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THE EFFECTS OF LOCUS OF CONTROL AND  
SKILL-CHANCE INCENTIVES ON PERFORMANCE  
AT THREE DEVELOPMENTAL LEVELS

by

Thomas C. Kneavel, Jr.

A thesis submitted to the School of Graduate Studies  
as partial fulfillment of the requirements  
for the Ph.D. degree in Clinical Psychology.



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## ACKNOWLEDGMENTS

This paper was prepared under the supervision of Henry V. Coady, Ph.D., of the School of Psychology of the University of Ottawa. The writer is also indebted to Gloria L. Fellers, Ph.D., of the School of Psychology of the University of Ottawa for her assistance in the actual preparation of the written manuscript.

The writer would like to thank the Cape Henlopen School District, Nassau, Delaware and St. William of York School, Baltimore, Maryland for their cooperation in providing subjects for this research. The writer is further indebted to the administrations and staffs of the eight schools for their cooperation and assistance in this project.

In addition, the writer would like to thank Mr. Desmond Walsh and Mr. Michael Walsh for their consultation and criticism in the analysis of the data.

## CURRICULUM STUDIORUM

Thomas C. Kneavel, Jr. was born October 30, 1941, in Baltimore, Maryland. He received his Bachelor of Science degree in Psychology from Loyola Evening College, Baltimore, Maryland in 1963. He received his Masters of Education degree in School Psychology in 1968 from Loyola Evening College, Baltimore, Maryland.

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## INTRODUCTION

Rotter's social learning theory is the conceptual framework within which the present research was conceived. For social learning theory, behavioral prediction results from the interaction of expectancy of reinforcement, the receipt of reinforcement, and the psychological situation. Rotter has noted that research has focused on individual differences related to expectancy but has not examined the situational parameters regarding expectancy.<sup>1</sup> The present study examines two sources of expectancy while reducing and controlling for reinforcement and situational influences.

This study is an outgrowth of the motivational studies which examine the roles of organismic and of environmentally based variables. The organismic variables are those generally thought of as part of the person. These variables include such things as attitudes, values, drive states, physiological states, and other internal states which influence human behavior. The environmental variables are events external to the individual which, when they occur, influence behavior.

The present research examines the organismic aspects of locus of control as defined by a psychological scale and the environmental aspects of locus of control as defined by skill/chance instructions. The interaction of these two sources of expectancy are examined as

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<sup>1</sup> J.B. Rotter, "Some Problems and Misconceptions Related to the Construct of Internal Versus External Control of Reinforcement," Journal of Consulting and Clinical Psychology, Vol. 43, No. 1, 1975, p. 56.

they affect children's behavior at different developmental levels. Both sources of expectancy are considered in Rotter's social learning theory. Locus of control refers to the degree of control the individual feels he has over outcomes of events and the reinforcement he receives. Substantial research is available using the locus of control concept which validates its utility in predicting individual differences in a wide variety of situations.

Research in social learning theory has shown that the perceived degree of control over events may be mediated by situational and reinforcement variables. According to social learning theory, environmental variables are situation variables which effect behavior in predictable ways. The environmental variable can alter locus of control expectancy or it can be an expectancy variable in its own right.

Another approach to the study of environmental variables as they influence perceived control has been by means of manipulation of incentives. Incentives affect expectancy by manipulating environmental cues associated with reinforcement, and may be viewed as environmental cues which create expectancy. In the present study, the environmental, verbal cues of skill or chance instruction will be used as incentives.

A major situational variable which has received little attention in predicting locus of control outcomes is age. The normal child's ability to conceptualize and verbalize matures with increased age. Concomitant with increased age is the increased mastery in the cognitive domain. The cognitive-conceptual skills needed to differentiate

the value of various verbal incentives and to perceive the relationship between performance and the rewards obtained increase with age. The child's ability to process the verbal concepts of skill and chance may be closely linked to mental maturity.

This research paper was prompted by the similarity between the locus of control concept and the incentive concept. Both examine expectancy from different perspectives, the locus of control concept from the organismic perspective and the incentive concept from the environmental perspective. Both concepts can be integrated and differentiated within Rotter's social learning theory.

Within the broad, theoretical framework outlined above, differential performances were expected as a result of examining various LOC levels under differing incentive orientations. Theory further predicts that differential performances may be found at various developmental levels.

A closer examination of incentive research within the context of locus of control leads to speculation that two factors, time and task, could be viewed as leading to confounding of some results with respect to locus of control theory. From this reasoning, hypotheses were formed and an experiment designed to test these hypotheses.

The first chapter will review the locus of control and the incentive literature. A second chapter will present the experimental design, the procedures used to implement the design, and the statistical analysis and results. The third chapter will be a discussion of the findings. The paper ends with a summary and conclusion.

## CHAPTER I

### REVIEW OF THE LITERATURE

This chapter is divided in three sections. The first presents locus of control within social learning theory. This review is restricted to Rotter's social learning theory,<sup>1</sup> as a comprehensive review of the entire body of social learning theory literature is beyond the scope of this paper. The second section presents research on incentives analyzed according to precise definitions related to incentives from the theoretical perspective of Witryol.<sup>2</sup> The third section presents a theoretical summation, outlines the design of the experiment, and concludes with a statement of the hypotheses.

#### A. Locus of Control within Social Learning Theory.

This section begins with a brief outline statement of social learning theory of which Rotter's locus of control construct is an integral part. Social learning theory constructs concerning reinforcement and the effects of the psychological situation provide a framework for interpreting experimental findings related to locus of control. This section is divided into five parts. The first part, expectancy of reinforcement and skill/chance, presents the initial attempts at validating the locus of control concept through the use of skill and

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<sup>1</sup> J.B. Rotter, J.E. Chance, and E.J. Phares, Application of a Social Learning Theory of Personality, New York, Holt, Rinehart, and Winston, 1972, p. 1-43.

<sup>2</sup> S.L. Witryol, "Incentives and Learning in Children," in H.W. Reese (Ed.), Advances in Child Development and Behavior, Vol. 6, New York, Academic Press, 1971, p. 1-61.

chance manipulations. The second section, locus of control, presents Rotter's definition of the locus of control concept along with selected validating studies. Development of the locus of control scales is the third section and outlines the construction of the various adult and children's locus of control scales. Developmental aspects of locus of control are treated in the fourth section. This section deals with motivational features of locus of control as they develop from childhood to adulthood. The fifth and final part of this section is entitled locus of control and skill/chance. Studies based on adult populations are presented first, followed by studies based on younger age groups.

Social learning theory states that behavior can be predicted as a function of the interaction of expectancy of reinforcement, reinforcement value, and the psychological situation.<sup>3</sup> According to Rotter, 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>4</sup> Reinforcement is defined as anything that contributes to the occurrence of a behavior. Reinforcement value is defined by Rotter as "the degree of the person's preference for that reinforcement to occur if the possibility of occurrence of all alternatives were equal."<sup>5</sup> The psychological situation is essentially the environmental stimuli, both

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3 Rotter, Chance, and Phares, op. cit., p. 1-43.

4 Ibid., p. 12.

5 Ibid., p. 13.

internal and external to the individual which affect behavior. A closer examination of each of these variables and of the interaction of these variables as they affect behavioral prediction is in order.

Expectancy of reinforcement, i.e. locus of control orientation, is established by prior reinforcement history. From experience in situations which have been rewarded, a person forms attitudes, values, and beliefs about the occurrence of reinforcement. Past experience with a reinforcement in a situation determines the expectancy of receiving reinforcement in new or similar situations. Thus, generalized expectancies concerning reinforcement in a variety of situations result from prior learning experience.

Reinforcement is anything that affects the occurrence of behavior. For a reinforcer to be effective in motivating the individual toward a particular behavior, the individual must attach some value to the reinforcer. Such familiar reinforcers as money and food are commonly seen as valued reinforcers. However, reinforcers obtain their value in relation to the other reinforcement available. For example, Dunlap<sup>6</sup> found that elementary school children changed preference for a toy according to the positive or negative reinforcement they received while playing with the toy. Other studies have found that delay of reinforcement can effect reinforcement value. Studies

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<sup>6</sup> R.L. Dunlap, "Changes in Children's Preference for Goal Objects as a Function of Differences in Expected Social Reinforcement," Unpublished Doctoral Dissertation, Ohio State University, 1953, as cited by Rotter, et al., *op. cit.* 1972, p. 22.

by Mischel<sup>7</sup> and Mischel and Staub<sup>8</sup> found that young children preferred immediate rewards of less value over delayed rewards of greater value.

The psychological situation, the final element of social learning theory, interacts with both expectancy of reinforcement and reinforcement value to effect the occurrence of a behavior. All stimuli in the environment, both internal and external to the individual, which affect behavior comprise the psychological situation. The psychological situation is an elusive variable because it is so inclusive. It includes the influence on the individual of cues, events, or other types of stimulation from the environment. The psychological situation can contain cues which can alter expectancies and which can alter reinforcement value, as in the Mischel<sup>9</sup> and Mischel and Staub<sup>10</sup> studies cited above. In these studies, the situational variable of delay of reinforcement interacted with another situational variable, age, to influence the reinforcement value.

The potential for a behavior to occur in a given situation with a given reinforcement is a function of the expectancy of reinforcement for that situation and the value of the reinforcement for that situation.

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

8 W. Mischel and E. Staub, "Effects of Expectancy on Working or Waiting for Larger Rewards," Journal of Personality and Social Psychology, Vol. 2, 1965, p. 625-633.

9 Mischel, op. cit., 1961, p. 116-124.

10 Ibid.

To date, research in social learning theory has focused on expectancy of reinforcement. Reinforcement values and situational variables have been examined primarily in their relationship to the expectancy variable. Studies emphasizing expectancy of reinforcement will be presented next.

### 1. Expectancy of Reinforcement and Skill/Chance.

This section presents the early attempts at validating constructs related to Rotter's social learning theory using skill/chance manipulations. Rotter observed that the ways in which people attribute the reinforcement they received to themselves or to chance, fate, or luck, in part, determines behavioral outcomes.<sup>11</sup> Early researchers used skill/ chance manipulations in the form of instructions to predict behavioral outcomes. This early research provides the basis for the theorization leading to the locus of control construct.

A study by Phares<sup>12</sup> examines how an individual's perception of a situation determines his expectancy that a given behavior will be reinforced. Skill and chance instructions were used in altering the subjects' categorization of the task and thereby altering expectancy for success or failure. With skill instruction, Phares construed that a person should perceive reinforcement as related to his ability. Following success, his

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<sup>11</sup> J.B. Rotter, "Generalized Expectancies for Internal Versus External Control of Reinforcement," Psychological Monographs, Vol. 80, No. 1 (Whole No. 609), 1966, p. 1-28.

<sup>12</sup> E.J. Phares, "Expectancy Changes in Skill and Chance Situations," Journal of Abnormal and Social Psychology, Vol. 54, No. 3, 1957, p. 339-342.

expectancy of reinforcement should increase; but following failure, his expectancy for reinforcement should decrease. By the same reasoning, a person given chance instructions should not be expected to perceive reinforcement as under his personal control, but as the result of luck, fate, or chance; and, therefore, expectancy of reinforcement should not be expected to increase greatly following success or decrease greatly following failure. Selecting two matching tasks, Phares assigned undergraduate females to four groups. The design was completely counterbalanced for each of the two tasks and skill and chance instructions. Subjects were asked to bet chips to determine if the two stimuli presented were the same or different. Since the discriminations involved were so fine that the subjects could not determine the correctness of their response, the author was able to predetermine the pattern of successful or unsuccessful matches for the thirteen trials. Skill and chance instructions were found to alter expectancy. It was found that in situations seen as skill determined, subjects used past performance to form expectancies about future performance, as reflected in the greater number of chips bet. In chance determined situations, subjects did not change their pattern of betting; that is, they did not use past performance to form expectancies about future performance since they did not perceive reinforcement as under their control but as based on luck.

James and Rotter,<sup>13</sup> intrigued by Phares'<sup>14</sup> results that skill and chance instructions alter subjects' expectancies for reinforcement, wanted to determine if resistance to extinction followed the established learning principle that partially reinforced conditions are more resistant to extinction than continuously reinforced conditions. James and Rotter<sup>15</sup> reasoned that subjects given chance instructions would perceive the task as experimenter controlled and reinforcement as a matter of luck. Under this condition, the subject would quickly notice the change from 100% reinforcement to no reinforcement. Chance instructed subjects receiving 50% reinforcement would not notice the change in reinforcement because the shift from 50% to 0% reinforcement was not immediately perceived. Therefore, in the 100% reinforcement conditions, subjects would be expected to extinguish quickly, while the subjects in the 50% reinforcement condition would be more resistant. The reasoning so far concurs with established reinforcement theory; however, an important departure of social learning theory from standard reinforcement theory is found in the predictions for the skill situation. Subjects given skill instructions were expected to perceive the task and reinforcement as under their control. Since subjects in this condition would believe that their efforts controlled the amount of reinforcement obtained, they would

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13 W.H. James and J.B. Rotter, "Partial and 100% Reinforcement under Chance and Skill Conditions," Journal of Experimental Psychology, Vol. 55, No. 5, 1958, p. 397-403.

14 Phares, op. cit., 1957, p. 339-342.

15 James and Rotter, op. cit., 1958, p. 397-403.

interpret the change from 100% reinforcement to no reinforcement as a sudden loss in skill and would compensate by more intense effort. Perceived control, established by the skill instructions, was predicted to mediate subject performance. If the prediction was correct, subjects in the 50% reinforcement condition should have extinguished more quickly than subjects in the 100% reinforcement condition. To test these predictions, four groups of undergraduates were administered a card-guessing task. Two groups were given chance instructions and two groups were given skill instructions. After a brief training period, in which half of each group received 100% and half 50% reinforcement, extinction began. The subjects' stated expectancy of reinforcement on a scale of one to ten was the measure of extinction. It was predicted that the chance instructed group with 100% reinforcement would show greatest extinction, followed by 50% skill, 100% skill, and 50% chance. The findings upheld the predicted order of extinction. The order of extinction was 100% chance, 50% skill, 100% skill, and 50% chance. A significant difference was not obtained between the critical skill conditions, although differences for the skill group were in the predicted direction. Individual differences within subjects led to the speculation that some factor other than skill and chance instructions were operating.

Holden and Rotter<sup>16</sup> partially replicated the James and Rotter<sup>17</sup> study. They were attempting to extend the earlier findings to include

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<sup>16</sup> K.B. Holden and Julian B. Rotter, "Supplementary Report: A Nonverbal Measure of Extinction in Skill and Chance Situations," Journal of Experimental Psychology, Vol. 63, No. 5, 1962, p. 519-520.

<sup>17</sup> James and Rotter, op. cit., 1958, p. 397-403.

other, less verbal, behavioral measures of extinction so that findings would be more comparable to traditional reinforcement studies. Betting technique using chips similar in concept to that of Phares<sup>18</sup> was used by Holden and Rotter.<sup>19</sup> In this study, only the 50% reinforcement condition was used under three instruction conditions; skill, chance, and "ambiguous" instructions. Findings supported the earlier study that partially reinforced, chance instructed groups are more resistant to extinction than partially reinforced, skill instructed groups. The effect was more pronounced for women than men and consistent with the earlier study of James and Rotter;<sup>20</sup> however, wide individual variation in extinction was noted.

To summarize, these studies suggest that skill or chance instructions alter expectancy in a college population whether verbal or behavioral measures of extinction are used. Both the James and Rotter<sup>21</sup> and the Holden and Rotter<sup>22</sup> studies reported wide individual differences in extinction scores, especially for the chance groups. Regarding this variance, James and Rotter have stated,

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18 Phares, op. cit., 1957, p. 339-342.

19 Holden and Rotter, op. cit., 1962, p. 519-520.

20 James and Rotter, op. cit., 1958, p. 397-403.

21 Holden and Rotter, op. cit., 1962, p. 519-520.

22 James and Rotter, op., cit., 1958, p. 402.

It is therefore possible that some individuals have strong general trends to see situations in either terms of being chance determined or skill determined and would act on these general characteristics in a manner to offset the effects of the instructions.<sup>23</sup>

Skill and chance instructions can be considered external cues which alter expectancy through changes in the way in which the individual views the psychological situation. These early researchers were attempting to theoretically validate the LOC construct by operationalizing internal LOC through skill instructions and external LOC through chance instructions. However, the substantial individual variation which was found suggests that some factor other than skill and chance instructions was operating to alter expectancy. In other words, the evidence indicates that perceived control over reinforcement cannot be solely defined by skill and chance instructions. The earlier suggestion by James and Rotter<sup>24</sup> that individuals have a strong tendency to see some situations as skill determined and some as chance determined also implies that the individual brings to the situation personal beliefs, values, and attitudes from his previous learning experiences which shape his expectancy. To understand more clearly what may be involved, a closer examination of the locus of control construct is in order.

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23 Ibid., p. 402.

24 Ibid., p. 397-403.

## 2. Locus of Control.

In this section, the locus of control construct is defined and a summary of some of the validating evidence for the locus of control construct is presented. Expectancy of reinforcement can result from environmental manipulations such as skill and chance instructions as discussed above. Expectancy of reinforcement also develops from the accumulation of past experiences, events, attitudes, and feelings, which establish expectancy patterns within the individual.

Through the growth and maturation process, an individual develops a set of learned beliefs, values, and attitudes on which he bases his actions. Knowledge of these beliefs and of the characteristic ways in which the individual acts because of these beliefs is important in predicting behavior. One such concept found to characterize individual beliefs in the expectancy of reinforcement is the locus of control (LOC) concept.<sup>25</sup> Studies using this conceptualization of expectancy of reinforcement support the view that individuals with an internal locus of control orientation have a high expectancy of reinforcement, while individuals with an external locus of control orientation have a low expectancy of reinforcement, as related to contingencies.

Similar to other psychological variables of this nature, the locus of control variable is not dichotomous, but varies along a continuum from extreme internality to extreme externality with most individuals clustering in the middle ranges. Rotter noted that based

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<sup>25</sup> Rotter, *op. cit.*, 1966, p. 1-28.

on their personal history of reinforcement, individuals "would differ in the degree to which they attribute reinforcement to their own actions."<sup>26</sup> An individual sees himself to various degrees as either controlled by events, or in control of events and of his own destiny. Some people perceive a reward as dependent upon or contingent on their own behavior, skill, ability, or cunning, and perceive themselves as responsible for their actions. Persons with this belief are said to have an internal locus of control orientation. Other persons see reinforcement as controlled by others, by unknown forces, by fate, by luck, by chance, by powerful others, and thus independent of their own actions. Persons with this belief are said to have an external locus of control orientation.<sup>27</sup>

The profound influence of locus of control as a determinant of behavior within the context of the social learning theory has been attested to by the proliferation of published research articles. The solidification of internal-external control of reinforcement as a meaningful psychological variable was given impetus by Rotter<sup>28</sup> when he published a reliable scale for measuring the locus of control variable along with validating data for the locus of control construct. In 1975, Rotter<sup>29</sup> indicates an awareness of over 600 articles dealing with LOC. In addition, numerous reviews have been

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26 Ibid., p. 2.

27 Ibid., p. 1.

28 Ibid.

29 Rotter, op. cit., 1975, p. 56-67.

published,<sup>30,31,32,33,34,34a</sup> along with several books.<sup>35,36,37</sup> This prodigious body of experiments demonstrates the predictive validity of the locus of control variable along a broad spectrum of psychological and behavioral dimensions.

Phares,<sup>38</sup> in his recent book, has reviewed some of the studies which lend validity to the locus of control concept. Locus of control has been found to affect prediction in academic achievement situations. Additionally, within the context of social learning theory, the value of the reinforcer has been shown to alter prediction and situational

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30 W. Throop and A. MacDonald, Jr., "Internal-External Locus of Control: a Bibliography," Psychological Reports, Monograph Supplement, Vol. 28, 1971, p. 175-190.

31 H.M. Lefcourt, "Internal Versus External Control of Reinforcement: A Review," Psychological Bulletin, Vol. 65, No. 4, 1966, p. 206-220.

32 V.C. Joe, "Review of the Internal-External Control Construct as a Personality Variable," Psychological Reports, Monograph Supplement, Vol. 28, 1971, p. 619-640.

33 H.M. Lefcourt, "Recent Developments in the Study of Locus of Control," in Progress in Experimental Personality Research, B.A. Maher (Ed.), New York, Academic Press, Vol. 6, 1972, p. 1-39.

34 E.J. Phares, Locus of Control: A Personality Determinant of Behavior, General Learning Press, Morristown, N.J., 1973, p. 1-24.

34a T.M. Gilmore, "Locus of Control as a Mediator of Adaptive Behaviour in Children and Adolescents," Canadian Psychological Review, Jan. 1978, Vol. 19, No. 1, p. 1-26.

35 Rotter, Chance, and Phares, op. cit.

36 H.M. Lefcourt, Locus of Control: Current Trends in Theory and Research, John Wiley and Sons, New York, 1976, p. 1-211.

37 E.J. Phares, Locus of Control in Personality, General Learning Press, Morristown, New Jersey, 1976, p. 1-217.

38 Ibid.

variables have been shown to alter expectancy and thus predictions based on expectancy.

According to Phares,<sup>39</sup> findings relating locus of control and performance measures of achievement suggest that grades in classroom situations are higher for internals than externals. Messer<sup>40</sup> suggested from his findings that in academic situations teachers would be more positively influenced by attitudes displayed by internals toward work and task completion than externals. Studies by Cellura;<sup>41</sup> Chance;<sup>42</sup> Crandall, Katkovsky, and Crandall;<sup>43</sup> Buck and Austrin;<sup>44</sup> and Solomon, Houlihan, Busse, and Parelius<sup>45</sup> also support the view that internality

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39 Ibid., p. 107-113.

40 S.B. Messer, "The Relation of Internal-External Control to Academic Performance," Child Development, Vol. 43, 1972, p. 1456-1462.

41 A.R. Cellura, "Internality as a Determinant of Academic Achievement in Low SES Adolescents," Unpublished Manuscript, University of Rochester, 1963, as cited by Phares, op. cit., p. 109.

42 J.E. Chance, "Internal Control of Reinforcement and the School Learning Process," Paper presented at the Biennial Meeting of the Society for Research in Child Development, Minneapolis, March, 1965, as cited by Phares, op. cit., p. 109.

43 C. Crandall, W. Katkovsky, and V.J. Crandall, "Children's Beliefs in their own Control of Reinforcement in Intellectual-Academic Situations," Child Development, Vol. 36, 1965, p. 91-109.

44 M.R. Buck and H.R. Austrin, "Factors Affecting the Socio-economically Disadvantaged Child in an Educational Setting," Final Report, Office of Education, Bureau of Research, July, 1970, No. 9-5-034, Grant No. 6-9-009-034-0072 (010), as cited by Phares, op. cit., p. 109.

45 D. Solomon, K.A. Houlihan, T.V. Busse, and R.J. Parelius, "Parent Behavior and Child Academic Achievement, Achievement Striving and Related Personality Characteristics," Genetic Psychology Monographs, Vol. 83, 1971, p. 173-273.

is associated with higher achievement scores, while externality is not. Phares<sup>46</sup> suggests that locus of control is a more accurate predictor of performance measures of achievement, such as grades rather than standardized achievement measures. When standardized achievement measures are used as the dependent variable, locus of control is a less accurate predictor. Support is not universal, however. Katz<sup>47</sup> found no relation between locus of control and academic achievement.

One possible reason for some of the inconsistencies in predicting academic achievement, as well as predictions in other areas, is that some individuals place a different reinforcement value on academic achievement. This is consistent with social learning theory which states that the value a person places on a given reinforcement alters prediction.<sup>48</sup> For example, some children may value success in school, while others may not perceive school success as a value goal. Parental attitudes, social class, and other environmental and social attitudes may shape different values. A study by Karabenick<sup>49</sup> provides evidence that internals value success on a difficult task, while externals value success on an easy task.

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46 Phares, op. cit., 1976, p. 107-113.

47 I. Katz, "The Socialization of Academic Motivation in Minority Group Children," in Nebraska Symposium on Motivation, D. Levine (Ed.), Lincoln, Nebraska, University of Nebraska Press, 1967, p. 133-191.

48 Rotter, Chance, and Phares, op. cit., p. 13-24.

49 S.A. Karabenick, "Valance of Success and Failure as a Function of Achievement Motives and Locus of Control," Journal of Personality and Social Psychology, Vol. 21, 1972, p. 101-110.

According to Phares,<sup>50</sup> another factor affecting prediction concerning locus of control is the way expectancy of reinforcement is altered by success and failure. Internals attribute success or failure to themselves, while externals attribute success or failure to luck, fate, or powerful others. The findings in this area are consistent for both children and adults. Internals have been found to increase performance following success and decrease performance following failure, as might be predicted from their past experience with reinforcement. Since the external associates the reinforcement received with luck, rather than with past experience, the external tends to increase performance following failure and decrease performance following success. For example, Feathers<sup>51</sup> examined expectancy of success in relation to task difficulty and locus of control. The author used male and female undergraduates and found that internals adjusted expectancies up after success and down after failure, while externals adjusted expectancies up after failure and down after success. The same pattern concerning success/failure<sup>52</sup> was reported earlier by Phares<sup>52</sup> using skill/chance instructions to induce locus of control expectancy. In another study, Garrett and Willoughby,<sup>53</sup> using an anagram task, found that for male

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50 Phares, op. cit., 1976, p. 113-114.

51 N.T. Feathers, "Change in Confidence Following Success or Failure as a Predictor of Subsequent Performance," Journal of Personality and Social Psychology, Vol. 9, No. 1, 1968, p. 38-46.

52 Phares, op. cit., 1957, p. 339-342.

53 A.M. Garrett and R.H. Willoughby, "Personal Orientation and Reaction to Success and Failure in Urban Black Children," Developmental Psychology, Vol. 7, No. 1, 1972, p. 92.

and female, fifth and sixth grade children, performance increased after success for internals, while the performance of externals increased following failure.

A number of studies also examine the relationship between locus of control and social influence. In initially reviewing this area, Rotter<sup>54</sup> reports studies by Strickland<sup>55</sup> and Getter<sup>56</sup> using reinforcement and extinction paradigms. These authors found adult internals more resistant to influences involving subtle manipulation, while externals were more conforming to the examiner's instructions. In another study reviewed, Gore<sup>57</sup> asked three groups of adults to respond to three TAT cards to determine which produced the longest story. For one of the cards in each group the examiner made either an overt, subtle or no attempt to influence the story length for that card. Internals produced significantly shorter stories in the subtle influence condition than externals. No differences between internals and externals in the overt suggestion condition were reported. In interpreting these studies,

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54 Rotter, op. cit., 1966, p. 1-28.

55 B.R. Strickland, "The Relationship of Awareness to Verbal Conditioning and Extinction," Unpublished Doctoral Dissertation, Ohio State University, 1962, as cited by Rotter, op. cit., 1966, p. 23.

56 H. Getter, "Variables Affecting the Value of the Reinforcement in Verbal Conditioning," Unpublished Doctoral Dissertation, Ohio State University, 1962, as cited by Rotter, op. cit., 1966, p. 23.

57 P.M. Gore, "Individual Differences in the Prediction of Subject Compliance to Experimenter Bias," Unpublished Doctoral Dissertation, Ohio State University, 1962, as cited by Rotter, op. cit., 1966, p. 23.

Rotter<sup>58</sup> indicates that internals, when they perceive examiner control, may or may not choose to conform with the examiner's suggestions. In situations where the internal is given obvious alternatives, the choice is generally conformity. When influence is subtle or not to the internal's benefit, the individual becomes resistive.

More recently, Joe<sup>59</sup> has reviewed the area related to experimenter influence and locus of control. The author reports that while internals tend to resist subtle examiner influences and externals tend to conform to the controls imposed by others, more research on interpersonal processes and the conditions under which internals do conform is needed.

In sum, the expectancy variable, locus of control, has shown validity in predicting academic achievement outcomes and in predicting behavior following success and failure experiences. The value of the reinforcement to the individual and situational variables were found to influence prediction. In addition, internals under some conditions can resist examiner influences while externals conform to the examiner's suggestion.

### 3. Development of LOC Scales.

Situational cues were discussed earlier as a way of altering or operationally defining expectancy. For example, skill or chance

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58 Rotter, op. cit., 1966, p. 22-24.

59 Joe, op. cit., 1971, p. 628-630.

instructions have been shown to alter expectancy. Another means of operationalizing a psychological construct is through the use of psychometric scales. A psychometric scale usually measures the individual's more permanent feelings, attitudes, values, and beliefs.

This section presents the development of the locus of control scales for adults followed by a more careful examination of the scale used with children. The purpose of this section is the selection of an appropriate scale to measure locus of control for use in this study.

Psychometric instruments can be designed to assess our beliefs, feelings, attitudes, or values in specific situations, or in a variety of situations which represent a sampling of life experiences. As with other constructs, scales have been developed to assess the individual's internal and external locus of control orientation in specific situations such as academic achievement, affection, and social and political attitudes.

The development of Rotter's<sup>60</sup> locus of control scale for adults was an outgrowth of the early efforts by Phares<sup>61</sup> and James<sup>62</sup> to assess locus of control orientation. The original scale was a Lickert-type

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60 Rotter, *op. cit.*, 1966, p. 1-28.

61 E.J. Phares, "Situational Factors in the Determination of Reinforcement Values," Unpublished Master's Thesis, Ohio State University, 1955, as cited by Phares, *op. cit.*, 1976, p. 38-39.

62 W.H. James, "Internal Versus External Control of Reinforcement as a Basic Variable in Learning Theory," Unpublished Doctoral Dissertation, Ohio State University, 1957, as cited by Phares, *op. cit.*, 1976, p. 39.

scale which contained twenty-six items.<sup>63</sup> From these early scales, Rotter, Seeman, and Liverant<sup>64</sup> produced a twenty-nine item, forced-choice scale which broadened the earlier James-Phares' content to include questions which examined personal control over such areas as achievement, affection, and general social and political attitudes. In this scale, social desirability was controlled by eliminating any item which correlated highly with the Marlowe-Crowne Social Desirability Scale.<sup>65</sup> The final form of the expanded I-E scale was published by Rotter<sup>66</sup> along with reliability and validity data which justified its administration to college and adult populations.

While the development of the Rotter<sup>67</sup> scale for adults was progressing, other instruments were being developed to assess locus of control orientation in children. In 1961, Bialer<sup>68</sup> published the first scale to measure locus of control orientation in children. The Children's

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63 Phares, op. cit., 1955.

64 J.B. Rotter, M. Seeman, and S. Liverant, "Internal Versus External Control of Reinforcement: A Major Variable in Behavior Therapy," in Decisions, Values, and Groups, Norman F. Washburns (Ed.), Pergamon Press, New York, 1962, p. 473-516.

65 D.P. Crowne and D. Marlowe, The Approval Motive, New York, Wiley, 1964, p. 23-24.

66 Rotter, op. cit., 1966, p. 1-28.

67 Ibid.

68 I. Bialer, "Conceptualization of Success and Failure in Mentally Retarded and Normal Children," Journal of Personality, Vol. 29, 1961, p. 303-320.

Locus of Control Scale<sup>69</sup> was derived from Phares<sup>70</sup> and James'<sup>71</sup> work. Bialer's<sup>72</sup> scale was developed for use with both normal and mentally retarded populations ranging in age from six-three to fourteen-three. The twenty-three item scale was designed to be administered orally to the individual child.

Another children's scale, the Intellectual Achievement Responsibility Questionnaire (IAR), was developed by Crandall, Katkovsky, and Crandall to assess locus of control orientation as related to academic situations for children in grades three through twelve. Standardization was done on a school population.<sup>73</sup> This scale measured the individual's locus of control beliefs, attitudes, and values only in relation to academic achievement situations, thus restricting its power to predict outcomes in other life situations. While satisfactory within their limited scope, other more broadly based measures allowing prediction of a broader range of life situations were developed. A description of some of these instruments follows.

Construction of the Children's Picture Test of Internal-External Control was completed by Battle and Rotter<sup>74</sup> and measured locus of control

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69 Ibid.

70 Phares, op. cit., 1955.

71 James, op. cit., 1957.

72 Bialer, op. cit., 1961, p. 303-320.

73 Crandall, Katkovsky, and Crandall, op. cit., 1965, p. 91-109.

74 E.S. Battle and J.B. Rotter, "Children's Feelings of Personal Control as Related to Social Class and Ethnic Group," Journal of Personality, Vol. 31, 1963, p. 482-490.

beliefs toward a variety of life situations. Its projective format was fashioned after the Rosenzweig Picture Frustration Test.<sup>75</sup> The child is asked to respond to six cartoon-like situations with what would they say "if they were in that situation." Initially, standardization was completed using sixth and eighth grade children. This scale was applicable to a limited age population and was of limited value as a psychometric instrument because of the small standardization sample used.

Nowicki in collaboration with others<sup>76,77,78,79</sup> has developed a series of scales which overcome much of the criticism leveled at the early children's I-E scales. The series of scales measure locus of control beliefs toward a variety of situations based on Rotter's<sup>80</sup> definition of locus of control. Nowicki's stated aim was to develop a series of psychometrically sound and comparable instruments which could be

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75 S. Rosenzweig, Rosenzweig Picture Frustration Study, 8029 Washington St., St. Louis, Mo.

76 S. Nowicki and M.P. Duke, "A Preschool and Primary Internal-External Control Scale," Developmental Psychology, Vol. 10, No. 6, 1974, p. 874-880.

77 S. Nowicki and B.R. Strickland, "A Locus of Control Scale for Children," Journal of Consulting and Clinical Psychology, Vol. 40, No. 1, 1973, p. 148-154.

78 S. Nowicki and M.P. Duke, "A Locus of Control Scale for Non-College as well as College Adults," Journal of Personality Assessment, Vol. 38, 1974, p. 136-137.

79 M. Duke, J. Shaheen, and S. Nowicki, "Locus of Control and Interpersonal Distance in a Geriatric Population," Journal of Psychology, Vol. 86, 1974, p. 277-285.

80 Rotter, op. cit., 1966, p. 1.

group-administered and used to measure locus of control orientation from preschool age through old age.<sup>81</sup>

The Preschool and Primary Internal and External Control Scale was developed by Nowicki and Duke.<sup>82</sup> It uses a sixteen-picture format similar to that of Battle and Rotter.<sup>83</sup> It was designed to be group-administered to children from four to eight years of age.

The Nowicki-Strickland Internal-External Scale<sup>84</sup> was designed for use with a third through twelfth grade population. The scale contains forty items and is a paper and pencil test with a forced-choice format.

The Adult Nowicki-Strickland Internal-External Control Scale has two forms.<sup>85</sup> Form C is for college adults and Form NC is for non-college adults. It was modeled after Rotter's<sup>86</sup> original I-E Scale, but was designed to be more readable for the non-college population. The final scale is the Geriatric Nowicki-Strickland Internal-External Control Scale or Form G.<sup>87</sup> It was derived from the non-college form

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81 Nowicki and Duke, op. cit., 1974, p. 874-880.

82 Ibid.

83 Battle and Rotter, op. cit., 1963, p. 482-490.

84 Nowicki and Strickland, op. cit., 1973, p. 148-154.

85 Nowicki and Duke, op. cit., 1974, p. 136-137.

86 Rotter, op. cit., 1966, p. 1-28.

87 Duke, Shaheen, and Nowicki, op. cit., 1974, p. 277-285.

of the Adult Nowicki-Strickland Locus of Control Scale.<sup>88</sup> It consists of thirty-eight items, thirty-two of which came directly from the adult scale and six of which were modified. The age range used in the standardization was from sixty-five to ninety years of age. The standardization was carried out in a residential setting for the elderly.

For each of these scales, adequate reliability and validity data are reported. Nowicki and Duke<sup>89</sup> consider that these are appropriate instruments to measure locus of control through the specified age ranges, at least for research purposes. This series of instruments is, as yet, too recent to have been used in longitudinal, developmental studies.

In sum, the Nowicki scales<sup>90,91,92,93</sup> have several advantages over the earlier I-E scale. These authors have reported adequate reliability and validity data to attest to their psychometric robustness from preschool to old age for research purposes. They were developed from a common rationale derived from Rotter's original definition of the locus of control construct. They allow for longitudinal studies of locus of control effects. All scales can be group-administered.

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88 Nowicki and Duke, op. cit., 1974, p. 136-137.

89 Nowicki and Duke, op. cit., 1974, p. 874-880.

90 Ibid.

91 Nowicki and Duke, op. cit., 1974, p. 136-137.

92 Nowicki and Strickland, op. cit., 1973, p. 148-154.

93 Duke, Shaheen, and Nowicki, op. cit., 1974, p. 277-285.

#### 4. Developmental Aspects of LOC.

This section presents studies dealing with the developmental aspects of LOC. Changes which occur in LOC orientation with age could affect performance outcomes.

One of the simplest yet least researched situational variables affecting change in locus of control belief is age. The child progressively acquires skills and moves from a situation of total dependency on others for need gratification at birth to a gradual dependence on self for need gratification by late adolescence and early adulthood. This progression from dependence to independence is the result of the natural process of physical growth and development.

The young child has little control over the reinforcements he receives and would be expected to be more external in his locus of control orientation, while the older child has more control over the reinforcements he receives and would be more internal. The acquisition of cognitive, motor, social, and emotional skills, which are synonymous with the growth process, also fosters independence and provides the individual with more skills to control the reinforcements received from the environment. Surprisingly, little research has examined the locus of control concept within the developmental framework, which views age as a situational variable affecting behavioral predictions. Phares, in reviewing locus of control changes with age, states:

There is little data on the relationship between age and locus of control beliefs. At best, we can patch together a few relationships taken from a variety of populations in a variety of life circumstances<sup>94</sup>.

Bialer<sup>95</sup> set out to examine several developmental assumptions concerning success-failure conceptualization related to reward preference and changes in locus of control orientation. First, the author wanted to determine if the individual's ability to conceptualize success-failure was related to developmental levels and locus of control. The author assumed that young children were more external in orientation than internal. Young children would be more motivated by hedonistic tendencies, while older children would be more internal in orientation and thus more sensitive to success-failure experiences. Secondly, Bialer wanted to determine if reward preference was related to age and locus of control. The author further reasoned that young children should prefer immediate, small gratifications, while older children should delay gratification to obtain larger rewards. Finally, the authors wanted to determine if there was a shift from external to internal perceptions in locus of control with increased age. To examine these assumptions, the author selected forty-five mentally retarded male and female children ranging in age from six years seven months to ten years two months. In addition, forty-four male and female children of normal intelligence and ranging in age from six years three months

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94 Phares, op. cit., 1976, p. 159.

95 Bialer, op. cit., 1961, p. 303-320.

to fourteen years three months were also selected. Both groups were administered the Peabody Picture Vocabulary Test.<sup>96</sup> The normal population obtained a mean IQ of 100, while the retarded population obtained a mean IQ of 67. All children were verbally administered the locus of control scale. Each child was asked to perform in a repetitive choice situation and in a situation which examined gratification patterns. In the repetitive choice situation, the child was given two puzzles in counter-balanced fashion of presumed equal difficulty. The child was allowed to complete one puzzle and was interrupted by the examiner after five of the eight pieces were completed on the other puzzle. The examiner then presented both puzzles and told the child he could choose one to put together. The choice of the previously completed puzzle task was interpreted as a hedonistic choice. According to the authors, the choice of the incomplete puzzle would be experienced by the subjects as a failure. If the subjects valued success, they would choose the incomplete puzzle to gain success. As part of the same experiment, another series of three tasks involving delayed versus immediate patterns of gratification were examined. In essence, the child was presented the three tasks which involved a choice between a small, immediate reward or a much larger reward which involved a delay in reception of the reward. Bialer's results indicate that as age increases, the child's locus of control perception becomes more internal; hedonistic cues are replaced by more success-failure cues; and

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<sup>96</sup> L.M. Dunn, Peabody Picture Vocabulary Test, American Guidance Service, Inc.

gratification progresses from a preference for immediate small rewards to delayed but larger rewards. In addition, the author notes that mental age, not chronological age, is the major factor contributing to the developmental changes involving success-failure conceptualization.

Another study was designed to investigate the relationship between age and locus of control. Penk<sup>97</sup> reasoned that children should develop, as mastery is gained over the environment, an increasing awareness that events are under their control and a decrease in the generalized view that events occur by chance. A locus of control scale was administered to male and female parochial school children by individual age groups of seven, eight, nine, ten, and eleven years. The author found that the mean locus of control score increased with age. In addition, a series of psychological tests were administered to measure cognitive and verbal abilities. The author reports that the older and more internal child used more mature verbal abstractions, a finding consistent with the increased internality and conceptualization skill reported above by Bialer.<sup>98</sup>

A more recent study by Pawlicki<sup>99</sup> examines the developmental changes in the effectiveness of two types of social reinforcers as related to internal-external control. The author reasons that the

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97 W.E. Penk, "Age Changes and Correlates of Internal-External Locus of Control Scale," Psychological Reports, Vol. 25, 1969, p. 856.

98 Bialer, op. cit., 1961, p. 303-320.

99 R.E. Pawlicki, "Locus of Control and the Effectiveness of Social Reinforcers," Journal of Genetic Psychology, Vol. 125, 1974, p. 153-159.

performance of internal children should be more affected than the performance of external children by information connoting social stimuli than praise connoting stimuli. The author administered Bialer's<sup>100</sup> scale to seventy-three male and seventy-two female children in the third, the fourth, the sixth, and the seventh grades. The children were asked to perform on a probability matching, card guessing task in which their least preferred choice was reinforced. For half the children in each grade, a praise-connoting social reinforcer such as "you're doing fine" was given, while the other half of each group was given information connoting social reinforcers such as "that's right," "that's correct." Findings indicate that information connoting reinforcers were more effective than praise connoting reinforcers at all grade levels. In addition, the author reports an increase in internality with an increase in age, but no main effect locus of control differences. No relationship was found between the social reinforcers and age or locus of control.

In sum, the findings indicate that there is an increase in internality between the ages of six and fourteen years. In addition, there is some validation evidence to suggest that with increased age, the internals' preference both for verbal abstraction and for a cognitive approach to a task can be observed; significant performance differences are apparent when the performance of internals is compared with the performance of externals. Less clear are the kinds of social reinforcers which affect locus of control performance and age.

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100 Bialer, op. cit., 1961, p. 303-320.

## 5. LOC and Skill/Chance.

This section discusses the relationship between LOC and skill/chance. It provides a perspective for interpreting the experimental findings reported in the other parts of this section. Part one of this section reports experimental findings relating LOC and skill/chance with adults. A second part of this section presents research which examines LOC and skill/chance with children.

Much of the research in locus of control with adults has focused on situations involving skill and chance manipulations. The skill and chance concept is a major aspect of Rotter's<sup>101</sup> definition of locus of control. From previous studies cited<sup>102,103,104</sup> in this review, it can be seen that skill/chance instructions are situation defining, environmental variables which can alter expectancy of reinforcement. Another way presented to operationalize the locus of control concept is through the use of a scale to measure the individual's beliefs about expectancy. It follows that behavioral prediction based on these methods of operationalizing the locus of control concept should be additive. By definition, internals should prefer skill conditions, while externals should prefer chance conditions. Each of these methods of operationalizing the

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101 Rotter, op. cit., 1966, p. 1.

102 Phares, op. cit., 1957, p. 339-342.

103 James and Rotter, op. cit., 1958, p. 397-403.

104 Holden and Rotter, op. cit., 1962, p. 519-520.

expectancy concept represent a different aspect of Rotter's<sup>105</sup> social learning theory. The use of scales to define locus of control orientation is a measure of expectancy within the individual, while the use of skill/chance instructions environmentally define expectancy for the particular psychological situation. In order to predict behavior, the conditions under which the expectancy of reinforcement related to the individual's personal beliefs, values, and attitudes as represented by a score on the locus of control scale and the expectancy of reinforcement defined by situational variables in the environment and represented by skill/chance instructions has been examined.

a. LOC and Skill/Chance with Adults.

Rotter and Mulry<sup>106</sup> wanted to show that skill and chance instructions and the locus of control variable interact to alter the length of time a person takes to make a decision. The authors reasoned that if expectancy remains constant, making a correct judgment in a difficult task will make the correct task response more valued for the subject. Those persons who value the outcome of their decisions would take longer to decide than individuals who did not place a value on the outcome of their decisions. The authors predicted that internals in a skill condition would have longer decision times on a difficult

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<sup>105</sup> Rotter, Chance, and Phares, op. cit., 1972, p. 1-43.

<sup>106</sup> J.B. Rotter and R.C. Mulry, "Internal Versus External Control of Reinforcement and Decision Time," Journal of Personality and Social Psychology, Vol. 2, No. 4, 1965, p. 598-604.

discrimination task. Externals would have longer decision times on a difficult discrimination task which they perceived as chance determined. Male and female undergraduates were divided into internal and external groups on the basis of scores obtained on the I-E scale. Each group was further subdivided, half receiving skill instructions and half receiving chance instructions. Subjects were asked to perform on a difficult angle matching task similar to one used by Phares.<sup>107</sup> This task was reported by the examiners as very difficult, one which allowed the examiners to indicate a correct or incorrect match without the subject's questioning that judgment. The examiner stood behind the subject and measured decision time without the subject's knowledge. Decision times for internals given skill instructions were significantly longer than for internals given chance instructions. A significant difference was also found for length of decision time between internals and externals in the skill conditions. The difference between skill and chance conditions for externals was not significant. Most of the changes in decision time were found in the internal group. The authors reasoned that the lack of significance for the external group in this study was that externals were selected more from the middle of the internal-external continuum than from the external end of the continuum.

In addition to replicating the findings of Rotter and Mulry<sup>108</sup> for internals given skill and chance instructions, Julian and

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107 Phares, op. cit., 1957, p. 339-342.

108 Rotter and Mulry, op. cit., 1965, p. 598-604.

Katz<sup>109</sup> wanted to determine the conditions under which skill and chance instructions could differentiate the performance of externals. Julian and Katz examined the hypothesis that, under skill conditions, internals would be more motivated by skill determined rewards than externals, whereas externals would be more motivated by chance determined rewards. To examine these hypotheses, two studies were conducted. In the first, male and female college students were divided into internal and external groups and told they were competing in a game for points. Three ways to obtain points were established. Subjects could rely on themselves, an unknown opponent (who was the examiner), or withdraw from that trial of the game. The examiner electronically controlled reinforcement feedback for both groups. Subjects who relied on their opponent's judgment had a better chance of winning than those who relied on their own skill to gain points. In addition to accumulating points, response time was used as a measure of motivation. The author found that the internals relied on themselves despite the built-in disadvantage, while the externals relied on their opponent. In addition, internals responded more quickly for easy items and had longer decision times for hard items. Both these findings are consistent with the findings of Rotter and Mulry that decision times are related to locus of control orientation. In this study, the authors realized that the task was presented as a skill condition to all subjects; therefore, the corollary

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109 J.W. Julian and S.B. Katz, "Internal Versus External Control and the Value of Reinforcement," Journal of Personality and Social Psychology, Vol. 8, No. 1, 1968, p. 89-94.

prediction that externals would be more motivated by chance determined rewards than internals could not be tested. Thus, Julian and Katz<sup>110</sup> report a second study. It was conducted using a similar undergraduate population and skill and chance instructions. Subjects were divided into four groups--internals who received skill instructions, internals receiving chance instructions, externals with skill, and externals with chance instructions. As in the first experiment, the examiner electronically controlled feedback. Subjects were presented a series of numbers and asked to choose the next number of the series from three choices presented by the examiner. The authors report internals relied more on their own ability than on the more competent opponent in both skill and chance instructed conditions. Externals relied more on their opponent in both skill and chance instructed conditions. Skill and chance instructions did not affect performance, and the expected interaction with locus of control, predicted from the Rotter and Mulry study, was not found.

In an attempt to explain the inconsistent findings reported above, Watson and Bauma<sup>111</sup> proposed that anxiety interfered with the performance of internals given chance instructions and externals given skill instructions. Consistent with social learning theory, the authors reasoned that internals preferred situations that were under personal

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<sup>110</sup> Ibid.

<sup>111</sup> D. Watson and E. Bauma, "Effects of Locus of Control and Expectation of Future Control upon Present Performance," Journal of Personality and Social Psychology, Vol. 6, No. 2, 1967, p. 212-215.

control and that externals preferred situations where control was external. The authors noted the above conditions were congruent with expectations. The authors departed from social learning theory when they reasoned that incongruent situations (i.e., internals given chance instructions and externals given skill instructions) create anxiety and thus interfere with performance on complex tasks. The authors established an avoidance learning situation using threat of electric shock. Four groups were established; internal and external locus of control subjects, crossed with chance and skill instructions. Subjects were told they would learn two sets of nonsense syllables. The skill groups were informed that avoidance of electric shock in the second task was dependent on their skill. The chance groups were told avoidance of electric shock in the second task was a matter of luck or chance. Only the first set of nonsense syllables was presented. The second list was not presented and no electric shock was given. As predicted, the internals made more errors in learning with the chance instructions. These findings are in accord with social learning theory and do not provide any distinguishing empirical evidence for the author's alternate, anxiety hypothesis. Watson and Bauml<sup>112</sup> found significant interactions as social learning theory would predict, but the introduction of the situational variable of electric shock did little to clarify the theoretical issue relating skill/chance to locus of control. It could be

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<sup>112</sup> Ibid.

hypothesized from the Watson and Bauma<sup>113</sup> study that more intense, emotional situations may actually enhance locus of control and skill/chance interaction effects.

Lefcourt, Lewis, and Silverman<sup>114</sup> used skill/chance instructions to examine several social learning hypotheses relating locus of control to the motivational value of skill and chance instructions. Specifically, the authors wanted to replicate the Rotter and Mulry<sup>115</sup> findings that internals given skill instructions have longer decision times than internals given chance instructions. The authors were also interested in determining if the effects of skill or chance instructions were more noticeable at the beginning or toward the end of the trials. Social learning theory would predict the effect would be more prominent at the outset of a task, since as experience is gained in a specific situation, all other factors become less important in predicting performance.<sup>116</sup> Lefcourt, et al.<sup>117</sup> also wanted to examine the effects locus of control orientation and skill/chance instructions have on the value placed on success in a task. To test these hypotheses,

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113 Ibid.

114 H.M. Lefcourt, L. Lewis, and I.W. Silverman, "Internal Versus External Control of Reinforcement and Attention in a Decision-Making Task," Journal of Personality, Vol. 36, 1968, p. 663-682.

115 Rotter and Mulry, op. cit., 1965, p. 598-604.

116 J. Rotter, "Some Problems and Misconceptions Related to the Construct of Internal Versus External Control of Reinforcement," Journal of Consulting and Clinical Psychology, Vol. 43, No. 1, 1975, p. 56-67.

117 Lefcourt, Lewis, and Silverman, op. cit., 1968, p. 663-682.

male and female undergraduates were formed into four groups by locus of control and instructional set--internal/skill, internal/chance, external/skill, and external/chance. They were asked to perform on a motor skill task using the Level of Aspiration Board described by Rotter.<sup>118</sup> Subjects stated their expectancy for success or failure which was recorded by the experimenter for each trial. Locus of control and locus of control interaction with skill/chance instructions was not found to be significant. Initial data analyses further revealed skill and chance instructions produced significant differences in altering expectancy for success. As predicted, differences in trial blocks were found. All subjects took less time to decide as experience on task increased. Since the subject's perception of the task as skill or chance determined may have effected expectancy, subjects were asked by the examiner after the experiment if they felt the task was skill or chance determined. When the data were analyzed on the basis of the subject's perception of the task as one of skill or of chance, the predicted interaction effects were found for decision time. Internals had longer decision times when the task was perceived as skill dependent than when the task was perceived as chance dependent. Externals had longer decision times when they perceived the task as chance determined as compared to when they perceived the task as skill determined. The authors concluded that internals were more dubious about accepting the examiner's description

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<sup>118</sup> J.B. Rotter, Social Learning and Clinical Psychology, Englewood Cliffs, N.J., Prentice-Hall, 1954, p. 313-326.

of a task as chance determined than were externals. However, internals are more accepting of the examiner's skill instructions since there is some opportunity to control the task.

To summarize, the evidence suggests internals perform better with skill instructions and in skill determined situations and externals with chance instructions and in chance determined situations. Externals' behavior is more predictable when the task is manipulated rather than the instructions. The situations under which skill and chance are valued as a reinforcer and the situations under which skill/chance alter expectancy are important considerations when predicting skill/chance outcomes and their relation to locus of control.

The study of Watson and Baumal<sup>119</sup> obtained results consistent with predictions made by social learning theory, but also not inconsistent with the interpretation that a moderate level of anxiety interferes with learning in incongruent situations. Petzel and Gynther<sup>120</sup> wanted to clarify the theoretical issue concerning skill/chance instructions and locus of control. Male undergraduates were placed in four groups according to locus of control orientation and skill and chance instructions--internal/skill, internal/chance, external/skill, and external/chance. Ten anagrams were presented to each subject. Before each anagram, subjects indicated their chance of success by marking a scale

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<sup>119</sup> Watson and Baumal, op. cit., 1967, p. 212-215.

<sup>120</sup> T.P. Petzel and M.D. Gynther, "Effects of Internal-External Locus of Control and Skill or Chance Instructional Sets on Task Performance," Journal of General Psychology, Vol. 82, 1970, p. 87-93.

from zero to one hundred. Surprisingly, the findings were the exact reversal of the social learning predictions. Internals completed more anagrams when given chance instructions than skill instructions. Externals completed more anagrams when given skill instructions than when given chance instructions. The authors conclude that the interpretation of these findings cannot be based on social learning theory related to skill and chance, but the authors provide no sound theoretical base to interpret their findings. Petzel and Gynther<sup>121</sup> note that reinforcements in their study and the Watson and Bauml<sup>122</sup> study were based on the subject's recognition of a correct response. In the Rotter and Mulry<sup>123</sup> study, reinforcement was dependent on the examiner's verbal report. Petzel and Gynther<sup>124</sup> suggest that examiner influence affects the Rotter and Mulry<sup>125</sup> results because of the direct examiner feedback to the subject of correct or incorrect. Petzel and Gynther<sup>126</sup> claim that their study and the Watson and Bauml<sup>127</sup> study did not have the experimenter influence because no feedback was given the subject by the examiner.

In addition to examiner feedback, which can affect prediction because of its value as a reinforcer, the degree to which a task demands

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121 Ibid.

122 Watson and Bauml, op. cit., 1967, p. 212-215.

123 Rotter and Mulry, op. cit., 1965, p. 598-604.

124 Petzel and Gynther, op. cit., 1970, p. 87-93.

125 Rotter and Mulry, op. cit., 1965, p. 598-604.

126 Petzel and Gynther, op. cit., 1970, p. 87-93.

127 Watson and Bauml, op. cit., 1967, p. 212-215.

cognitive or performance responses by the individual may affect prediction. The matching task of Rotter and Mulry<sup>128</sup> is complex and demanding of the subject's attention and cognitive ability. Another complex cognitive task is the paired association and learning task of Watson and Baumal.<sup>129</sup> Both are tasks which require the subject to make repeated judgments. In both tasks, the subject received both immediate and definitive feedback. Task response was either right or wrong. In the Petzel and Gynther<sup>130</sup> study, an anagram task was used. Here correct and incorrect were more obvious to the subject and cognitive judgments concerning correctness not as important as persistence to goal. At first, this seems inconsistent with earlier findings, but the relation of LOC to skill and chance may be more complex than originally thought. It has been repeatedly suggested in the literature that an internal sees reinforcement as contingent on his own skill. In more complex cognitive situations the subject can develop the required skills and get immediate feedback on his progress. In a less challenging, less complex situation requiring less immediate judgment, the same person seems to recognize that he can easily accomplish the required task. A more plausible interpretation of the Petzel and Gynther<sup>131</sup> results may be that internals given skill instructions in the less complex situation may accurately

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128 Rotter and Mulry, op. cit., 1965, p. 598-604.

129 Watson and Baumal, op. cit., 1967, p. 212-215.

130 Petzel and Gynther, op. cit., 1970, p. 87-93.

131 Ibid.

assess the reality of the situation and resist the examiner's influence by performing opposite to the examiner's instruction. Ironically for the internal, the examiner's influence becomes the challenge to be overcome by his skill and determination. This line of reasoning is supported by the findings reported earlier on pages 17 and 18 relating LOC and resistance to examiner influences.<sup>132,333</sup> The Petzel and Gynther<sup>134</sup> results may suggest that the internal's behavior reflects a more cognitive analysis of the actual situation; more cognitive, especially when, as Watson and Brumal<sup>135</sup> and Lefcourt, et al.'s<sup>136</sup> results suggest, there is an incongruence between what the internal is told and the reality he perceives.

The external is influenced by others as well as skill and chance conditions. In the Petzel and Gynther<sup>137</sup> study these factors may be interacting. For example, the external given chance instructions in a simple task situation may have believed the examiner that his performance is a matter of chance and, thus, not put forth much effort. Conversely, the external given skill instructions in a simple task situation can see he can do well and most importantly is told by the examiner that

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<sup>132</sup> Rotter, op. cit., 1966, p. 22-24.

<sup>133</sup> Joe, op. cit., 1971, p. 628-630.

<sup>134</sup> Petzel and Gynther, op. cit., 1970, p. 87-93.

<sup>135</sup> Watson and Bauma1, op. cit., 1967, p. 212-215.

<sup>136</sup> Lefcourt, Lewis, and Silverman, op. cit., 1968, p. 663-682.

<sup>137</sup> Petzel and Gynther, op. cit., 1970, p. 87-93.

he can do well. This is one possible analysis of the unexpected findings of Petzel and Gynther;<sup>138</sup> however, it may help to explain some of the less definitive results to be reported in the child studies.

In sum, the adult studies examining locus of control and skill/chance instructions have reported divergent results, especially for externals given skill and chance instructions. When the task has high cognitive demands, skill and chance instructions seem more effective. On less demanding tasks, where the subject is more in control of the reinforcement he receives, performance may be consistent but opposite to prediction. Petzel and Gynther<sup>139</sup> suggest performance feedback in the form of knowledge of results given by the examiner may alter performance outcome by adding positive or negative value to the reinforcement that the subject receives merely by performing the task. It appears that task selection, the perception of the examiner by the subject, and examiner feedback are important situational and reinforcement variables which effect behavioral prediction. For adults, experimental results obtained under the preceding condition may be accounted for by Rotter's social learning theory when LOC and skill and chance instructions are examined.<sup>140</sup> Within this framework of reasoning, a review of some of the child studies examining locus of control and skill/chance instructions is in order.

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138 Ibid.

139 Ibid.

140 Rotter, Chance, and Phares, op. cit., 1972, p. 1-43.

b. LOC and Skill/Chance with Children.

Published research examining the skill/chance manipulations and locus of control orientation has been largely focused on adult populations, with few studies reported examining these variables in children. Following from the adult studies, internals given skill instructions are hypothesized to perform better than internals given chance instructions; while externals given chance instructions are hypothesized to perform better than externals given skill instructions. As with adults, task selection, sex of subject, age, and socio-economic level are all situational factors which influence prediction with children. This portion of the review will consider the existing evidence for successfully predicting outcomes with skill and chance instructions and locus of control orientation for children.

A study examining the relationship between skill and chance and locus of control with children was reported by Waters.<sup>141</sup> The author, using a persistence task, consisting of a three dimensional wooden puzzle, wanted to detect whether skill and chance instructions would have a functional relationship to locus of control with children. Forty male and forty female subjects aged nine to ten years were assigned to internal or external groups on the basis of their scores on the Nowicki-Strickland Internal-External Locus of Control Scale (CNSIE).<sup>142</sup>

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<sup>141</sup> D.B. Waters, "Differential Effects of Skill and Chance Instructions on Persistence Time and Attention Breaks as a Function of Locus of Control in Elementary School Children," Unpublished Doctoral Dissertation, Emory University, Atlanta, Georgia, 1972, p. 1-71.

<sup>142</sup> Nowicki and Strickland, op. cit., 1973, p. 148-154.

Half the internals and half the externals were given skill instructions, while the other half of these groups received chance instructions. They were then asked to complete the wooden puzzle task. Total persistence time was the dependent measure. No main effect differences were reported. A significant three-way interaction between LOC, skill/chance, and sex was reported. Consistent with theoretical prediction, internal males persisted significantly longer than external males under skill instructions and male externals persisted significantly longer than male internals under chance instructions. Female persistence times were not demonstrated to be significantly affected by skill or chance instructions or locus of control orientation. Waters' findings for males are consistent with the prediction based on social learning theory and also consistent with the findings of most of the adult studies.

With regard to the task variable, Waters further hypothesized, "an inherently less interesting task would provide even stronger results of the kind reported here."<sup>143</sup> The author found that any combination of two or three puzzle pieces fit together in some way and provided some success for the subject which may have influenced expectancy outcomes. However, if the analysis of the Petzel and Gynther<sup>144</sup> study just reported is correct, the elimination of task related reinforcement could significantly alter skill/chance and LOC outcomes. Whether this analysis is applicable to children remains to be demonstrated.

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<sup>143</sup> Waters, op. cit., 1972, p. 46.

<sup>144</sup> Petzel and Gynther, op. cit., 1970, p. 87-93.

Rather than using a perceptual motor persistence task as did Waters,<sup>145</sup> Short<sup>146</sup> used an anagram task to examine the effects of skill and chance instructions and locus of control orientation on persistence. Third and sixth grade male and female subjects were administered the CNSIE scale. Each subject received skill and chance instructions just prior to the presentation of each of two equivalent sets of anagrams, which were presented in a counter-balanced fashion. The expected locus of control and skill/chance interaction was not obtained. Sixth grade internal males persisted significantly longer than sixth grade external males, while no significant difference between females was observed. Third grade internal females persisted longer than third grade external females, but no difference is reported between internal and external third grade males. No differences related to skill or chance instructions were reported.

In sum, the results of these two child studies suggest that the functional relationship between skill and chance instructions and locus of control found in the adult studies shows some applicability to children, particularly males. The conditions under which these variables interact need clarification, specifically the type of task and length of time on task may affect results. As reported earlier, Rotter<sup>147</sup>

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<sup>145</sup> Waters, op. cit., 1972, p. 1-71.

<sup>146</sup> N.L. Short, "Persistence in Children as a Function of Developmental Level, Locus of Control, and Skill and Chance Instructions," Unpublished Honor's Thesis, Emory University, Atlanta, Georgia, 1976, p. 1-27.

<sup>147</sup> Rotter, op. cit., 1975, p. 56-57.

suggests that all variables have less effect as experience with a particular situation is gained. The use of total persistence time as a dependent measure may be masking initial effects of skill/chance instructions. The above findings are more consistent for males than females. The divergent results of Waters<sup>148</sup> and Short<sup>149</sup> suggest that task selection may be a critical variable to control in future studies, along with sex and age of subject. A cognitively oriented perceptual motor persistence task was more effective in obtaining the locus of control and skill/chance interaction than the more verbal cognitively involving anagram task. Age of the subject is also important since as age increases there is a concomitant increase in mental ability. From the developmental studies cited earlier, internals are known to prefer verbal abstractions and cognitive approaches to task solution. Further clarification of the factors affecting outcomes involving the locus of control and skill/chance interaction may be found in the incentive literature. Since the incentive literature examines effects of skill and chance instructions within an expectancy of reinforcement model, this literature may clarify further the conditions under which locus of control and skill/chance operate with children. In particular, the influence of expectancy versus the influence of reinforcement on performance outcomes could be clarified.

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148 Waters, op. cit., 1972, p. 1-71.

149 Short, op. cit., 1976, p. 1-27.

## B. Incentives.

This section is divided into four parts. Part one defines incentive, reinforcer, and reward and discusses scaling of incentive values. Part two presents studies reporting experimental outcomes using verbal and material rewards and incentives. Part three examines social incentives and task considerations, and the fourth section reviews studies dealing with skill and chance and situational considerations.

### 1. Incentive, Reinforcer, and Reward.

In the first part of this section, the terms incentive, reinforcer, and reward will be defined. Because the meanings of these terms are closely related, they are frequently used interchangeably. This has led to confusion and misinterpretation of experimental findings. The second part of this section presents experimental findings concerned with scaling incentive values. Early researchers in the incentive area were concerned with determining the value of incentives. Since incentive values are determined by reward values, researchers used the method of paired comparison to define the value of reward objects.

#### a. Definitions.

When examining incentive research, terminology often impedes clarity. In order to provide a standard for comparing and interpreting research results, the terms incentive, reinforcer, and reward will be defined.

Incentive research suggests behavior is regulated by anticipation or expectation of future events which motivate the individual toward desired goals. This section will attempt to show the relationship between Rotter's social learning theory<sup>150</sup> and incentive theory.<sup>151</sup> In order to establish a reference point from which theoretical reasoning may proceed, definitions of incentive, reward, and reinforcement set forth by Witryol<sup>152</sup> and Reese and Lipsitt<sup>153</sup> will be used.

i) Incentives. -- Witryol defines an incentive as "a construct which accounts for the anticipation of reward following experiences with a reward."<sup>154</sup> The concept of anticipation or expectancy of reward is central to the definition of incentive. Similarly, Reese and Lipsitt have defined an incentive stimulus as "a stimulus that elicits expectation of reward."<sup>155</sup>

ii) Reinforcer. -- According to Witryol,<sup>156</sup> "a reinforcer is any event that increases the probability or any other index of strength of the response which it follows."

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150 Rotter, Chance, and Phares, op. cit., 1972, p. 1-43.

151 Witryol, op. cit., 1971, p. 1-61.

152 Ibid.

153 H.W. Reese and L.P. Lipsitt, Experimental Child Psychology, New York, Academic Press, 1970, p. 311-355.

154 Witryol, op. cit., 1971, p. 4.

155 Reese and Lipsitt, op. cit., 1970, p. 320.

156 Witryol, op. cit., 1971, p. 4.

iii) Reward. -- Witryol further states, "a reward is a kind of reinforcement which operates in more varied situations than do reinforcers."<sup>157</sup>

Witryol<sup>158</sup> feels that reinforcement operates in a general way to elaborate response strength, while rewards have similar properties to reinforcers but are seen more specifically as motivators.

One of the problems with research on incentives and reward is that researchers have often used rewards sequentially to produce repeated incentive conditions and thereby have confounded the distinction between incentive and reward. Therefore, the manuscript will adhere closely to the definitions of Witryol<sup>159</sup> and Reese and Lipsitt.<sup>160</sup> In reporting the works of previous researchers, an evaluation of their findings and, if necessary, an interpretation of their findings within the framework of the definitions specified above will be made.

b. Scaling Incentive Values.

Much research in incentive literature has focused on responsiveness of children to both material and verbal incentives. Incentives are mental constructs operating within the organism which anticipates rewards and as such are difficult to observe and measure. The value of

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<sup>157</sup> Ibid.

<sup>158</sup> Ibid.

<sup>159</sup> Ibid.

<sup>160</sup> Reese and Lipsitt, op. cit., 1970, p. 311-355.

the incentives is based on the value of the reward. Since rewards are more concrete, measurable, and observable, early researchers were concerned with establishing reward values so that predictions concerning rewards and incentives could be made. The studies reviewed in this section will examine the scaling of material and verbal rewards as to value. In the studies to follow, reward objects are presented to the subject, and the subject is asked to indicate his preference.

Witryol,<sup>161</sup> in reviewing this area, cites supportive studies which indicate reliable differences in reward preference can be found in children. For example, Witryol and Fischer<sup>162</sup> used twenty-seven nursery school children with a mean age of three years eleven months to determine the reward value of different objects. The authors used the method of paired comparison to present bubble gum, a balloon, a charm, a marble, and a paper clip to the children. While the authors note the narrow range of reward values, differences were obtained, with bubble gum as the most valued and progressing to the paper clip, in the order cited above, as the least valued.

Witryol and Alonzo<sup>163</sup> were interested in determining the effects of social influences upon scaled reward values. The authors partially

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161 Witryol, op. cit., 1971, p. 1-61.

162 S.L. Witryol and W.F. Fischer, "Scaling Children's Incentives by the Method of Paired Comparison," Psychological Reports, Vol. 7, 1960, p. 471-474.

163 S.L. Witryol and A.A. Alonzo, "Social Manipulations of Preschool Children's Paired Comparisons Incentive Preferences," Psychological Reports, Vol. 10, 1962, p. 615-618.

replicated the Witryol and Fischer study by having preschool children with a mean age of four years three months rank the same rewards of bubble gum, a balloon, a charm, a marble, and a paper clip. Two separate presentations of the rewards were made. Before the second presentation, the authors told their preschool subjects that the paper clip was preferred by one of the subject's friends. This social manipulation caused the rank order of the paper clip to rise from last place in value during the first session to first place during the second session. Thus, social norms can influence reward preference.

Witryol, Tyrell, and Lowden<sup>164</sup> examined material rewards and verbal rewards for value preference at three developmental levels. The authors selected twenty boys and twenty girls from each of grades one, three, and five. Each subject ranked a penny, a charm, bubble gum, and "very good boy (girl)," and nothing for preference value. There was a small, but reliable, scale separation of rewards when compared to the "nothing" control condition. The fifth grade boys and girls showed a preference for the verbal reward over the material reward and control condition. The exception to this was fifth grade boys who showed an equal preference for the penny and the verbal reward.

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<sup>164</sup> S.L. Witryol, D.J. Tyrell, and L.M. Lowden, "Development of Incentive Values in Childhood," Genetic Psychology Monographs, Vol. 72, 1965, p. 201-246.

Witryol and Ormsby<sup>165</sup> also examined reward preference at three developmental levels. The authors selected twenty male and twenty female subjects in each of three grades--kindergarten, third, and sixth. The children were presented four material rewards of a charm, a nickel, bubble gum, and M & M candy. Two verbal rewards of "you are doing better than anyone else" and "you are doing better than you did before" were also presented. The authors, using the method of paired comparison, found that with kindergarten children material rewards were preferred over verbal rewards. With older children of third and sixth grade levels, verbal rewards were more preferred over material rewards. This shift in preference from material to verbal rewards with age suggests the increased value of verbal rewards with age.

To summarize, preference for material and verbal rewards is greater than no reward. The preference for material rewards is noted for younger children. Preference for verbal rewards is noted for older children, by fifth grade. In addition, verbal and material reward values can be reliably scaled for differences; however, social norms can influence scaled reward values.

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<sup>165</sup> S.L. Witryol and E.L. Ormsby, "Age Trends in Children's Incentives Scaled by Paired Comparison," Paper presented to Eastern Psychological Association, Philadelphia, April, 1961, as cited by Witryol, *op. cit.*, 1971, p. 6-7.

## 2. Verbal and Material Rewards and Incentives.

As noted from the previous section, reliable differences in preference between material and verbal rewards can be scaled; however, the motivational qualities of these rewards need to be demonstrated by behavioral differences in a variety of task situations. Quite often, in order to examine performance outcomes associated with rewards, the effects of rewards have been confounded with the effects of the incentive created by the reward. In the studies which follow, the author's terminology will be used and any confounding reported and discussed. To date, studies have primarily used discrimination learning tasks to examine the effects of rewards and the resulting incentive conditions; however, there are a few studies which examine the effects of rewards and incentives in other task situations. In this section, discrimination learning tasks as well as other tasks will be examined as they affect prediction when various rewards and incentives are used.

Terrell and Kennedy<sup>166</sup> examined the relative effectiveness of different rewards on discrimination learning in children. One group of eighty children, aged four to five, and an older group of eighty children, aged eight to nine, were asked to perform on a task requiring simple size discrimination. At each age level, children were divided into groups given rewards of verbal praise, verbal reproof, candy, a

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<sup>166</sup> G. Terrell, Jr. and W.A. Kennedy, "Discrimination Learning and Transposition in Children as a Function of the Nature of the Reward," Journal of Experimental Psychology, Vol. 53, No. 4, 1957, p. 257-260.

token, or a control condition with no reward. At each age level, candy was a significantly more effective reward than any other condition, both in acquiring the required discriminations and in transposing the learning to another situation. Verbal praise approached significance when compared to the control condition. According to the definitions presented in the introduction, the reward and incentive concept is confounded since the effects of the rewards cannot be separated from the effects of the incentive.

In a follow-up study, Terrell<sup>167</sup> compared two types of delayed incentives with each other and an immediate incentive on the same discrimination learning task as in the above-mentioned study.<sup>168</sup> A four to five year old group and an eight to nine year old group, each containing twenty male and twenty female subjects, performed on a discrimination learning task for which a correct discrimination response resulted in a light flash. For each age and sex group, four incentive conditions were administered in addition to the light flash which all subjects received. In the first condition, the immediate incentive was a candy presented after each correct response. In the second condition, a delayed incentive required the subject to transfer a bean from one jar to another in order to receive a candy. The third condition was another delayed incentive in which the examiner promised the

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<sup>167</sup> G. Terrell, Jr., "The Role of Incentives in Discrimination Learning in Children," Child Development, Vol. 29, No. 2, 1958, p. 231-236.

<sup>168</sup> Terrell and Kennedy, op. cit., 1957, p. 257-260.

subjects a candy after they had made the light flash enough times. The fourth and final condition was a control condition in which the subjects received a light flash for a correct response. The author considered the light flash a reward condition. The author found that the second or delayed incentive condition of the candy reward and the fourth or control condition were more effective than the promised candy incentive condition in increasing quickness of acquisition on a discrimination learning task for both age and sex groups examined. It is interesting to note that the results of the second condition or delayed incentive condition may be interpreted as a combination of a promised reward of candy and a material reward of a bean. Reward seemed more effective in changing behavior than the incentive. In fact, the incentive condition may have interfered with performance since in the control condition performance was significantly better than the third or delayed incentive condition which did not offer a material reward. Again, confounding of the reward and incentive concepts is noted.

To examine the effect of different monetary incentive and need achievement on the discrimination learning of children, Miller and Estes<sup>169</sup> designed a simple study. Seventy-two, nine year old normal male subjects were divided into a high and a low need achievement group. Each of these groups was further subdivided into three incentive conditions of one cent, fifty cents, and knowledge of results

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169 L. Miller and B. Estes, "Monetary Reward and Motivation in Discrimination Learning," Journal of Experimental Psychology, Vol. 61, No. 6, 1961, p. 501-504.

(control) and administered a visual discrimination learning task. Significantly more errors were made by the groups which actually received the monetary reward than by the group which was signaled by a red lamp (knowledge of results) for choosing the correct alternative. Again, the possibility of confounding resulting from the direct delivery of the monetary reward must be considered.

In a follow-up study using male and female adults, Estes, Miller, and Curtin<sup>170</sup> wanted to determine if monetary incentives were associated with more errors in discrimination learning than a control condition in which the subject was given performance feedback. Male and female college students were administered the same visual discrimination learning task used by Miller and Estes.<sup>171</sup> No incentive effects were obtained for males. Females made fewer errors than males. The authors attribute the females better discrimination to cultural differences. The authors suggest that females' training might include attention to minute facial details. In addition, females responded significantly better to the twenty-five cent reward than to the one-cent reward or the performance feedback control condition. It may be concluded that for male adults monetary rewards do not seem to enhance performance, therefore leaving in doubt its value as a reward or

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170 B. Estes, L. Miller, and M. Curtin, "Supplementary Report: Monetary Incentive and Motivation in Discrimination Learning-Sex Differences," Journal of Experimental Psychology, Vol. 63, No. 3, 1962, p. 320.

171 Miller and Estes, op. cit., 1961, p. 257-260.

incentive. The repeated delivery of the monetary rewards to create incentive conditions suggests confounding.

In a study by McCullers and Martin,<sup>172</sup> the authors wanted to determine if information feedback could influence the high and low incentive value of objects. The authors selected thirty-three male and thirty-nine female fourth graders to perform on a simple form discrimination task in which subjects were asked to choose a circle or triangle. Having selected the most and least preferred objects by the method of paired comparison for each subject, eight experimental conditions were created, leaving nine subjects per cell. The experimental conditions included every combination of correct and incorrect feedback with every reward object, most and least preferred object with no feedback, and two conditions in which no incentive object was offered, with feedback of "yes" for correct discriminations. In one of these conditions, the examiner informed the subjects that he would be told "yes" for a correct response, while in the other condition the examiner did not inform the subject that "yes" would indicate a correct response. Results suggest that higher value incentives yielded better performance irrespective of correct or incorrect information feedback received. However, the condition with no reward object and verbal reinforcement from the examiner where the subject knew what was expected produced the best performance of all conditions. The authors conclude that the

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<sup>172</sup> J.C. McCullers and J.A. Gardiner Martin, "A Reexamination of the Role of Incentives in Children's Discrimination Learning," Child Development, Vol. 42, 1971, p. 827-837.

delivery of material rewards may interfere with performance on a discrimination learning task with fourth grade male and female subjects.

The findings thus far suggest that monetary rewards are more effective than no reward for female adults, but not for male adults when performance on a discrimination learning task is used as the dependent measure. With children, monetary and material rewards may reduce positive incentive value and thus seem to interfere with performance on a discrimination learning task, while verbal reinforcement seems to enhance incentive level and improves performance.

Research has focused primarily on the effects of rewards and incentives in discrimination learning situations; however, there are some notable exceptions. Researchers have examined the effects of various rewards and incentives in a number of task situations other than discrimination learning. Marshall<sup>173</sup> wanted to examine the effects of material and verbal reinforcers and material and verbal incentives as they interact with social class and task interest. One hundred and sixty white kindergarten children were asked to perform on either a high interest task or a low interest task. Half the subjects were assigned a high interest task consisting of a marble game in which the route of the marble could be seen. A correct route would result in bells ringing and shapes moving. The remaining eighty subjects dropped the marble in the apparatus which was covered so that the mechanisms

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173 H.H. Marshall, "Learning as a Function of Task Interest, Reinforcement, and Social Class Variables," Journal of Educational Psychology, Vol. 60, No. 2, 1969, p. 133-137.

could not be seen and the visual and auditory stimulation were eliminated. Within each task, subjects were further subdivided by sex and middle or low social class so that twenty were in each cell. These twenty subjects were further randomly assigned to one of five reinforcement conditions; knowledge of results, immediate verbal reinforcement, delayed verbal reinforcement (incentive condition), delayed material reinforcement (incentive condition), and a combination condition of the delayed material condition plus the immediate verbal condition. Findings indicate that immediate verbal reinforcement significantly increased the rate of learning over other reinforcement and incentive conditions, irrespective of the social class variable. The author reasons that the delivery of material rewards acts as a distraction and interrupts performance. Verbal rewards help focus attention by providing feedback and facilitating performance. In addition, the group scoring high on the social class variable performed significantly better on the low interest task, while the group scoring low on the social class variable performed better on the high interest task. The delayed incentive conditions were not effective in changing performance. Again, confounding between reward and incentive is noted.

A study by Benowitz and Busse<sup>174</sup> examined the effects of rewards on the spelling performance of fourth graders. The authors found that a material reward of crayons as opposed to the reinforcers randomly

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174 M.L. Benowitz and T.V. Busse, "Material Incentives and the Learning of Spelling Words in a Typical School Situation," Journal of Educational Psychology, Vol. 61, No. 1, 1970, p. 24-26.

generated by the classroom teacher as part of her regular classroom procedure could increase spelling performance of low SES, male and female, fourth grade Negroes. However, lack of a standardized spelling test with equivalent forms limits the utility of these findings.

Jeffrey and Skager<sup>175</sup> wanted to determine if material incentives for a correct response would improve performance on a spatial generalization task which required subjects to press a telegraph key to light cues. A seven and a ten year old group were divided by sex and further assigned to the material incentive condition or a control condition. The author found that for seven year olds, the material incentive of a poker chip, and the incentive condition which allowed the subjects to cash the chip for a movie, improved performance over a control condition. For the ten year old group, the combined material reward and movie incentive did not produce an improvement in performance over the control condition. Again, confounding of incentive and reward conditions is noted.

In sum, verbal rewards which create an incentive stimuli seem more effective in increasing performance on a variety of tasks than material rewards which create incentive stimuli, especially for nine year old and above subjects. After nine years of age, the delivery of material rewards tends to interfere with performance. Prior to nine years of age, material rewards are generally more effective in altering

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175 W.E. Jeffrey and R.W. Skager, "Effects of Incentive Conditions on Stimulus Generalization in Children," Child Development, Vol. 33, 1962, p. 865-870.

performance than verbal rewards. Little can be said concerning the operation of the verbal and material incentives and its ability to change performance, because the reward and incentive conditions have been confounded in the studies presented thus far. The findings suggest reward and incentive effects need to be separated.

### 3. Social Incentive Manipulations and Task.

In the studies reported in the previous section, reward and incentive were confounded because the tasks selected required repeated administration of rewards in order to observe experimental differences. To eliminate the confounding between repeated reward delivery and incentive effects, studies reported in the following section utilize tasks which allowed for the delivery of a reward prior to task participation by the subjects. Hence, the incentive effect related to reward could be observed. A variety of complex and simple tasks are reported. In addition, the effects of various social incentive constructs on performance are examined. The relationship between various verbally induced incentive and other psychological constructs such as need for approval and locus of control are examined.

Social incentives are intangible and involve social concepts which effect behavior such as peer influences, purposive behavior, and self competition, which are more related to broad social values, socially and environmentally learned concepts, and environmentally determined situations. Studies examining these social concepts as incentives will be examined in this section.

Swingle, Coady, and Moore<sup>176</sup> wanted to compare the effectiveness of five incentive conditions with performance feedback in maintaining the lever-pressing behavior of male undergraduates. There were five incentive conditions. In the self-competitive condition (control), subjects were told, "Try to accumulate as many points as possible."<sup>177</sup> This statement was added at the end of the other four conditions. The class norm condition stated, "Most males in your class obtain about 450 points or about ten per trial; try to accumulate ..." For the social competition condition, instructions were, "You are competing against five other persons; ..." <sup>179</sup> The social competition for monetary reward condition stated, "You are competing against five other persons for \$2.50; ..." <sup>180</sup> The final condition, monetary reward, stated, "You will receive one cent for every five points you accumulate; ..." <sup>181</sup> Marked heterogeneity in the self-competitive condition suggests two separate populations within this group which were significantly different. The other four incentive conditions did not produce significantly different behavior from each other. In the self competitive condition, the

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176 P. Swingle, H. Coady, and D. Moore, "The Effects of Performance Feedback, Social and Monetary Incentives upon Human Lever Pressing Rate," Psychonomic Science, Vol. 4, No. 6, 1966, p. 209-210.

177 Ibid., p. 209.

178 Ibid., p. 209.

179 Ibid., p. 209.

180 Ibid., p. 209.

181 Ibid., p. 209.

experiment stated, "Try to accumulate as many points as possible." These results suggest that self competition established expectancy for some subjects and did not establish expectancy for other subjects. In this regard, it is interesting to note that the verbal instructions given by the examiner in the self-competitive condition would be more valued by internals than externals.

Coady and Brown<sup>182</sup> reasoned that need for social approval may be a mediating variable when examining various social incentives. To explore this hypothesis, the author selected one hundred and twenty male and female eight to ten year old children and divided them into high need for approval and low need for approval groups using scores obtained on the Children's Social Desirability Questionnaire.<sup>183</sup> From these groups, subjects were further subdivided to receive either a norm-based incentive, a competitive incentive, or no incentive (control). The norm-based incentive was "most children your age do well at this task,"<sup>184</sup> while the competitive incentive stated "you have a chance to win a prize."<sup>185</sup> The subjects were then presented a page of random numbers and asked to cross out the threes and the sevens. The

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182 H. Coady and M. Brown, "Need for Approval and the Effects of Normative and Competitive Incentives on Children's Performance," Journal of Genetic Psychology, Vol. 132, 1978, p. 291-298.

183 V.C. Crandall, V.J. Crandall, and W.A. Katkovsky, "A Children's Social Desirability Questionnaire," Journal of Consulting Psychology, Vol. 29, 1965, p. 27-36.

184 Coady and Brown, op. cit., 1978, p. 294.

185 Ibid.

number of threes and sevens canceled was the dependent measure. The author found that high need for approval subjects performed significantly better under the norm induced incentive, while the low need for approval subjects responded better under the competitive induced incentive. The author concludes that children who have a high need for social approval conform to peer group norms to avoid disapproval.

In another study, Morris and Coady<sup>186</sup> examined the mediating effects of need for social approval on incentives induced by verbal instructions. The social incentive group was instructed "most of your friends do very well in this game, and they are liked and praised by many boys and girls when they do well."<sup>187</sup> The material incentive group was told that they had a chance to win a prize if they did well, while the control group received no special instructions other than those needed to perform on the probability task. One hundred and eighty, male and female, eight and nine year old children were divided by sex and high and low need for social approval. High need for social approval subjects gave more maximizing responses than low need for social approval subjects. In addition, high need for social approval subjects place a significantly higher value on the social incentive. The authors discuss their findings as related to Rotter's<sup>188</sup> social

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186 P. Morris and H. Coady, "The Effects of Need for Approval and Incentives upon Children's Probability Learning Responses," Child Development, Vol. 45, 1974, p. 862-865.

187 Ibid., p. 863.

188 Rotter, Chance, and Phares, op. cit., 1972, p. 1-43.

learning theory presented earlier. Morris and Coady<sup>189</sup> interpret their findings as indicating that social reinforcement has a high value for high need for social approval subjects. Expectancy to receive approval and the low confidence in their ability to attain approval is presumably based in their reinforcement history. As Rotter<sup>190</sup> notes, behavior is the result of expectancy of receiving reinforcement and the value of the reinforcement, both of which operate independently. High need for social approval subjects value social reinforcement more than low need for social approval subjects. The greater responsiveness of high need for social approval subjects to the social incentive condition could reflect the greater reinforcement value of the social incentive which created a greater expectancy for the group. In agreement with Rotter, the authors note that expectancies are learned in previous situations and transferred to specific tasks or situations. The authors suggest that expectancy in the developing child can be elevated by incentives. It remains for other researchers to determine the type of incentives which produce such measurable elevations in expectancy in other situations with children.

The findings thus far suggest that social incentives can alter performance on a simple digit-canceling task and on probability learning tasks. In addition, the need for social approval is a mediating

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189 Morris and Coady, *op. cit.*, 1974, p. 862-865.

190 Rotter, Chance, and Phares, *op. cit.*, 1972, p. 1-43.

variable. The Morris and Coady<sup>191</sup> statements concerning expectancy theory and the value of reinforcers suggest another area which would help define the conditions under which incentives operate; that is, locus of control.

To explore the relationship between incentives and expectancy outlined by Morris and Coady,<sup>192</sup> Bastien<sup>193</sup> examined the relationship of verbally induced social and material incentives with three levels of locus of control orientation. Thirty male and thirty female subjects ranging in age from eight to eleven years were asked to perform on a digit-canceling task. Three incentive conditions were presented to each level of locus of control. For the social incentive it was stated, "Most children your age do very well on this task."<sup>194</sup> A material incentive stated, "You have a chance to win a prize."<sup>195</sup> For a control condition, no statement other than the direction for the task was made. As expected, the author found internal locus of control subjects performed significantly better than external locus of control subjects, while a middle group did not significantly differ from the extreme locus of control groups. No differences between incentive

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191 Morris and Coady, op. cit., 1974, p. 862-865.

192 Ibid.

193 C. Bastien, "Locus of Control and the Differential Effects of Incentives on Performance," Unpublished Master's Thesis, University of Ottawa, 1976, p. 1-76.

194 Ibid.

195 Ibid.

conditions were found. The author points out that McCullers and Stevenson<sup>196</sup> and Lewis, Wall, and Aronfreed<sup>197</sup> did not find differential incentive effective with children of similar ages. However, differential incentive effects were obtained by these authors with younger children, suggesting age of subject may be a significant factor to consider when predicting incentive outcomes.

In sum, Morris and Coady<sup>198</sup> found that high need for approval children valued social incentives more than material incentives. The findings of Coady and Brown<sup>199</sup> suggest high need for social approval subjects prefer norm-based incentives, while low need for approval children prefer competitive incentives, suggesting that appropriate incentives can significantly alter performance. Bastien<sup>200</sup> reports no relationship between locus of control and preference for two different social incentives. These findings suggest that while the social and material rewards may be valued by internals and externals, the social and material rewards used by Bastien to create incentive conditions do not affect the performance of internals and externals. It remains to

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196 J.C. McCullers and H.W. Stevenson, "Effects of Verbal Reinforcement in a Probability Learning Situation," Psychological Reports, Vol. 7, 1960, p. 439-445.

197 M. Lewis, A.M. Wall, and J. Aronfreed, "Developmental Change in the Relative Values of Social and Non-Social Reinforcement," Journal of Experimental Psychology, Vol. 66, No. 2, 1963, p. 133-137.

198 Morris and Coady, op. cit., 1974, p. 862-865.

199 Coady and Brown, op. cit., 1978, p. 291-298.

200 Bastien, op. cit., 1976, p. 1-76.

be determined which rewards create incentive conditions which are effective in differentiating the performance of internals and externals. Other studies examining locus of control and incentive constructs may help clarify the kinds of incentives which motivate internals and the kinds of incentives which motivate externals.

Findings linking locus of control and incentives are also reported by Taub and Dollinger.<sup>201</sup> These authors wanted to examine the differential effects of a material incentive and purpose as an incentive on various levels of locus of control. The authors reasoned from Lefcourt<sup>202</sup> that instructions explaining the purpose and meaning of the subjects' behavior could provide explicit cues and methods to enhance the performance of externals. The authors had male and female, fourth and fifth grade subjects perform for ten minutes on a boring coding task adapted from the W.I.S.C. to assess the relationship between locus of control and the four incentive conditions of material incentive/purpose, material incentive/no purpose, no material incentive/purpose, and no purpose/no material incentive. Under the material incentive conditions, the subjects were instructed, "If you do well, you will receive a candy bar after we're finished."<sup>203</sup> Under the purpose

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201 S.I. Taub and S.J. Dollinger, "Reward and Purpose as Incentives for Children Differing in Locus of Control Expectancies," Journal of Personality, Vol. 43, No. 2, 1975, p. 179-195.

202 H.M. Lefcourt, "Effects of Cue Explication upon Persons Maintaining External Control Expectancies," Journal of Personality and Social Psychology, Vol. 5, No. 3, 1967, p. 372-378.

203 Taub and Dollinger, op. cit., 1975, p. 184-186.

conditions, subjects were told the experiment was trying to determine which shapes were best to use in an instrument panel for the space program. As part of these latter instructions, subjects were told, "The astronaut has to respond quickly to the danger signal, but especially he has to be accurate. That's how you should do this task, quickly and accurately."<sup>204</sup> Subjects in a no purpose condition were told to work "quickly and accurately."<sup>205</sup> For the no material incentive condition, no instructions were given. Findings indicate that for the no material incentive/no purpose condition, internals performed significantly better than externals. Within the internal groups, no significant differences were found between the various incentive conditions. Externals were significantly more motivated by the combined incentive condition than by the control condition. Internals were not motivated by any of the incentive conditions.

It should be noted that the material, the purpose, and the no purpose incentive constructs express concepts valued by internals. For example, the directions stating "if you do well"<sup>206</sup> and "quickly and accurately"<sup>207</sup> express internal values. As such, the no purpose condition cannot be considered a control condition since it expresses concepts valued by internals, but not externals, and differences between

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204 Ibid.

205 Ibid.

206 Ibid.

207 Ibid.

internals and externals would be expected. A study by Bauer illustrates a similar point.

Bauer<sup>208</sup> examined the effects of verbal instruction, anxiety, and locus of control in the intelligence test scores of males and females in the fifth grade. The author felt that boys would be sensitive to the social demands of a testing situation created by the various sets of instructions because of the value boys learn to place on success strivings, while girls' expectancies are more conforming.<sup>209</sup> The Test Anxiety Scale for Children<sup>210</sup> was used to define anxiety, while the IAR<sup>211</sup> measured locus of control orientation. A fifth grade group intelligence test was administered using three sets of instructions. The control group received the standardized instructions accompanying the test. The intelligence instructed group was told the test was an intelligence test designed to find out how "smart," "clever," "bright," and "able" the student was.<sup>212</sup> The achievement group was informed that the test was an achievement test, and instructions emphasized that

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208 D.H. Bauer, "The Effects of Instructions, Anxiety, and Locus of Control on Intelligence Test Scores," Measurement and Evaluation in Guidance, Vol. 8, No. 1, 1975, p. 12-18.

209 B.R. McCandless, Children: Behavior and Development, New York, Holt, Rinehart, and Winston, 1967, p. 544.

210 S.B. Sarason, K. Davidson, F. Lighthall, and R. Waite, "A Test Anxiety Scale for Children," Child Development, Vol. 29, No. 1, 1958, p. 105-113.

211 Crandall, Katkovsky, and Crandall, op. cit., 1965, p. 91-109.

212 Bauer, op. cit., 1975, p. 15.

results depended on how "skillfully"<sup>213</sup> the student used his knowledge and related hard work to high scores. Findings reveal anxiety in boys and girls caused differences in intelligence test performance. Internal locus of control boys achieved significantly better than external locus of control boys. No other sex or incentive differences were obtained. One possible reason for the lack of significance in instruction is that achievement and intelligence instructions emphasize that an individual's performance is related to some factor which is controllable by the individual. The adjectives cited earlier as part of the instructions all convey internal expectation; and under these conditions, differences due to instructions would be observed as locus of control effects but not as incentive effects.

To summarize, task selection emerges as a significant variable when examining the effects of the incentive construct. When more complex tasks are employed, such as probability learning or intelligence tests, the influence of task on LOC and incentive cannot be clearly separated. In order to observe the behavior of internals and externals and the effects of incentive on that behavior, a simple task could be used. The simple task used by Coady and Brown<sup>214</sup> and by Bastien<sup>215</sup> has several advantages. The task requires only simple recognition of numbers and the use of a marking pen. The task has simple, easily

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213 Ibid., p. 15.

214 Coady and Brown, op. cit., 1978, p. 291-298.

215 Bastien, op. cit., 1976, p. 1-76.

understandable directions. Few cognitive or complex learning skills are needed to successfully participate. Because of the lack of inherent interest, the motivation attributed to the various locus of control levels and the incentive conditions could be observed as they emerge with time. In addition, the digit-canceling task has been shown to be sensitive to both locus of control<sup>216</sup> and incentive conditions.<sup>217</sup>

Social and verbal incentives have been shown to alter performance. As expected, social incentives, conveying social approval, are more effective with persons who have a high need for social approval. Less clear are the types of incentives which motivate internal and external locus of control oriented individuals and under what conditions these incentives affect performance. Social and material incentives have not been shown to change performance of locus of control subjects.

Qualities valued more by internals than externals have been emphasized in verbal instructions used as incentive stimuli. In the Bauer<sup>218</sup> study, instructions emphasized purpose and accuracy of performance which reflect internal beliefs and incentive differences were not found. In the Taub and Dollinger<sup>219</sup> study, verbal instructions also present incentive conditions needed to account not only for factors

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216 Ibid.

217 Coady and Brown, op. cit., 1978, p. 291-298.

218 Bauer, op. cit., 1975, p. 12-18.

219 Taub and Dollinger, op. cit., 1975, p. 179-195.

valued by internals, but also for factors valued by externals if differential performance is to be expected. From Rotter's<sup>220</sup> definition of internal and external locus of control and from studies cited in previous sections of this paper, skill oriented activities, directions, and instructions are known to be valued more by internals; chance activities, directions, and instructions are known to be valued more by externals. Use of skill/chance instructions as incentive stimuli might provide necessary baseline data concerning the relationship between incentive and LOC by providing incentive constructs known to have differential value for internals and externals. Since skill and chance instructions are known to have differential reward value in some situations and are also known to define locus of control expectancy, it would seem prudent to examine studies using skill and chance instructions.

#### 4. Skill/Chance and Situational Considerations.

Studies using skill/chance instructions will be presented in this section. An examination of studies using skill/chance instructions with various task and reinforcement conditions could be helpful in predicting outcomes where skill/chance and LOC are concerned.

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220 Rotter, op. cit., 1966, p. 1.

Skill and chance instructions first appeared in the incentive literature with Witryol, et al.'s<sup>221</sup> use of these variables in a study. The authors used skill instructions to operationally define internal locus of control and chance instructions to operationally define external locus of control in much the same manner as Rotter and his early associates.<sup>222,223,224</sup> Witryol, et al.<sup>225</sup> wanted to examine the relation between locus of control expectancy as defined by skill and chance instructions and verbal and material incentives at three developmental levels. The authors chose first, third, and fifth grade children. At each grade level, ten male and ten female subjects were given skill oriented instructions or chance oriented instructions and asked to perform for eighty trials on a two-choice discrimination learning task. Two sets of reward conditions were established--a 100% verbal reward vs. a 100% material reward and a 100% verbal reward vs. a 50% material reward.

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221 S. Witryol, L. Lowden, J. Fagan, and T. Bergan, "Verbal Versus Material Rewards as a Function of Schedule and Set in Children's Discrimination Preference Choice Behavior," in Discrimination Learning, Problem Solving, and Choice Patterning by Children as a Function of Incentive Value, Motivation, and Sequential Dependencies, Sam Witryol (Ed.), Final Report, U.S. Department of Health, Education, and Welfare, Project No. 2512, Contract No. SAE, OE-5-10-017, 1967, p. 48-73.

222 Phares, op. cit., 1957, p. 339-342.

223 James and Rotter, op. cit., 1958, p. 397-403.

224 Holden and Rotter, op. cit., 1962, p. 519-520.

225 Witryol, Lowden, Fagan, and Bergan, op. cit., 1967, p. 48-73.

For example, in the latter reward condition, the appropriate cue of the two-choice task was verbally rewarded 100%, while the other stimulus cue of the two-choice discrimination learning task was rewarded with the material reward (a toy cow) 50% of the time. Each subject experienced each of the two reward conditions; thus, each subject acted on his own control. Increasing verbal choices were reported with increasing age. The authors conclude that children, increasingly with age, internalize verbal social values. The authors also report a marginal but non-significant effect for skill and chance instructions for high SES subjects, and no SES or other experimental effects were noted for the low SES group. The authors report the strong and significant effects of skill and chance instructions for the middle SES group. The authors interpret their findings as the result of the more conforming attitude of the middle-class children. The significant triple interaction of instructions, sex, and reinforcement schedule shows girls as more responsive for both schedules of reinforcement with skill instructions, while under chance instructions girls were only responsive to the 100-50 schedule. For boys given chance instructions, reward schedules did not differentiate performance; but with skill instructions, verbally reinforced choices were highest with the 100-50 reinforcement schedule.

A trial block effect was also noted in relation to skill and chance instructions, which revealed skill instructions were more effective than chance instructions in increasing verbal choices over trials. It will be noted that the trial block effects reported by Witryol for instructional sets are contradictory to the effects predicted by social

learning theory. As reported earlier, according to Rotter,<sup>226</sup> instructions should have an initial impact on performance and decrease as familiarity with the situation is gained. In sum, the authors' findings suggest that the orienting directions of skill and chance are influenced by socio-economic status, sex of subject, kind of reinforcement, and trial blocks. However, the presentation of continuous rewards to create incentive states confounded incentive and reward conditions.

In another study, Stabler and Johnson<sup>227</sup> examined the relationship between skill and chance instructions and extinction. The authors wanted to extend the early findings of Rotter and his associates concerning skill and chance instructions and resistance to extinction with adults to children. As discussed earlier, the James and Rotter<sup>228</sup> study found that a partially reinforced task is more resistant to extinction than a 100% reinforced task if it is preceded by chance instructions. With skill instructions, the 100% reinforcement group was more resistant to extinction than the 50% reinforcement group. The authors selected sixty-four, five year old male and female Head-Start children. Subjects were assigned to skill and chance instruction groups by sex prior to performance on a five choice, key-pressing task.

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226 Rotter, op. cit., 1975, p. 56-67.

227 J.R. Stabler and E.E. Johnson, "Instrumental Performance as a Function of Reinforcement Schedule, Luck Versus Skill Instructions, and Sex of Child, Journal of Experimental Child Psychology, Vol. 9, 1970, p. 330-335.

228 James and Rotter, op. cit., 1958, p. 397-403.

The skill and chance groups were further subdivided, one receiving a marble and a bell ring reward 100% of the time and the other group receiving a marble and a bell ring reward 50% of the time during acquisition. Each cell contained eight subjects. Starting, movement, and finishing times were recorded for forty acquisition and twenty extinction trials. Findings for the acquisition trials suggest that increased speed of performance is obtained with greater speed than continuously reinforced groups. No differences in acquisition were reported for skill and chance instructions. For extinction trials, the analyses of starting speed and movement speed were important. For starting speed, the skill instructed group was more resistant to the extinction than the chance instructed group. For partially reinforced groups, females were more resistant to extinction than continuously reinforced groups; females were more resistant to extinction than males. The analysis of movement speeds revealed that skill instructions and continuous reinforcement were more resistant to extinction, while chance instructions and continuous reinforcement were least resistant to extinction. For the partially reinforced groups, the chance instructed group was most resistant to extinction, while the skill instructed group was least resistant to extinction. The authors interpret these findings as support for the James and Rotter<sup>229</sup> findings reported earlier for skill and chance instructed groups given continuous and partial reinforcement.

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229 Ibid.

Altshuler and Kassinove<sup>230</sup> also wanted to extend the adult findings of James and Rotter<sup>231</sup> concerning skill and chance instructions and extinction to persistence time measures with children. In addition, the authors wanted to determine if greater persistence would be obtained for persons given skill instructions, since according to Rotter's theory, these individuals should feel responsible for their success or failure, while individuals given chance instructions should feel success or failure is chance dependent and not under their control. Forty-eight male and forty-eight female fifth grade children were divided so that half the subjects in each sex group received skill instructions, while the other half received chance instructions. These groups were further partitioned by four reinforcement conditions (0%, 33%, 66%, 100%). Each subject was administered seven trials consisting of two minutes of work on an anagram task. For each of the first six trials, the subjects were given success or failure feedback by the examiner in proportion to the ratios cited above, disregarding actual success or failure. The seventh trial was used as a measure of persistence time. Findings indicate the overall superior persistence of skill instructed subjects over chance instructed subjects. Girls persisted longer in the 0%, 33%, and 66% reinforcement condition, while boys persisted longer in the 100% condition. With skill

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230 A. Altshuler and H. Kassinove, "Effects of Skill and Chance Instruction Set, Schedule of Reinforcement and Sex on Children's Temporal Persistence," Child Development, Vol. 45, 1975, p. 258-262.

231 James and Rotter, op. cit., 1958, p. 397-403.

instructions, greatest reinforcement produced greatest persistence. With chance instructions, least reinforcement (0%) produced greatest persistence. The authors reported that chance instructed subjects persisted longer than skill instructed subjects under the nonreinforcement condition. The authors interpret this finding as the result of the acquisition trials. Skill subjects given no reinforcement by the seventh trial viewed failure as inevitable, while the chance group given no reinforcement felt success was still possible.

These findings also suggest that in a nonreinforced, persistence situation, chance instructed subjects may perform better than skill instructed subjects. The present findings provide some support for the Petzel and Gynther<sup>232</sup> findings with adults. These authors also used an anagram task without reinforcement and found that internals completed more anagrams when given chance instructions than when given skill instructions, while externals completed more anagrams when given skill instructions than when given chance instructions.

Results relating skill/chance instructions and persistence seem contradictory. The results of Petzel and Gynther<sup>233</sup> reported earlier and Altshuler and Kassinove<sup>234</sup> suggest that with non-rewarded persistence measures, outcome may be opposite to social learning theory predictions. Other studies using skill/chance instructions and

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232 Petzel and Gynther, op. cit., 1970, p. 87-93.

233 Ibid.

234 Altshuler and Kassinove, op. cit., 1975, p. 258-262.

persistence are in accord with social learning theory. Waters<sup>235</sup> used a puzzle persistence task; and his findings for males support the social learning predictions that internals given skill instructions persist longer than externals given skill instructions, while externals given chance instructions persisted longer than internals given chance instructions. Short<sup>236</sup> used an anagram task and reported only LOC differences but found no skill/chance instruction effects for total number of anagrams completed. With the exception of Short,<sup>237</sup> the criterion variables are similar in that all measure total persistence time. However, none of these studies report clear evidence related to sequence patterns. It may be that differences related to performance over time are important. The use of total persistence time may be obscuring patterns which may be related to length of time on task and could help to account for the contradictory findings reported.

In sum, the few studies which examine skill/chance outcomes with children suggest the predictions concerning extinction found with the adult studies can be extended to children, at least with kindergarten and fifth graders. In addition, skill instructed subjects seem more responsive to verbal rewards than chance instructed subjects. There is some evidence to suggest that with nonrewarded persistence tasks, chance instructed subjects may perform significantly better

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235 Waters, op. cit., 1972, p. 1-72.

236 Short, op. cit., 1976, p. 1-27.

237 Ibid.

than skill instructed subjects, a finding also suggested by the Petzel and Gynther<sup>238</sup> study previously reported. Greater predictability of performance outcomes involving skill and chance instructions need to be examined where the type of task employed and the reinforcement contingencies are carefully considered. In addition, subjects from the middle socio-economic strata may be more sensitive to skill and chance instructions. While age may be a significant variable to consider, the few studies using skill and chance instructions with children do not allow for specific conclusions concerning the effects of age to be made.

#### C. Theoretical Summation and Statement of Hypotheses.

In this section, a theoretical summation and integration of the major variables of this paper are presented, together with an outline of the experiment and a statement of the research hypotheses.

Behavioral prediction, according to Rotter, results from the interaction of expectancy of reinforcement, the receipt of reinforcement, and the psychological situation. Incentive research has examined more closely the relation between incentives, rewards, and reinforcement; and this body of literature may be useful in extending Rotter's theoretical statements concerning expectancy, reinforcement, and the psychological situations. Conversely, Rotter has defined expectancy

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238 Petzel and Gynther, *op. cit.*, 1970, p. 87-93.

so that incentives and reward values can be further differentiated when making behavioral predictions.<sup>239,240</sup>

For Rotter, locus of control is one of the expectancy of reinforcement constructs which accounts not only for environmentally induced expectancy, but also residual expectancy present in the organism from prior learning, the effects of which are observed in contingency situations. The locus of control construct provides a framework for ordering one source of expectancy both from within the individual and from the environment.<sup>241</sup>

A myriad of studies have been presented in this review to provide validity for the locus of control construct in complex psychological situations and under complex reward conditions. However, no studies were found which have examined these social learning construct variables in a way which would test Rotter's theory by attempting to eliminate the confounding between (among) reinforcement, expectancy, and the psychological situation. The suggestion of confounding in many of these validating studies seems to indicate that an attempt to identify the individual contributions of these variables should be made. By employing procedures which reduce complexity, a critical test of Rotter's locus of control construct should emerge from a carefully defined experimental situation.

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239 Rotter, Chance, and Phares, op. cit., 1972, p. 1-43.

240 Witryol, op. cit., 1971, p. 1-61.

241 Rotter, op. cit., 1975, p. 56-67.

Skill/chance instructions are environmental variables which have been shown to influence expectancy in some studies, but the suggestion is also present in evidence cited earlier that in complex situations, organismic and environmental sources of expectancy are complimentary and additive. In view of the sometimes contradictory results which have arisen from expectancy experiments utilizing verbal incentive instructions, the present study, while retaining such instructions for comparison purposes, administered these instructions only once. Further, these instructions were modeled upon those utilized in previous research studies.<sup>242,243,244,245,246,247,248</sup>

A further contribution to expectancy theory relates to the age at which internality/externality appears in the normal developmental sequence. Most of the scales discussed earlier in this review indicate that internality is established by the time the individual attains a chronological age of nine, and as age increases children's scores become more internal as they gain further control of the contingencies in their environment.<sup>249</sup> A developmental study sampling the performance

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242 Rotter and Mulry, op. cit., 1965, p. 598-604.

243 Julian and Katz, op. cit., 1968, p. 89-94.

244 Watson and Baumal, op. cit., 1967, p. 212-215.

245 Lefcourt, Lewis, and Silverman, op. cit., 1968, p. 663-682.

246 Petzel and Gynther, op. cit., 1970, p. 87-93.

247 Waters, op. cit., 1972, p. 1-71.

248 Short, op. cit., 1976, p. 1-27.

249 Nowicki and Strickland, op. cit., 1973, p. 148-154.

of fourth, seventh, and tenth grades would provide additional data to help determine if the increases in internality are observable as performance differences.

Rotter would predict differential effects of internals and externals and skill/chance instructions, but research findings have not examined this phenomena in less complex situations. This study utilizes the simple digit-canceling task over a timed series in an attempt to further reduce the confounding of experimental influences. The experiment was conducted under conditions which were controlled for situational effects, and the skill/chance instructions were given only once at the beginning of the timed series. To further clarify the questions of expectancy and incentive, subjects of three different age levels were used.

The three independent variables of this research are internality/externality as defined by the CNSIE Scale; verbal incentive instructions related to skill/chance; and developmental levels defined as fourth, seventh, and tenth grades. The dependent measure is a low complexity digit-canceling task, which according to previous research possesses inherently low reward or reinforcement value. In order to observe as clearly as possible the differential effects of the locus of control variable, the digit-canceling task was selected to provide a low stimulus value psychological environment. A series of three trial blocks consisting of five one-minute trials each were used so that performance differences related to time on task could be observed.

For purposes of clarity, hypotheses relating to statistical interactions between and among the variables have not been stated; but where significant interactions occur, they are noted in the results and discussion. The major hypotheses of the experiment may now be formulated.

1. Within the verbal incentive theoretical structure presented, the following predictions with regard to instructions were made:

- a. The skill instructed group would cancel significantly more digits than the chance instructed group.
- b. The skill instructed group would cancel significantly more digits than the neutral instructed group.
- c. The chance instructed group would cancel significantly more digits than the neutral instructed group.

2. Within the theoretical structure presented with regard to task complexity and performance, the following predictions were made:

- a. It was predicted that tenth grade subjects would cancel significantly more digits than seventh and fourth grade subjects, and that seventh grade subjects would cancel significantly more digits than fourth grade subjects.
- b. It was predicted that the experimental groups would cancel significantly more digits with each successive trial block.
- c. It was predicted that internals would cancel significantly more digits than externals.

## CHAPTER II

### EXPERIMENTAL PROCEDURES AND RESULTS

The present chapter describes in detail the experimental procedures employed to test the hypotheses formulated in the first chapter, the statistical analyses, and a statement of the results. In the first section, the sample and the selection of the experimental subjects are described. The second section describes in detail the experimental procedures and the situation in which the experiment was conducted. The third section presents the statistical analyses and results.

#### A. Selection of Experimental Subjects.

Subjects were chosen from the three elementary schools, the three junior high schools, and the one high school of the Cape Henlopen School District in Delaware. In addition, subjects were also chosen from the fourth and seventh grades of the St. William of York School, Baltimore, Maryland. In order to avoid longitudinal effects in a cross-sectional study, experimentation was completed between May 2 and May 31, 1977.

All children in the fourth, seventh, and tenth grades of the above-mentioned schools were administered the Nowicki-Strickland Internal-External Locus of Control Scale for Children.<sup>1</sup> A total

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<sup>1</sup> S. Nowicki, Jr. and B.R. Strickland, "A Locus of Control Scale for Children," Journal of Consulting and Clinical Psychology, Vol. 40, No. 1, 1973, p. 148-154.

population of 434 male students were screened using this instrument. From this population, sixty male students scoring one standard deviation from the mean at each grade level were assigned an internal or external locus of control group, respectively. Within each level of locus of control, subjects were then randomly assigned to one of three levels of instruction (skill, chance, or control). A total of 180 students constituted the sample for the experimental portion of the study. A description of the experimental sample by age and grade can be found in Table I. Children identified by the school as having learning disorders, perceptual handicaps, known visual defects, or those in special classes for the retarded were not included in the sample.

The Nowicki-Strickland Locus of Control Scale for Children<sup>2</sup> is a thirty-question scale with a "yes-no," forced-choice format. A sample of the scale is contained in Appendix 1.

The scale was administered by the individual classroom teacher. The scale was group administered during the regular school day at a time convenient to the teacher. Each teacher was individually instructed by the writer in the administration procedures. Each student was instructed to read the question and put an "x" in the "yes" or "no" column. The directions read by the teacher to each class can be found in Appendix 2. Teachers were instructed to identify any words which the students could not read.

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<sup>2</sup> Ibid.

Table I.-  
 Mean Age (in months), Standard Deviations, and  
 Range of Internals and Externals for the Experimental Groups.

Grade	N	Group	Means (in months)	Standard Deviations (in months)	Range
4	30	Internal	118.10	4.64	111-128
	30	External	119.93	5.74	111-136
7	30	Internal	156.27	5.75	148-167
	30	External	161.10	7.46	150-171
10	30	Internal	241.57	8.35	231-257
	30	External	240.80	8.04	231-252

The above-reported procedure is a departure from that used by Nowicki and Strickland. These authors read each question to their subjects. The present procedure for administration was adopted to be consistent at all three grade levels and because it was easier to enlist teacher cooperation in screening the large number of students needed for the experimental group.

Students answering both "yes" and "no" to the same question and students not completing all questions were not included in the sample.

The scale was scored with low scores indicating internal locus of control and high scores indicating external locus of control. For each grade level, the means and standard deviations were computed separately. At each grade level, those students obtaining scores below one standard deviation were designated the internal locus of control group. Those scoring higher than one standard deviation above the mean were designated the external locus of control group. This procedure was completed separately for each grade level. From these populations of externals and internals, subjects were randomly assigned to one of the three instructional groups. The mean, standard deviation, and range of scores for each grade level of the population sample are summarized in Table II. The same information for the experimental groups is contained in Table III.

Following the experimental procedures, the Nowicki-Strickland Locus of Control Scale for Children<sup>3</sup> was administered a second time

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3 Ibid.

Table II.-

Grade, Mean Age, Number of Students per Grade,  
Locus of Control Means, Standard Deviation, and  
Range for Male Population.

Grade	Mean Age (months)	Number of Students	LOC Means	LOC Standard Deviations	LOC Score Range
4	119.67	131	17.60	4.02	9-29
7	158.54	166	16.16	4.51	6-28
10	240.96	137	14.38	5.02	3-28

Table III.-  
Locus of Control Means, Standard Deviations, and  
Range for Experimental Groups.

Grade	N	Group	LOC Means	Standard Deviations	Range
4	30	Internal	12.47	1.55	9-14
	30	External	23.07	1.61	22-29
7	30	Internal	9.80	1.81	6-12
	30	External	22.40	1.90	21-28
10	30	Internal	7.13	1.65	3- 9
	30	External	21.83	2.38	19-28

to obtain test-retest reliability information. Appendix 3 contains a summary of test-retest reliability data by grade level. There was at least one month between test-retest administration, but no more than two months. Complete test-retest data was collected between April 25 and June 14, 1977.

#### B. The Experimental Setting and Procedures.

This section presents the experimental procedures, the instructions, and a description of the task.

##### 1. Setting.

Subjects were examined in the space available in each of the eight schools. The rooms were all quiet, well lighted, and adequately ventilated. Students were obtained from the classroom by the male examiner and brought to the experimental room. Students were examined on the experimental task in groups of four or five. Each student was seated at an individual desk in a row. Celolite dividers 4' x 5' separated the subjects to control for social influences and to minimize distractions. Subjects could not see each other. Subjects were able to see the examiner only during the initial instructions and when additional sheets of digits were distributed. While the subjects were engaged in the task, the examiner remained behind a divider out of sight.

## 2. Instructions.

Instructions were modified for appropriate presentation to the skill group, the chance group, and the control group. All groups first received the following verbatim directions:

Today, I would like you go cross out some numbers. You will be given a sheet filled with numbers just like this one. (Examiner held up a sample sheet). When I tell you to begin, I want you to cross out threes and sevens. Start at the top of the page and work your way across, and then go on to the next line. (Examiner demonstrated with his finger). I'll tell you when to stop.

You have been chosen because of your answers to the questionnaire you took a few weeks ago.

For the skill group, the following verbatim statement was added to the above statement:

Your score is the result of your own ability and skill. How well you do depends on your own skill and ability.

Remember, you are to cross out threes and sevens.

Any questions? Ready? Start.

For the chance group, the following verbatim statement was added:

Your score is the result of chance or luck. How well you do depends more on luck and chance.

Remember, you are to cross out threes and sevens.

Any questions? Ready? Start.

For the control group only, the following verbatim statement was added:

Remember, you are to cross out threes and sevens.

Any questions? Ready? Start.

Any questions asked were answered within the context of the directions. Questions not related to the mechanics of the digit-canceling task were deferred to a later time. For each of the fifteen sheets that were presented, the examiner said, "Ready? Start." None of the subjects experienced any difficulty understanding these directions.

### 3. Task.

The task was a simple digit-cancellation task similar to that employed by Coady and Brown<sup>4</sup> and Bastien.<sup>5</sup> It consisted of a page of random numbers (see Appendix 4). Subjects were supplied a green felt-tip pen and asked to cross out the threes and sevens beginning at the left-hand top of the page and working their way across and down. Subjects canceled the numbers on each sheet presented for one minute. Subjects were supplied a new sheet after each trial, and the paper from the previous trial was collected by the examiner. In all, fifteen individual sheets were presented to each subject. For data analysis purposes, the fifteen trials were collapsed into three trial blocks of five each. Scores for each trial were the cumulative number of threes and sevens canceled.

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4 H. Coady and M. Brown, "Need for Approval and the Effects of Normative and Competitive Incentives on Children's Performance," Journal of Genetic Psychology, Vol. 132, 1978, p. 291-298.

5 C. Bastien, "Locus of Control and the Differential Effects of Incentives on Performance," Unpublished Master's Thesis, University of Ottawa, 1976, p. 1-76.

### C. Statistical Analysis and Results.

This section will present the results of the experiment. The statistical analysis of the experimental data will be presented in such a way as to allow the reader to test the hypotheses presented in the previous chapter.

For the present statistical analysis, a four-way analysis of variance with one of the factors a repeated measure was performed. The four factors were locus of control (L), grade (G), skill, chance, and neutral instructions (I), and trial blocks (T). Each factor of grade, instruction, and trial block contained three levels, while the locus of control factor contained two levels. Thus, for the locus of control factor, high and low groups were identified. For the grade factor, populations were chosen from fourth, seventh, and tenth grades. For the instruction factor, skill oriented instructions, chance oriented instructions, and neutral instructions were used. Finally, three trial blocks were used. For computational purposes, each trial block was composed of five one-minute trials on the digit-canceling task. For each one-minute trial, the total number of threes and sevens canceled was the dependent measure. The cumulative number of three's and seven's canceled for five trials composed one trial block of the dependent measure. Thus, trials one through five made up the first trial block, trials six through ten made up the second trial block, while trials eleven through fifteen constituted the third and final trial block. Significance level was set at the .05 level.

A summary of the repeated measures analysis of variance is presented in Table IV. As stated at the end of Chapter I, the three sub-hypotheses for instructions were not accepted since the analysis of variance failed to show any main effect differences among the three instructional conditions [ $F(2, 162) = 0.3957, p > .05$ ].

The second hypothesis was stated at the end of Chapter I as three sub-hypotheses dealing with age (a), number of digits canceled over trials (b), and internal and external locus of control.

The second hypothesis, section (a), was accepted based on a highly significant main effect for grade level [ $F(2, 162) = 77.38927, p < .001$ ]. The Tukey test for significant differences between means revealed that tenth grade subjects performed significantly better than seventh and fourth grade subjects ( $p < .01$ ), and seventh grade subjects performed significantly better than fourth grade subjects ( $p < .01$ ).

For the second hypothesis, section (b), a highly significant main effect was obtained for trial blocks [ $F(2, 324) = 168.86601, p < .001$ ]. Tukey's test for post-hoc comparisons showed that subjects performed significantly better on trial block three than on trial block one ( $p < .01$ ). Trial block two was compared separately with trial block one and then with trial block three, and significant differences were obtained between means ( $p < .01$ ).

The third hypothesis, section (c), was not accepted since the analysis failed to show any main effect differences between internal and external locus of control subjects [ $F(1, 162) = 2.55086, p > .05$ ].

Table IV.-

Table of Variance of 2 x 3 x 3 x 3 Split-Plot  
Design for Number of Digits Canceled.

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	Prob. F Exceeded
Mean	29234192.00000	1	29234192.00000	4251.79297	0.000
G	1064215.00000	2	532107.50000	77.38927	0.000
L	17539.00000	1	17539.00000	2.55086	0.112
I	1133.00000	2	566.50000	0.08239	0.921
GL	18966.00000	2	9483.00000	1.37920	0.255
GI	10092.00000	4	2523.00000	0.36694	0.832
LI	4013.00000	2	2006.50000	0.29182	0.747
GLI	10883.00000	4	2720.75000	0.39570	0.812
Error	1113868.00000	162	6875.72656		
T	85183.00000	2	42591.50000	168.86601	0.000
TG	1684.75000	4	421.18750	1.66992	0.157
TL	4981.12500	2	2490.56250	9.87454	0.000
TI	85.37500	4	21.34375	0.08462	0.987
TGL	992.87500	4	248.21875	0.98413	0.416
TGI	3498.62500	8	437.32813	1.73391	0.090
TLI	247.93750	4	61.98438	0.24575	0.912
TGLI	2428.68750	8	303.58594	1.20365	0.296
Error	81719.50000	324	252.22067		

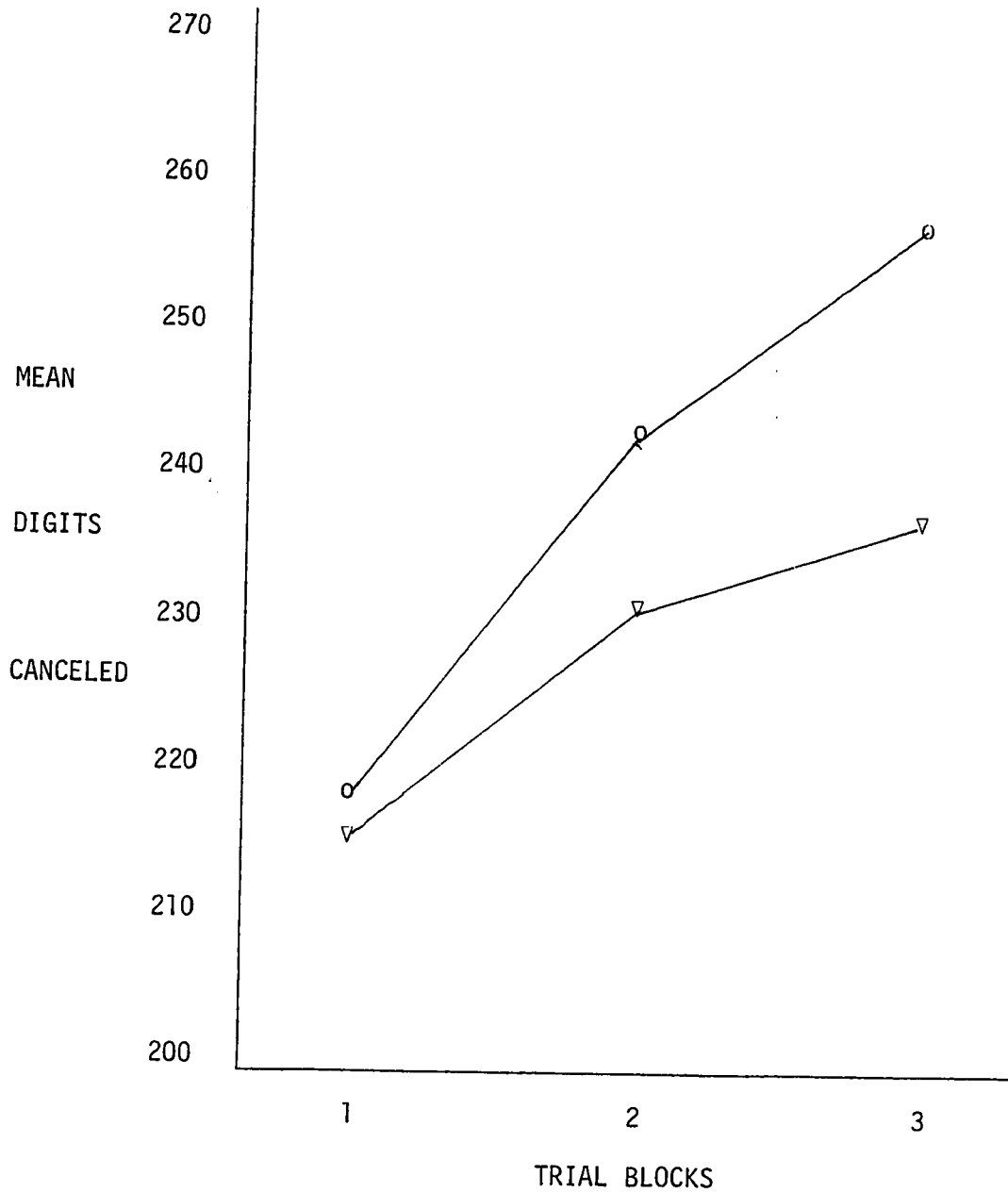


Figure 1.- Representation of Mean Digits Canceled for the Three Trial Blocks by Internal and External Locus of Control Subjects.

○—○ Internal  
 ▽—▽ External

internal and external groups were found for the first two trial blocks ( $p > .05$ ). Application of Tukey's tests for significant differences between trial block means reveals a significant difference between trial block one, trial block two, and trial block three for the internal locus of control groups ( $p < .01$ ). The Tukey analysis revealed a significant increase in digit-canceling performance for the external group from trial block one to trial block two ( $p < .01$ ). The increase between trial block two and trial block three for the external group was also significant ( $p < .05$ ). This finding suggests that with increased practice and exposure, internals significantly increase digit-canceling rate over time. For externals, the digit-canceling rate levels off after the second trial block. These findings suggest that locus of control differences emerge with the length of time on task. While the performance of internals steadily increases from trial to trial, the performance of externals reaches asymptote by trial block two. It may be that with more practice the differences between internal and external groups would emerge more clearly.

## CHAPTER III

### INTERPRETATION OF RESULTS

The purpose of the present study was to investigate the effects of age, locus of control orientation, and skill and chance instructions as they influence performance on a simple task over time. In this section, the major hypotheses will be discussed along with the implications of acceptance or rejection.

#### A. Discussion of Main Effects: Skill/Chance.

The analysis of variance failed to show any significant main effects for incentives. No significant differences were found between skill instructions, chance instructions, and the control group.

The findings related to skill/chance instructions may be interpreted within Rotter's theoretical structure.<sup>1</sup> The theoretical perspective presented in the review of literature provides the structure for examining expectancy, reinforcement, and situational variables as they effect behavioral prediction without the confounding present in other studies. The present non-significant findings suggest that the psychological situation and the contingencies of reinforcement present in a given situation may be of significant importance when identifying verbal expectancy. The situation provides clues and reinforcement for the individual to orient his previous learning experiences. The lack

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<sup>1</sup> J.B. Rotter, J.E. Chance, and J.E. Phares, Applications of a Social Learning Theory of Personality, New York, Holt, Rinehart, and Winston, 1972, p. 1-43.

of such situational cues and the lack of easily recognizable reinforcement in the present study suggest that verbally stated skill/chance instructions, which have been shown to be effective in many other experimental situations of greater complexity than digit canceling, have low expectancy value when these other factors are controlled. The success of skill/chance instructions reported in the literature in obtaining differential performance in complex situations can be interpreted to mean that skill/chance instructions obtain some of their expectancy value in relation to other reinforcement and other factors of the psychological situation which reflect skill/chance values.

As the level of task difficulty decreases, situational and reinforcement variables associated with task diminish. While Julian and Katz<sup>2</sup> point out that internals may have a preference for easy tasks, this fact did not seem to significantly influence the skill instructed subjects in the present study. If the internals' preference for an easy task were a reinforcing factor, differences in performance would be expected to emerge earlier in the performance sequence. The present findings suggest that environmentally defined locus of control expectancy alone has little effect on performance. The implication is that environmentally based expectancy is dependent on situational factors and reinforcement factors associated with task.

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<sup>2</sup> J.W. Julian and S.B. Katz, "Internal Versus External Control and the Value of Reinforcement," Journal of Personality and Social Psychology, Vol. 8, No. 1, 1968, p. 89-94.

As discussed in the review of the literature, both adult and child studies used complex situations or tasks, along with various methodological procedures which influence expectancy. Previous research findings suggest that similar skill and chance instructions obtained main effects or interaction effects with adults and children. The difference between the present study and previous findings is that this study was designed to minimize variables not directly associated with expectancy. In the present study, situational and reinforcement variables which could affect expectancy were reduced in order to focus on expectancy outcomes.

Two sources of expectancy were examined by operationalizing expectancy through the scale defining locus of control criterion and verbally stating expectancy through skill and chance instructions at the beginning of the task. This present study, therefore, attempts to influence the two factors related to expectancy, and appears to have done so in view of the results and within the context of Rotter's social learning theory.<sup>3</sup> In studies where the situational and reinforcement variables were allowed to interact, quite different results were obtained. For example, in the Rotter and Mulry<sup>4</sup> study, examiner feedback and repeated trial administration may have affected expectancy

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3 Rotter, Chance, and Phares, op. cit., 1972, p. 1-43.

4 J.B. Rotter and R.C. Mulry, "Internal Versus External Control of Reinforcement and Decision Time," Journal of Personality and Social Psychology, Vol. 2, No. 4, 1965, p. 598-604.

while Julian and Katz<sup>5</sup> used repeated trials and socially influenced subjects. Watson and Baumal<sup>6</sup> introduced the confounding arousal factor. While the child studies focused on simpler tasks, examiner influences were present and tasks with inherent reinforcement value, such as anagrams and puzzles, were used. When these situational and reinforcement variables are reduced, outcomes thought to be associated with expectancy appear to be more related to situational or reinforcement factors. The present nonsignificant findings can be interpreted within Rotter's social learning framework. Within this context, low levels of expectancy, such as that resulting from skill/chance instructions, do not alone increase the subject's performance output. When compared with previous significant findings, it seems that the psychological situation and reinforcement can enhance expectancy in a manner consistent with social learning theory.

Other research findings suggest the present failure to obtain significant results may be related to the methodological difficulties in verbally stating expectancies. Two major sources of variability have been identified in the literature. Any verbal statement can be interpreted or acted upon quite subjectively. Lefcourt, Lewis, and

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5 J.W. Julian and S.B. Katz, "Internal Versus External Control and the Value of Reinforcement," Journal of Personality and Social Psychology, Vol. 8, No. 1, 1968, p. 89-94.

6 D. Watson and E. Baumal, "Effects of Locus of Control and Expectation of Future Control upon Present Performance," Journal of Personality and Social Psychology, Vol. 6, No. 2, 1967, p. 212-215.

Silverman<sup>7</sup> obtained quite different results, as did Gruen and Ottinger<sup>8</sup> when these authors analyzed results based on the subjects' perception of the task as skill or chance oriented rather than on skill and chance instructions. More recently, Hart and Libb<sup>9</sup> asked subjects if they believed the skill and chance directions given by the examiner. The authors reported more subjects given skill instructions believed the examiner than those given chance instructions. While this method may be appropriate in classifying the subjects' perceptions, it does not explain or offer methodological solutions to reduce the variability associated with verbal skill/chance instructions.

A second possible source closely linked to the first which adds variability to skill/chance instructions is that the directions are misinterpreted, ignored, or seen as ambiguous by the subject. The careful construction of instructions which would not only emphasize skill or chance aspects of expectancy but other attributes of internals and externals contained in Rotter's definition may reduce variability associated with skill/chance instructions without essentially distorting the verbally induced expectancy variable being examined.

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7 H.M. Lefcourt, L. Lewis, and I.W. Silverman, "Internal Versus External Control of Reinforcement and Attention in a Decision-Making Task," Journal of Personality, Vol. 36, 1968, p. 663-682.

8 Gruen and Ottinger, op. cit., 1969, p. 207-214.

9 J.L. Hart and J.W. Libb, "Interaction of Locus of Control, Skill Versus Chance Instructions, and Task Difficulty," Psychological Report, Vol. 40, 1977, p. 1059-1069.

### B. Discussion of Main Effects: Age.

As expected, tenth graders canceled more digits than seventh graders and seventh graders more than fourth graders. Thus, differences in the number of digits canceled are related to age. The developmental implication is that as children mature, motor and perceptual motor speeds increase. In addition, reliable differences between ages can be demonstrated by the digit-canceling task, suggesting it is a valid instrument to assess the contribution of other variables.

The absence of interaction effects relating age to LOC and skill/chance instructions further suggests that the necessary cognitive processes and learning experiences needed to participate in the present task were acquired prior to fourth grade. In complex situations involving higher cognitive processes, reward choices, examiner influences, and learning experiences, age may be a more significant variable in prediction. The present results suggest that age is of considerable impact in predicting performance with simple tasks. When complex cognitive and verbal responses are controlled, the age related maturational factors do not appear to play a significant role in the prediction of expectancy, at least between nine and sixteen years.

### C. Discussion of Main Effects: Trial Blocks.

Another expected and highly significant finding was that for each successive trial block significantly more digits were canceled. Practice on the digit-canceling task appears to improve performance. Further, these findings regarding grade and trial block also appear

to demonstrate the validity of the task as a measure sensitive to individual differences related to age and performance over time.

D. Discussion of Main Effects: Locus of Control.

The present study failed to reveal any significant differences in the number of digits canceled between internal and external locus of control groups when locus of control was analyzed as a main effect. Interpreting these results in light of those of Bastien, who used an identical task and reported significant locus of control main effects, requires a more detailed analysis. Examiner influences, known to affect the LOC variable, could have been operative. The present study controlled for age more strictly than did Bastien and, therefore, results may not be directly comparable. Bastien<sup>10</sup> selected subjects between eight and twelve years of age; while in the present study, the fourth grade populations were more homogeneous, ranging in age from nine to eleven. However, the specific design of the present study provides for a different interpretation of the results of the two studies.

In the present study, fifteen trials were administered successively, with no additional incentives between trials. Bastien<sup>11</sup> had three sets of five, one-minute trials, with each set being preceded by

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<sup>10</sup> C. Bastien, "Locus of Control and the Differential Effects of Incentives on Performance," Unpublished Master's Thesis, University of Ottawa, Ottawa, Ontario, 1976, p. 1-76.

<sup>11</sup> Ibid.

an incentive condition. As Bastien points out, the counter-balanced presentation of incentives makes it possible for incentives to be operating during the control condition. This added motivation could not only have masked incentive differences, as Bastien suggests, but also increased the motivational level of all three incentive trials. Results of this present study support Bastien's interpretation that the additional motivation present in all three incentive conditions did contribute to the main effect, locus of control.

The level of task difficulty may be another reason for the non-significant main effects of the present study. In the review of the literature, it was noted that locus of control effects had not been extended to low level tasks, with the possible exception of Bastien,<sup>12</sup> Short,<sup>13</sup> Waters,<sup>14</sup> and Taub and Dollinger.<sup>15</sup> Taub and Dollinger<sup>16</sup> used a digit-symbol task, but lack of an adequate control group limits these

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12 Ibid.

13 N.L. Short, "Persistence in Children as a Function of Developmental Level, Locus of Control, and Skill and Chance Instructions," Unpublished Honor's Thesis, Emory University, Atlanta, Georgia, 1976, p. 1-27.

14 D.B. Waters, "Differential Effects of Skill and Chance Instructions on Persistence Time and Attention Breaks as a Function of Locus of Control in Elementary School Children," Unpublished Doctoral Dissertation, Emory University, Atlanta, Georgia, 1972, p. 1-71.

15 S.I. Taub and S.J. Dollinger, "Reward and Purpose as Incentives for Children Differing in Locus of Control Expectancies," Journal of Personality, Vol. 43, No. 2, 1975, p. 179-195.

16 Ibid.

findings. Short<sup>17</sup> used total number of anagrams completed as the dependent measure and obtained LOC differences. Waters<sup>18</sup> did not report main effects for LOC. The nonsignificant main effects of the present study may be suggesting that in the absence of environmental cues and other environmentally based motivation, internal-external differences on low level, performance type tasks do not produce differences in main effects. This would be consistent with Lefcourt's<sup>19</sup> interpretation. Expectancies of reinforcement are either not present or are so low that differences in performance disappear.

#### E. Discussion: LOC x Trial Blocks.

The significant trial block by locus of control interaction in the context of the previous discussion suggests a basis for predictions when locus of control is used and situational and reinforcement variables are controlled.

It appears that when performance is examined as a function of time rather than one final criterion measure and reinforcement and situational factor controlled by task selection, a pattern emerges. With time, the expectancy patterns predicted by Rotter for internals and externals emerge with internals outperforming externals. There

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17 Short, op. cit., 1976, p. 1-27.

18 Waters, op. cit., 1972, p. 1-72.

19 H.M. Lefcourt, "Effects of Cue Explication upon Persons Maintaining External Control of Expectancies," Journal of Personality and Social Psychology, Vol. 5, No. 3, 1967, p. 372-378.

is no significant difference between groups for the first and second trial blocks. By the final trial block, a significant difference between internal and external groups is observed. The difference between the performance of internals and externals over time is consistent with Rotter's theorizing.

Rotter notes that expectancies may be specific or generalized. Generalized expectancy accounts for individual differences associated with generalizations from past experiences. Specific expectancies are the expectancies of reinforcement which occur as a result of prior experience in the same situation. Rotter further indicates that generalized expectancy has more initial importance in predicting performance, especially when novelty or ambiguity are factors in the task. As more experience is gained with the situation, specific expectancies based on experiences with that situation are formed.<sup>20,21</sup> The present results provide support for this principle. The absence of significant differences in the early trial blocks suggests generalized expectancies of locus of control were not producing significant effects on performance at that time. The task was selected because it was non-involving and not imbued with inherent reinforcement qualities which may alter expectancy. The present digit-canceling task would seem to lack the

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20 J.B. Rotter, "Some Problems and Misconceptions Related to the Construct of Internal Versus External Control of Reinforcement," Journal of Consulting and Clinical Psychology, Vol. 43, No. 1, 1975, p. 56-67.

21 Rotter, Chance, and Phares, op. cit., 1972, p. 1-43.

novelty and/or ambiguity which Rotter suggests is necessary to observe generalized expectancy effects. The significance between internals and externals by the third trial block suggests, as Rotter would predict, that LOC expectancies emerge as experience is gained in this kind of specific task situation. Reinforcement qualities associated with the task, which would develop divergent expectancies in more highly involving tasks, apparently were not present in the first and second trial blocks. Through the use of experimental procedures which reduced stimulation in the psychological situation and minimized verbal incentives provides clear support for the view that the internal and external LOC characteristics of the experimental subjects were the significant variables producing significant performance differences by the third trial block. Internals characteristically place a value on performance, set goals, are intrinsically motivated, self-reliant, and generally act in a manner consistent with the belief that outcome of events is under their control. Externals rely on others rather than themselves, are less goal directed, and are less confident that the outcome of events is under their control. These behavioral characteristics of internals and externals are thought to be based on previous reinforcement history, and the present results suggest the beliefs are established prior to the fourth grade. Further, the fact that performance differences emerged with time argues for the existence of internal and external control as a stable characteristic within the person. The present results support Rotter's formulation of the expectancy construct.

## SUMMARY AND CONCLUSIONS

The present study was designed to investigate the effects of locus of control orientation, age, and skill and chance instructions as the effects of these variables are measured by performance over time using a simple digit-canceling task.

The first chapter reviewed the major theoretical variables of Rotter's social learning theory. Studies relating the development of the locus of control concept, the validation of locus of control construct, the developmental aspects of locus of control, and the effects of skill and chance instructions on performance outcomes were reviewed. In addition, the first chapter presented a theoretical overview of incentive research and linked the incentive research to Rotter's social learning theory. Studies were reviewed which discussed scaling of incentives for value, the conditions under which material and social incentives affect performance, and performance outcomes involving skill and chance instructions. The necessity of clearly defining reward, reinforcement, and incentive was stressed. The developmental implications of the incentive research were discussed concurrently with the presentation of the various incentive studies reviewed. The interrelationship of the two theoretical positions was summarized and hypotheses stated.

In the second chapter, the experimental design was presented. As part of the experimental design, the sample, the administration of the locus of control scale, the task and experimental procedures, and

the statistical treatment were described. The chapter concluded with the results of the statistical analysis.

The first hypothesis, which proposed significant differences between skill, chance, and control instructed subjects, was rejected.

The second hypothesis, section (a), which proposed significant differences between grade levels, was accepted. Tenth grade subjects canceled significantly more digits than seventh and fourth grade subjects. Seventh grade subjects canceled significantly more digits than fourth grade subjects.

The second hypothesis, section (b), stating significant difference between trial blocks was accepted. With each progressing trial block of the three trial blocks, significantly more digits were canceled.

The second hypothesis section (c), stating significant differences between internal and external locus of control subjects was rejected. However, the significant interaction between trial blocks and locus of control suggests that the performance of internals and externals is related to time on task. Internals by the third trial block canceled significantly more digits than externals.

It is felt that the results of the present study in which LOC differences emerged only after time provide clear support for Rotter's theorizing concerning generalized vs. specific expectancy as specified in the theoretical summation in Chapter I. The results of this study suggest that when simple tasks are used, generalized expectancies which are related to experience in similar situations do not emerge as performance differences. Specific locus of control expectancies related to

experience with the task do emerge over time, Rotter would predict. Thus, differential effects attributed to generalized expectancy or specific expectancy have been separated by experimental manipulation. The task is an important situational variable related to prediction of locus of control outcomes. Since the environmental situations which affect performance, such as task interest, were kept at a low level in the present study, the personality characteristics inherent to internals and externals emerged progressively with performance. Further investigation of the extent to which these personality differences could be sustained in a nonrewarded situation before reaching asymptote and extinction would further add to the understanding of the locus of control construct.

A neutral task was used in the present study so that the effects of expectancy related to LOC and skill/chance instructions could be directly observed. Since skill/chance instruction effects were not found, the question still remains as to what types of verbal incentives are effective in altering performance of locus of control subjects. Several suggestions for further study emerge. As with the scale defined LOC construct discussed above, it may be that specific verbal expectancies associated with skill/chance instructions would emerge with more time on task. The present skill and chance instructions emphasized only skill and chance. It may prove fruitful to use instructions which include more of the characteristics indigenous to internals and externals contained in Rotter's definition. In addition, the skill and chance instructions used in this study could be stated more strongly and

emphatically, possibly by the use of repetition and synonyms, even though presented only once.

Future studies to further identify operations associated with the expectancy construct are needed. A slightly more complex task, such as a series of simple math problems, could be administered over a time series. Such a task would minimize the situational and reinforcement variables as in the present study so that expectancy outcomes could be examined. Another suggestion would be to use both tasks along with internal and external locus of control and skill and chance instructions as variables. Additional studies, such as those suggested above, could help to further explicate the expectancy construct.

## BIBLIOGRAPHY

Bastien, Claudette, "Locus of Control and the Differential Effects of Incentives on Performance," Unpublished Master's Thesis, University of Ottawa, 1976, p. 1-76.

This recent study was an initial attempt to link the locus of control construct with incentive research. The selection of the digit-canceling task as the dependent measure provides a methodological basis for examining the expectancy construct.

Lefcourt, Herbert M., Locus of Control Current Trends in Theory and Research, New York, Halsted Press Division of John Wiley and Sons, 1976, p. 1-211.

This book emphasizes the locus of control concept as it effects prediction related to resistance to influence, cognitive activity, achievement related behavior, psychopathology, and other research areas. In addition, changes in the measurement of and the current status of locus of control are discussed.

Nowicki, Stephen and Bonnie E. Strickland, "A Locus of Control Scale for Children," Journal of Consulting and Clinical Psychology, Vol. 40, No. 1, 1973, p. 148-154.

This study provides the rationale for the development of a generalized measure of locus of control for children and a brief critique of previous locus of control scales for children. Reliability data for males and females from grade three through grade twelve are reported along with validating data.

Phares, E. Jerry, "Expectancy Changes in Skill and Chance Situations," Journal of Abnormal and Social Psychology, Vol. 54, No. 3, 1957, p. 339-342.

Skill and chance instructions were used to operationalize the locus of control expectancy construct. This initial study demonstrated the utility of skill and chance instructions in predicting behavioral outcomes.

Phares, E. Jerry, Locus of Control in Personality, Morristown, New Jersey, General Learning Press, 1976, p. 1-217.

An overview of social learning theory is presented along with a review of selected research areas such as measurement of individual differences of locus of control, achievement, and mastery of the environment. It presents a framework from which to evaluate the previous research in locus of control.

Rotter, Julian B., "Generalized Expectancies for Internal Versus External Control of Reinforcement," Psychological Monographs, Vol. 80, No. 1, 1966, p. 1-27.

The author presents the theoretical basis for the locus of control concept and provides a definition of internal and external locus of control citing prior research for support. The construction of a scale for measuring locus of control along with normative reliability and validity data is presented.

Rotter, Julian B., "Some Problems and Misconceptions Related to the Construct of Internal Versus External Control of Reinforcement," Journal of Consulting and Clinical Psychology, Vol. 43, No. 1, 1975, p. 56-67.

This article provides a necessary perspective for relating the locus of control construct within social learning theory. Theoretical problems, misconceptions, and the place of measurement in behavioral prediction are discussed.

Rotter, Julian B., June E. Chance, and Jerry E. Phares, Application of a Social Learning Theory of Personality, New York, Holt, Rinehart, and Winston, 1972, p. 1-624.

Rotter's social learning theory is presented along with a collection of major articles which explicate his theory.

Rotter, Julian B. and Ray C. Mulry, "Internal Versus External Control of Reinforcement and Decision Time," Journal of Personality and Social Psychology, Vol. 2, No. 4, 1965, p. 598-604.

This was the initial study which examined the relationship between internal and external control and skill and chance instructions with adults. Support for the hypothesis that internals would value performance based on skill and externals would value performance based on chance was obtained.

Waters, David B., "Differential Effects of Skill and Chance Instructions on Persistence Time and Attention Breaks as a Function of Locus of Control in Elementary School Children," Unpublished Doctoral Dissertation, Emory University, 1972, p. 1-71.

A key study which examines the relationship between locus of control, skill and chance instructions, and persistence time with children.

Witryol, Sam L., "Incentives and Learning in Children," in H.W. Reese (Ed.), Advances in Child Development and Behavior, Vol. 6, New York, Academic Press, 1971, p. 1-61.

Along with definitions and discussion of reward, reinforcement, and incentive, a comprehensive report of incentive research was presented.

APPENDIX 1

NOWICKI-STRICKLAND INTERNAL-EXTERNAL  
LOCUS OF CONTROL SCALE FOR CHILDREN

NOWICKI-STRICKLAND INTERNAL-EXTERNAL  
LOCUS OF CONTROL SCALE FOR CHILDREN

Name \_\_\_\_\_

Grade \_\_\_\_\_

Yes    No

- |     |     |   |
|-----|-----|---|
| ___ | ___ | 1. Do you believe that most problems will solve themselves if you just don't fool with them?                        |
| ___ | ___ | 2. Do you believe that you can stop yourself from catching a cold?  |
| ___ | ___ | 3. Are some kids just born lucky?   |
| ___ | ___ | 4. Most of the time do you feel that getting good grades means a great deal to you?                                 |
| ___ | ___ | 5. Are you often blamed for things that just aren't your fault?   |
| ___ | ___ | 6. Do you believe that if somebody studies hard enough he or she can pass any subject?                              |
| ___ | ___ | 7. Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway?         |
| ___ | ___ | 8. Do you feel that if things start out well in the morning that it's going to be a good day no matter what you do? |
| ___ | ___ | 9. Do you feel that most of the time parents listen to what their children say?                                     |
| ___ | ___ | 10. Do you believe that wishing can make good things happen?  |
| ___ | ___ | 11. When you get punished, does it usually seem it's for no good reason at all?                                     |
| ___ | ___ | 12. Most of the time do you find it hard to change a friend's (mind) opinion?                                       |
| ___ | ___ | 13. Do you think that cheering more than luck helps a team to win?  |
| ___ | ___ | 14. Do you feel that it's nearly impossible to change your parent's mind about anything?                            |

- | <u>Yes</u> | <u>No</u> |  |
|------------|-----------|--|
| ___        | ___       | 15. Do you believe that your parents should allow you to make most of your own decisions?  |
| ___        | ___       | 16. Do you feel that when you do something wrong there's very little you can do to make it right?                                    |
| ___        | ___       | 17. Do you believe that most kids are just born good at sports?  |
| ___        | ___       | 18. Are most of the other kids your age stronger than you are?   |
| ___        | ___       | 19. Do you feel that one of the best ways to handle most problems is just not to think about them?                                   |
| ___        | ___       | 20. Do you feel that you have a lot of choice in deciding who your friends are?  |
| ___        | ___       | 21. If you find a four leaf clover, do you believe that it might bring you good luck?  |
| ___        | ___       | 22. Do you often feel that whether you do your homework has much to do with what kind of grades you get?                             |
| ___        | ___       | 23. Do you feel that when a kid your age decides to hit you, there's little you can do to stop him or her?                           |
| ___        | ___       | 24. Have you ever had a good luck charm?   |
| ___        | ___       | 25. Do you believe that whether or not people like you depends on how you act?   |
| ___        | ___       | 26. Will your parents usually help you if you ask them to?   |
| ___        | ___       | 27. Have you felt that when people were mean to you it was usually for no reason at all?   |
| ___        | ___       | 28. Most of the time, do you feel that you can change what might happen tomorrow by what you do today?                               |
| ___        | ___       | 29. Do you believe that when bad things are going to happen they are just going to happen no matter what you try to do to stop them? |
| ___        | ___       | 30. Do you think that kids can get their own way if they just keep trying?   |

- | <u>Yes</u> | <u>No</u> |  |
|------------|-----------|--|
| ___        | ___       | 31. Most of the time do you find it useless to try to get your own way at home?  |
| ___        | ___       | 32. Do you feel that when good things happen they happen because of hard work?   |
| ___        | ___       | 33. Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters?                    |
| ___        | ___       | 34. Do you feel that it's easy to get friends to do what you want them to?   |
| ___        | ___       | 35. Do you usually feel that you have little to say about what you get to eat at home?   |
| ___        | ___       | 36. Do you feel that when someone doesn't like you there's little you can do about it?   |
| ___        | ___       | 37. Do you usually feel that it's almost useless to try in school because most other children are just plain smarter than you are? |
| ___        | ___       | 38. Are you the kind of person who believes that planning ahead makes things turn out better?                                      |
| ___        | ___       | 39. Most of the time, do you feel that you have little to say about what your family decides to do?                                |
| ___        | ___       | 40. Do you think it's better to be smart than to be lucky?   |

APPENDIX 2

INSTRUCTIONS FOR NOWICKI-STRICKLAND INTERNAL-EXTERNAL  
LOCUS OF CONTROL SCALE FOR CHILDREN

INSTRUCTIONS FOR NOWICKI-STRICKLAND INTERNAL-EXTERNAL  
LOCUS OF CONTROL SCALE FOR CHILDREN

This is a short questionnaire to see how people your age think about some things. Read each question and make an "X" in the column that best describes your feelings. Read the question and answer "yes" or "no" by marking an "X" in the "yes" or "no" column. Please answer all the questions.

These directions for group administration of the CNSIE were read by each teacher to the subjects.

APPENDIX 3

TEST-RETEST RELIABILITY FOR THE NOWICKI-STRICKLAND LOCUS OF CONTROL  
SCALE FOR CHILDREN FOR THE MALE POPULATION OF THIS RESEARCH

TEST-RETEST RELIABILITY FOR THE NOWICKI-STRICKLAND LOCUS OF CONTROL  
SCALE FOR CHILDREN FOR THE MALE POPULATION OF THIS RESEARCH

Grade	Number of Students	Test-Retest Reliability
10	81	.73
7	116	.65
4	113	.53

APPENDIX 4

NUMBER CANCELLATION TASK SAMPLE

231570554514871389769731211742433619380649540367680709243310615703135257048  
092439795793732726216102097839891602596681443113225485955043603507495161718  
593812885920478131817263352392010810636083799865264420035018595701122574418  
854749719288220317195493101837105373240494051997554433911016382680842937948  
246274486306173107792779568721408944378100922453713305522232628710504942362  
259934350836223758533087030872456230449184187215691206780307637751894193692  
071378832998885682642079491718906377926554806343867624990611500517880594251  
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454733505502823746900862470886837440332290194258413311800499189322966168670  
453441614895123764485654675756825216682659434378665414445489528620756797687  
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315916416783054840613663059790133515483124878603256532236316803572522525586  
023185623051992922986675225920344305037434879428021227389578800780432435106  
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176963811266591796554827460626393238666920628620696622490966085280022135742  
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967496909692923995917305831252238163399260218657968743127558134636298654222  
959472332869149036666509061212387064533643969577340758933488650266237787229  
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752136555305668393026459207513865938373508595412730047386131338496187043898  
299393850531824914303863502362998183806684401724898392712678690890071832254  
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030869046685746795192943183660998008124808204694581224207868035860861286129  
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763149618288663973499765306641948871156292552038059244101261535244998885567  
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287266783153279023910411639651106504412565579844718379231205929989161287137  
915820723267614053843543106347864322254645091807864647370819822683875363514  
024901196748256272463253266757112661787262561627967551087439977429881151624  
402392693688502634993637993801298569772085237757465412236469834657308077265  
989553454539142303653077921771016910262106001018529337659186117163809381206  
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043396351710748215716460710419516679829925593033174747956311882657460131727  
393648370124079235367072293431977468014614754705013366026590788030287592553  
686102764540974619957871057017500531305046377957739423909253054030488186529  
432043466893137517983010542757444373833721828290044912046329423947986773828  
593342536571017599387236472074302083515489977184575582526999489240813308133  
622230712765226839122669502941446816220080569310833064781265151771564787324  
116790138539613494849265745443267426425761010009978756598706921498518878583  
800359419069094010236050943061224140695734177368795408237482031369307110011  
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266600243192919927530680229935151140387079390300352903578196158473661440549  
408781022915918134036652391665674157652719815255925590202470186308967362986  
069710712643225391880691599861081088549362248548840899739282767871897694596  
364698751596996477895358745539583765326338230673646317551890105894075679196  
287592410791442491949146514286411733062449909749086834308207237247434876384

APPENDIX 5

ABSTRACT OF  
The Effects of Locus of Control and Skill-Chance  
Incentives on Performance at Three Developmental Levels

ABSTRACT OF  
The Effects of Locus of Control and Skill-Chance  
Incentives on Performance at Three Developmental Levels<sup>1</sup>

The study examined the relationship between locus of control orientation, age, trial blocks, and instructions as these variables effected performance outcomes. Sixty male subjects from each of grades four, seven, and ten were selected for their extreme scores on the CNSIE. Thirty internal locus of control subjects and thirty external locus of control subjects were further randomly assigned to one of three instruction conditions of skill, chance, or control. The subjects were read one of the instructions and immediately administered fifteen, one-minute trials of a number cancellation task. For data analysis, five, one-minute trials were combined to form a single trial block. Thus, three trial blocks were used in the statistical analysis.

The hypotheses were: (1) significant differences were predicted in the number of digits canceled by the skill, the chance, and the neutral instructions groups; (2) significant differences were predicted in the number of digits canceled for the different grade levels; (3) significant differences were predicted in the number of digits canceled with each successive trial block; and (4) significantly greater differences were predicted in the number of digits canceled by internal rather than external locus of control groups. The second and

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<sup>1</sup> T.C. Kneavel, Jr., "The Effects of Locus of Control and Skill-Chance Incentives on Performance at Three Developmental Levels," Doctoral Dissertation presented to the School of Graduate Studies, University of Ottawa, August 1978, p. 1-128.

third hypotheses were accepted, while the first and fourth were rejected. However, a significant interaction between locus of control and trial blocks gave support for the emergence of locus of control differences with increased time on task. This finding was interpreted as support for Rotter's theory which examines generalized expectancy versus specific expectancy in predicting behavioral outcomes. Suggestions for further study were given.