavior as when the three are considered in combination."<sup>13</sup> Behavior potential is not a static concept; therefore, as the individual encounters new experiences his reinforcement values and expectancies will change. This will result in a change in the possibility for the occurrence of a specific behavior.

### Expectancy

Expectancy is the belief held by the individual that he will receive a certain reinforcement if he behaves in a given way in a given situation. Expectancy may be strengthened or weakened as a result of experience with the actual occurrence of a given reinforcement. For example, Mahrer<sup>14</sup> has shown experimentally that if a given subject always experiences a certain type of reinforcement as a consequence of a specific behavior, he is most likely to establish a high level of expectancy for the occurrence of such a reinforcement under similar conditions. On the other hand, if he rarely experiences a specific reinforcement as a consequence of a specific behavior, then his level of expectancy is likely to be low. Consequently, in a choice situation between two

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13 Idem, Ibid., p. 16.

14 A. Mahrer, "The Role of Expectancy in Delayed Reinforcement", in Journal of Experimental Psychology, Vol. 52, 1956, p. 101-106.

alternatives, he may choose the reinforcement for which he has the higher expectancy, if reinforcement values are equal.

Expectancy on one hand may be regarded, therefore, as being specific to a given situation. For example, an individual may have a specific expectancy for success in a certain English class. On the other hand, an individual's expectancy may be generalized with respect to various situations. Thus, a person may have expectancy for academic success in all of his classes. A generalized expectancy, according to Rotter, is one which is held by the individual in a variety of situations.<sup>15</sup> It is assumed to be the result of accumulated experiences which generalize from one situation to situations which are viewed as similar in some respect.

In a new or novel situation, generalized expectancy will be more important in determining the expectancy of an individual than will specific expectancy.<sup>16</sup> For example, an individual's expectancy for winning a 100-meter dash on his first trial will, to a great extent, be determined by his previous experience, generalized from other athletic situations. However, as he repeats his performance in the 100-meter dash, his expectancy of winning will be determined

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15 J. Rotter, J. Chance and E. Phares, Applications of a Social Learning Theory, 1972, p. 24.

16 Idem, Ibid., p. 24-25.

more and more by his specific experiences in those competitive situations.

Thus, functional relationships among behaviors occur as a result of experiences in which the behaviors are reinforced in a similar manner. Also, the degree of relatedness varies with the degree of similarity of reinforcements obtained and/or the proportion of incidences of the behaviors reinforced in the same way. If a particular reinforcement changes the individual's expectancy about the outcome of a given behavior, expectancies for other behaviors are changed at the same time to the same degree that these other behaviors have a history of reinforcement similar to the first behavior.<sup>17</sup> If a child, for example, is refused ice cream, it is possible that his expectancy of getting a bar of candy from the same source is reduced. At the same time, his expectancy for persuading a friend to accompany him to a hockey game may remain relatively unaltered. Hence changes in expectancies may lead to generalization of expectancy in given situations. In an actual choice situation, an individual may have to choose between ten cents available immediately and twenty-five cents available a week later. The ten cents represent the immediate reinforcement and the twenty-five cents the delayed reward. Comparatively speaking,

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17 Idem, Ibid., p. 47.

if the individual's reinforcement value is high for the twenty-five cents, he may choose it although it is a delayed reward. On the other hand, if the expectancy for receiving the twenty-five cents is low, but high for the ten cents, the individual may choose the immediate reward of ten cents although the reinforcement value is relatively lower than for the twenty-five cents.<sup>18</sup>

Whether or not the individual chooses a delayed or an immediate reinforcement will depend to a great extent on how generalized his expectancies are with respect to the choice of a particular reinforcement. For example, in a choice situation between a small reinforcement now or a larger reinforcement later, the occurrence of a delayed choice will depend on the expectancy associated with the occurrence of delayed reinforcement in general. If the individual's experiences are such that he received delayed rewards in the past, then he may generalize from those situations and anticipate reinforcements in the future. On the other hand, if he experienced no reward under conditions of delay in the past, then he may not anticipate reinforcements under similar conditions in the future. Consequently, in a choice situation between immediate and delayed reinforcement, the

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<sup>18</sup> J. Shybut, Delayed Gratification: A Study of Its Measurement and Relationship to Certain Behavioral, Psychological and Demographic Variables, unpublished Master's thesis, University of Colorado, 1954, xvi-144 p.

higher one's expectancy for the occurrence of delayed reinforcement and the more one generalizes from past experiences that the reward will be given, the stronger will be one's tendency to delay gratification.

### Reinforcement Value

Reinforcement value is the degree of preference for any one of a group of reinforcements to occur, if the probabilities of all occurring were equal.<sup>19</sup> Thus, if expectancy is held constant, reinforcement value is the degree to which one prefers a given reinforcement over another in a choice situation. The choice made in such a situation will depend on the relative value of a given reinforcement.

The value of any reinforcement may be a function of the individual's expectancy that some reinforcements lead to additional reinforcements, whereas others do not. Hence the greater his expectancy for obtaining a certain reinforcement, the greater will be the value of such a reinforcement to him, and the greater will be the behavior potential for choices associated with future consequences.

The ecology of reinforcement may determine whether or not the occurrence of a given reinforcement will lead to

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19 J. Rotter, op. cit., p. 105-107.

other reinforcements or a generalization about them. For example, in some societies delayed reinforcements are expected or generalized to have higher reinforcement values than immediate reinforcement. Thus on-the-job training is one method of increasing an individual's earning power, although one earns relatively little during the training period. Immediate reinforcements, on the other hand, tend not to be linked with any additional reinforcement in the future. Thus, if expectancy for two or more rewards is equal, the extent to which reinforcement value affects the behavior potential for one choice over another corresponds to the relative strength or preference value that the individual has for the reinforcements, in a given situation.

An individual, for example, may have obtained a reward during a delayed situation. The more he generalizes that situation with respect to the given reinforcement, the greater will be the value of such a reinforcement to him. Hence, if he has to choose between a small reward obtainable immediately and a larger one that can be obtained later, he will have the tendency to accept the delayed reinforcement. If the individual had experienced no reward under similar conditions of delay, he may also generalize this to other situations. Hence in a choice situation between delayed and immediate rewards if expectancy is held constant, the individual will select the reinforcement that is available immediately.

It is generally agreed that all individuals are capable of delaying gratification to some degree and that as individuals grow older they are better able to inhibit their responses.<sup>20</sup> Therefore the ability to delay gratification can be measured. The authors who have contributed mainly to its measurement include Bialer,<sup>21</sup> Shybut,<sup>22,23</sup> and Mischel,<sup>24,25, 26,27,28.</sup>

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20 J. Shybut, op. cit., 1963, p. 19-21.

21 I. Bialer, "Conceptualization of Success and Failure in Mentally Retarded and Normal Children", in Journal of Personality, Vol. 29, 1961, p. 303-319.

22 J. Shybut, Delayed Gratification: A Study of Its Measurement and Relationship to Certain Behavioral, Psychological and Demographic Variables, unpublished Master's Thesis, University of Colorado, 1954, xvi-144 p.

23 -----, Delayed Gratification and Severity of Disturbance Among Hospitalized Psychiatric Patients, a doctoral dissertation presented to the Graduate Division of the University of Colorado, 1965, p. 1-149.

24 W. Mischel, "Preference for Delayed Reinforcement: An Experimental Study of a Cultural Observation", in Journal of Abnormal and Social Psychology, Vol. 56, 1958, p. 57-61.

25 -----, "Delay of Gratification, Need for Achievement, and Acquiescence in Another Culture", in Journal of Abnormal and Social Psychology, Vol. 62, 1961, p. 543-552.

26 -----, "Father Absence and Delay of Gratification: Cross-Cultural Comparisons", in Journal of Abnormal and Social Psychology, Vol. 63, 1961, p. 116-124.

27 -----, "Preference for Delayed Gratification and Social Responsibility", in Journal of Abnormal and Social Psychology, Vol. 62, 1961, p. 1-7.

28 Idem, Ibid., p. 202.

Delayed gratification may be influenced by certain variables which will strengthen or weaken expectancy or reinforcement value. The most relevant of these variables are locus of control, general ability and anxiety. In order to understand better the function of these mediating variables each one will be discussed briefly.

### Locus of Control

Locus of control is one of the variables that influences an individual's ability to delay gratification.

It may be defined as:

... the extent to which an individual feels that his own actions determine what happens to him, or that what happens to him is determined by fate, luck, chance, or powerful forces outside of his control.<sup>29</sup>

Therefore, the individual who believes that reinforcement is contingent upon his or her own behavior is said to show evidence of internal control. On the other hand, the person who perceives reinforcement as being dependent upon external factors beyond his or her control is said to show evidence of external control. The individual, therefore, may interpret the occurrence of various reinforcements as a consequence of his behavior.

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29 J.B. Rotter, M. Seeman and S. Liverant, "Internal versus External Control of Reinforcement: A Major Variable in Behavior Theory", in N.F. Washburne (Ed.), Decisions, Values and Groups, Vol. 2, London Pergamon Press, 1962, p. 473-516.

Rotter,<sup>30</sup> in his social learning theory provides a general theoretical background for his conception of the nature and effects of reinforcement. He states that "a reinforcement acts to strengthen an expectancy that a particular behavior or event will be followed by that reinforcement in the future." If the expectancy for such a behavior sequence is formed and the reinforcement fails to occur, then expectancy will be reduced or extinguished.<sup>31</sup> Rotter therefore concludes that "when the reinforcement is seen as not contingent upon the subject's own behavior, its occurrence will not increase expectancy as much as when it is seen as contingent." On the contrary, its non-occurrence will not lower an expectancy as much as when it is seen as contingent. It seems possible that, depending upon the individual's history of reinforcement, people may differ in the degree to which they attribute reinforcement to their own actions.

Within the context of Rotter's social learning theory, Shybut concludes that:

If an individual holds a belief in external control, i.e., perceives future events as controlled by forces outside of his control, whatever they may be, he is more likely to engage in behavior which has its major

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30 J.B. Rotter, M. Seeman and S. Liverant, "Generalized Expectancies for Internal versus External Control of Reinforcement", Psychological Monographs, General and Applied, Vol. 80, No. 1, Whole No. 609, 1966, p. 1-28.

31 Idem, Ibid., p. 2.

reinforcements immediately available. This is because future events would tend to be looked upon as unrelated to present behavior. Behavior potential for long-range goals would remain, therefore, relatively low. On the other hand, an individual who perceives future events as consequences of his present behavior will attach secondary expectancies to the occurrence of various reinforcements. This would tend to increase behavior potential for selection of those behaviors that are related to long-range goals or to delayed gratification.<sup>32</sup>

It may be concluded therefore that an individual may or may not interpret the occurrences of various reinforcements as a consequence of his behavior.

Viewing the developmental stages of locus of control, Bialer,<sup>33</sup> within the construct of Rotter's theory, states that in the early stages of development of an individual there is no conception of the outcome of events and one's own behavior. Hence young children as a group, tend to view their experiences, both positive and negative, as being externally controlled. As development proceeds, the child begins to note that he can influence the outcome of events by his own actions. He is likely, therefore, to view his goal-directed experiences as being internally controlled,<sup>34</sup> that is, as a consequence of his own behavior. Hence in a

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32 J. Shybut, Delay of Gratification and Severity of Disturbance Among Hospitalized Psychiatric Patients, p. 10.

33 I. Bialer, "Conceptualization of Success and Failure in Mentally Retarded and Normal Children", Journal of Personality, Vol. 29, No. 3, 1961, p. 303-320.

34 Idem, Ibid., p. 304.

situation in which children are allowed to choose between an immediate smaller reward and a future greater reward, the younger child would not be able to endure the tension or low expectancy of getting the reinforcement associated with delay. He would most likely respond to the cues associated with immediate pleasure and accept the lesser-valued reward.<sup>35</sup> The older child, on the contrary, would be better able to cope with the tension generated by the postponement of immediate need satisfaction, and should choose to defer his gratification.<sup>36</sup> Bialer concludes that regardless of the developmental stage at which an individual happens to be, the behavior patterns should all tend to move in a consistent direction. For example, if the younger child could envisage events as being internally controlled, he should respond to cues in such a manner that he would be able to delay gratification. This concept has been supported by Strickland, who states that the ability to delay gratification appears to be linked to a belief in behavior-reinforcement contingencies that can be assessed along a dimension of internal-external locus of control as early as the third grade.<sup>37</sup>

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35 Idem, Ibid., p. 306.

36 Idem, Ibid., p. 306.

37 B.R. Strickland, "Delay of Gratification and Internal Locus of Control in Children", Journal of Consulting and Clinical Psychology, Vol. 40, No. 2, 1973, p. 338.

The relationship of delayed gratification and locus of control has been investigated by several authors. The general consensus of the findings of the studies is that individuals who show evidence of being highly internally controlled are more likely to delay gratification than those who are highly externally controlled.<sup>38,39,40,41</sup>

General ability is another variable that may influence a person's ability to delay gratification. According to Rotter, the influence of a person's experiences on his capacity to delay are also to some degree, a function of his cognitive development.<sup>42</sup> For example, are smaller and larger reinforcements seen as being different? The evidences available suggest that general ability or intelligence is necessary to insure basic comprehension of a choice between two or more alternatives.

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38 J. Shybut, Delayed Gratification: A Study of Its Measurement and the Relationship to Certain Behavioral, Psychological and Demographic Variables, unpublished Master's thesis, University of Colorado, 1954, xvi-144 p.

39 -----, Delayed Gratification and Severity of Disturbance Among Hospitalized Psychiatric Patients, 1965, p. 1-149.

40 Strickland, op. cit., p. 338.

41 J. Bialer, "Conceptualization of Success and Failure in Mentally Retarded and Normal Children", in Journal of Personality, Vol. 29, 1961, p. 303-319.

42 Rotter, Chance and Phares, op. cit., p. 202.

Mischel and Metzner<sup>43</sup> postulated a positive relationship between general ability or intelligence as measured by the Lorge-Thorndike Form A and Pintner General Ability Test, Verbal Series, Forms A and B, and the ability to delay gratification. They stated that "...learning to delay is intimately bound up with learning to think".<sup>44</sup> Hence greater delaying capacity should be reflected in greater cognitive facility or intelligence. Mischel and Mitzner found that children who were delayed gratifiers were more intelligent than those who were immediate gratifiers.

Milikian<sup>45</sup> using Goodenough's Draw A Man Test also investigated the relationship between intelligence and delayed gratification in Palestinian Arabs. The results of his study indicated that the more intelligent students had the tendency to delay gratification.

Bialer<sup>46</sup> working with young children reports that with

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43 W. Mischel and R. Metzner, "Preferences for Delayed Reward as a Function of Age, Intelligence, and Length of Delay Interval", in Journal of Abnormal and Social Psychology, Vol. 64, No. 6, 1962, p. 425-431.

44 Idem, Ibid., p. 425.

45 L. Milikian, "Preference for Delayed Reinforcement: An Experimental Study Among Palestinian Arab Refugee Children", in Journal of Social Psychology, Vol. 50, 1959, p. 81-86.

46 I. Bialer, "Conceptualization of Success and Failure in Mentally Retarded and Normal Children", in Journal of Personality, Vol. 29, 1961, p. 303-319.

an increase in age (mental age more relevant than chronological age), the tendency to delay gratification also increased. The works of Roberts and Erikson,<sup>47</sup> Levine, Spivak and Wright,<sup>48</sup> and Spivak, Levine and Springle<sup>49</sup> have all reported a positive relationship between intelligence and the ability to delay gratification.

The other sub-variable which will be discussed with respect to its influence on delayed gratification is anxiety. It will be considered from the point of view of its place in a social learning theory and will be defined according to Rotter's theory. Empirical studies involving anxiety and delayed gratification are discussed and the relationship between the two variables is stated.

In social learning theory the term: "low expectancy for success or high expectancy for failure in obtaining a given reinforcement," is used for anxiety. Rotter,<sup>50</sup> discusses

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47 A. Roberts and R. Erikson, "Delayed Gratification, Porteus Maze Test Performance, and Behavioral Adjustment in a Delinquent Group", in Journal of Abnormal Psychology, Vol. 73, No. 5, 1968, p. 449-453.

48 M. Levine, G. Spivak and B. Wright, "The Inhibition Process, Rorschach Human Movement Responses, and Intelligence: Some Further Data", Journal of Consulting Psychology, Vol. 23, 1959, p. 306-313.

49 G. Spivak, M. Levine and H. Springle, "Intelligence, Test Performance and the Delay Functions of the Ego", Journal of Consulting Psychology, Vol. 23, 1959, p. 428-431.

50 Rotter, Social Learning and Clinical Psychology, 1954, p. 234-237.

this substitution. He states that from the point of view of social learning theory, the psychological situation may present cues that lead the individual to have the expectancy that the potential reinforcements in a given situation will be negative, rather than positive. Hence the behavior a person exhibits under such circumstances may be avoidant in nature. Therefore low expectancy for success or gratification may also be spoken of as high expectancy for failure. Rotter concludes therefore that relatively high expectancy for failure is the closest one comes in social learning theory to a term overlapping the concept of anxiety or tension as used in other systematic frameworks.

Anxiety (tension) is defined as "the mean expectancy for success or failure as generalized from past experience to an up-coming task or life situation."<sup>51</sup> Hence the term anxiety or tension when used will mean low expectancy for success or high expectancy for failure in obtaining a reinforcement.<sup>52</sup>

In an example involving anxiety, to say that someone is anxious is to suggest that he has a low expectancy for success relative to a reinforcement of value to him.

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51 J. Rychlak and Lerner, "An Expectancy Interpretation of Manifest Anxiety", in Journal of Personality and Social Psychology, Vol. 2, No. 5, 1965, p. 677-684.

52 Rotter, Chance and Phares, op. cit., p. 447.

Therefore if an individual is anxious about passing an examination, then his expectancy for success is not as high as it might have been. Hence the higher the expectancy for failure, the greater the emission of anxiety behaviors.<sup>53</sup>

Rychlak and Eacker<sup>54</sup> investigated the effects of anxiety, delay and reinforcement on generalized expectancies. The results indicated that individuals who are low in anxiety and who have to endure a period of delay are more able to lower or raise their expectancy for positive reinforcement than highly anxious subjects.

Several studies by other authors have pursued the implications similar to those of Rychlak and Eacker. For example, Rychlak and Lerner (1965) report data to support their hypothesis that anxious subjects are greatly influenced by the effects of recent successes and failures. Then Phares and Davis (1966)<sup>55</sup> demonstrated that prior to performance on the first trial of a task, anxious subjects state significantly lower expectancies for task success than do non-anxious subjects. This finding was replicated in a further study by

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53 Idem, Ibid., p. 447.

54 J.F. Rychlak and J.N. Eacker, "The Effects of Anxiety, Delay and Reinforcement on Generalized Expectancies", Journal of Personality and Social Psychology, Vol. 30, No. 2, 1962, p. 123-134.

55 E.J. Phares and W. Davis, "Breadth of Categorization and the Generalization of Expectancies", Journal of Personality and Social Psychology, Vol. 4, 1966, p. 461-464.

Phares (1968). The last two studies suggest that the conceptualization of low expectancy for success and of anxiety are correlated descriptions of the same event.

Mandler and Sarason<sup>56</sup> (1952) have also investigated the effects of high anxiety upon the performance of a given task. They hypothesized that when an anxious subject is faced with a stressful task, he makes responses which are irrelevant to task completion. Mandler and Watson tested the hypothesis.<sup>57</sup> The results of their study support the hypothesis that high anxious subjects would do more poorly than low anxious individuals on a test of intelligence. Hence anxiety tends to interfere with task performance.

From the literature reviewed it can be derived that, delayed gratification is the ability to select an alternative in a choice situation which has a greater reinforcement forthcoming as a consequence of delay. The variables that determine its expression are expectancy and reinforcement value. The ability to delay gratification is positively related to locus of control (internal), general ability and anxiety (tension).

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56 G. Mandler and S.B. Sarason, "A Study of Anxiety and Learning", Journal of Abnormal and Social Psychology, Vol. 47, 1952, p. 166-173.

57 G. Mandler and D.L. Watson, "Anxiety and the Interruption of Behavior", in E.D. Spielberger (ed.), Anxiety and Behavior, New York, Academic Press, 1966.

To this point, Rotter's theory of delayed gratification has been outlined and its relationship to anxiety, locus of control and general ability stated. However, the question of the relationship between delayed gratification and creativity still remains. As Torrance remarked, students who perform in a highly creative manner are the ones who will delay their gratification and cope with frustration until a novel or uncommon solution is found to a given problem.<sup>57a</sup> On the other hand, the student whose performances are low with respect to creative thinking are those who become dismayed easily and select their responses immediately. If these observations are valid then one could identify delayed and immediate gratifiers and then teach the immediate gratifiers how to delay gratification and cope with frustrations. This would, in turn, enable one to teach them (immediate gratifiers) how to increase their creative productions. Hence in order to know more about the relationship between the two variables, there is a need to study the concept of creative thinking.

## 2. Creativity

Creative thinking is believed to be of great importance in all areas of human endeavour. Therefore it has given rise to a vast literature. Within this body of

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<sup>57a</sup> E.P. Torrance, Guiding Creative Talent, Englewood Cliffs, N.J., Prentice Hall, 1962, XI-278 p.

literature, creativity has been defined differently, depending upon the context in which it is used. Creative thinking has been approached from the individual points of view of many disciplines. For example, the literature indicates that there are four main avenues: those through the creative product, the creative process, the creative person, and the environment.<sup>58,59,60</sup> Within the field of Psychology there are at least five theoretical patterns. These include Associationistic, Psychoanalytic, Gestalt, Interpersonal and Trait interpretations of creativity. Hence the volume of literature on creativity is immense.

In our study, to avoid confusion in the interpretation that is made of creativity, it will be defined conceptually and operationally in terms of Torrance's contribution to the domain. The procedure to be followed in the discussion of his theory is:

- 1) the reasons for choosing his theory
- 2) a definition of creativity
- 3) the stages of the creative process

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58 Richard De Mille, "The Creativity Boom", in Teachers College Records, Vol. XLV, No. 3, December, 1963, p. 199.

59 John E. Olford, The Concept of Creativity; in Proceedings of the Philosophy of Education Society of Great Britain, Vol. V, No. 1, January, 1971, p. 77.

60 R.K. Elliot, "Versions of Creativity", in Proceedings of the Philosophy of Education Society of Great Britain, Vol. V, No. 2, July 1971, p. 139.

- 4) the abilities that are involved in the creative process and their relationship to one another
- 5) development of the creative abilities as the individual increases in chronological age, and
- 6) studies and research related to the relationship between delayed gratification and creative thinking.

Torrance's concept of creative thinking was chosen because numerous experimental studies have been carried out within the framework of his conceptualization of creativity. 61,62,63,64 Secondly, the literature reveals support for the reliability and/or validity of the Torrance Tests of Creative

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61 G.J. Middens, "The Relationship of Creativity and Anxiety", in Dissertation Abstracts, 28 (7A), 1968, p. 2562-A.

62 N.C. Aliotti and W.E. Blanton, "Some Dimensions of Creative Thinking Ability, Achievement, and Intelligence in First Grade", in ERIC, Ed 028 818, 1969.

63 R.A. Johnson, "Differential Effects of Reward versus Non-reward Instructions on the Creative Thinking of Two Levels of Elementary School Children", in Journal of Educational Psychology, 1974, Vol. 66, No. 4, p. 530-533.

64 J.A. Glover and F. Sautter, "An Investigation of the Relationship of Four Components of Creativity to Locus of Control", in Social Behavior and Personality, Vol. 4, No. 2, 1976, p. 257-260.

Thinking.<sup>65,66,67,68,69,70</sup> These tests were derived directly from Torrance's theory of creative thinking. Torrance's tests can be used with a wide range of subjects, kindergarten children to adults. This flexibility in usage suggests a reason for his tests being one of the most widely used instruments within the domain of creativity.<sup>71</sup>

Another reason for selecting Torrance's theory is that his definition also enables one to define operationally the kinds of abilities and mental functionings that go on during the process. It provides an opportunity for showing the kinds of products that result from the process and the

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65 B. Mackler, Creativity and Life Style, a doctoral dissertation presented to the University of Kansas, Lawrence, 1962.

66 K. Yamamoto, A Study of the Relationship Between Creative Thinking Abilities of Fifth-Grade Teachers and Academic Achievement, a doctoral dissertation presented to University of Minnesota, Minneapolis, 1962.

67 Holland, in O.K. Buros, The Seventh Mental Measurement Year-Book, Vol. 1, New Jersey, Crypton Press, 1972, p. 836.

68 Idem, Ibid., p. 837.

69 Storm and Larimare, in E.P. Torrance, "Predictive Validity of the Torrance Tests of Creative Thinking", Journal of Creative Behavior, Vol. 6, 1972, p. 236-252.

70 Idem, Ibid., p. 243.

71 O.K. Buros, The Seventh Mental Measurement Year-book, Vol. 1, New Jersey, Crypton Press, 1972, p. 836.

kind of person who can engage most successfully in the process (Torrance, 1966).<sup>72</sup> His definition seems to be in harmony with historical usage although it has been criticized by authors such as Asubel (1963), Kreuter and Kreuter (1964), and Mueller (1964).<sup>73</sup>

In defending his concept of creativity against criticism, Torrance states that all definitions involve to some degree, uncommonness of response or non-habitual rather than habitual behavior.<sup>74</sup> Therefore, he incorporated into his definition the major features of most other definitions.<sup>75</sup> For example, his definition incorporates the idea of sensitivity to problems, flexibility, originality and elaboration. These elements are to be found in most of the major theories of creativity. An example is that of Guilford's theory in which Guilford stated that the thinking abilities involved in creative thinking were those he had defined as divergent productions and transformations. He now includes the redefinition of abilities which are in the convergent

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72 Torrance Tests of Creative Thinking Norms -- Technical Manual, Research Edition, Verbal Tests, Forms A and B, Figural Tests, Forms A and B, Princeton, N.J., 1966, p. 1-95.

73 Idem, Ibid., p. 6.

74 Idem, Ibid., p. 6.

75 Idem, Ibid., p. 6.

production category of his structure of the intellect, and sensitivity to problems which falls in the category of evaluation.<sup>76,77,78</sup> A detailed account of Guilford's theory will be found in "The Structure of the Intellect Model: Its Uses and Implication, 1960".

Torrance defined creative thinking as:

... a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, ... identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies; testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results.<sup>79,80</sup>

This definition describes a process that is natural to human beings.

In order to identify and measure the abilities involved in creative thinking it is necessary to understand the nature of the creative process. Torrance identifies four

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76 J.P. Guilford, "Creativity", in the American Psychologist, Vol. 5, 1950, p. 444-454.

77 -----, Personality, New York, McGraw-Hill, 1959.

78 -----, The Structure of Intellect Model; Its Uses and Implications, University Park, California, University of Southern California Press, 1960.

79 E.P. Torrance, Torrance Tests of Creative Thinking: Norms - Technical Manual Research Edition, Verbal Tests, Forms A and B, Figural Tests, Forms A and B, 1966, p. 95.

80 -----, Guiding Creative Talent, Englewood Cliffs, N.J., Prentice Hall, 1962.

steps in that process. They are preparation, incubation, illumination or insight, and revision. Torrance's process flows like the following. First, during the step called preparation, there is the sensing of a need or deficiency. Random exploration takes place and clarification or "pinning down" of the problem is sought.<sup>81</sup> According to Torrance, if one senses some incompleteness or disharmony, anxiety is aroused.<sup>82</sup> Anxiety was defined earlier as: "The mean expectancy for success or failure as generalized from past experience to an up-coming task or life situation."<sup>83</sup> That is, anxiety refers to low expectancy for success. The individual, therefore, will be uncomfortable and will have the desire to relieve the tension. Since the usual ways of behaving are inadequate, the subject will try to avoid commonplace and obvious (but incorrect) solutions by investigating, diagnosing and manipulating. During this step which is known as incubation, the individual may examine several alternatives and formulate hypotheses while waiting for a solution.<sup>84</sup>

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81 E.P. Torrance, Guiding Creative Talent, Englewood Cliffs, N.J., Prentice Hall, 1962, p. 16-17.

82 Torrance, op. cit., 1966, p. 6-7.

83 Rotter, Chance and Phares, op. cit., p. 446-449.

84 Torrance, op. cit., 1962.

The next step in the process is the time of insight which involves the birth of a new idea.<sup>85</sup> It is a moment of inspiration during which everything falls into place. The solutions to the hypotheses are then tested during the step in the process known as revision. This test is done by experimentation which is designed to evaluate the most promising solution for eventual selection and perfection of the idea. The anxiety is unrelieved, however, until the individual communicates his discovery to somebody.<sup>86</sup>

According to Torrance certain abilities are involved in the creative process. These abilities are designated as fluency, flexibility, originality and elaboration. The possession of these abilities increases a person's chances of behaving creatively.<sup>87</sup> Hence all these abilities should be considered in the assessment of the creative thinking of an individual. He further states that the four abilities are positively related to each other. For example, the average correlations between fluency and originality; fluency and flexibility, fluency and elaboration are: .60, .68 and .23 respectively. The correlations between flexibility and

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85 Idem, Ibid., p. 17.

86 Torrance, op. cit., 1966, p. 6-7.

87 Idem, Ibid., p. 6-7.

originality; flexibility and elaboration; and originality and elaboration are: .80, .51 and .56 (Torrance, 1966).<sup>88</sup> These abilities will be defined below.

Fluency is defined as the ability of an individual to produce a large number of ideas rapidly.<sup>89</sup> The fluent individual will examine situations in many ways and find the missing elements. In order to locate the gaps, he must retrieve from memory storage items of information that can be rearranged to suit the given stimulus. The individual who can produce a number of alternatives quickly is likely to find one that helps him to provide an appropriate solution. Fluency is therefore important throughout the process.

Flexibility is defined as the ability of an individual to produce a variety of kinds of ideas, to shift from one approach to another, or to use a variety of strategies.<sup>90</sup> A person who is low on flexibility has the tendency to restrict himself to a narrow range of types of responses. Torrance concludes that this may be due to a rigid pattern of habit or thinking, a small range of information and/or experiences, limited intellectual energy and/or low motivation.<sup>91</sup> On the

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88 Idem, Ibid., p. 82.

89 Idem, Ibid., p. 72-73.

90 Idem, Ibid., p. 73.

91 Idem, Ibid., p. 73-74.

other hand, an individual with a high degree of flexibility would give a wide variety of types of responses.<sup>92</sup>

Originality is defined as the ability of an individual to produce ideas that are away from the obvious, commonplace, banal, or established. It is characterized by uncommonness of response.<sup>93</sup> Torrance states that originality requires the ability to delay gratification or cope with tension in order to avoid low quality response.<sup>94</sup> Originality, therefore, enables the individual to make "great mental leaps" in arriving at creative solutions during the process. However, this does not imply that the individual is erratic or impulsive in his behavior.<sup>95</sup> Originality is the result of the work that was done during the periods of preparation and incubation. This result is the insight which produces a new and novel idea or solution.

Elaboration is defined as the ability to develop, embellish, carry out, and elaborate ideas. It is therefore the elaboration of basic ideas by the addition of supporting ideas.<sup>96</sup> The individual must return to memory core again

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92 Idem, Ibid., p. 73.

93 Idem, Ibid., p. 73.

94 Idem, Ibid., p. 73.

95 Idem, Ibid., p. 73.

96 Idem, Ibid., p. 73-75.

and again in order to produce appropriate ideas for the expansion of the original idea. Elaboration involves also keenness or sensitivity in observation. It is involved during the periods of preparation, incubation and revision. At these stages the creator re-examines his work and adds details. The addition of details involves some amount of delay. For example the creative person will cope with anxiety and delay his response by adding details to an idea or solution, whereas an individual who is low in creativity will fail to cope with anxiety and will not embellish nor perfect the idea.<sup>97</sup> The lack of elaboration leads to a response that is generally less creative.

The creative abilities, according to Torrance, are found in all individuals to some degree unless they are idiots. However, some individuals display greater creative abilities than others. These abilities can be increased or decreased depending on the way in which individuals are motivated.<sup>98</sup> Hence, creative abilities can be developed to their fullest potential.

Such abilities develop as individuals increase in chronological age. For example, it is claimed by Torrance that there is a steady growth in the creative thinking of

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97 Idem, Ibid., p. 73-75.

98 Idem, Ibid., p. 7.

children from birth to the end of age four. Then there is a decrease in the rate of growth between the fifth and sixth years, followed by recovery during the seventh year. Another decrease in the rate of growth of creative thinking occurs at about the age of ten. This is followed by a further growth until the age of twelve when another decrease in rate of growth occurs. Further growth in creativity takes place during the high school years.<sup>99</sup>

Creative thinking has been studied empirically in relation to a number of variables. For example, studies have investigated the relationship between creativity and locus of control (internal versus external). At this point it must be recalled that locus of control was defined earlier. It refers to the extent to which an individual feels that he has control over the reinforcements that occur relative to his behavior. Externals feel that forces beyond their control are the essential factors in determining the occurrence of reinforcement. Internals, however, tend to feel that they control their own destiny and are the effective agents in determining the occurrence of reinforcements.<sup>100</sup>

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99 Torrance, Guiding Creative Talent, p. 13.

100 Rotter, Seeman, and Liverant, op. cit., 1966, p. 1-28.

A study by Glover and Sautter (1970)<sup>101</sup> investigated the relationship of creative thinking as defined by Torrance and locus of control as defined by Rotter. The study was designed to determine whether internally controlled individuals differ from externally controlled individuals in terms of their performance on the Unusual Uses subtest of the Torrance Tests of Creative Thinking (1974) which yields measures of fluency, flexibility, originality and elaboration. Internal-external locus of control was determined by the subject's performance on the Rotter Social Reaction Inventory scale.

The results of the study indicated that students who were internally controlled had significantly higher scores on the flexibility and originality measures, while those who were externally controlled were higher on the elaboration scores. For fluency there was no significant difference shown between the internals and externals. Other researchers who have studied the relationship between creativity and locus of control have supported the view that individuals who are internally controlled are likely to be more creative

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101 J.A. Glover and F. Sautter, "An Investigation of the Relationship of Four Components of Creativity to Locus of Control", in Social Behavior and Personality, Vol. 4, No. 2, 1976, p. 257-260.

than those who are externally controlled.<sup>102,103,104,105,106</sup>

Creative thinking has been studied also in relation to general ability. Again, it must be recalled that general ability as a term used earlier in this chapter, is measured by tests of intelligence. A review of the empirical studies involving the two variables indicates that creativity, and general ability as measured by tests of intelligence, are positively related to each other. That is, individuals who are highly creative tend to be more intelligent than those

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102 J. DuCette, S. Wolk and S. Friedman, "Locus of Control and Creativity in Black and White Children", Journal of Social Psychology, No. 88, 1972, p. 297-298.

103 Y.P. Aggarwal and L. Verma, "Internal-External Control of High Creative and Low Creative High School Students at Different Levels of Socio-Economic Status", in Journal of Creative Behavior, Vol. 11, No. 2, 1977, p. 150.

104 M.L. Dickinson, "Locus of Control, Self-Reinforcement and Modelling of Self-Reinforcement as Related to Creativity", in Dissertation Abstracts, Sciences and Engineering, Vol. 35B, 8, 1975, p. 4166B.

105 P.M. Churchill, "Creativity and Locus of Control in Junior High School Students", in Dissertation Abstracts International, Vol. 37 (11-A), 1977, p. 7031.

106 E. Hartshorn, "The Prediction of Achievement in Dramatic Play Program for Teaching a Second Grade Social Studies Curriculum", in Dissertation Abstracts, Vol. 35 (6-A), p. 3519A-3520A, 1974.

who are less creative.<sup>107,108,109,110,111,112,113</sup> Similarly creativity has been investigated in relation to anxiety. This relationship will be discussed generally and then specific empirical studies will be cited in order to show how they are related.

Again it must be recalled that anxiety was defined earlier as a low expectancy for success relative to a reinforcement of value.<sup>114</sup> Thus if an individual is anxious

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107 M. McDowell and S. Howe, "Creative Use of Play Materials by Pre-School Children", in Childhood Education, Vol. 17, 1941, p. 321-326.

108 E.P. Torrance, "Education for Creativity", in C.W. Taylor (ed.), Creativity: Progress and Potential, New York, McGraw-Hill, 1964, p. 89.

109 C. Taylor and J. Holland, "Development and Application of Tests of Creativity", in Review of Educational Research, Vol. 32, 1962, p. 91-102.

110 P. Hasan and H. Butcher, "Creativity and Intelligence: a Partial Replication of Scottish Children of Getzel's and Jackson's Study", in British Journal of Psychology, Vol. 57, 1966, p. 129-135.

111 Ginsberg and R. Whittemore, "Creativity and Verbal Ability: A Direct Examination of their Relationship", British Journal of Education, Vol. 38, 1968, p. 133-139.

112 J.B. Cooper and B.O. Richmond, "Intelligence, Creativity, and Performance Abilities of EMR Pupils", in Psychology in the Schools, Vol. 12, 1975, p. 304-309.

113 N.C. Aliotti and W.E. Blanton, "Some Dimensions of Creative Thinking Ability, Achievement, and Intelligence in First Grade", in ERIC, Ed 028 818, 1969.

114 Rotter, Chance and Phares, op. cit., 1972, p. 446-449.

about passing an examination, then his expectancy for success is not as high as it might be. In effect, the higher the expectancy for failure, the greater the emission of what are usually designated as anxiety behaviors. Rotter (1954) discusses the usage of the term while works by Rychlak and Lerner (1965) and Phares (1968) also illustrate this empirically.

The literature indicates that during the creative process the individual becomes tense. If the degree of anxiety is very high then it is likely to paralyze thinking and prevent verification.<sup>115</sup> Coping with anxiety is therefore necessary in creative thinking while failure to cope tends to limit the full mental functioning of the individual and therefore produce a response that is low in creativity.<sup>116</sup>

According to Torrance's concept of creative thinking anxiety is aroused whenever an individual senses some incompleteness or disharmony. If the subject is to carry out a high degree of creative thinking he must cope with anxiety while investigating, diagnosing, manipulating and making hypotheses. This feeling of anxiety will not disappear until the hypotheses are tested, verified and the solutions

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115 Torrance, Guiding Creative Talent, p. 158-161.

116 Idem, Ibid., p. 158-161.

communicated.<sup>117</sup> On the other hand, if the individual fails to cope with anxiety he is likely to give a commonplace answer and thus relieve the anxiety.<sup>118</sup>

The idea of anxiety has been incorporated into Torrance's tests of Creative Thinking. For example, the Incomplete Figures test calls into play the tendency towards structuring and integrating. The Incomplete Figures according to Torrance, creates anxiety in the individual who, if he has to be judged creative, must cope with the anxiety long enough to make the mental leap necessary to get away from answers that are low in creativity.<sup>119</sup> Failure to cope with anxiety usually results in the premature closure of the incomplete figures and an obvious or commonplace answer.

The relationship between creativity and anxiety has been investigated. The general trend of the literature suggests that a high degree of anxiety tends to stifle a high degree of creative production; hence, subjects must cope with anxiety if they must produce creative

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117 Torrance, op. cit., 1966, p. 6-16.

118 Idem, Ibid., p. 6-16.

119 Idem, Ibid., p. 6-16.

ideas.<sup>120,121,122</sup>

The next section will discuss the relationship between creativity and delayed gratification.

### 3. The Relationship Between Delayed Gratification and Creative Thinking

With respect to creativity and delayed gratification, attempts have been made in recent years to understand the nature of their relationship. There is evidence, direct and indirect of the existence of a possible relationship between the two variables, delayed gratification and creativity. For example, Torrance states that individuals who fail to delay gratification generally give a response that is low in creativity.<sup>123,124</sup> The creative person is also more internally controlled, more intelligent, and better able to

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120 G.J. Middens, "The Relationship of Creativity and Anxiety", in Dissertation Abstracts, 28 (7A), 1968, p. 2562-A.

121 Casba Pleh, "Effects of Anxiety, Success and Failure on Some Factors of Creative Thinking", in Psychological Abstracts, Vol. 46 (1-2), 1971, 4991.

122 H.E. Schmidt, "The Relationship between Anxiety, Creativity and Academic Success in Student Teachers", in Psychologia Africana, Vol. 14, No. 2, 1972, p. 130-136.

123 Torrance, op. cit., 1966, p. 6-16.

124 Idem, Ibid., p. 73-75.

cope with anxiety than his less creative peer.<sup>125,126,127,128,129</sup> Similarly the delayed gratifier is more internally controlled, more intelligent and better able to cope with anxiety than his peer who is an immediate gratifier. Hence there is an implication that there is a relationship between creative thinking and delayed gratification.<sup>130,131,132,133,134</sup>

There is also empirical evidence which suggests that the relationship between creative thinking and delayed gratification was indirectly investigated. An example of a study that involved the two variables is that of Johnson's (1974).<sup>135</sup> He studied the effects of reward versus no

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125 Idem, Ibid., p. 6-16.

126 DuCette, Wolk and Friedman, op. cit., 1972, p. 297-298.

127 Torrance, op. cit., 1962, p. 158-161.

128 McDowell, op. cit., p. 321-326.

129 Hasan and Butcher, op. cit., 1966, p. 129-135.

130 Shybut, op. cit., 1965, p. 10.

131 Strickland, op. cit., 1973, p. 338.

132 Rotter, Chance and Phares, op. cit., 1972, p. 202.

133 Milikian, op. cit., 1959, p. 81-86.

134 Rychlak and Eaker, op. cit., 1962, p. 123-134.

135 R.A. Johnson, "Differential Effects of Reward versus Non-reward Instructions on the Creative Thinking of Two Economic Levels of Elementary School Children", in Journal of Educational Psychology, Vol. 66, No. 4, 1974, p. 530-533.

reward instructions on the creative thinking of two economic levels of elementary school children. The purpose of the study was to examine:

- (a) the effects of immediate and delayed reward instructions on the Figural Form A of Torrance Tests of Creative Thinking, and
- (b) the possible interactions between reward conditions and economic status and between reward conditions and grade level.

The subjects consisted of one hundred and forty-five students who were randomly selected from Grades 3, 4 and 5. The instrument used for measuring creativity was the Figural Form A of Torrance Tests of Creative Thinking.

The results of this study indicated that subjects who received immediate and delayed-reward instruction scored approximately the same and significantly higher than subjects who received no reward instructions.

Johnson concluded that since reward instructions were effective in increasing creative thinking, then it is important to determine which reinforcements are most effective, especially with different economic classes.

A criticism of Johnson's study is that no mention was made of the reliability and validity of the instruments used to determine the difference between the subjects who accepted delayed reward versus immediate rewards. Also, the author did not make an exhaustive and critical review of the literature on creative thinking and the ability to

delay gratification. Hence his findings should be viewed with reservation.

Ward and Kogan (1972) also investigated the effects of incentives such as monetary rewards on children's creativity under delayed and immediate conditions.<sup>136</sup> The purpose was to test the effects of a concrete incentive on children's ideational production.

The results of this study revealed that incentives (rewards) increased the number of ideas relative to controls, both for conditions immediate and delayed. No difference was found in the fluency dimension of creative thinking when using immediate and delayed rewards.

Ward and Kogan's study can also be criticized from the point of view that the authors did not give a critical overview of the literature with respect to delayed gratification. No mention was made of the reliability and validity of the instruments used in this study.

The studies by Johnson, and Ward and Kogan did not have as their main purpose the study of the relationship between creativity and delayed gratification. Hence little effort was exerted toward the establishment of a relationship between the two variables.

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<sup>136</sup> W.C. Ward and N. Kogan, et. al., "Incentive Effects in Children's Creativity", in Child Development, Vol. 43, 1972, p. 669-676.

Evidence from the literature suggests that a relationship exists between creative thinking and delayed gratification.<sup>137,138,139,140,141,142,143,144,154</sup> Also, the author's personal experience with children in the classroom suggests the existence of the relationship. However, in the author's opinion, this evidence does not sufficiently nor experimentally establish the reality of such a relationship. Hence it is the purpose of this study to demonstrate experimentally whether delayed gratifiers are more creative than immediate gratifiers.

The problem will be presented in the next section.

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137 Torrance, op. cit., 1966, p. 6-16.

138 Idem, Ibid., p. 73-75.

139 DuCette, Wolk and Friedman, op. cit., 1972, p. 297-298.

140 Dickinson, op. cit., 1975, p. 4166-B.

141 Torrance, op. cit., 1962, p. 158-161.

142 Middens, op. cit., 1968, p. 2562-A.

143 McDowell, op. cit., p. 321-326.

144 Taylor and Holland, op. cit., p. 91-102.

145 Hasan and Butcher, op. cit., p. 123-135.

#### 4. The Problem

The question that arises from the preceding discussion of creativity and delayed gratification may be asked as follows: Is there a need to study the relationship between creative thinking and the ability to delay gratification? The review of the literature indicates that a need is there. For example, the two variables have been studied separately in the past by authors such as Bialer, 1961; Mahrer, 1956; Mischel, 1961; Rotter, Chance and Phares, 1972; Shybut, 1965; Torrance, 1962, Torrance 1966; and Middens, 1968. However, these authors did not study the relationship between the two of them. It seems that the only authors who have indirectly mentioned the relationship between creativity and delayed gratification are Johnson, and Ward and Kogan.<sup>146,147</sup> However, Johnson, and Ward and Kogan did not have as their objective, the investigation of a relationship between the variables.

The main purpose of Johnson's study, for example, was to examine the possible interactions between creativity, and economic status, and between reward conditions and grade levels. His study did not establish a relationship. Also,

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146 Johnson, op. cit., p. 530-533.

147 Ward and Kogan, op. cit., p. 669-676.

the validity of his findings is questionable, as was previously discussed.

Similarly, Ward and Kogan had as their purpose, the study of the effects of a concrete incentive on children's ideational production. Their study, also, did not establish a clear relationship between creative thinking and delayed gratification. There is a need therefore, to study the relationship between the two variables.

The research proposes to provide experimental evidence of the kind of relationship that exists between creativity and delayed gratification. This is also different from the other studies mentioned above for the following reasons: 1) the presentation of the theory is different, 2) the instruments used to measure delayed gratification and creativity are different, 3) the population is different since Canadian students were used instead of Americans, and 4) the statistical procedures and analyses are also not similar to the other studies mentioned earlier.

In accordance with the rationale presented above, the following hypothesis is formulated:

There is a positive relationship between delayed gratification (as presented by Rotter) and creative thinking (as presented by Torrance).

The above hypothesis may be stated in more specific terms as follows:

Delayed gratifiers will obtain higher scores than immediate gratifiers on Torrance's tests of creative thinking.

The experimental design for testing the hypothesis will be presented in Chapter two.

## CHAPTER II

### EXPERIMENTAL DESIGN

The procedure for the experimental design will next be presented. It includes a description of the research subjects, the instruments used to measure delay of gratification and creativity, and the collection of data. The chapter ends with a brief description of the planned statistical procedure.

#### 1. The Subjects

The one hundred and seventy subjects (ninety-two English speaking boys and seventy-eight girls) who participated in the experiment were grade eight students enrolled at a large suburban senior elementary school. The subjects ranged in age from twelve to fourteen years. The average number of students per classroom was thirty. They were drawn from six classrooms which were randomly selected from the ten available classes.

The results of this research can be generalized specifically to the grade eight students of the school from which the sample was drawn. However, the results may be broadly generalized to include all grade eight students whose creativity scores and ability to delay gratification are similarly distributed in the population.

## 2. Measuring Instruments

a) Delay of Gratification: The measures of the ability to delay gratification consisted of two behavioral choices and a suppositional choice. Each choice involved the selection of a small reinforcement available immediately or a larger reinforcement available later. The reinforcements selected were adopted from the works of Bialer<sup>1</sup> and Mischel.<sup>2</sup> It should be noted that Shybut's instruments for measuring delay were adopted from the same sources.<sup>3</sup>

The first behavioral choice adopted from the works of Mischel was the Candy Test, a choice between a ten cent chocolate (candy) bar now or three ten cent chocolate bars a week later. The second behavioral choice, or the Money Test, was adopted from Bialer's work. It consisted of a choice between ten cents now or twenty-five cents a week later. The suppositional choice, also adopted from Bialer's

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1 I. Bialer, "Conceptualization of Success and Failure in Mentally Retarded and Normal Children", in Journal of Personality, Vol. 29, No. 3, 1961, p. 303-319.

2 W. Mischel, "Delayed Gratification, Need for Achievement, and Acquiescence in Another Culture", in Journal of Abnormal and Social Psychology, Vol. 62, No. 3, 1961, p. 543-552

3 J. Shybut, Delay of Gratification and Severity of Disturbances Among Hospitalized Psychiatric Patients, a doctoral dissertation presented to the Graduate Division of the University of Colorado, 1965, p. 52.

work, consisted of a choice between an automobile now, or a million dollars and an automobile a year from now. This is called the Auto Test.

In scoring the gratification tests the delayed response for each test was given a score of one, while each immediate response was given a score of zero.

The use of the instruments for delayed gratification can be justified from the point of view that most recent studies use behavioral and verbal choices as measures of this variable. For example Mischel,<sup>4,5,6</sup> in a number of studies involving delayed versus immediate gratification, used a combination of three choices. The method that he used involved a behavioral choice of a small reinforcement now or a larger reinforcement later, in conjunction with two verbal choice items, or non-material rewards.

In another study, Bialer<sup>7</sup> used a similar technique (to Mischel's) to study delay of gratification and

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4 W. Mischel, "Preference for Delayed Reinforcement and Social Responsibility", Journal of Abnormal Social Psychology, Vol. 62, 1961, p. 1-7.

5 -----, op. cit., p. 543-552.

6 -----, "Father Absence and Delay of Gratification: Cross Cultural Comparisons", Journal of Abnormal Social Psychology, Vol. 63, 1961, p. 116-124.

7 Bialer, op. cit., p. 303-319.

intelligence. In his study the measure for delayed gratification consisted of three separate tasks. Two of the tasks were concrete choices and the third a suppositional or non-material choice. For the concrete choices, the subject was asked to choose between one small piece of candy available now or four pieces available tomorrow in one situation; and between one penny available now or ten pennies available tomorrow, in another situation. The hypothetical or non-material situation involved a choice between the best kind of automobile right now or the automobile and a million dollars a year from now. The results indicated that with an increase in age (mental age more relevant than chronological age), the tendency to delay gratification also increased. The results demonstrated also that the subject's tendency to respond in terms of "now" or "later" (immediate versus delayed gratification) was consistent across the three measures.

It may be assumed, therefore, that the behavioral and verbal techniques are simple and effective measures of the ability to delay gratification. They provide realistic choices that the subject may encounter in his everyday environment.<sup>8</sup> Shybut recommends that a combination of

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<sup>8</sup> J. Shybut, Delay of Gratification and Severity of Disturbance Among Hospitalized Psychiatric Patients, a doctoral dissertation presented to the Graduate Division of the University of Colorado, 1965, p. 34.

techniques should be used to measure the ability to delay gratification.<sup>9</sup> He justifies this from the point of view that a delayed or immediate response over two or more measures indicates a level of consistency which gives a more valid picture of the individual's mode of thought in a given situation.

The reliability of the gratification tests for a Canadian population was investigated in 1973, in a pilot study.<sup>10</sup> The sample used consisted of eighty-six English speaking Canadian boys and girls at the grade eight and nine levels. The grade eight group consisted of twenty-three boys and twenty-four girls (N=47), while the grade nine group comprised seventeen boys and twenty-two girls (N=39). Their ages ranged from thirteen to fifteen years. This sample was drawn from the Ottawa Valley area.

The gratification instruments used in the above study were adopted from Bialer<sup>11</sup> and Mischel.<sup>12</sup> They included the Auto Test, the Money Test (twenty-five cents versus ten cents) and the Candy Test (three ten cent

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9 Idem, Ibid., p. 34-35.

10 E.G. Blackwood, Delayed Gratification and Locus of Control, A Pilot Study, Upgrading Paper, Faculty of Education, University of Ottawa, 1973, 71 p.

11 Bialer, op. cit., p. 303-319.

12 Mischel, op. cit., p. 1-7.

chocolate bars versus one ten cent chocolate bar).

Intercorrelations among the three tests revealed significant correlations of  $\emptyset = .57$  between the Auto and Candy Tests;  $\emptyset = .64$  between the Auto and Money Tests; and  $\emptyset = .62$  between the Money and Candy Tests.

A test retest reliability study for the group over a period of four months revealed that six students changed the consistency of their responses over the three tests. That is, one student who was originally classified as a delayed gratifier became an inconsistent gratifier, three immediate gratifiers became inconsistent, and two of the original inconsistent gratifiers became (one) delayed and (one) immediate gratifier.

Since approximately ninety-three per cent of the subjects remained consistent with respect to their original choices on the Money, Auto and Candy tests, these tests were used in distinguishing between two extreme groups on the delay of gratification variable.

Delayed gratification tests have not only been used extensively in research, but are known to have content validity.<sup>13,14,15</sup>

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13 Bialer, op. cit., p. 303-319.

14 Mishel, op. cit., p. 543-552.

15 Shybut, op. cit., p. 33-35.

b) Torrance's Tests of Creative Thinking: Figural Form B. -- Creative thinking was measured by Torrance's Figural Form B tests.<sup>16</sup> They are as follows: Picture Construction Activity, Picture Completion Activity, and the Circles Activity.

Torrance's Figural Form B test is one of the most widely used figural tests of creativity. It can be administered to subjects from kindergarten through graduate school.<sup>17</sup> For research work involving primary and secondary grade children, the figural forms appear to be more practical since they can be applied to groups of students and are less time consuming for the students than the verbal forms.<sup>18,19</sup> The Figural Form B may also be a fairer test than the Verbal Forms when used with (highly creative) children who tend to lag in verbal development and writing skills.<sup>20</sup>

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16 E.P. Torrance, Torrance Tests of Creative Thinking Norms -- Technical Manual, Research Edition: Verbal Tests Forms A and B, Figural Tests, Forms A and B, New Jersey, Personnel Press, Inc., 1966, p. 14-16.

17 Idem, Ibid., p. 9.

18 Idem, Ibid., p. 3.

19 A.J. McCormak, "Nonverbal Administration Protocols for Figural Tasks of Torrance Tests of Creative Thinking", in The Journal of Creative Behavior, No. 9, 1975, p. 88.

20 Torrance, op. cit., p. 2.

The Picture Construction Activity is scored for originality and elaboration only. It consists of one figure which has the shape of a jelly bean. During a testing situation, the individual is told to draw a picture or an object that contains the bean as a part of it. The responses for originality and elaboration are elicited by asking the subject to think of something rare or uncommon, and to add details so that the picture will tell as complete and as interesting a story as possible.<sup>21</sup>

Scores for originality are assigned on a scale ranging from zero to five.<sup>22</sup>

With respect to elaboration, two assumptions are used in the scoring of the Picture Construction Activity. The first assumption is that the minimum and primary response of the stimulus figure is a single response. The response is shown in the individual's drawing. Secondly, the exposition of details is a function of creative ability.<sup>23</sup> In scoring elaboration, credit is given, therefore, for each detail or idea added to the original stimulus figure, to its boundaries and/or surrounding area. The basic response

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21 E. Torrance, Torrance Tests of Creative Thinking, Directions Manual and Scoring Guide, Figural Test Booklet B, Research Edition, Princeton, N.J., 1966, p. 6.

22 Idem, Ibid., p. 12.

23 Idem, Ibid., p. 14.

must be meaningful before a score can be given for elaboration. The score for elaboration ranges from zero to no fixed ceiling.

The time limit for the Picture Construction Activity is ten minutes.

The Picture Completion Activity has ten incomplete figures. The individual is asked to complete each figure into a picture. The responses are scored for fluency, flexibility, originality and elaboration. The fluency score is obtained by counting the number of figures completed.<sup>24</sup> The range of scores is zero to ten. The flexibility score is obtained by counting the number of different categories into which the responses fall. The range of the flexibility score is from zero to ten. Originality is measured on a scale that ranges from zero to twenty points. It is determined by assigning a score of zero, one or two points to each stimulus figure according to Torrance's Manual, and then adding the results.<sup>25</sup> The elaboration score for the Picture Completion test is obtained by assigning one point for each essential detail such as color, decoration, deliberate shading and each major variation of the ideas presented. The score ranges from zero to a maximum with no set ceiling.

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24 Idem, Ibid., p. 16.

25 Idem, Ibid., p. 19-25.

The time limit for the Picture Completion test is ten minutes.

The Circles test contains thirty-six circles. It is scored for fluency, flexibility, originality, and elaboration. The subjects are told to use the circles to construct pictures which are meaningful. A time limit of ten minutes is given for this test.

In scoring the Circles test a check is made for relevancy and repetitions. Relevancy is defined as: "a response which contains the circle (the stimulus element of the test) as an integral part".<sup>26</sup> In scoring this test, fluency is simply the number of responses. The range of the fluency scores is from zero to thirty-six. Flexibility is obtained by counting the number of different categories into which a subject's responses can be classified.<sup>27</sup>

The originality scores for the Circles test are based on the uncommonness of responses. They are determined by comparing each response with the originality weights given in Torrance's scoring guide. The weight given to each response ranges from zero to two points, depending on the originality of the response.<sup>28</sup> The total score range

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26 Idem, Ibid., p. 25.

27 Idem, Ibid., p. 27.

28 Idem, Ibid., p. 29-30.

is from zero to seventy-two.

The principle for scoring elaboration for the Circles activity is similar to that which has been described for the Picture Construction and Picture Completion activities.<sup>29</sup> That is, credit is given for each detail which has been added to the original response to the stimulus figure. The score for elaboration ranges from zero to a maximum with no set ceiling.

The Picture Construction test is scored for originality and elaboration only, while the Picture Completion and Circles tests yield scores for fluency, flexibility, originality and elaboration. The scores are added for each ability.

With respect to reliability, Torrance reported two test-retest reliability studies that used all the tests in the Figural B battery.<sup>30</sup> In the first study the sample consisted of 118 fourth, fifth and sixth grade students in St. Croix, Wisconsin. The interval of time between the two testings was two weeks. The results showed reliabilities of .71 for fluency, .73 for flexibility, .85 for originality and .83 for elaboration.<sup>31</sup>

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29 Idem, Ibid., p. 14-15.

30 Torrance, Torrance Tests of Creative Thinking Norms -- Technical Manual, Research Edition, Verbal Tests, Forms A and B, Figural Tests, Forms A and B, p. 20-21.

31 Idem, Ibid., p. 21.

The second study involved fifty-four fifth grade students in White Bear, Minnesota. The group was divided into two sub-groups of twenty-eight and twenty-six students. The tests in the Figural B battery were administered two weeks apart to the first group (N=28) and eight months apart to the second group (N=26). The results of the test-retest reliability coefficients for the first group are as follows: fluency .50, flexibility .63, originality .60, and elaboration .71. The reliability coefficients for the second are: fluency .80, flexibility .64, originality .60 and elaboration .80.<sup>32</sup>

The Circles test from the Figural B battery has been used separately in several test-retest reliability studies. For example, Mackler<sup>33</sup> tested a group of subjects three times with the Circles test. Each testing was separated by a two-week interval. The results gave reliabilities of .72, .60 and .63 for fluency, flexibility and originality between the first and second testings. The results showed also reliabilities of .65, .62 and .81 between the second and third testings; and .47, .60 and .57 between the first and third testings. No coefficient of

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32 Idem, Ibid., p. 21.

33 B. Mackler, Creativity and Life Style, a doctoral dissertation presented to the University of Kansas, Lawrence, 1962.

reliability was reported for elaboration.

Another study involving the Circles test in the Figural B battery was conducted by Yamamoto, who used fifth grade teachers as subjects.<sup>34</sup> Reliability coefficients of .76, .63 and .79 were reported for fluency, flexibility and originality for the Circles test. The time interval was ten weeks. No coefficient of reliability was reported for elaboration.

Added support with respect to the reliability of Torrance's tests of creative thinking is given in The Seventh Mental Measurement Yearbook. For example, Baird supports the fact that the diversity of studies done on Torrance's tests suggests that the scales have adequate reliability.<sup>35</sup>

In summary, although the test-retest reliabilities are moderate, they indicate that the Figural B tests are reliable for research use and are suitable for different grade levels.

With respect to the reliability of scoring, Torrance states that the mean coefficient of correlation between an

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34 K. Yamamoto, A Study of the Relationships Between Creative Thinking Abilities of Fifth-Grade Teachers and Academic Achievement, a doctoral dissertation presented to the University of Minnesota, Minneapolis, 1962.

35 O.K. Buros, The Seventh Mental Measurement Yearbook, Vol. 1, New Jersey, Gryphon Press, 1972, p. 836.

experienced scorer and a new scorer after training is generally in excess of .90 for the figural tests. For example, the mean reliability coefficients for the new scorer and experienced scorer are as follows: fluency .96, flexibility, .94, originality .85, and elaboration .90.<sup>36</sup>

The validity of Torrance's tests is based on a number of investigations using samples of children, adolescents and adults. Most of the researchers investigated construct and concurrent validities. Holland, in The Seventh Mental Measurement Yearbook, criticizes these studies by stating that they are weak in design.<sup>37</sup> However, since most of the evidence is generally consistent with the literature of creative behavior, he states that the validity is acceptable for research purposes. This conclusion has also been supported by Baird.<sup>38</sup>

Several other authors have investigated the validity of Torrance Tests of Creative Thinking. For example, Weisberg and Springer (1961) studied, on a short term basis, thirty-two highly gifted fourth-grade children and their

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36 Torrance, Torrance Tests of Creative Thinking Norms -- Technical Manual, Research Edition, Verbal Tests, Forms A and B, Figural Tests, Forms A and B, p. 18-19.

37 Buros, op. cit., p. 841.

38 Idem, Ibid., p. 837.

families.<sup>39</sup> The median creativity score was used to separate the highly creative subjects from their less creative counterparts. The instruments used were the Circles tests, the Ask Questions, Guess Causes, Guess Consequences and Unusual Uses (Tin Cans) tests. Psychiatric interviews, Rorschach Ink Blots, and the Draw-a-Family Technique were used to measure the subjects' behavior.

The results indicated that creative children were rated significantly higher than the less creative on: the strength of self-image, ease of early recall and uneven ego development.

Strom and Larimare (1970) studied teacher success in an inner city project which emphasized creative teaching.<sup>40</sup> The predictor measures used included the Figural battery of Torrance Tests of Creative Thinking. Several of the measures of creative thinking proved to be valid predictors of teaching success. For example, the measure of figural elaboration correlated .49 with Principal Overall Rating.

With respect to long range predictions, Cropley (1971) and his associates carried out a five-year predictive

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39 E.P. Torrance, "Predictive Validity of the Torrance Tests of Creative Thinking", Journal of Creative Behavior, Vol. 6, 1972, p. 236-252.

40 Idem, Ibid., p. 242.

validity study.<sup>41</sup> Six of the test tasks from the Torrance Tests of Creative Thinking were administered. The subjects were one hundred and eleven seventh-grade students. They were tested in 1964 and retested five years later. The follow-up data included information about their achievement in art, music, drama and literature. The results showed a correlation of .51 between the combined creativity scores and criterion data obtained five years later.

Other predictive validity studies of the Torrance Tests of Creative Thinking are those in which Torrance, Tan and Allman (1970) used one hundred and fourteen junior elementary school children (eight years old) to study creative teaching behavior.<sup>42</sup> The results yielded a validity coefficient of correlation of .62 over a period of eight years. Another study by Torrance (1969)<sup>43</sup> involved forty-six twelfth-graders over a period of seven years. Validity coefficients of correlation of .50, .46 and .51 were obtained with achievement, creative architecture, and aspirations (behaviors predicted) respectively.

The results of the studies quoted above indicate that the creativity tests by Torrance may be used to predict

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41 Idem, Ibid., p. 244.

42 Idem, Ibid., p. 243.

43 Idem, Ibid., p. 243.

creative behavior in the future, although the coefficients of validity are small.

Bastos<sup>44</sup> also evaluated the Torrance Tests of Creative Thinking. The purpose of the study was to provide a critical analysis and evaluation of the tests from evidences reported in its technical manual and in selected empirical studies against the criteria set forth in Standards for Educational and Psychological Tests Manuals, published in 1966 by the American Psychological Association. Twenty-six criteria selected from the Standards constituted the essential elements of a congruence model against which the Torrance Tests of Creative Thinking was evaluated.

According to the methodology used, evidence gathered from the manual and other sources was rated as "satisfactory," "questionable," "unsatisfactory" or "not applicable," according to its compliance to the requirements stated in each of the twenty-six criteria.

The author concluded that Torrance's tests are valid and can be used to test the creative abilities of individuals.

It may be concluded therefore, that the reliability and validity of the Torrance Tests of Creative Thinking are acceptable for testing and research purposes.

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44 L. Bastos, "An Evaluation of the Torrance Tests of Creative Thinking", in Dissertation Abstracts, Vol. 34, (7-A), 1974, p. 3976A-3977A.

### 3. Experimental Procedure

The general procedure of the experiment consisted of the administration of the delayed gratification test, followed by Torrance's Figural B tests. All the testing was done on a group basis. Also, the number of students in each group ranged from twenty-six to thirty-five.

Details of the procedure for the test administration will be found in Appendix 1.

After an examination of the results of the gratification tests, the subjects were assigned to a delayed, immediate or inconsistent group as follows: Those who gave three responses out of three indicating a delayed choice were classified as delayed gratifiers. Subjects that gave three responses out of three indicating an immediate choice were categorized as immediate gratifiers. Those that responded by giving one delayed and two immediate responses or vice versa were classified as inconsistent gratifiers. From the group of one hundred and seventy students tested, fifty students (twenty-seven boys and twenty-three girls) were classified as inconsistent gratifiers, thirty-five (twenty boys and fifteen girls) as immediate gratifiers and eighty-five (forty-five boys and forty girls) as delayed gratifiers. Appendixes 2, 2a and 3 will show the test scores for the groups. The combined groups of delayed and immediate gratifiers formed seventy percent of the total number tested. The delayed gratifiers and immediate gratifiers were to be compared using four creativity scores as dependent variables.

The tests of creative thinking were scored for fluency, flexibility, originality and elaboration by two trained raters from Torrance's Scoring Service. The inter-rater reliability coefficients for the raters were as follows: fluency, .99; flexibility, .92; originality, .94; and elaboration, .97.<sup>45</sup>

#### 4. Plan of the Statistical Analysis

A multivariate analysis of variance was carried out to test the null hypothesis. The research hypothesis stated that delayed gratifiers would score higher than immediate gratifiers on Torrance's tests of creative thinking (Figural B). Delayed gratification and immediate gratification were used as levels of the independent variable, while fluency, flexibility, originality and elaboration were the dependent variables. A multivariate approach was justified since it was found that the dependent variable which is creativity, is multivariate in nature. That is, its component parts are fluency, flexibility, originality and elaboration.

Scheffe's post-hoc procedure was used to determine which of the dependent variables were contributing to the differences found.

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<sup>45</sup> Personal correspondence with Torrance's Scoring Service in Athens, Georgia, January 1974.

It must be remembered that in an experimental study comparisons are made on the operational and measurable level and then through the process of "inferential leap" brought to the conceptual level. It is therefore of utmost importance that the readers be constantly aware of this in dealing with and interpreting the statistical data derived from the operational definitions adopted in the study.

In this chapter, the particulars of the experiment including descriptions of the subjects, measuring instruments, the procedure for the collection of data and the plan for data analysis, have been presented. The results and discussion of the statistical analysis will be described in Chapter Three.

## CHAPTER III

### PRESENTATION AND DISCUSSION OF RESULTS

In this chapter the results of testing the hypothesis are presented and discussed under the following headings:

1) Statistical Analysis, and 2) Discussion of Results.

#### 1. Statistical Analysis

The observed mean creativity scores of the delayed and immediate groups are presented in Table I. In the delayed gratifiers' group the means for fluency, flexibility, originality and elaboration scores are higher than the means of the same dependent variables for the immediate gratifiers. The higher means for the delayed group are in the direction hypothesized.

The standard deviations for the delayed and immediate groups are also given in Table I. The responses of the delayed gratifiers are somewhat more variable than those of the immediate group.

The correlations among the dependent variables are presented for the 120 subjects in Table II. The table shows that all of the coefficients of correlation are positive although some were quite low. It indicates also that fluency and flexibility, fluency and originality, and flexibility and originality are intercorrelated to a higher degree than elaboration

Table I

Observed Means and Standard Deviations  
of Creativity Scores of Eighty-Five Delayed  
and Thirty-Five Immediate Gratifiers.

	Fluency	Flexibility	Originality	Elaboration
Means	20.94	17.84	27.28	71.01
Standard Deviations	4.83	4.24	5.07	11.06
Means	17.31	14.54	23.23	61.91
Standard Deviations	2.41	2.80	4.70	11.63

Table II

Sample Correlation Matrix for the Dependent Variables: Fluency, Flexibility, Originality and Elaboration; for Eighty-Five Delayed and Thirty-Five Immediate Gratifiers

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	Fluency	Flexibility	Originality
Fluency			
Flexibility	0.64		
Originality	0.50	0.50	
Elaboration	0.30	0.23	0.30

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with fluency, flexibility or originality. Elaboration is therefore the most independent of the four creative performance variables.

Multivariate analysis of variance was used to test the hypothesis. The creativity scores for the delayed and immediate groups were used in the analysis. The value of the F-ratio for the multivariate test of equality of mean vectors was 7.67, there being 4, 115 degrees of freedom.

The results showed a significant difference between the creative performance of delayed and immediate gratifiers. The hypothesis stated in Chapter I was supported.

Scheffe's post-hoc analysis was carried out following the multivariate analysis of variance. In Table III the results of the mean difference contrasts between the delayed and the immediate groups measured on the four dependent variables are presented. Each dependent variable contributed to the overall difference between the two groups.

## 2. Discussion of Results

It was argued that individuals who think creatively can delay gratification and cope with anxiety when identifying problems, formulating hypotheses, selecting an alternative and testing the solution.

The hypothesis stated that delayed gratifiers would score higher than immediate gratifiers on Torrance's tests of

Table III  
Data for Mean Difference Contrasts  
Between Immediate (N=35) and Delayed (N=85) Groups

Variable	Variance	Contrast	$\hat{\sigma}_{\hat{\Psi}}\sqrt{A B}$		Confidential Interval	
					Lower Limit	Upper Limit
Fluency	18.27	-3.63	.86	2.73	-6.36	-0.90
Flexibility	15.08	-3.31	.78	2.47	-5.78	-0.84
Originality	24.62	-4.05	1.00	3.17	-7.22	-0.88
Elaboration	126.07	-9.10	2.26	7.16	-16.26	-1.94

The means and sample sizes are shown in Table I.

For all contrasts  $\alpha = 0.05$ .

$$\sqrt{A} = \sqrt{\frac{(N_1+N_2-2)p}{N_1+N_2-p-1}} = 3.17$$

$$\sqrt{B} = \sqrt{F_{(p, N_1+N_2-p-1)}(1-\alpha)}$$

$$\hat{\sigma}_{\hat{\Psi}}\sqrt{AB} = \hat{\sigma}_{\hat{\Psi}}\sqrt{\frac{(N_1+N_2-2)p}{N_1+N_2-p-1} F_{(p, N_1+N_2-p-1)}(1-\alpha)}$$

creativity. The results indicated that delayed gratifiers are significantly more creative than immediate gratifiers. Each of the four measures of creative thinking, namely: fluency, flexibility, originality and elaboration, contributed to the overall difference between delayed and immediate gratifiers.

Table II shows that of the four abilities involved in creative thinking, elaboration is the variable least related to the remaining three variables.

The results of this study imply that delayed gratifiers produced solutions that were many, varied and novel. They also elaborated solutions. The immediate gratifiers, on the other hand, produced responses that were comparatively fewer in number, less varied, more commonplace and not as fully elaborated.

Although the data clearly support the above-stated hypothesis, alternate interpretations of the obtained data may be raised. In order to examine the validity of such interpretations and their relevance to the theoretically postulated relationship between the ability to delay gratification and creative thinking, some of the other possible interpretations will be examined.

It may be suggested that intelligence, to a large extent, accounts for the obtained results. The data show

that there were differences in choice preferences for the various measures and that the delayed gratifiers or presumably more intelligent subjects had a higher mean score for creativity than the immediate gratifiers or presumably less intelligent individuals. It seems likely that the more intelligent individual with his greater capacity to generalize, delays, copes with anxiety, views the alternatives quickly, conceptualizes the benefits of the more valuable delayed reward, and then makes a choice. The less intelligent person seems to be less capable of seeing the differences between the reinforcement values and chooses, therefore, the reward with the greater expectancy immediately.

During the creative process, for example, the subjects were asked to use a number of circles to make as many different and unusual objects as they could think of in ten minutes. The results indicated that the mean scores of the delayed gratifiers, or more intelligent individuals, were higher than those of the immediate gratifiers for fluency, flexibility, originality and elaboration. It is likely, therefore, that intelligence permits the individual to conceptualize the problem quickly and then to generalize from past experiences what objects, new and old, can be created from the circles. The less intelligent subjects, with a more limited capacity to generalize and to

conceptualize the situation, seems to choose immediately any response that would complete the task. This resulted in a low score in creativity.

Hence the results obtained may be a function of intelligence. Because of the absence of I.Q. scores and also the limited time that was available at the time of testing, it was not possible to obtain scores for intelligence from the students. If scores were obtained, then the problem of knowing whether or not intelligence is a factor in explaining the relationship between creativity and delayed gratification could be resolved by partial or multivariate correlation techniques. This would indicate if there was significant variance not associated with intelligence. In order to resolve this problem with respect to the significance of intelligence in the relationship of gratification and creativity, it is suggested that further studies be carried out with the two variables, and that intelligence be partialled out.

Another variable that may account for the relationship between the ability to delay gratification and creativity is locus of control. The obtained data showed that delayed gratifiers were more creative than the immediate gratifiers. It seems that the reinforcement for creation comes from within the individual himself, and that the

delayed gratifier has a greater capacity to be internally controlled than the immediate gratifier. The reward may be abstract, such as the personal satisfaction that a person receives by believing that he will become famous in the future if he waits and produces an unusual piece of music which reflects his own thoughts. Hence if the reinforcements are produced by the individual himself, then it appears that locus of control may be an important variable in accounting for the relationship between the ability to delay gratification and creativity.

During the delay of gratification, the individual who shows evidence of internal control will generalize from past experiences and perceive future events as consequences of his own present behavior. This would tend to increase his behavior potential for the selection of those behaviors that are related to delayed gratification.

On the other hand, the individual who thinks that future events are controlled by forces outside of his control is likely to engage in behavior which has its major reinforcements immediately available. This may be explained from the point of view that future events are generalized to be unrelated to present behavior. Therefore the behavior potential for delayed rewards would remain low.

During the creative process, an individual must produce his own reinforcement. Therefore as he identifies

problems, formulates hypotheses, chooses among alternatives and revises solutions, he will stop and think about the outcome of his choice. This is because he believes in what he is doing. Therefore, the result of his choice should reflect creative thinking. On the other hand, the person who generalizes from past experiences that he gained no satisfaction from his works in the past will not expect to be satisfied in the future. This is because he does not produce his own reinforcement. Therefore, he will avoid the anxiety associated with delay and will give any solution to a problem immediately. The result is that such a solution is generally low in creativity.

Since the relationship of creativity and delayed gratification may be a function of locus of control, it is suggested that further research be carried out to clarify the explanations. This could be done by using locus of control as a co-variate and then employing partial or multiple correlation techniques to determine whether or not there was significant variance not associated with locus of control in the results.

It seems, therefore, that creative thinking and delayed gratification follow a process that is similar. The difference in performance between the delayed gratifiers who were highly creative, and the immediate gratifiers who were low in creativity, can be explained in terms of coping

with tension, intelligence, and locus of control.

The present finding that there is a positive relationship between the ability to delay gratification and creative thinking may have implications for practical applications in an educational setting. For example, if delayed gratifiers are more creative than immediate gratifiers, then one could identify pupils that are delayed and immediate gratifiers in a classroom.

Additional research should be carried out with different age groups in order to determine if delay of gratification and creative thinking are related at different developmental levels.

It may be concluded therefore that the individual who thinks creatively can delay gratification. The findings of this study support the hypothesis.

The summary and conclusions will next be presented.

The purpose of this study was to investigate the relationship between delayed gratification as presented by Rotter and Torrance's concept of creative thinking. Delayed gratification is the tendency to select reinforcements which are expected to occur in the future. Creativity, according to Torrance, is the process of sensing gaps, identifying problems, formulating hypotheses, choosing alternatives, testing solutions and finally communicating the results.

It was hypothesized that "delayed gratifiers will obtain higher scores than immediate gratifiers on Torrance's tests of creative thinking, Figural Form B."

The research subjects were one hundred and twenty grade eight boys and girls. They ranged in age from twelve to fourteen years and were enrolled in a large suburban elementary school operated by the Carleton Roman Catholic School Board.

Delayed gratification was measured by the Auto, Money and Candy tests. Creativity was measured by the Torrance Tests of Creative Thinking, Figural Form B.

The subjects were classified as delayed gratifiers if they chose three delayed reinforcements. Those who chose three immediate reinforcements were classified as immediate gratifiers.

The hypothesis was tested by multivariate analysis of variance. Fluency, flexibility, originality and

elaboration were used as the dependent variables, while delayed gratification and immediate gratification were the two levels of the independent variable. The hypothesis was supported. That is, delayed gratifiers were significantly more creative than immediate gratifiers.

Scheffe's post-hoc procedure was carried out following the testing of the hypothesis.

The findings stated above indicate that the specific hypothesis of this study has been supported and that creative thinking, as defined by Torrance, involves the ability to delay gratification. These conclusions should be viewed cautiously since they are valid only within the specific conditions of this study.

One limitation of the study is that only the Figural Form B of Torrance's tests was used. The results of creative thinking would have been obtained from a wider variety of responses if it had been possible to use both the verbal and figural forms. Therefore, further research should be carried out with the verbal form of Torrance's test in order to add more support to these findings.

In conclusion, this study supports the hypothesis that there is a positive relationship between Rotter's concept of delay of gratification and creative thinking as defined by Torrance.

Aggarwal, Y.P. and L.k. Verma, "Internal-External Control of High Creative and Low Creative High School Students at Different Levels of Socio-Economic Status," in Journal of Creative Behavior, Vol. 11, No. 2, 1977, p. 150.

In this study high creative and low creative subjects were compared on internal-external control dimensions of personality. The results of the study showed that high creative students were significantly more internal than low creative students.

Aliotti, N.C. and W.E. Blanton, "Some Dimensions of Creative Thinking Ability, Achievement and Intelligence in First Grade," in ERIC, ED 028 818, 1969.

This study deals with the relationship of intelligence, creative thinking and achievement of children at the grade one level.

Bastos, L., "An Evaluation of the Torrance Tests of Creative Thinking," in Dissertation Abstracts, Vol. 34, (7-A), 1974, p. 3976A-3977A.

This report gives an evaluation of the Torrance Tests of Creative Thinking.

Bialer, I., "Conceptualization of Success and Failure in Mentally Retarded and Normal Children," Journal of Personality, Vol. 29, 1961, p. 303-319.

Reports on a method for measuring the ability to delay gratification in normal and mentally retarded children. Develops instruments for measuring delayed gratification.

Brown, D.L., K. Chambers, Laurie Goldman and Peter Kovesdy, "Effects of Positive Reinforcement on Creativity," in Perceptual and Motor Skills, Vol. 44, No. 1, 1977, p. 322.

The authors investigated the effects of immediate, non-directive, verbal reinforcement on creativity. Results indicated that verbal reinforcement enhanced the production of creative responses.

Churchill, P.M., "Creativity and Locus of Control in Junior High School Students," in Dissertation Abstracts International, Vol. 37 (11-A), 1977, p. 7031.

In this study the relationship of creativity and locus of control was examined.

Cooper, J.B. and B.O. Richmond, "Intelligence, Creativity and Performance Abilities of EMR Pupils," in Psychology in the Schools, 12, 1975, p. 304-309.

The relationship of intelligence, creativity and performance abilities was investigated in EMR subjects.

Dacey, J., G. Madaus and A. Allen, "The Relationship of Creativity and Intelligence in Irish Adolescents," in British Journal of Educational Psychology, Vol. 39, 1969, p. 261-266.

In this work the authors examined the relationship between creativity and intelligence in an Irish sample. It was found that divergent thinking and intelligence have separate dimensions.

Dickinson, Mary L., "Locus of Control and Self-Reinforcement as Related to Creativity," in Dissertation Abstracts, Sciences and Engineering, Vol. 35 (8-B), 1975, p. 4166B.

An abstract of a study that was carried out relating the variables locus of control, self-reinforcement and creativity.

Ducette, Joseph, Stephen Walk, Sarah Friedman, "Locus of Control and Creativity in Black and White Children," Journal of Social Psychology, No. 88, 1972, p. 297-298.

This study investigated the relationship of locus of control and creativity in black and white children.

Fling, Sheila, "Intelligence, Creativity, and Waiting Ability in Young Children with Imaginary Companions," in Dissertation Abstracts, Sciences and Engineering, 35 (5-B), 1974, p. 2426-B.

The study was designed to investigate if children who have imaginary companions have more intelligence, waiting ability and creativity than children who have not had imaginary companions.

Glover, J., and F. Sautter, "An Investigation of the Relationship of Four Components of Creativity to Locus of Control," in Social Behavior and Personality, Vol. 4, No. 2, 1976, p. 257-260.

Describes the relationship between creativity and locus of control.

Goetz, E.M. and D.M. Baer, "Social Control of Form Diversity and the Emergence of New Forms in Children's Block Building," in Journal of Applied Behavior Analysis, Vol. 6, 1973, p. 209-217.

This study indicated that verbal reinforcement increased the number of creative responses in preschool children.

Johnson, Roger A., "Differential Effects of Reward versus Nonreward Instructions on the Creative Thinking of Two Economic Levels of Elementary School Children," in Journal of Educational Psychology, Vol. 66, No. 4, 1974, p. 530-533.

No difference was found when the author investigated the effects of reward or no reward instruction on the creative thinking of children.

Mahrer, A., "The Role of Expectancy in Delayed Reinforcement," Journal of Experimental Psychology, Vol. 52, 1956, p. 101-106.

An empirical study which reports on the role of expectancy in delayed reward within the domain of Rotter's social learning theory.

Mischel, W., "Delayed Gratification, Need for Achievement and Acquiescence in Another Culture," in Journal of Abnormal and Social Psychology, Vol. 62, No. 3, 1961, p. 543-552.

An empirical study describing the relationship of delayed gratification, need for achievement and acquiescence in another culture. Gives a description of the use of an instrument for measuring delayed gratification.

Oziel, L.J., "The Relationship Between Perceived Locus of Control, Resistance to Demands for Compliance, and Creativity," in Dissertation Abstracts, Sciences and Engineering, Vol. 33 (3-B), 1972, p. 1272-B.

An abstract of a study that was done relating the variables locus of control, resistance to demands and creativity.

Rotter, J.B., Social Learning and Clinical Psychology, New York, Prentice Hall, 1954, xvi-466 p.

Gives a comprehensive description of social learning theory. Defines behavior potential in terms of expectancy, reinforcement value and the psychological situation.

Rotter, J.B., J. Chance, and E. Phares, Applications of Social Learning Theory of Personality, New York, Holt, Rinehart and Winston, 1972, xiii-623 p.

Presents basic concepts with respect to social learning theory. Describes the relationships between behavior potential, expectancy and reinforcement value. Describes a number of works based on the applications of social learning theory.

----- and Hochreich, Personality, Dallas, Scott, Foresman and Company, 1975.

A description of personality from the point of view of social learning theory.

-----, M. Seeman and S. Liverant, "Internal versus External Control of Reinforcement: A Major Variable in Behavior Theory," in N.F. Washburne (Ed.), Decisions, Values and Groups, Vol. 2, London, Pergamon Press, 1962, p. 473-516.

A description of the variable, locus of control.

Rychlak, J.F. and J.N. Eacker, "The Effects of Anxiety, Delay, and Reinforcement on Generalized Expectancies," in Journal of Personality, Vol. 30, No. 2, 1962, p. 123-134.

In this study the effects of anxiety, delay and reinforcement on generalized expectancies was investigated.

----- and Lerner, "An Expectancy Interpretation of Manifest Anxiety," in Journal of Personality and Social Psychology, Vol. 2, No. 5, 1965, p. 677-684.

A description of manifest anxiety in terms of social learning theory.

Shipe, D. and S. Lazare, "Two Measures of Delay of Gratification: Age and Socioeconomic Status in Young Children," Proceedings of the 77th Annual Convention of the American Psychological Association, No. 4, 1969, p. 461-462.

The findings of this study indicated that delayed reinforcement increased with age.

Shybut, J., Delayed Gratification and Severity of Disturbance Among Hospitalized Psychiatric Patients, Unpublished Ph.D. thesis, University of Colorado, 1965, x-149 p.

Defines the ability to delay gratification in terms of Rotter's social learning theory. Gives a comprehensive study on the relationship between delayed gratification and psychopathology. Describes also the reliability and validity of a test for measuring the ability to delay gratification.

Shybut, J., Delayed Gratification: A Study of the Relationship to Certain Behavioral, Psychological and Demographic Variables, Unpublished Master's Thesis, University of Colorado, 1963, xvii-144 p.

Gives a definition of delayed gratification in terms of Rotter's concept of social learning theory. Describes the development of a scale to measure delayed gratification. Describes the relationship of delayed gratification to other variables such as expectancy and reinforcement value.

Torrance, E.P., Guiding Creative Talent, Englewood Cliffs, N.J., Prentice Hall, 1962, xi-278 p.

This book defines and provides a rationale for creative thinking. It elaborates on creativity in terms of a process and delimits the abilities that are mainly involved in creative thinking. The reliability and validity of instruments for the measurement of creative thinking are also described.

-----, Torrance Tests of Creative Thinking Norms: Technical Manual, Research Edition, Verbal Tests, Forms A and B, Figural Tests, Forms A and B, Princeton, N.J., Personnel Press, 1966, 1-95 p.

Presents a comprehensive account of the rationale and definition of creative thinking. Describes the development of Torrance's tests of creative thinking. Gives evidences of the norms, reliability and validity of the creativity tests.

-----, Torrance Tests of Creative Thinking, Directions Manual and Scoring Guide, Figural Test Booklet B, Research Edition, Princeton, N.J., Personnel Press, 1966, 1-40 p.

Describes the administration and scoring of Torrance's Figural Form B tests.

-----, "Scientific View of Creativity and Factors Affecting Its Creative Growth," in J. Kagan, Creativity and Learning, Boston, Houghton Mifflin, 1967, p. 81.

A description of the factors affecting the growth of creativity.

-----, Encouraging Creativity in the Classroom, Dubuque, Iowa, Wm. C. Brown Company Publishers, 1970.

A discussion based on creativity in the classroom.

Torrance, E.P., "Predictive Validity of the Torrance Tests of Creative Thinking," in Journal of Creative Behavior, Vol. 6, 1972, p. 236-252.

This article gives a review of the major short-range and long-range validity studies of the Torrance Tests of Creative Thinking.

-----, and R.E. Myers, Creative Learning and Teaching, New York, Dodd, Mead, 1970.

A description of the process of creative learning and teaching.

Walls, R.T. and J.J. Miller, "Delay of Gratification in Welfare and Rehabilitation Clients," in Journal of Counseling Psychology, Vol. 17, No. 4, 1970, p. 383-384.

The study was designed to investigate selected variables related to delay of reinforcement.

-----, "Delay of Reinforcement Development," in Child Development, Vol. 44, 1973, p. 689-692.

The study describes the development of delay of reinforcement in children.

Ward, W.C., N. Kogan and E. Pankove, "Incentives in Children's Creativity," in Child Development, Vol. 43, 1972, p. 669-676.

The findings indicate that incentives (money) increased the number of creative ideas relative to controls.

## APPENDIX 1

### TESTING PROCEDURE

The researcher was introduced to the students by the teacher as follows:

This student is from the University of Ottawa. He is doing some research in education and is interested in getting some information on the ways in which people make choices in different situations. He is also interested in gaining some information on how good you are at thinking up new ideas and solving problems. This student will offer you an opportunity to make a choice between two things in three different situations. In two out of three situations, I guarantee that you will actually obtain your choice today or next week (a week from now). Do not forget, you will get your choice, so think well before you choose. Take up the answer sheet. Write your name and the date on it. Indicate your choice in each situation by shading the square on your answer sheet that represents your choice. Do not allow anyone to see your answers since you will actually get your choice.

Following the above instructions, the experimenter introduced Situation I or the Suppositional Test (Auto Test by Bialer<sup>1</sup> as follows:

Suppose a fairy told you she would give you three wishes, you could have any three things in the world you wanted, what would you wish for? Suppose you could have your choice, which would you rather have, an automobile or a million dollars? (Do not record your answers.) Now, suppose you could have your choice, which would you rather have, the best kind of automobile right now (today) - and you would have a driver's licence and know how to drive it too - or have the automobile and a million dollars

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<sup>1</sup> I. Bialer, "Conceptualization of Success and Failure in Mentally Retarded and Normal Children", in Journal of Personality, Vol. 29, No. 3, 1961, p. 308.

a year from now? Which would you choose, the automobile right now (today) or the automobile and a million dollars a year from now? (Indicate your choice on the answer sheet.)

At the end of Situation I or the Auto Test, the experimenter introduced Situation II or the Money Test as follows:

### Situation II

This time you can really have what you choose. You can have the choice between this ten cent piece now (today) or this twenty-five cent piece next week (a week from now). Which one will you have: a) this ten cent piece now (today) or b) this twenty-five cent piece next week? (Indicate your choice on the answer sheet.)

The students having recorded their answers to the Money Test were then introduced to the Candy Test thus:

### Situation III

This time you can also have what you choose. Here are two packages of chocolate (candy). I would like to give each of you a package of chocolate bars, but I do not have enough of these (indicating the larger package of three chocolate bars) with me today. So you can either have this one (indicating the smaller package with one chocolate bar) right now, today, or if you want to wait for this one (indicating the package of three bars), I will bring it for you next week, a week from today. Which one do you want, this small chocolate bar now (today) or this package of three chocolate bars next week (a week from today)? (Indicate your choice on the answer sheet.)

At the end of the Candy Test, the experimenter said:

Thank you for your co-operation in completing the answer sheets. Give me your answer sheets.

After all the answer sheets were collected, the experimenter said:

I would like you to participate in some more activities for the remainder of this session.

The experimenter then introduced the Torrance Tests of Creative Thinking as follows:

Thank you for your co-operation. Now I think you can have a lot of fun doing the activities we have planned for the rest of this period. "We are going to do some things that will give you a chance to see how good you are at thinking up new ideas and solving problems. They will call for all of the imagination and thinking ability you have. So I hope that you will put on your best thinking cap and that you will enjoy yourself."<sup>2</sup>

Following the above statements, the students were told by the experimenter:

Take up your booklet entitled: "Thinking Creatively with Pictures." On the first page print your name.

After the identifying information was recorded, the standard instructions for administering Torrance's Figural Tests (Booklet B)<sup>3</sup> were followed from the testing manual.

At the end of the testing session, the creativity test booklets were collected from the students. They were then given the following instructions:

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2 E.P. Torrance, Torrance Tests of Creative Thinking: Directions Manual and Scoring Guide, Figural Booklet B, Research Edition, New Jersey, Ginn and Company, 1968, p. 1-40.

3 Idem, Ibid., p. 5-7.

Some of you have won a prize today. Listen carefully to your names and come for your prize immediately. If you do not hear your name, it indicates that you will get your prize next week. Your teacher will give it to you a week from today. Now remember, those who have won a prize today will not get one next week.

When all the immediate gratifiers were given their rewards, the experimenter said: "Thank you very much." The students were then dismissed from the testing room.

APPENDIX 2

Creativity Scores for Delayed Gratifiers

Fluency	Flexibility	Originality	Elaboration
20	19	36	99
29	21	30	97
21	17	25	95
19	18	26	90
18	17	26	67
29	19	28	70
27	16	25	68
20	16	25	67
24	19	31	79
19	18	30	79
17	16	27	74
14	12	26	72
15	12	25	72
22	20	29	78
16	12	20	64
17	16	24	68
15	10	18	62
23	19	27	70
30	35	38	81
20	16	19	61

## Creativity Scores for Delayed Gratifiers (cont'd)

Fluency	Flexibility	Originality	Elaboration
21	20	23	64
31	26	30	73
27	23	29	69
20	18	25	65
14	13	20	60
26	22	30	70
24	19	33	75
17	14	22	64
19	13	20	60
29	25	36	61
20	16	28	60
15	14	25	70
19	16	27	73
17	16	27	77
22	20	29	77
25	24	30	81
15	12	21	65
12	12	22	66
21	20	33	74
21	18	30	68
25	23	34	74

## Creativity Scores for Delayed Gratifiers (cont'd)

Fluency	Flexibility	Originality	Elaboration
26	17	29	59
21	18	29	65
23	21	34	68
23	22	36	75
21	21	34	71
18	17	30	65
18	13	23	71
21	20	30	75
16	14	25	70
21	19	33	80
21	16	27	70
29	26	32	75
13	12	22	70
18	17	30	75
16	14	25	64
21	18	33	76
18	17	32	72
15	15	30	60
21	19	33	70
24	20	35	80
16	12	20	70
24	21	30	75

## Creativity Scores for Delayed Gratifiers (cont'd)

Fluency	Flexibility	Originality	Elaboration
12	11	18	60
20	16	22	65
23	18	24	67
17	16	22	60
22	21	26	71
23	20	25	70
16	10	15	51
37	22	25	76
28	19	25	76
25	21	27	76
22	16	18	74
28	24	24	80
23	20	20	70
28	24	34	75
26	17	32	70
19	19	35	75
12	24	20	40
27	15	34	120
20	15	26	40
26	16	30	80
27	11	30	50
10	21	26	75

## Creativity Scores for Inconsistent Gratifiers

<u>Fluency</u>	<u>Flexibility</u>	<u>Originality</u>	<u>Elaboration</u>
23	20	29	74
15	10	18	68
22	18	33	71
21	19	32	69
15	14	27	60
20	15	27	72
18	18	30	66
17	13	23	61
24	20	21	60
18	18	22	78
19	13	17	68
14	15	32	62
15	16	25	70
11	18	19	76
18	17	26	35
14	13	17	45
20	19	25	50
17	11	20	49
16	12	24	60
18	18	29	74
13	13	22	70
29	25	32	74
20	15	26	70
15	14	24	70
20	20	30	70
16	17	12	59
18	14	20	58
20	18	22	63
12	13	19	60
19	20	21	67
13	17	23	62
18	11	15	50
25	20	22	70
20	15	19	61
28	22	21	64
14	16	17	61
23	20	20	66
25	18	25	69
20	21	17	61
26	18	18	58
16	10	15	51
16	19	20	55
23	20	21	62
18	15	26	40
26	15	27	71
22	12	23	50
14	18	29	73
15	10	17	70
14	12	20	68
19	14	27	59

APPENDIX 3

Creativity Scores for Immediate Gratifiers

Fluency	Flexibility	Originality	Elaboration
18	13	33	60
19	17	29	60
15	15	18	52
14	13	18	50
14	12	18	60
15	15	15	50
20	18	23	71
15	15	19	70
16	16	23	67
20	17	21	59
17	13	32	51
17	17	19	75
20	19	25	69
19	11	28	60
15	14	21	58
18	12	29	58
19	15	28	59
14	12	21	69
15	11	18	73
15	12	27	61

## Creativity Scores for Immediate Gratifiers (cont'd)

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Fluency	Flexibility	Originality	Elaboration
24	20	22	60
18	18	23	80
19	14	18	71
20	20	24	72
15	15	33	62
17	11	22	63
16	16	25	71
20	14	23	71
20	13	27	70
18	11	19	90
18	17	27	30
14	12	17	40
20	18	24	50
16	10	21	45
16	10	23	60

APPENDIX 4

Delayed-Immediate Gratification

ANSWER SHEET  
(A Choice Situation)

NAME \_\_\_\_\_ Age \_\_\_\_\_ Sex \_\_\_\_\_ Grade \_\_\_\_\_  
School \_\_\_\_\_ City \_\_\_\_\_ Date \_\_\_\_\_

Indicate your choice in each situation by shading the square that represents your choice.

SITUATION I

- (a)  The automobile right now (today).  
(b)  The automobile and a million dollars  
a year from now.

SITUATION II

- (a)  Ten cents now (today).  
(b)  Twenty-five cents next week (a week from  
today).

SITUATION III

- (a)  A small chocolate bar now (today).  
(b)  Three chocolate bars next week (a week  
from today).

APPENDIX 5

Thinking Creatively With Pictures

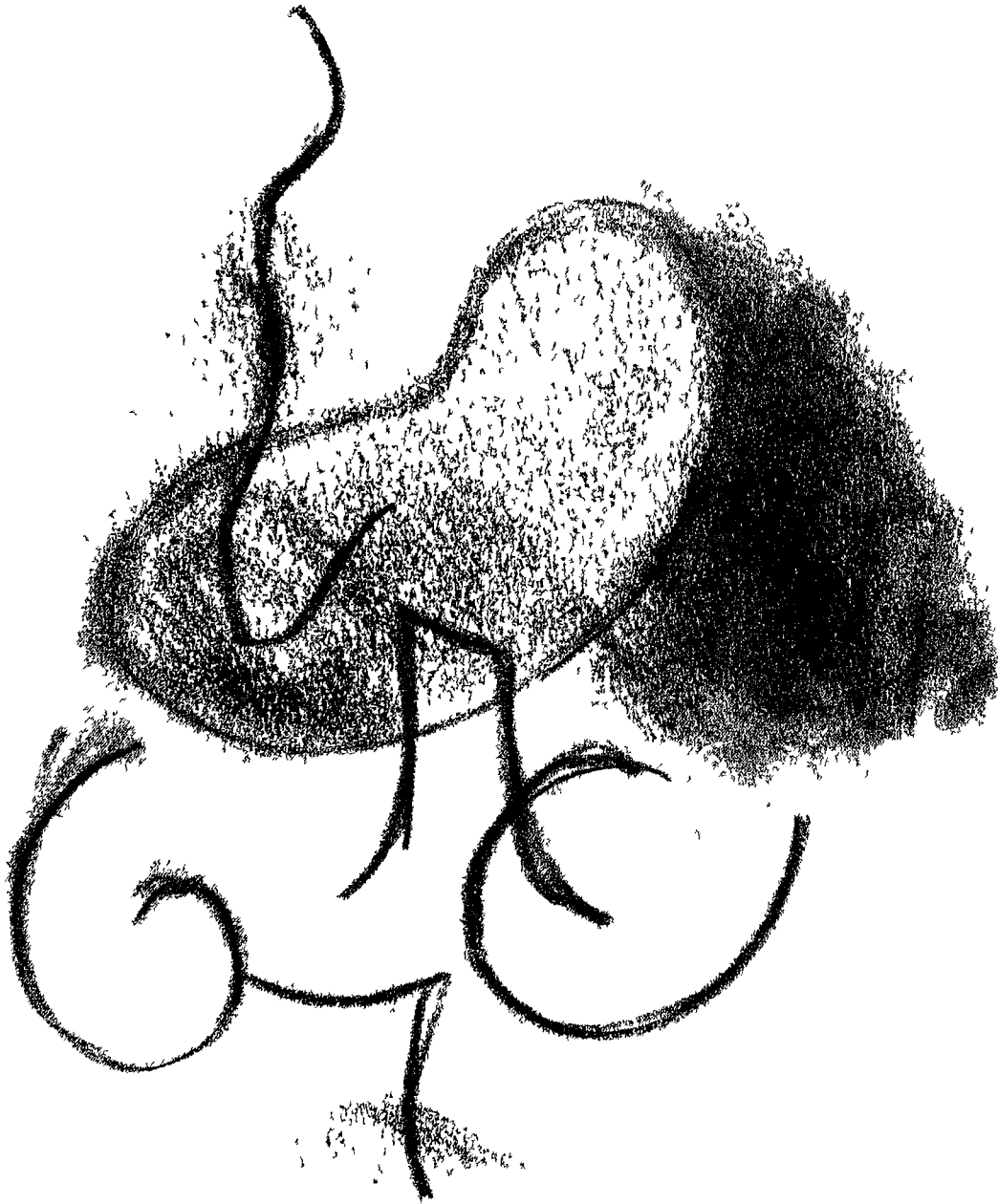
# Thinking Creatively With Pictures

By E. Paul Torrance

Booklet B

Name \_\_\_\_\_ Age \_\_\_\_\_ Sex \_\_\_\_\_ Grade \_\_\_\_\_

School \_\_\_\_\_ City \_\_\_\_\_ Date \_\_\_\_\_



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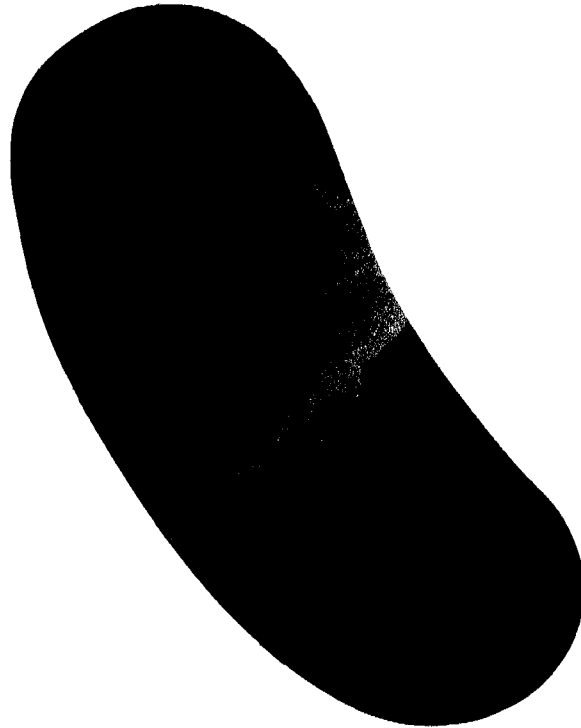
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## Activity 1. PICTURE CONSTRUCTION

Below is a piece of colored paper in the form of a curved shape. Think of a picture or an object which you can draw with this piece of paper as a part. On the back of these shapes you will find a thin layer of paper that can be peeled away. Look. Now you can stick your colored shape wherever you want it to make the picture you have in mind. Stick yours on the next page where you want it and press down on it. Then add lines with your pencil or crayon to make your picture.

Try to think of a picture that no one else will think of. Keep adding new ideas to your first idea to make it tell as interesting and as exciting a story as you can.


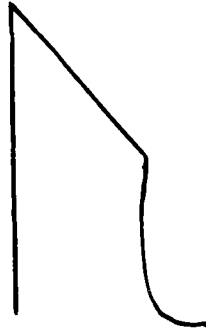
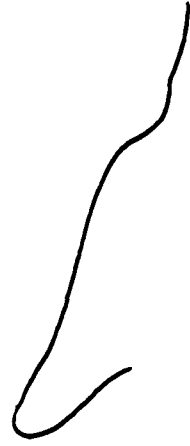

When you have completed your picture, think up a name or title for it and write it at the bottom of the page in the space provided. Make your title as clever and unusual as possible. Use it to help tell your story.

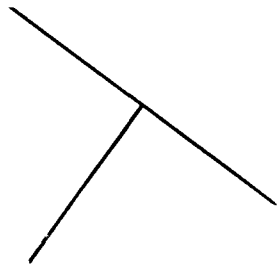


YOUR TITLE: \_\_\_\_\_

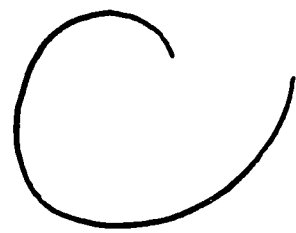
## Activity 2. PICTURE COMPLETION

By adding lines to the incomplete figures on this and the next page, you can sketch some interesting objects or pictures. Again, try to think of some picture or object that no one else will think of. Try to make it tell as complete and as interesting a story as you can by adding to and building up your first idea. Make up an interesting title for each of your drawings and write it at the bottom of each block next to the number of the figure.

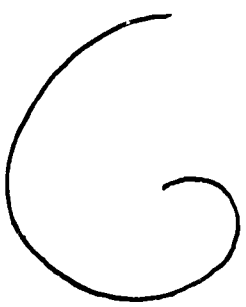
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 <p>3. _____</p>	 <p>4. _____</p>



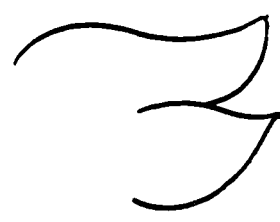
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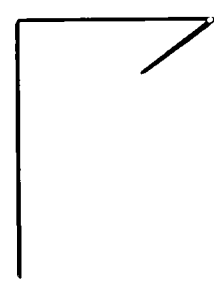
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8.



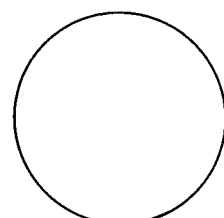
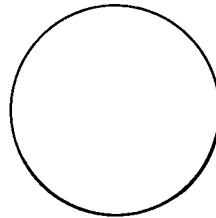
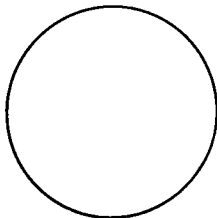
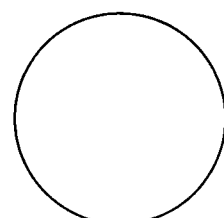
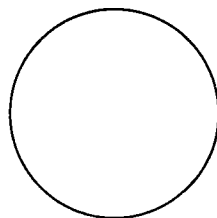
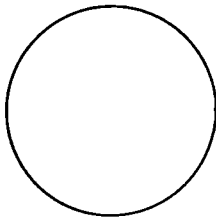
9.

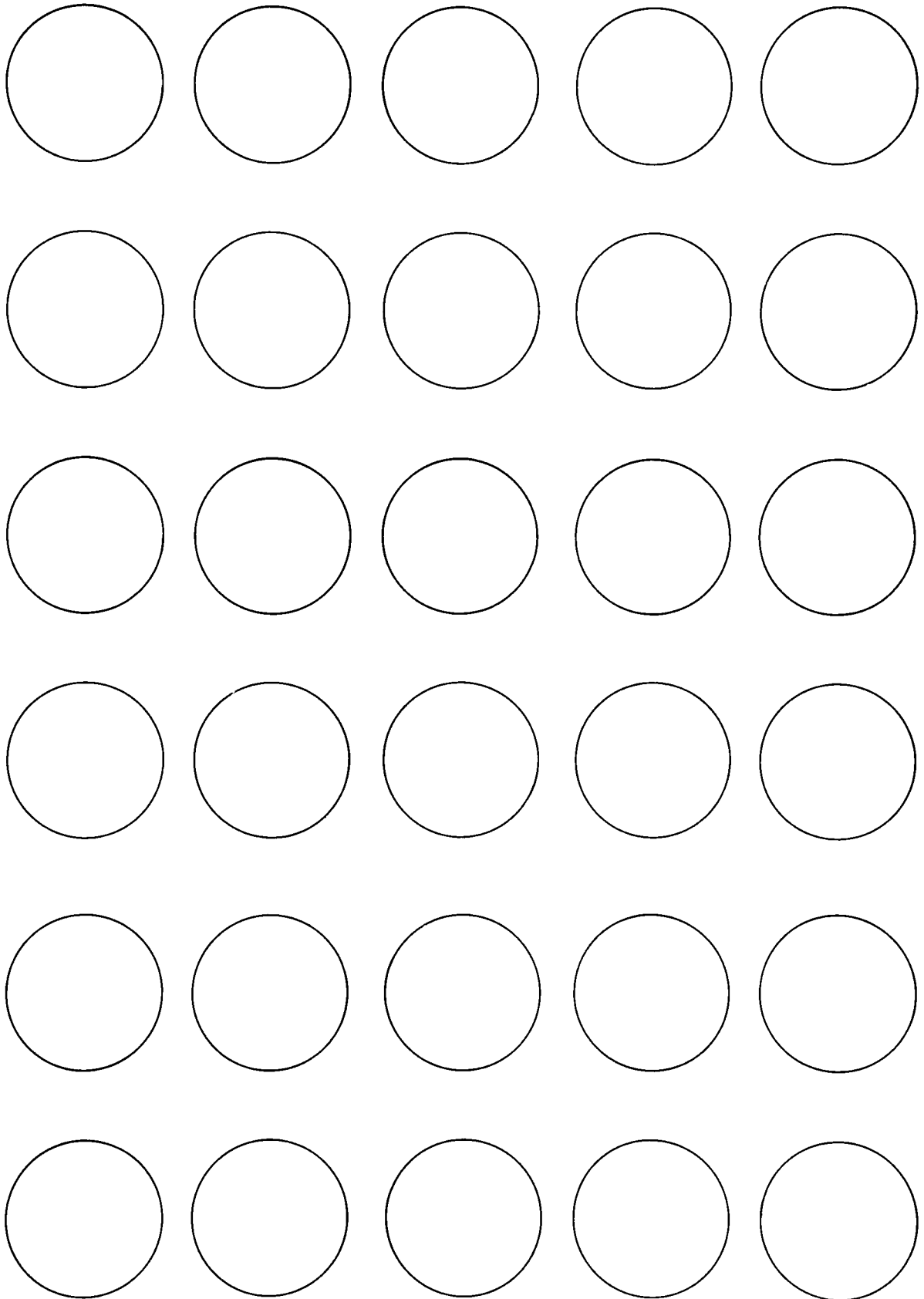


10.

### Activity 3. CIRCLES

In ten minutes see how many objects or pictures you can make from the circles below and on the next page. The circles should be the main part of whatever you make. With pencil or crayon add lines to the circles to complete your picture. You can place marks inside the circles, outside the circles, or both inside and outside the circles—wherever you want to in order to make your picture. Try to think of things that no one else will think of. Make as many different pictures or objects as you can and put as many ideas as you can in each one. Make them tell as complete and as interesting a story as you can. Add names or titles below the objects.





TORRANCE TESTS OF CREATIVE THINKING, FIGURAL FORMS A and B

Pupil's Name \_\_\_\_\_ Sex \_\_\_\_\_ Test Date \_\_\_\_\_

School \_\_\_\_\_ Age \_\_\_\_\_ Grade \_\_\_\_\_ Scorer \_\_\_\_\_

Form \_\_\_\_\_

Resp. No.	Activity 1		Activity 2			Activity 3		
	Orig.	Elab.	Categ.	Orig.	Elab.	Categ.	Orig.	Elab.
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

SCORE SUMMARY

	FLU	FLEX	ORIG	ELAB
Act. 1	<del> </del>	<del> </del>		
Act. 2				
Act. 3				
TOTAL				
T SCORE				

COMMENTS:

## APPENDIX 7

### ABSTRACT OF THE RELATIONSHIP OF DELAYED GRATIFICATION AND TORRANCE'S CONCEPT OF CREATIVE THINKING<sup>1</sup>

The purpose of this study was to investigate the relationship between delayed gratification as presented by Rotter and creative thinking as defined by Torrance. Delayed gratification is the tendency to select reinforcements which are expected to occur in the future. Creativity, on the other hand, is:

[...] a process of becoming sensitive to problems, deficiencies, gaps in knowledge [...] identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies, testing and retesting these hypotheses and possibly modifying and retesting them, and finally communicating the results.

On the basis of previous research, it was hypothesized that "delayed gratifiers will obtain higher scores than immediate gratifiers on Torrance's Tests of Creative Thinking, Figural Form B."

The research sample for the study consisted of one hundred and twenty grade eight boys and girls. They were enrolled in a large suburban elementary school operated by

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<sup>1</sup> Egerton G. Blackwood, doctoral thesis presented to the School of Graduate Studies of the University of Ottawa, Ontario, 1981.

the Carleton Roman Catholic School Board. Their ages ranged from twelve to fourteen years.

Delayed gratification was measured by the Auto, Money and Candy tests. Creativity was measured by the Torrance Tests of Creative Thinking, Figural Form B.

The data were analyzed by multivariate analysis of variance F-test. Scheffe's post-hoc procedure was carried out following the testing of the hypothesis. Conclusions drawn from the data reveal that there was a positive relationship between the ability to delay gratification and creative thinking. That is, delayed gratifiers were significantly more creative than immediate gratifiers.

The findings of this study indicate that the specific hypothesis has been supported. However, these conclusions should be viewed cautiously since they are valid only within the specific conditions of this study. Therefore, further research should be carried out with the verbal form of Torrance's test in order to add more support to these findings. Additional research can also be conducted with different age groups in order to determine if the developmental qualities of delay of gratification and creative abilities are similar.