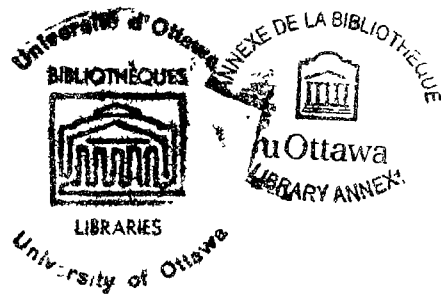


LOCUS OF CONTROL, EGO INVOLVEMENT AND THE
PERSISTENCE OF MENTAL RETARDATES IN THE FACE OF
MONOTONY

by George L. Reilly

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CURRICULUM STUDIORUM

George L. Reilly was born on April 23, 1930, in Noranda, Quebec. He received the Bachelor of Arts degree in Psychology from Carleton University, Ottawa, Ontario, in 1962.

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INTRODUCTION

The social sciences have long been concerned with the question of how alternative belief systems influence our behavior. Two such beliefs are that reinforcing events are due to outside forces, or to our own actions. Attempts to deal with this question have led to such concepts as "alienation", "inferiority feelings", "competence strivings", "ego strength" and many others.

A recent approach to the problem has come from Julian B. Rotter and his students who have coined the terms "internal locus of control" and "external locus of control" to refer to the two opposing belief systems. Rotter and others have developed a fair sized body of literature attempting to relate these constructs to various types of behaviors and situations. There is now evidence that they are valid for predicting both social behaviors and performances on laboratory tasks.

The present study is concerned with the prediction of persistent behavior when dealing with repetitive, simple, monotonous tasks from prior knowledge of whether individuals tend to believe in an internal or external locus of control. It is intended to evaluate specific hypotheses which have been put forth in the literature but which have not as yet found experimental support.

Much of the work with children in the locus of control area has been done using educable mental retardates. Subjects from this category of people will be used in this study.

The first chapter of this report will present a review of the relevant literature, dealing first with the locus of control construct, then with the situational variable of ego-involvement which is generally considered as a necessary concomitant to differential performance predicted on locus of control, and then with previous studies of persistence. A summary of the review and a general statement of the hypotheses will also be included in this chapter. Chapter two will state the experimental hypotheses and present the experimental design used to test them; including a discussion of the subjects, psychometric instruments, procedure and finally a statement of the statistical techniques to be used in analyzing the data. Chapter three will present and discuss the results, to be followed by a summary and conclusion. The appendices will contain a copy of the locus of control scale used to classify subjects as being internal or external locus of control, two graphs of main effects on persistence times, and an abstract of the present study.

CHAPTER I

REVIEW OF THE LITERATURE

This chapter will outline the theoretical development of the locus of control construct with an emphasis on studies using children. Next the importance of considering ego-involvement will be presented along with a brief discussion of the meaning of this term in the present context. Previous studies of persistence will then be reviewed in order to lay the groundwork for the choice of the tasks used in the present study to measure persistence in the face of monotony. Finally a brief summary will be provided from which the problem to be investigated will be developed.

1. The Construct of Locus of Control.

The term "Locus of Control" refers to how a person perceives relationships between himself and the events that happen in his psychological environment. A person who sees himself as a responsible agent in influencing events is considered as possessing an "Internal Locus of Control" (ILC); if he sees himself as not a responsible agent in influencing events, he is construed as having an "External Locus of Control" (ELC). This construct has evolved within the framework of Social Learning Theory, an attempt at a systematic theoretical position which has sprung from the publication

by Rotter in 1954.¹ It was initially formulated in a series of studies which dealt with the effects of chance versus skill situations on the formation and extinction of expectancies. These investigations showed that expectancies of success on ambiguous tasks such as the matching of similar angles or doing extrasensory perception (ESP) type tasks could be influenced by instructions or cultural sets which characterized successful performance as mainly due to chance or to skill.^{2,3,4,5} Concomitantly, attempts were made to develop a questionnaire to measure a general personality

1 J.B. Rotter, Social Learning and Clinical Psychology, Englewood Cliffs, New Jersey, Prentice Hall, 1954, xvi-466 p.

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

3 W.H. James and J.B. Rotter, "Partial and One Hundred Percent Reinforcement Under Chance and Skill Conditions", in Journal of Experimental Psychology, Vol. 55, No. 5, May 1958, p. 397-403.

4 J.B. Rotter, S. Liverant and D.P. Crowne, "The Growth and Extinction of Expectancies in Chance Controlled and Skill Tasks", in Journal of Psychology, Vol. 52, No. 1, July 1961, p. 161-177.

5 K.B. Holden and J.B. Rotter, "A Non-Verbal Measure of Extinction in Skill and Chance Situations", in Journal of Experimental Psychology, Vol. 63, No. 5, May 1962, p. 519-520.

orientation of internal versus external control.^{6,7} These attempts culminated in the Internal-External scale as published by Rotter.⁸

A fairly extensive literature has developed in which locus of control has been related to various personality variables in studies with adults. In his review of this area, Rotter⁹ suggests that generally people who respond in the internal locus of control direction on the locus of control scales tend to have more integrated personalities, make more use of past experiences to modify present behavior, are more active in controlling their environment (such as in civil rights), tend to learn more relevant information in problem situations, are less conforming, are resistive to subtle suggestion, and prefer skill situations to chance situations.

A parallel development of the Locus of Control construct took place in studies with children. This phase of

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

7 W.H. James, "Internal versus External Control of Reinforcement as a Basic Variable in Learning Theory", unpublished doctoral dissertation, Ohio State University, 1957, vii-134 p.

8 J.B. Rotter, "Generalized Expectancy for Internal versus External Control of Reinforcement", in Psychological Monographs: General and Applied, Vol. 80, No. 1, Whole No. 609, January 1966, p. 1-28.

9 Ibid., p. 25.

research began with Bialer¹⁰ who theorized that whereas young children were motivated primarily by a hedonistic, pleasure-approach pain-avoidance, system, as they grew older and experienced exercising control over events in their environment, they tended to develop an additional motivational system based on approaching success and avoiding failure. Success and failure were defined as the occurrence of favorable or non-favorable environmental events only when the child conceived of a personal responsibility in their occurrence. Thus it was Bialer's theory that a child can only experience pleasure or displeasure unless he is old enough to construe environmental events as being produced by his behavior, i.e., unless he has an internal locus of control. In order to measure the development of the success-approach failure-avoidance motivational system, Bialer tested forty-five mentally retarded and forty-four normal children ranging in chronological age from 6 to 14 years and in mental age from 3 to 15 years. Three tasks were used. These were a Repetitive Choice task (choice of return to a previously completed or uncompleted puzzle), a Delay of Gratification task (where subjects were offered small prizes today versus larger prizes tomorrow), and a

10 I. Bialer, "Conceptualization of Success and Failure in Mental Retardates and Normal Children", unpublished doctoral dissertation, George Peabody College for Teachers, 1960, iv-99 p.; also, in brief, in Journal of Personality, Vol. 29, No. 3, September 1961, p. 303-320.

Children's Locus of Control questionnaire (LC scale) (a 23-item scale of tasks related to the perception of internal versus external control). A factor analysis of the scores obtained of these three tests along with MA and CA produced two factors. The first of these had high positive loadings for all variables and was interpreted as a general developmental factor thus supporting the hypothesis of a success-failure motivational system as a developmental variable. The second factor had low loadings for CA and MA with loadings that were considered substantial for each of the other factors (in this study the Repetitive Choice task gave a negative loading on the second factor; however, subsequent research has reversed this finding¹¹). This factor was interpreted as reflecting a personality dimension independent of age or level of conceptual development.

Following Bialer, Miller¹² applied the locus of control construct to the prediction of performance on a serial learning task under varying conditions of examiner produced cues for correct and incorrect responses. Using ninety retardates,

11 E.C. Butterfield, "Task Recall and Repetition Choice as a Function of Locus of Control Components, Mental Age, and Skill versus Non-Skill Instructions", unpublished doctoral dissertation, George Peabody College for Teachers, 1963, vi-166 p.

12 M.B. Miller, "Locus of Control, Learning Climate and Climate Shift in Serial Learning with Mental Retardates", unpublished doctoral dissertation, George Peabody College for Teachers, 1961, v-160 p.

split into groups of Internal and External locus of control on the basis of the Children's Locus of Control scale, and conditions of a token reinforcement for each incorrect response, and no reinforcement of either kind as a control, Miller found that the reinforcement condition had a marked effect upon the acquisition rates of ELC's but no effect upon ILC's. Specifically, under a positive reinforcement condition ELC's developed situational ILC tendencies and performed at a rate equal to the ILC's. However, under both the negative reinforcement and control conditions ELC's tended to fall apart and took twice as many trials to criterion as did the ILC's. The performance of the ILC's was constant over all three conditions. Miller concluded that ILC's tend to react primarily to task produced cues, they evaluate their own behavior, whereas ELC's tend to react primarily to cues produced by others.

Miller's line of thought was applied to the classroom situation by Butterfield.¹³ In dealing with a situation in which it was assumed that the values of teachers were at variance with the values of the students, Butterfield studied the academic achievement of retarded children who came from

¹³ E.C. Butterfield, "Locus of Control, Academic Aspirations, and Achievement", unpublished manuscript, 1961, as cited by R.L. Crosswell, "A Social Learning Approach to Mental Retardation", in N.R. Ellis, (ed.), Handbook of Mental Deficiency, New York, McGraw-Hill, 1963, p. 74.

lower socioeconomic backgrounds and were being taught by middle class teachers. He found that children who rated at the ELC end of the Children's Locus of Control scale tended to rank higher on achievement measures than did the ILC children. This result was interpreted as indicating that the ELC's had been more influenced by the teachers than had the ILC's or, in terms of Miller's theorizing, the ELC's were more responsive to external cues than were the ILC's.

Relationships between locus of control and achievement in normal children have been further investigated using a questionnaire specifically designed to evaluate the attitudes of normal children about their personal responsibility in school situations. This instrument, called the Intellectual Achievement Responsibility questionnaire (IAR), was developed by Crandall, Katkovsky and Preston,¹⁴ and was shown to predict the free play intellectual achievement behaviors of a group of grade school boys at a summer camp. The boys, who ranked in the internal locus of control direction, engaged in more intellectual pursuits during their free time than did those who scored in the external control direction. This relationship did not hold for a group of girls that was also part of

¹⁴ V.J. Crandall, W. Katkovsky and A. Preston, "Motivational and Ability Determinants of Young Children's Intellectual Achievement Behavior", in Child Development, Vol. 33, 1962, p. 643-661.

the study. Using the same questionnaire Crandall, Katkovsky and Crandall¹⁵ related the IAR scores of 923 school children from grades three to twelve to measures of academic achievement. They found that the attribution of self-responsibility (internal locus of control) was related to high performance on both standardized achievement tests and report card ratings. Katkovsky, Crandall and Good¹⁶ used the IAR scale to shed light on family determinants of belief in internal locus of control. Ratings of parent-child interactions, of data on interviews with parents, and parents' answers to a questionnaire concerned with their attitudes to their children's intellectual achievement behavior were correlated with their children's IAR scores. As to be expected, warm, praising, protective and supportive parent behaviors were related to internal locus of control in their children, while dominance, rejection, and criticality on the part of the parents were related to external locus of control in the children.

A third technique of assessing beliefs in internal versus external locus of control in children has been reported

15 V.C. Crandall, W. Katkovsky and V.J. Crandall, "Children's Beliefs in Their Own Control of Reinforcement in Intellectual Academic Situations", in Child Development, Vol. 36, No. 1, March 1965, p. 91-109.

16 W. Katkovsky, V.C. Crandall and S. Good, "Parental Antecedents of Children's Beliefs in Internal-External Control of Reinforcements in Intellectual Achievement Situations", in Child Development, Vol. 38, No. 3, September 1967, p. 765-776.

by Battle and Rotter.¹⁷ This is a six-item cartoon test in which the child states what he would say in various lifelike situations and is referred to as the "Children's Picture Test of Internal-External Control". Using this task, along with the Children's Locus of Control questionnaire, Battle and Rotter tested eighty sixth and eighth grade children, selected on the basis of sex, race, and social class. Both locus of control measures were found to relate to social class and to race. The middle-class children, both white and negro, were found to be more internal than the lower-class children. In addition, the lower-class negro group was found to be more external than the lower-class white group, thus reflecting the double burden of class and caste placed on the negro in American society.

The effect of sensory handicap on the development of internal locus of control has been demonstrated with blind and deaf children. Using the Children's Locus of Control scale, Land¹⁸ found blind children to be more external than

17 E.S. Battle and J.B. Rotter, "Children's feelings of Personal Control as Related to Social Class and Ethnic Group", in Journal of Personality, Vol. 31, No. 4, December 1963, p. 482-490.

18 L.S. Land and S.C. Vineberg, "Locus of Control in Blind Children", in Exceptional Children, Vol. 31, 1965, p. 257-260.

normal controls. Two studies by Blanton and Munnally^{19,20} have reported the same finding for deaf adolescents.

Northcutt²¹ attempted to predict the superiority of a programmed method of teaching arithmetic, over regular teacher techniques, with fifth grade children on the basis of locus of control. Her hypothesis was not supported. However, she did find that the internal locus of control children attempted more frames in the programmed condition than did the externals.

Dealing with the ability of educable mental retardates to use clues from the context of a reading passage to fill in missing words, Brooks²² found an interaction between locus of control and anxiety. Four groups were formed as combinations of internal or external locus of control on the Children's Locus of Control scale and high or low anxiety on the

19 R.L. Blanton and J.C. Munnally, "Semantic Habits and Cognitive Style Habits in the Deaf", in Journal of Abnormal and Social Psychology, Vol. 68, No. 4, April 1964, p. 397-402.

20 -----, "Evaluational Language Processes in the Deaf", in Psychological Reports, Vol. 15, No. 3, December 1964, p. 891-894.

21 M.P. Northcutt, "The Comparative Effectiveness of Classroom and Programmed Instructions in the Teaching of Decimals to Fifth Grade Students", unpublished doctoral dissertation, George Peabody College for Teachers, 1964, v-176 p.

22 S.T. Brooks, "Effects of Locus of Control and Anxiety on the Ability of Mentally Retarded Children to Use Context Cues in Reading", unpublished doctoral dissertation, George Peabody College for Teachers, 1962, iv-141 p.

Children's Manifest Anxiety scale.²³ The combination of internal locus of control and low anxiety was found to yield the best clue utilization performance, with internal locus of control and high anxiety producing the worst performance. External control and either high or low anxiety produced intermediate performances.

The variable of persistence in the face of physical pain was explored in a study by Shipe.²⁴ This author found no relationship between the Children's Locus of Control scale scores and a measure of tiptoe standing with educable retardates. This study was criticized by McConnell²⁵ in that Shipe had given attention and encouragement to all subjects during the criterion performance. McConnell suggested that such a positive hedonic situation would effectively eradicate the influence of the locus of control variable as a behavioral determinant.

²³ A. Castaneda, B.R. McCandless and D.S. Palermo, "The Children's Form of the Manifest Anxiety Scale", in Child Development, Vol. 27, No. 3, September 1956, p. 317-326.

²⁴ D. Shipe, "The Relationships Among Locus of Control and Some Measures of Persistence in Mentally Retarded and Normal Subjects", in Abstracts of Peabody Studies in Mental Retardation, Vol. 1, 1960, No. 58.

²⁵ T.R. McConnell Jr., "Locus of Control, Examiner Presence and Source and Type of Reinforcement as Factors in Visual Discrimination Learning with Mental Retardates", unpublished doctoral dissertation, George Peabody College for Teachers, 1965, p. 129.

Through his review of the literature, McConnell²⁶ arrived at three conditions which he feels are necessary in any task situation for the locus of control variable to be operative. These are that the examiner must be present, that performance on the task must be related to success and failure by instructions from the examiner, and that no positive reinforcements be administered. In a study of discrimination learning in which his three posited conditions were varied, McConnell was unsuccessful in predicting performance from locus of control.

A theoretical working paper by Crowwell²⁷ presents a modification of McConnell's conditions for locus of control operation. For Crowwell, the main prerequisite is that the subject arrives at a categorization of a task as a success-failure situation. Whether he does this on his own or through instructions from the examiner does not matter. Also, no reinforcements of any kind, whether positive or negative, should be available; as for example, in the neutral condition of Miller's study. Crowwell thus downplays the emphasis on the examiner's role in evoking the locus of control influence on task behavior, although he suggests that examiner presence

26 Ibid.

27 R.L. Crowwell, "Comments on the Theoretical Formulation of Success-Striving versus Failure-Avoiding in children", unpublished paper, 1964, p. 1-11.

and examiner definition of a task in terms of success-failure would probably aid in its evocation.

2. The Variable of Ego Involvement.

The term "ego involvement" has been frequently used in the locus of control literature to refer to a variable which interacts with locus of control. In his theoretical formulation Bialer stated that:

While an internal locus of control is a necessary condition for the awareness of success or failure, it is not a sufficient one. Although the child may be able developmentally, to conceptualize these phenomena, he will probably become aware of and respond to them only in situations which contain elements of competition or ego involvement.²⁸

He then goes on to define his usage of ego involvement as follows:

Ego involvement prevails when the situation in which the activities take place is of such a nature that the child feels he (or his ability) is being put to the test.²⁹

As previously reported, the McConnell and Crowell studies have essentially reiterated their position.

An even broader definition of this construct was provided by Iverson and Reuder³⁰ who considered the term

²⁸ Bialer, Op. Cit., p. 5.

²⁹ Ibid.

³⁰ M.A. Iverson and M.E. Reuder, "Ego Involvement as an Experimental Variable", in Psychological Reports, Vol. 2, No. 2, June 1956, p. 147-181.

ego involvement to refer to a motive which is evoked in any situation in which a person feels a threat to his self-esteem. In their review of the ego involvement literature, these authors discuss attempts to relate the effects of ego involvement to psychometric categories such as "ego strength", "frustration reaction", "achievement motivation", and "test anxiety". Such personality dimensions have been investigated in terms of defining susceptibility to ego involvement. From Bialer's formulation it seems clear the locus of control can also be considered from the point of view of being an index of ego involvement susceptibility.

In discussing the problems inherent in the investigation of ego involvement, Iverson and Reuder³¹ point out that the presence of such a motive in a subject cannot be inferred simply from the fact of the experimenter varying aspects of a situation. To maintain the distinction between the intent of the examiner and the response of the subject, Alper³² has used the terms "task orientation" and "ego orientation" to refer to the instructions given by the examiner. High or low ego involvement is then inferred from responses on a dependent variable.

31 Ibid., p. 146.

32 T.G. Alper, "Memory for Completed and Incompleted Tasks as a Function of Personality: An Analysis of Group Data", in Journal of Abnormal and Social Psychology, Vol. 41, No. 4, October 1946, p. 403-420.

3. Persistence on Monotonous Tasks.

Kurt Lewin³³ made use of persistence on simple repetitive tasks as a reflection of personality variables in children. In attempting to validate his theory that the boundaries of the regions in the life space of the retardate are more rigid than those of the normal child of the same C.A., he used a task of drawing moon faces until the subject is satiated. Although he found retardates to persist longer on this task than did equal C.A. normals, his results did not differentiate between such "rigid behavior" as being due to rigidity of boundaries of psychical systems or to less differentiation of psychical systems. In extending Lewin's work, Kounin³⁴ equated retardates and normals on M.A., and thus degree of psychical differentiation, while varying C.A., and thus degrees of rigidity in psychical systems. Using a similar drawing task he also found retardates to persist longer than normals and interpreted his results as supporting the concept of rigidity of intrapsychic boundaries as being due to chronological age.

³³ K. Lewin, A Dynamic Theory of Personality, New York, McGraw-Hill, 1935, viii-286 p.

³⁴ J.L. Kounin, "Experimental Studies of Rigidity I. The Measurement of Rigidity in Normal and Beebleminded Persons", in Character and Personality, Vol. 9, No. 4, June 1941, p. 251-273.

Using a modification of the Lewin-Kounin task, Brailsford³⁵ investigated differences in a persistence among brain damaged retardates, nonbrain damaged retardates, and normals, equated for C.A. Whereas Lewin and Kounin had subjects do their drawings on separate sheets of paper, Brailsford controlled for extraneous activities by adopting a procedure introduced by Wolfe³⁶ in which subjects drew on a continuously moving roll of paper. His results did not support the Lewin-Kounin position, as he found no significant difference between the satiation times of the normal and non-brain damaged retardates.

The Lewin-Kounin position was also challenged by Zigler, Hodgden and Stevenson³⁷ who criticized the Kounin experiments on the grounds that motivational variables were not sufficiently controlled. These investigators used two repetitive tasks, one involved the sorting of two sets of small pegs, which varied in shape, into two holes in a box.

35 E.C. Brailsford, "An Investigation into the Topology of Exogenous Feeble Minded Children", unpublished doctoral dissertation, University of Ottawa, 1965, viii-53 p.

36 W.M. Wolfe, "Satiation and Co-Satiation: A New Method", in American Journal of Psychology, Vol. 73, No. 4, December 1960, p. 612-614.

37 E. Zigler, L. Hodgden, and H. Stevenson, "The Effects of Support on the Performance of Normal and Feeble-minded Children", in Journal of Personality, Vol. 26, No. 1, March 1958, p. 106-122.

The second consisted of hitting a bar and knocking concealed pegs into an enclosed container. Using the time spent on these tasks as the dependent variable they equated groups of retardates and normals for M.A. and varied conditions of examiner support. They found that the variable of social reinforcement influenced persistence times in the retardates but did not affect the persistence of normals. Retardates under the support condition persisted longer than did the retardates under the nonsupport condition. There was no difference in persistence times between the latter group and either of the normal groups. These results were interpreted as reflecting a greater need for interaction with accepting adults on the part of the retardates. This variable was in turn related to the degree of social deprivation experienced by the subjects in a subsequent study by Zigler.³⁸ Employing retarded children only, and equating them on both C.A. and M.A., Zigler found a significant relation between the degree of social deprivation and persistence time under support conditions. The monotonous task used in this study was a marble-sorting task in which two sets of colored marbles were sorted into two holes in the top of a box.

³⁸ C. Zigler, "Social Deprivation and Rigidity in the Performance of Feeble Minded Children", in Journal of Abnormal and Social Psychology, Vol. 62, No. 2, March 1961, p. 413-421.

Further support to this position was given by Green and Zigler³⁹ who found that there was no difference in persistence under support conditions in a peg-sorting task between noninstitutionalized retardates and normals, whereas institutionalized retardates performed longer than either of the other two groups.

Zigler⁴⁰ developed a modification of the marble-sorting task in which marbles are returned to the subject by means of a chute which led from the holes in the box. With this apparatus, subjects were prevented from extraneous activities such as picking up handfuls of marbles or sorting through a marble container for one color or the other. Using this apparatus, Zigler confirmed earlier findings that degree of social deprivation interacted with reinforcement conditions to influence persistence times, but that retardation, per se, did not. Length of institutionalization was shown not to be a relevant variable.

Subsequently a great deal of work has been done investigating ramifications of the social reinforcement variables

39 C. Green and E. Zigler, "Social Deprivation and the Performance of Normal and Retarded Children on a Satiation Type of Task", in Child Development, Vol. 33, 1962, p. 497-508.

40 E. Zigler, "Rigidity and Social Reinforcement Effects in the Performance of Institutionalized and Non-Institutionalized Normal and Retarded Children", in Journal of Personality, Vol. 31, No. 2, June 1963, p. 258-269.

as it affects persistence on monotonous tasks. The task of choice has been variations of Zigler's marble-sorting task. In a review of this work, Stevenson⁴¹ provides a rationale for the use of this task in that its simplicity controls for the variable of intellectual ability while allowing motivational variables relatively full play.

4. Summary and Statement of the Problem.

The personality construct of locus of control has proven to be of heuristic value in predicting behavior of both children and adults in various laboratory and real-life situations. The principal generalization is that people who conceive of themselves as being responsible agents in influencing events will tend to relate to goals defined in terms of success and failure and will rely on their own evaluations of their behavior in approaching the goals, whereas those who conceive themselves as not being responsible agents will tend to react in a hedonistic pleasure-approach pain-avoidance manner and rely on other people for evaluation of their behavior. The ILC's thus appear to be capable of becoming ego-involved in a competitive situation and sustaining activity directed towards success and away from failure. The

⁴¹ H.W. Stevenson, "Social Reinforcement of Children's Behavior", in L.P. Lipsitt and C.P. Spiker, (eds.), Advances in Child Development and Behavior, Vol. II, New York, Academic Press, 1965, p. 97-126.

ELC's are seen as less capable of becoming involved or motivated by competitive situations and less able to sustain activity directed toward nonimmediate goals.

Following an hypothesis stated by Crowwell,⁴² ILC's should persist longer than LLC's in the face of repetitive, monotonous tasks. The only investigation of this prediction to date was a study of persistence in tiptoe standing by Shipe,⁴³ which failed to find a relationship with locus of control. However, Shipe did not vary the condition of ego-involvement.

Among the infinite array of monotonous tasks which could be devised, two have been used successfully in previous research. One, the drawing of simple moon faces until satiation, has been used in studies of cognitive rigidity by Lewin,⁴⁴ Kounin,⁴⁵ and Brailsford.⁴⁶ The second, the sorting of two sets of colored marbles until satiation, has been employed extensively in studies of social reinforcement.⁴⁷

⁴² R.L. Crowwell, "A Social Learning Approach to Mental Retardation", in N.R. Ellis, (ed.), Handbook of Mental Deficiency, New York, McGraw-Hill, 1963, p. 77.

⁴³ Shipe, Op. Cit.

⁴⁴ Lewin, Op. Cit.

⁴⁵ Kounin, Op. Cit.

⁴⁶ Brailsford, Op. Cit.

⁴⁷ Stevenson, Op. Cit.

The present study is directed towards investigating the effect of the locus of control variable on the persistent behavior of educable mentally retarded subjects on monotonous tasks under varying conditions of ego involvement. Locus of control will be measured by the Children's Locus of Control scale.⁴⁸ Ego involvement will be varied by giving instructions intended to be either task orienting or ego orienting. Persistence in the face of monotony will be measured by satiation time on a moon face drawing task similar to that devised by Wolfe⁴⁹ and adapted by Brailsford,⁵⁰ and a marble-sorting task patterned after Zigler.⁵¹

By classifying subjects in terms of external versus internal control, and by task-oriented versus ego-oriented, a 2x2 analysis of variance with fixed factors can be computed for the persistence times on each of the two monotonous tasks. Analysis of rows (ILC vs ELC) will serve both to test Cromwell's hypothesis, stated above, as well as be an analogous replication of Shipe's study of persistence in which ego involvement was not varied. Analysis of columns (ego-oriented vs task-oriented) will allow the investigation of

48 Bialer, Op. Cit.

49 Wolfe, Op. Cit.

50 Brailsford, Op. Cit.

51 Zigler, Op. Cit.

whether ego involvement alone can produce differences in persistence on monotonous tasks, a question not heretofore raised in the literature. Testing for the significance of interaction of the two levels of locus of control with the two levels of ego involvement, will serve to shed light on the point raised in the present review to the effect that locus of control can be considered as an index of susceptibility to ego involvement. Should such an interaction prove statistically significant, the locus of control theory would predict that analysis of simple effects would show that internal locus of control is significantly influenced by the ego involvement conditions, whereas external locus of control is not. That is, the ILC person is susceptible to changes in ego involvement, while the ELC person is not.

CHAPTER II

EXPERIMENTAL DESIGN

The previous chapter presented a review of the literature upon which the present study is based as well as a statement of the hypotheses to be investigated. The present chapter will state the null hypotheses and present details of subjects, psychometric instruments, procedure, and the techniques of statistical analysis.

1. The Null Hypotheses.

In null form the experimental hypotheses of the present study are:

1. There is no significant difference between the persistence times of educable mental retardates classified as internal locus of control (ILC) and those classified as external locus of control (ELC) on either moon face drawing (MF) task or marble dropping (MD) task.
2. There is no significant difference between the persistence times of educable mental retardates given ego-oriented (EO) instructions and those given task-oriented (TO) instructions on either MF task or MD task.
3. There is no significant interaction effect of the degree of locus of control (ILC vs ELC) and the type of instructions given (ego-oriented (EO) vs task-oriented (TO)) on the persistence times of educable mental retardates on either MF or MD tasks.

2. Subjects.

The subjects in the present study were all residents of the Rideau Regional Hospital School, Smiths Falls, Ontario. The subject pool was selected through examination of the hospital files. The criteria were: (a) classification of either Cultural-Familial or Undetermined etiology; (b) recorded I.Q.'s in the educable range (50-80); (c) chronological age between twelve and twenty years; (d) no history of diagnosed brain damage or mental illness; (e) no apparent sensory or motor abnormalities; and (f) either enrolled in the academic program or in the vocational training program at the hospital school. Eighty-three residents met these criteria; of these 48 were males and 35 were females.

The next step consisted of individually administering the Children's Locus of Control (LC) scale and Form A of the Peabody Picture Vocabulary test (PPVT) to all eighty-three members of the subject pool. The order of these two tests was alternated for each successive subject. The LC scale was then given a second time, approximately one week following the first administration. The two locus of control scores for each subject were averaged and subjects were assigned to ILC or ELC categories according to whether their combined scores fell above or below the chosen cut off scores. (The cut off scores used will be discussed in a subsequent section dealing in detail with the locus of control scale.)

This procedure yielded twenty-two ILC subjects, of whom 16 were male and 6 female, and twenty-three ELC subjects, 14 males and 9 females. In order to control for sex, three of the ELC female subjects and two of the ILC male subjects were randomly eliminated. The remaining fourteen males and six females in each locus of control group were then randomly divided into two subgroups. Thus four subgroups of $N = 10$, each with seven males and three females were formed. These subgroups were referred to as:

- (a) Internal Locus of Control - Ego-oriented (ILC-EO)
- (b) Internal Locus of Control - Task-oriented (ILC-TO)
- (c) External Locus of Control - Ego-oriented (ELC-EO)
- (d) External Locus of Control - Task-oriented (ELC-TO)

Table I presents means, standard deviations and ranges for the total sample for each subgroup for locus of control, age, mental age, and intelligence. In order to check for equivalence among groups on these variables, separate 2x2 analysis of variance tests were run on each. No significant differences were found between any of the groups on any of the variables except locus of control. The various groups were thus considered equated on the variables of age, mental age and I.Q. Table II summarizes the analyses of variance in terms of F values obtained.

Table I.-

Means and Standard Deviations of Total Group and Subgroups on
Chronological Age, Mental Age, I.C.^a, and Locus of Control^b.

Group	N	Age		Mental Age		I.C.		L.C.	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
ILC-EO	10	197.7	24.6	102.9	18.1	64.3	9.3	16.2	1.67
ILC-TO	10	186.1	21.5	102.2	24.9	65.3	10.1	15.9	0.63
ELC-EO	10	179.1	22.1	87.8	17.6	60.5	7.0	10.1	0.84
ELC-TO	10	184.7	23.9	94.6	21.6	62.6	12.9	10.7	0.77
ILC	20	191.9	23.8	102.5	21.9	64.8	9.6	16.1	1.00
ELC	20	181.9	23.2	91.2	20.0	61.5	10.6	10.5	1.67
EO	20	188.4	25.2	95.3	19.6	62.4	8.4	13.3	3.19
TO	20	185.4	22.7	98.4	23.6	63.9	11.9	13.3	2.68
Total	40	186.9	24.0	96.9	21.5	63.2	10.1	13.3	2.95

a M.A. and I.C. scores according to Feabody Picture Vocabulary test.

b Locus of Control score according to the Children's Locus of Control scale

Table I.-

Means and Standard Deviations of Total Group and Subgroups on Chronological Age, Mental Age, I.Q.^a, and Locus of Control^b.

Group	N	Age		Mental Age		I.Q.		L.C.	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
ILC-EO	10	383.8	24.6	102.9	18.1	64.3	9.3	16.2	1.67
ILC-TO	10	363.8	21.5	102.2	24.9	65.3	10.1	15.9	0.63
ELC-EO	10	376.8	22.1	87.8	17.6	60.5	7.0	10.4	0.84
ELC-TO	10	370.8	23.9	94.6	21.6	62.6	12.9	10.7	0.77
ILC	20	191.9	23.8	102.5	21.9	64.8	9.6	16.1	1.00
ELC	20	181.9	23.2	91.2	20.0	61.5	10.8	10.5	1.67
EO	20	188.4	25.2	95.3	19.6	62.4	8.4	13.3	3.19
TO	20	185.4	22.7	98.4	23.6	63.9	11.9	13.3	2.68
Total	40	186.9	24.0	96.9	21.5	63.2	10.1	13.3	2.95

a M.A. and I.Q. scores according to Peabody Picture Vocabulary test.

b Locus of control score according to the Children's Locus of Control scale.

Table II.-

F Values Obtained for the Separate Analyses of Variance
for All Subjects on the Variables
of CA, MA, IQ and LC^a.

Source of Variation	C.A.	M.A.	I.Q.	L.C.
Locus of Control	1.69	2.69	0.94	381.50
Instructions	0.16	0.19	0.21	0.0
LC x Instructions	1.25	0.29	0.04	1.37

a For df (1, 36), $F_{05} = 4.11$.

3. Psychometric Instruments.

In this study the variable of Locus of Control was measured by the Children's Locus of Control scale. The variable of persistence in the face of monotony was measured by two tasks, a moon face drawing task, and a marble dropping task. These instruments will be considered in turn.

(a) The Children's Locus of Control Scale.- As previously mentioned, the Children's Locus of Control scale (LC scale) was designed by Bialer¹ as a measure of the degree to which children attribute responsibility for events to their own activities (ILC), or to the actions of others, external forces, fate, etc. (ELC). It consists of twenty-three questions, each of which are answered yes or no. For five of the items a "no" response is scored in the ELC direction; for the other eighteen a "no" response is scored in the ILC direction. The higher the score, the more ILC the person is considered to be. The complete scale is presented in Appendix 1.

Since normative data is lacking, this study followed the procedure used by Miller² in order to dichotomize subjects

1 I. Bialer, "Conceptualization of Success and Failure in Mental Retardates and Normal Children", unpublished doctoral dissertation, George Peabody College for Teachers, 1960, iv-99 p.; also, in brief, in Journal of Personality, Vol. 29, No. 3, September 1961, p. 303-320.

2 M.B. Miller, "Locus of Control, Learning Climate and Climate Shift in Serial Learning with Mental Retardates", unpublished doctoral dissertation, George Peabody College for Teachers, 1961, p. 15.

into ELC and ILC groups. The scale was administered twice, and the average score was calculated for each subject. A mean of 13.2 was calculated for the distribution. Cut off points were chosen arbitrarily as scores of 14.5 and above being considered as ILC, and those 11.5 and below considered as ELC. Subjects whose combined scores fell between these two scores were eliminated from the study. Moreover, only those subjects whose score remained below or above the mean on each of the two testing distributions were included in the study, so as to exclude any subject whose scores changed from the ILC direction to the ELC direction, or vice versa, from test to retest.

The validity of the Children's Locus of Control scale (LC scale) has been discussed previously in the review of the literature. In addition to these studies, Gozali and Bialer³ investigated the possible biasing effects of social desirability and acquiescence response sets on the scale. Using a Children's Social Desirability scale⁴ and a reverse item form

³ J. Gozali and I. Bialer, "Children's Locus of Control Scale: Independence from Response Set Bias among Retardates", in American Journal of Mental Deficiency, Vol. 72, No. 4, January 1968, p. 622-625.

⁴ V.C. Crandall, V.J. Crandall and W. Katkovsky, "A Children's Social Desirability Questionnaire", in Journal of Consulting Psychology, Vol. 29, No. 1, January 1965, p. 27-36.

of the LC scale, they found that these two factors do not significantly affect the LC scale.

The literature indicates fairly high reliability for the scale. Test-retest correlations of 0.61,⁵ 0.73,⁶ and 0.84.⁷ An odd-even correlation of 0.67,⁶ and a split-half reliability of 0.86⁹ are also reported. The internal consistency of the scale, as evaluated by Bialer,¹⁰ yielded point biserial correlations of items that ranged from 0.23 to 0.64.

(b) The Moon Face Drawing Task.- The moon face drawing task (MF task) used in this study as an operational definition of monotony was patterned closely after similar tasks used by Wolfe¹¹ and Brailsford.¹² The subject's task was to draw

5 Miller, Op. Cit., p. 17.

6 T.R. McConnell Jr., "Locus of Control, Examiner Presence and Source and Type of Reinforcement as Factors in Visual Discrimination Learning with Mental Retardates", unpublished doctoral dissertation, George Peabody College for Teachers, 1965, p. 14.

7 Gozali and Bialer, Op. Cit., p. 624.

8 Miller, Op. Cit., p.17.

9 Bialer, Op. Cit., p. 70.

10 Ibid., p. 69.

11 W.M. Wolfe, "Satiation and Co-Satiation: A New Method", in American Journal of Psychology, Vol. 73, No. 4, December 1960, p. 612-614.

12 E.C. Brailsford, "An Investigation into the Topology of Exogenous Feeble Minded Children", unpublished doctoral dissertation, University of Ottawa, 1965, p. 23.

"moon faces"; that is, circles with eyes, nose, mouth, ears, and hair, on a moving strip of paper. The apparatus consisted of the drive mechanism from a portable polygraph recorder which was placed inside a 6" x 12" x 10" wooden box. A one-inch square opening was cut in the top of the box thus exposing a one-inch square of recording paper. The paper was moved past the opening at a constant rate of six inches per minute. Standard polygraph record chart paper was used. Reliability of persistence times on a task very similar to the present MF task reported by Brailsford¹³ as correlating 0.79 and 0.95 over a two-week interval. The same study reports rates of drawings to correlate 0.96 and 0.99 for two groups of retardates and 0.89 for a group of normal children. These coefficients indicate a high reliability for this type of task. The validity of this task will be considered later along with the validity of the marble dropping task.

(c) The Marble Dropping Task.- The second "monotonous" task employed, the Marble Dropping task (MD task), required subjects to sort two colors of marbles into two holes. The apparatus consisted of a box 6" x 9" x 6", which had a 1-1/2" high lip that extended 1-1/2" from one side, an electrical counter attached to the back, and two 1/2" holes, 2" apart on the top. Beneath each hole was a counter switch.

¹³ Ibid., p. 27.

A cork-lined funnel was built inside the box so that the marbles dropped into the holes were automatically returned to a trough in the center of the extended lip at the box front. Six marbles were used, three yellow, and three blue. Once a marble was dropped into a hole, it depressed a counter switch, then fell into the funnel and was returned to the lip of the box. In this way a continuous, endless supply of marbles was available.

There appears to be no published reports of the reliability of times spent on tasks similar to the present MD task, despite the fact that this measure has been used extensively in studies of the effect of social reinforcement or persistence. Reliability of rate of responding during a one-minute period prior to social reinforcement has been reported by Stevenson and Knights¹⁴ to be high. These authors report three coefficients of 0.74, 0.66, and 0.66, obtained respectively at twelve- eighteen- and thirty-week intervals.

The MF task and the MD task both fit Stevenson's¹⁵ criteria of face validity for monotonous tasks in that they

¹⁴ H.W. Stevenson and R.M. Knights, "The Effectiveness of Social Reinforcement after Brief and Extended Institutionalization", in American Journal of Mental Deficiency, Vol. 66, No. 4, January 1962, p. 591.

¹⁵ H.W. Stevenson, "Social Reinforcement of Children's Behavior", in L.P. Lipsitt and C.P. Spiker, (eds.), Advances in Child Development and Behavior, Vol. II, New York, Academic Press, 1965, p. 99.

appear to be quite dull, apparently endless, require minimal prior learning, have no clear criteria for adequate performance, and use discrete responses. The valid use of the MD task as an index of the effects of social reinforcement has been amply demonstrated.¹⁶ The validity of the MF task rests only on its use by Brailsford¹⁷ in studying the persistence of endogenous and exogenous mental retardates. On the strength of their past use, therefore, both the tasks used in the present study appear to be valid tools for the measurement of persistence in the face of monotony.

4. Procedure.

Both criterion tasks were administered individually. All forty subjects were run on the MF task during a three-week period. In the following three weeks they were all administered the MD task. The twenty ILC subjects and the twenty ELC subjects were each assigned random numbers from 1 to 20 using the tables of random numbers in Edwards.¹⁸ These two groups were then each divided into EO vs TO groups by placing subjects numbered 1 to 10 in one subgroup, and

¹⁶ Ibid., p. 97-120.

¹⁷ Brailsford, Op. Cit., p. 1-53.

¹⁸ A.L. Edwards, Experimental Design in Psychological Research, New York, Holt Rinehart and Winston, 1960, p. 332-336.

the rest into the second subgroup. Labelling the four groups thus obtained as a, b, c, and d, two patterns of occurrence of the groups were arbitrarily chosen. These were a, c, b, d, and c, a, d, b. These two patterns were then alternated until all forty subjects had been run on each of the two tasks. Although this order of presentation concealed whether an individual subject was from the ILC or ELC group, the possible biasing effect of such knowledge was not completely controlled for, since the same examiner had previously administered the LC scale and selected the ILC and ELC groups. The same order of subjects was used in the administration of both criterion tasks. An attempt was made to control for variables, such as time of day and activity that a subject was being called away from, by testing only during school hours and by giving both criterion tasks to any one subject at approximately the same time of day.

Upon being seated at the testing table, the task was demonstrated and the subject was given either "ego orienting" or "task orienting" instructions. For the MF task, the TO group were given the following instructions:

"Today I want you to draw some moon faces, faces just like this (demonstration). You are to draw them on the paper that you see through the hole in this box.

(E. indicates opening in the box.) When I push the switch the paper will start to move. You can draw as many moon faces as you want to. You tell me when you want to stop."

The EO group were given the same instructions with the exception that instructions designed to be ego involving were added. The directions then read:

"Today I want you to draw some moon faces, faces just like this (demonstration). You are to draw them on the paper that you see through the hole in this box. (E. indicates opening in the box.) When I press this switch the paper will start to move. Some kids your age can draw a lot of moon faces. I want to see how many moon faces you can draw as compared to other kids your age. You can draw as many moon faces as you want to. You tell me when you want to stop."

On the MD task the TD instructions were:

"I want you to do a task today. Here is how you do it. You see these marbles. Some of them are blue and some are yellow. The blue ones go in this hole, and the yellow ones in this hole. (E. points to appropriate holes.) Now show me a blue marble. Put it in the hole it goes in. Now show me a yellow marble. Put it in the hole it goes in. You can put as many marbles in the holes as you want to. You tell me when you want to stop."

The EO instructions read:

"I want you to do a task today. Here is how you do it. You see these marbles. Some of them are blue and some are yellow. The blue ones go in this hole and the yellow ones in this hole. (E. points to the appropriate holes.) Now show me a blue marble. Put it in the hole it goes in. Now show me a yellow marble. Put it in the hole it goes in. Some kids your age can put a lot of marbles in the holes. I want to see how many you can put in these holes, as compared to other kids your age. You can put as many marbles in the holes as you want to. You tell me when you want to stop."

After giving the instructions, the examiner sat at a desk which was slightly to one side of and approximately five feet behind the subjects. He thus was out of the range of the subject's peripheral vision. The examiner then proceeded to busy himself with reading or writing, ostensibly paying no attention to the subject, and ignored any comments made by any of the subjects. In this way, the examiner avoided the possibility of giving reinforcements of any sort.

In order to assess the reliability of the criterion tasks under the conditions of the present study, a random selection of five subjects from each of the four experimental groups were tested on both tasks approximately one month after

the main study had been completed. Each subject received the same instructions which he had previously been given.

The amount of time (to the nearest second) spent by each subject on each task and the numbers of responses made (moon faces drawn or marbles dropped) were recorded.

5. Statistical Techniques of Data Analysis.

This section presents the statistical techniques that were used to analyze the data.

Since the means and standard deviations of the persistence times of the groups in this study were found to be proportional, the times in seconds were converted to logarithms.¹⁹

Reliability of the three psychometric tools, as well as the intertest relationship of the MF and MD tasks, were determined by use of the Pearson r .²⁰ t tests for correlated means²¹ were used to test for differences between means of test-retest distribution on the MD and MF tasks. Data from the MF and MD tasks were analyzed by means of a 2x2 analysis of variance technique with fixed factors.²²

19 Ibid., p. 130.

20 J.P. Guilford, Fundamental Statistics in Psychology and Education, New York, McGraw-Hill, 1956, p. 140.

21 Ibid., p. 220.

22 L.T. Dayhaw, Manuel de Statistique, Ottawa, Editions de l'Universite d'Ottawa, p. 434-446.

CHAPTER III

PRESENTATION AND DISCUSSION OF RESULTS

In this chapter the results obtained will be presented and discussed. This will be done under four sections. The first section will deal with the reliability of the three psychometric instruments used, the second with the relationships found between the MF and MD tasks, the third with the analyses of variance pertaining to the experimental hypotheses, and the fourth section will present a discussion of the various findings.

1. Reliability of the Instruments.

An estimate of test-retest reliability for the Children's Locus of Control (LC) scale, determined by using the entire sample pool of eighty-three residents over a seven-day period, yielded a Pearson r coefficient of $+0.59$ ($P < .01$). A t test for difference between means of correlated scores yielded a $t = 1.57$ ($P > .05$). This correlation coefficient is lower than those reported in the literature. Coupled with the t value obtained, which falls between the .10 and .05 probability levels, it appears that the reliability of the LC scale in the present study can be considered only moderate. However, this reliability seems adequate for the purpose of classifying in terms of extremes on the LC dimension.

The test-retest reliabilities of log persistence times on the moon face drawing (MF) task and the marble dropping (MD) task were calculated on twenty subjects selected in a stratified random manner from the four experimental subgroups and retested over an interval that varied from three to six weeks. For the MF task, a Pearson r of $+0.73$ was obtained. It was also found that subjects persisted less on the second administrations with a t test for differences between correlated means of 3.199 ($P < .01$) being obtained.

The MD task proved to be more consistent than did the MF task. On the former, a Pearson r of $+0.80$, coupled with a nonsignificant test of differences between means ($t = 0.94$, $P > .10$), was obtained.

The reliabilities of persistence times on both monotonous tasks were considered sufficiently high for the purposes of the present study.

Test-retest reliability of rates on the MF and MD tasks was also determined. For this measure, the correlations were $+0.75$ and $+0.76$ respectively on the two tasks, with t tests indicating nonsignificant differences between test-retest means in both cases. In relation to results from previous studies, as reported in an earlier section of this paper, the obtained reliability for rates on the MF task is somewhat low, whereas for the MD task it compares favorably.

Table III presents means, standard deviations, t values for differences between means, and correlation coefficients for the test-retest studies on the three psychometric instruments.

2. Relationship between the MF and MD Tasks.

A Pearson r calculated between the persistence times on the MF task and the MD task yielded a coefficient of $.85$ for the total experimental sample of forty subjects. This high relationship indicates that the two tests are measuring some factor in common and, when viewed in the light of the strong face validity of each of them, it supports the assumption that they are both valid measures of persistence in the face of monotony. A t test for difference between means gave a value of $t = 3.956$ ($P < .01$), with the mean of the MD task being lower than that of the MF task. From an inspection of the moon face drawings produced, it was apparent that some of the subjects varied their drawings somewhat as they went along. This broader scope for individual expression on the MF task may have accounted for a greater interest in it than on the MD task, at least on initial exposure, and thus to longer persistence times.

The rates of responses on the two tasks were also correlated, yielding a Pearson r of $.22$ which is not significantly different from zero at the $.05$ probability level.

Table III.-

Test-Retest Reliability Data for LC Scale, MF Task, and MD Task.

Task	Measure	N	Mean		SD		t	r
			Test	Retest	Test	Retest		
LC	LC score	63	13.4	13.0	2.58	2.49	1.575	0.59
MFT	Log Time ^a	20	2.6082	2.6329	0.3393	0.2963	3.199 ^d	0.73
MFT	Rates ^b	20	0.0984	0.1102	0.0200	0.0264	0.89	0.75
MDT	Log Time	20	2.6950	2.6390	0.4240	0.3960	0.945	0.80
MDT	Rates ^c	20	0.5741	0.5659	0.1292	0.1414	0.418	0.76

a Log Seconds

b Drawings per second

c Marbles per second

d Significant at .01 level

This result suggests that there is very little, if any, relationship between the speed of response on the two tasks, despite the fact that the times the subjects spent on them are highly proportional to one another.

3. Experimental Results.

Before proceeding with the main statistical analysis checks were made of the relationship between the control variables of CA, MA, and I.Q. with persistence times on the MF and MD tasks. These correlations ranged from $-.03$ to $+.21$ with none of them being significantly different from zero at the $.05$ probability level. These findings add to the group matchings on the control variables in allowing for the assumption that CA, MA, and I.Q. were adequately controlled.

For the main effect of locus of control the 2×2 analysis of variance of persistence times on the MF task yielded an F ratio of 3.497. This ratio fails to reach significance at the $.05$ probability level. By a graphic extrapolation using F values from Edwards¹ a probability value for this F ratio of $.07$ was calculated. Such a value could be interpreted as suggesting a trend towards significance for the effect of internal versus external locus of

¹ A.L. Edwards, Experimental Design in Psychological Research, New York, Holt, Rinehart, and Winston, 1950, p. 364-371.

control on MF task persistence times. However, the null hypothesis concerning the variables cannot be rejected. The effect of the variation in instructions (task oriented versus ego oriented) was much clearer, with a very significant F ratio of 9.634 ($P < .01$) being obtained. It is therefore legitimate to reject the null hypothesis related to the effect of this variable on persistence times with the MF task. The null hypothesis with respect to the interaction of the two independent variables clearly could not be rejected as a nonsignificant F ratio for interaction of 1.325 was obtained. A summary of the analysis of variance for log persistence times on the MF task is presented in Table IV.

On the MD task the 2x2 analysis of variance of log persistence times indicated that both the null hypotheses relating to the main effects could be rejected at the .05 level of probability. For the LC variable an F ratio of 5.05 ($P < .05$) was obtained, indicating that the ELC subjects performed differently from the ELC's in the time spent dropping marbles. Similarly, for the instructions variable, an F ratio of 4.24 ($P < .05$) was calculated indicating that the persistence times of the EO and TO groups were significantly different on the MD task. However, the interaction variance ratio between locus of control and instructions was not significant. An F value of 1.38 ($P > .10$) was obtained in this case. It appears, therefore, that on the basis of the present study

Table IV.-

Summary of Analysis of Variance for Log
Persistence Times^a on the MF Task.

Source	SS	df	MS	F	P
Lc ^b	0.5400	1	0.5400	3.497	P = 0.07
I ^c	1.4786	1	1.4786	9.634	P < .01
LXI	0.2046	1	0.2046	1.325	
Error	5.5583	36	1.1544		
Total	7.7905	39			

- a Log seconds
b Locus of Control
c Instructions

no evidence has been found to support the hypothesis that there is a relationship between locus of control and instructions directed towards varying the degree of ego involvement on persistence in the face of monotony. A summary of the analysis of variance of log persistence times on the MD task is given in Table V.

The means and standard deviations of the persistence times for the various subgroups of the present study are given in Table VI for both the W and MD tasks. From this table it can be seen that the means of the ELC group on both tasks are higher than those of the ILC group. It thus appears that on both tasks the ELC group persisted longer on the monotonous tasks than did the ILC group. This result is contrary to that predicted from the review of the locus of control literature. Performance differences related to the two levels of instructions given is in the direction predicted with the ego-oriented group persisting longer on both tasks than did the task-oriented group.

In order to highlight the parallel between persistence on the two monotonous tasks used, Appendix 2 presents graphs of the means of the ILC and ELC groups on the two tasks (Figure 1) and of the EO and TO groups on both tasks (Figure 2).

Although not pertaining to the experimental hypothesis with which this study was directly concerned, data on the rates of responding to the two monotonous tasks were also

Table V.-

Summary of Analysis of Variance for Log
Persistence Times^a on the MD Task.

Source	SS	df	MS	F	P
LC ^b	1.0221	1	1.0221	5.05	<.05
I ^c	0.8602	1	0.8602	4.24	<.05
LCXI	0.2799	1	0.2799	1.38	>.10
Error	7.2873	36	0.2024		
Total	9.4495	39			

a Log seconds
b Locus of Control
c Instructions

Table VI.-

Means and Standard Deviations of Log Persistence Times^a
on the MF Task and the MD Task for
the Total Sample and Each Subgroup.

Group	N	MF Task		MD Task	
		Mean	SD	Mean	SD
ILC-EO	10	3.0958	0.4340	2.8546	0.2672
ILC-TO	10	2.5670	0.1450	2.3940	0.3760
ELC-EO	10	3.1851	0.4294	3.0069	0.4218
ELC-TO	10	2.9425	0.4027	2.8809	0.5815
ILC	20	2.8314	0.4180	2.6234	0.3995
ELC	20	3.0638	0.4337	2.9440	0.5112
EO	20	3.1404	0.4344	2.9307	0.3615
TO	20	2.7547	0.3566	2.6373	0.5466
Total	40	2.9476	0.4415	2.7841	0.4860

^a Log seconds

analyzed. With respect to the rates of drawing moon faces, in number of faces drawn per second, a 2x2 analysis of variance yielded nonsignificant F ratios for both main effects and for interaction as well. A summary of this analysis is presented in Table VII, where it can be observed that all the F ratios were less than unity. It, therefore, appears that speed of drawing moon faces is not influenced by either locus of control or attempts to induce ego involvement. Analysis of rates of responding on the MD task, however, indicated that the instructions variable produced a significant F ratio of 4.393 ($p < .05$). For the LC variable, an F ratio of 3.144 ($p = .080$) was obtained. Although nonsignificant, this ratio suggests that a trend towards a significant LC effect on rates of marble dropping may be present. The interaction effect of LC x Instructions was definitely nonsignificant as an F ratio of less than unit was found. Table VIII presents a summary of the analysis of variance for the MD task.

Table IX shows the mean rates of responding for each of the subgroups on both tasks. From the table it can be seen that the EO group worked faster than the TO group on the MD task while the ILC group tended to work faster, although not significantly, than did the LLC group.

Table VII.-
 Summary of Analysis of Variance for
 Rates (Drawings per Second)
 on the MF Task.

Source	SS	df	MS	F	P
LC ^a	0.0008	1	.0008	0.0193	>.10
I ^b	0.0002	1	.0002	0.0048	>.10
LCXI	0.0000	1	.0000		>.10
Error	0.0415	36	.0415		
Total	0.0425	39			

a Locus of Control

b Instructions

Table VIII.-

Summary of Analysis of Variance for
Rates (Marbles per Second)
on the MD Task.

Source	SS	df	MS	F	P
LC ^a	0.0720	1	0.0720	3.144	= .086
I ^b	0.1006	1	0.1006	4.393	<.05
LCXI	0.0112	1	0.0112	0.489	
Error	0.8256	36	0.0229		
Total	1.0094	39			

a Locus of Control
b Instructions

Table IX.-

Means and Standard Deviations of Rates^a on the MF Task and the MD Task for the Total Sample and Each Subgroup.

Group	N	MF Task		MD Task	
		Mean	SD	Mean	SD
ILC-EO	10	0.1025	0.0200	0.6806	0.0860
ILC-TO	10	0.0975	0.0436	0.5466	0.1833
ELC-EO	10	0.0943	0.0300	0.5621	0.1760
ELC-TO	10	0.0882	0.0300	0.4954	0.1024
ILC	20	0.0970	0.0490	0.6136	0.1581
ELC	20	0.0913	0.0317	0.5288	0.1476
EO	20	0.0984	0.0265	0.6213	0.1506
TO	20	0.0928	0.0375	0.5210	0.1510
Total	40	0.0956	0.0332	0.5712	0.1590

a Drawings or marbles per second

As a final note, the time spent on each task was correlated with the speed of response on each as a check on the relationship between the two response measures. In both cases nonsignificant negative correlations were found, $-.14$ and $-.06$, for the MF and MD tasks, respectively. It therefore appears that speed and persistence on monotonous tasks are independent of one another. This being the case, the reporting of reliability coefficients for rates on monotonous tasks may be of no value in estimating the usefulness of such tasks for purposes of investigating persistence.

4. Discussion of Results.

The reliability estimates obtained in the present study for the psychometric instruments used are all large enough to be within acceptable limits for the experimental manipulation of groups. The moderate stability estimates obtained for the LC scale indicate that this instrument is not sufficiently reliable to be used as a measure of individual differences other than in forming groups at either end of a continuum. This conclusion has been reached by Rotter² with reference to his adult form of the LC questionnaire.

² J.E. Rotter, "Generalized Expectancy for Internal Versus External Control of Reinforcement", in Psychological Monographs: General and Applied, Vol. 80, No. 1, Whole No. 609, January 1966, p. 17.

The present results indicate that it applies equally to the children's LC scale.

Of the two measures of persistence in the face of monotony, the MD task appeared in this study to be slightly more reliable than the MF task. Although test-retest correlation coefficients were fairly high for both tasks, the subjects spent less time, on the average, in drawing moon faces when they were retested than they had on their original testing. This was not so with performance on the MD task, since the difference in the means of the test-retest sets of scores for this task did not approach significance. A possible explanation for this difference in the stability over time of these two tasks may lie in qualitative observations of the subjects' responses. Scrutiny of the drawings produced on the MF task revealed that some of the subjects varied the drawings in such details as smiling faces versus frowning faces, changed hair styles, adding mustaches, etc. This sort of variation of response appeared more prevalent on the initial testing than on the retest. On the other hand, responses to the MD task allowed for very little such variation in performance style. It follows from these observations that the MF task may have held more interest than the MD task on initial exposure; however, a differential interest factor was removed on the second presentation of the tasks. In other words, the two monotonous tasks were not equally dull on their first

presentation but they were on their second. To check this line of thought the means of the log persistence times on the two tasks for test and retest were compared for the twenty subjects used in the reliability study. The difference between the means for the initial test gave a t value of 2.316, which is significant at the .05 probability level. As expected, the mean score on the MF task was higher than that on the MD task. However, the same test run on the retest means proved not to be significant ($t = 0.124$, $P > .10$). Thus, on the second testing the mean time scores on the MD and MF tasks did not differ from one another. Thus, the speculation that the MF task is more interesting than the MD task on initial exposure, but of equal interest upon a second exposure, seems to be supported by statistical analysis of persistence times on the two tasks. If this is the case, the MD task would appear to be slightly more valid as a monotonous task, according to the criteria of having low interest value, set forth by Stevenson.³

Considering the relationship between the two monotonous tasks a bit further, the higher intertask correlation under the present conditions of no time limit being imposed

³ H.W. Stevenson, "Social Reinforcement of Children's Behavior", in L.P. Lipsitt and C.P. Spiker, (eds.), Advances in Child Development and Behavior, Vol. II, New York, Academic Press, 1965, p. 99.

and no external feedback being given during performance, suggests that some aspect of subjective sense of time was being reliably tapped. It suggests that an idea such as persistence in the face of monotony is a reliable and valid construct in that, if interest value, i.e., variation in response, can be controlled, individuals may have a built-in plan of how long they will perform on a task despite differing responses being called for by the task. It may be that tasks of the present nature could be used in the investigation of individual differences in "time sense" as a basic variable in psychological functioning.

With respect to the specific hypotheses under consideration in this study, it can be concluded from the above discussion that persistence time performance on both the MF and MD tasks are measuring very much the same phenomenon and thus can be considered, in general, together.

Considering the experimental hypothesis with which the present study is primarily concerned, the obtained results indicated that persistence on monotonous tasks was related to both independent variables manipulated, but not to an interaction of them. That is, statistically significant differences in persistence times were found to be related both to the two levels of locus of control and to the two levels of instructions aimed at varying ego involvement, but the predicted effect of these two variables acting together

in affecting persistence was not found. These results were more clear-cut in the case of persistence on the MD task, where significant differences were found for both locus of control and ego involving instructions, than they were on the MF task, in which the locus of control effect approached significance while the ego involvement effect reached it. However, in the light of the above discussion of the high relationship between the two tasks, and the higher validity of the MD task, at least in initial presentation, it appears reasonable to consider the results on the MF task to be approximately equivalent to those on the MD task. This position will be taken through the remainder of the present discussion.

The rejection of the null hypothesis concerning ILC versus ELC and persistence on the monotonous tasks used, supports the predictions made by Crowwell.⁴ However, the direction of difference between the two locus of control groups was opposite to what was predicted by that author.

Rather than finding ILC's to persist longer than ELC's, the present study found the opposite effect. Actually, this finding does not contradict locus of control theory. ILC's are typically seen as persons who expect their behavior

⁴ R.L. Crowwell, "A Social Learning Approach to Mental Retardation", in N.R. Ellis, (ed.), Handbook of Mental Retardation, New York, McGraw-Hill, 1963, p. 77.

to be related to foreseeable goals; to prefer situations in which they can compete, and not to be passive or conforming. When contrasted with the theoretical picture of the ELC as a person who tends towards conforming relying on agents outside of himself to monitor his behavior, one might well expect that the ELC person would persist for long periods in order to please the examiner or because he had difficulty in determining on his own when he should stop. It may also be that the ELC prefers such a noncompetitive, open-ended task, to other situations in which comparison of his behavior to that of others is more apparent. Conversely, the ILC may dislike such a situation since in it he lacks any standard towards which he can aim. This consideration of preferences for skill versus nonskill situations follows a study by Watson and Beaumel,⁵ who interpreted results of a learning task in skill versus chance situations as indicating that ILC's prefer skill situations and ELC's prefer chance situations. The present experimental task clearly has all the appearances of a chance controlled situation since, on the one hand, a subject would have no prior experience on such tasks from which he could draw competitive norms and, on the other hand, he was given

⁵ D. Watson and E. Beaumel, "Effects of Locus of Control and Expectations of Future Control upon Present Performance", in Journal of Personality and Social Psychology, Vol. 6, No. 2, June 1967, p. 212-215.

no information during his performance which he could use to construct ad hoc criteria. Therefore, upon analysis of the theory of locus of control, the present result falls neatly into place. That is, under conditions of ego involvement being controlled, ELC's should be expected to persist longer on a monotonous task than should ILC's.

This discussion leads to a comparison of the present result with that of Shipe,⁶ in which locus of control was not found to be related to a persistence measure. In one sense, the two studies are not directly comparable since Shipe's measure was one of persistence in the face of physical pain and not monotony per se. However, the main difference in the studies may be that in Shipe's investigation both locus of control groups were given ego orienting instructions. Thus, ILC's may have been motivated primarily to compete, whereas the natural ELC motivation to please may have effectively nullified any differential in motivation. Had she included a condition of no ego orienting instructions, she may have found the ELC subjects to persist longer than did the ILC's. If such a result occurred, then the effects of locus of control on "persistence" could be generalized across tasks, at least to the point of including pain and monotony.

⁶ D. Shipe, "The Relationships Among Locus of Control and Some Measures of Persistence in Mentally Retarded and Normal Subjects," in Abstracts of Peabody Studies in Mental Retardation, Vol. 1, 1960.

The second independent variable with which the present study dealt, namely, ego involvement, also produced a significant effect upon persistence on the monotonous tasks used. As well as rejecting the null hypothesis concerned, the results showed that the ego oriented subjects persisted longer than did the task oriented subjects, which is in line with what would generally be expected. It thus appears that the instructions given can be considered as validly inducing the degree of motivation which they were intended to induce. It should be noted, however, that finding a differential performance level between groups having varying types of task versus ego instructions does not unequivocally justify the assumption that ego involvement was actually varied. Such a conclusion is considered definitively warranted only if some criterion unrelated to the dependent variable is utilized, such as some form of a questionnaire or rating scale. This cautionary note has been sounded, among others, by Iverson and Reuder.⁷ Although such a procedure was not followed in any of the locus of control investigations reported in the literature, the fact that it was not used in the present study stands as a criticism of the methodology employed.

⁷ M.A. Iverson and M.E. Reuder, "Ego Involvement as an Experimental Variable", in Psychological Reports, vol. 2, No. 2, June 1956, p. 148.

The hypothesis developed in the literature review to the effect that locus of control could be considered as an index of susceptibility to ego involvement was not supported by the present results. Specifically, the interaction of the two levels of locus of control with the two levels of instructions intended to be ego involving did not yield a significant F ratio for persistence times on either monotonous task. The null hypothesis regarding interaction could not, therefore, be rejected.

This finding does not concur with basic assumptions of locus of control theory. As previously noted, Bialer,⁸ in his initial formulation of the theory, stated that ego involvement is an important variable to consider in predicting behavior on the basis of locus of control. Specifically, he held that the presence of an ILC orientation was needed before a person would respond to ego involving conditions. To conform to Bialer's theorizing the present study should have shown the ELC subjects to have been little, if at all, affected by the different instructions given, while the performance of the ILC's should have been markedly affected by them. The inability to reject the null hypothesis in the present study indicates that either no such interaction effect existed or,

⁸ I. Bialer, "Conceptualization of Success and Failure in Mental Retardates and Normal Children", unpublished doctoral dissertation, George Peabody College for Teachers, 1960, iv-99 p.

if one did, it was not great enough to be safely regarded as due to factors other than chance.

Before considering possible reasons for the obtained lack of interaction between locus of control and ego involving instructions, it was deemed worthwhile to look carefully at the data for any indication of a possible significant interaction were the study to be repeated under a more controlled experimental design. To this end, tests of significance were run on the differences between the mean persistence times for the four subgroups on each monotonous task. On both tasks significant differences (at .05 level) were found between the mean persistence time of the ILC subjects in the ego oriented, as opposed to task oriented, groups. Differences between means of the two ELC groups did not approach significance. It seems, therefore, that the obtained variation in subgroup persistence times was in keeping with what would be predicted from Bialer's theorizing; varying ego involving conditions clearly had no effect upon ELC subgroups, whereas it did at least tend towards having an influence on the ILC groups.

Since some tendency was found towards the type of interaction which the present experimental design was expected to yield, it appears worthwhile to consider possible weaknesses in the methodology which may have accounted for the failure of such a tendency to reach statistical significance.

Of most obvious consideration is the small sample used in the present study. It is a basic principle in statistical theory that the larger the sample the smaller is the degree of error associated with estimations of population parameters. Consequently, the chances are increased that relatively small variations in such parameters will be detected. Had larger samples been available, the statistical analyses employed would have had greater sensitivity and, if the interaction effect still proved to be not significant, then greater confidence could be placed in not rejecting the null hypothesis related to it.

Another limiting factor may have been the relative lack of distance along the locus of control variable between the ILC and ELC groups used. The procedure used for dichotomizing subjects along this dimension may have failed to yield groups which were sufficiently extreme in one tendency or the other to form groups which were adequate representatives of the theoretical populations of extremes in the ILC and ELC orientations. Had a larger subject pool been tapped, a wider separation of locus of control groups may have been possible. A close to ideal such situation is reported by Watson and Beaumel⁹ who were able to form groups made up of the highest ten per cent and the lowest ten per cent of over five hundred

⁹ Watson and Beaumel, Op. Cit., p. 213.

subjects who were given the adult version of the locus of control scale. The difference between the ILC and ELC groups in that study was eleven score units as compared to three score units between the groups used in the present study. The finding that locus of control, when considered alone, did show difference in persistence between the ILC and ELC groups used tends to counter the above argument, yet the possibility remains that, if an interaction effect of locus of control and the type of ego orienting variation used here, does in fact exist, it might have been enhanced by the use of more extreme locus of control groups.

Also worth considering is the criticism noted previously that no direct measure of the effectiveness of the ego orienting instructions was made independently of the performance on the monotonous tasks employed. Although the need of such a procedural refinement must be accepted in principle, the highly significant effects which statistical analyses indicated could be assigned to the influence of the varying instructions given, suggests strongly that motivation to perform longer on the tasks was successfully induced by them. It, therefore, is doubtful that lack of a significant ego involvement-locus of control interaction could be attributed to a weakness in the instructions given.

Turning for a moment to consideration of the data concerning rates of performance on the two monotonous tasks,

it was found that the MF task did not discriminate between groups on this measure but the MD task did. Specifically, none of the experimental effects tended towards significance in analysis of variance of MF task rates. It seems indicated that, if speed of response is a variable under consideration, the MF task is not appropriate as a psychometric tool. This finding agrees with the results reported by Brailsford¹⁰ who found that rates on an MF task did not discriminate between groups of retardates varied in terms of brain-damaged versus non brain-damaged. However, the rates were different between the retardate groups and a control group of intellectually normal children, with the normals working faster than the retardates. Taking Brailsford's study into account suggests that, at the present time, any conclusion of not using rates on the MF task as a dependent variable measure should be applied to mentally retarded subjects only.

Rates for the MD task, on the other hand, allowed for rejection of the null hypothesis concerning the instructions variable (ego involvement), and showed a tendency towards rejection of the null hypothesis for the locus of control variable. Again the null hypothesis related to interaction effects of the two variables could not be rejected. Considering

10 E.C. Brailsford, "An Investigation into the Topology of Exogenous Feeble Minded Children", unpublished doctoral dissertation, University of Ottawa, 1965, viii-53 p.

the locus of control condition, the difference in the mean rates for the ILC and ELC groups, although only approaching significance, was in the direction which had been predicted for the persistence time measure; that is, the ILC's worked faster than did the ELC's. Although any speculation on this result must be considered as very tentative, these findings suggest that ILC's will work faster but spend less time than will ELC's on a monotonous task when the variable of ego involvement is not considered. In order to follow through with this line of thought and see if the higher speed of the ILC's resulted in their doing as much work as the ELC's, in terms of the number of marbles sorted, a t test for the significance of the difference of the mean number of marbles dropped by each group was computed. A t value that closely approached significance ($t = 1.929$, $p = .06$) was obtained, with the mean for the ELC's being higher than that for the ILC's. Thus the increased rate of the ILC's did not appear to compensate for their lack of persistence as far as the amount of work done was concerned.

The present experimental findings may have value for problems of applied psychology. For instance, in thinking about occupations for the mentally retarded, the generalization has often been made that dull, routine tasks are usually appropriate. The results obtained here indicate that certain qualifications of such a working principle may be required.

Specifically, taking the locus of control variable into account indicates that retardates who are ILC might fit less well on such tasks than would those who are ELC. This suggestion applies in particular to adolescent retardates who fall in the educable range of intelligence. Such a theoretical extrapolation of the present results would, of course, require validation by studies using performance on actual jobs as the dependent variable.

To recapitulate briefly the main results obtained in the present study, evidence was found indicating that educable mental retardates who tend to be external locus of control (ELC) persist longer on monotonous tasks than do educable mental retardates who tend to be internal locus of control (ILC). Also, instructions intended to be ego orienting produce longer persistence times on such tasks than do instructions intended to be task orienting. Although a tendency towards locus of control interacting with ego involving conditions was observed, this tendency was not sufficiently pronounced to reject the hypothesis that it was a chance occurrence.

SUMMARY AND CONCLUSIONS

From the literature on the personality variable of locus of control it was suggested that people who tend toward an internal locus of control orientation (ILC) would respond differently than those who tend towards an external locus of control (ELC) on the variable of persistence in the face of monotony. It was further suggested that varying conditions of ego involvement would differentially affect the persistence of ILC and ELC subjects on such tasks. To investigate these speculations, two repetitive, monotonous tasks requiring simple, discrete responses, and used in previous studies for similar purposes, were employed as measures of persistence.

A total population of eighty-three adolescent, educable, familial, institutionalized mental retardates was given the Children's Locus of Control (LC) scale, and the Peabody Picture Vocabulary test. Groups of twenty ILC and twenty ELC subjects were selected on the basis of arbitrary cut off points above and below the mean LC score. These groups were then each randomly divided into subgroups allowing for either task-oriented or ego-oriented instructions to be given to one half of each LC group. Analysis of control variables of C.A., M.A., and I.Q. showed that the four experimental groups were equated on all of them.

Analysis of variance for persistence times on the two monotonous tasks indicated that ELC subjects persisted more than did ILC's; ego-orienting instructions produced greater persistence than did task-orienting instructions; and locus of control tended to interact with type of instruction, but this interaction did not reach significance.

Suggestions were made concerning improvement in design which might lead to more conclusive results. These were: (a) utilizing samples of larger size; (b) tapping a larger subject pool in order to obtain groups which are more extreme in ILC and ELC tendencies; and (c) using some measure of the degree of involvement which is unrelated to the dependent variable.

In conclusion, support was found in the present study for the value of the construct of locus of control as a predictor of persistence in the face of monotony with educable mentally retarded adolescents.

BIBLIOGRAPHY

Bialer, Irv., "Conceptualization of Success and Failure in Mental Retardates and Normal Children", unpublished doctoral dissertation, George Peabody College for Teachers, 1960, iv-99 p.

Initial formulation of the locus of control construct as it applies to children, both retarded and normal. Presents the Children's Locus of Control scale and uses it to validate the locus of control construct against several pertinent variables.

Brailsford, Eugene C., "An Investigation in the Topology of Exogenous Feeble Minded Children", unpublished doctoral dissertation, University of Ottawa, 1965, viii-53 p.

Introduces a modified version of the moon face drawing task, using a continuous presentation of drawing paper, as a technique for assessing persistence in children.

Crowwell, Rue L., "A Social Learning Approach to Mental Retardation", in M.R. Ellis, (ed.), Handbook of Mental Deficiency, New York, McGraw-Hill, 1963, p. 41-91.

An exhaustive review of locus of control studies up to 1963, including a hypothesis relating locus of control to persistence.

Iverson, Marvin A. and M.E. Reuder, "Ego Involvement as an Experimental Variable", in Psychological Reports, Vol. 2, No. 2, June 1956, p. 147-181.

This article reviews literature on ego involvement up to 1956. It argues cogently for the value of this construct, pointing out that ego involvement is frequently involved in discussions of results, yet seldom referred to in titles of studies.

McConnell, Thomas R. Jr., "Locus of Control, Examiner Presence and Source and Type of Reinforcement as Factors in Visual Discrimination Learning with Mental Retardates", unpublished doctoral dissertation, George Peabody College for Teachers, 1965, ix-164 p.

Dissertation containing an excellent review of locus of control literature from which is drawn three conditions which are hypothesized to be necessary if performance is to be predicted from differences in locus of control.

Rotter, Julian B., "Generalized Expectancy for Internal versus External Control of Reinforcement", in Psychological Monographs: General and Applied, Vol. 30, No. 1, January 1966, Whole No. 609, p. 1-28.

A major review of the locus of control area which also relates this construct to similar constructs in psychology and sociology and presents a locus of control questionnaire for adults.

Shipe, Dorothy, "The Relationships Among Locus of Control and Some Measures of Persistence in Mentally Retarded and Normal Subjects", in Abstracts of Peabody Studies in Mental Retardation, Vol. 1, No. 58, 1960.

This study is an unsuccessful attempt to relate locus of control in children to persistence.

Stevenson, Harold W., "Social Reinforcement of Children's Behavior", in Lewis P. Lipsitt and C.P. Spiker, (eds.), Advances in Child Development and Behavior, Vol. II, New York, Academic Press Inc., 1965, p. 97-126.

Along with presenting criteria for monotonous tasks, this article presents a comprehensive review of studies using marble-dropping tasks to investigate the variable of social reinforcement.

Zigler, Edward, "Rigidity and Social Reinforcement in the Performance of Institutionalized and Non-Institutionalized Normal and Retarded Children", in Journal of Personality, Vol. 31, No. 2, June 1963, p. 258-269.

This paper contains a description of a marble-dropping task which provides an endless supply of marbles and which has served as the prototype for similar tasks used in numerous subsequent studies.

APPENDIX 1

CHILDREN'S LOCUS OF CONTROL SCALE

APPENDIX 1

CHILDREN'S LOCUS OF CONTROL SCALE

Instructions

This is not a test. I am just trying to find out how kids your age think about certain things. I am going to ask you some questions to see how you feel about these things. There are no right or wrong answers to these questions. Some kids say "yes" and some say "no". When I ask the question, if you think your answer should be yes, or mostly yes, say "yes". If you think the answer should be no, or mostly no, say "no". Remember, different children give different answers, and there is no right or wrong answer. Just say "yes" or "no", depending on how you think the question should be answered. If you want me to repeat a question, ask me. Do you understand? All right, listen carefully, and answer "yes" or "no".

- 1p. When somebody gets mad at you, do you usually feel there is nothing you can do about it?
- 2f. Do you really believe a kid can be whatever he wants to be?
- 3f. When people are mean to you, could it be because you did something to make them be mean?
- 4f. Do you usually make up your mind about something without asking someone first?
- 5f. Can you do anything about what is going to happen tomorrow?
- 6f. When people are good to you, is it usually because you did something to make them be good?
- 7f. Can you ever make other people do things you want them to do?
- 8f. Do you ever think that kids your age can change things that are happening in the world?
- 9f. If another child was going to hit you, could you do anything about it?
- 10f. Can a child your age ever have his own way?

- 11p. Is it hard for you to know why some people do certain things?
- 12f. When someone is nice to you, is it because you did the right things?
- 13f. Can you ever try to be friends with another kid even if he doesn't want to?
- 14f. Does it ever hep any to think about what you will be when you grow up?
- 15f. When someone gets mad at you, can you usually do something to make him your friend again?
- 16f. Can kids your age ever have anything to say about where they are going to live?
- 17f. When you get in an argument, is it sometimes your fault?
- 18p. When nice things happen to you, is it only good luck?
- 19p. Do you often feel you get punished when you don't deserve it?
- 20f. Will people usually do things for you if you ask them?
- 21f. Do you believe a kid can usually be whatever he wants to be when he grows up?
- 22p. When bad things happen to you, is it usually someone else's fault?
- 23f. Can you ever know for sure why some people do certain things?

Note: The letter "f" following item number indicates that an answer of "yes" is scored as internal control. The letter "p" signifies that an answer of "no" is scored as internal control.

APPENDIX 2

**GRAPHS OF MEAN PERSISTENCE TIMES OF THE EXPERIMENTAL
GROUPS ON THE MF AND MD TASKS**

APPENDIX 2

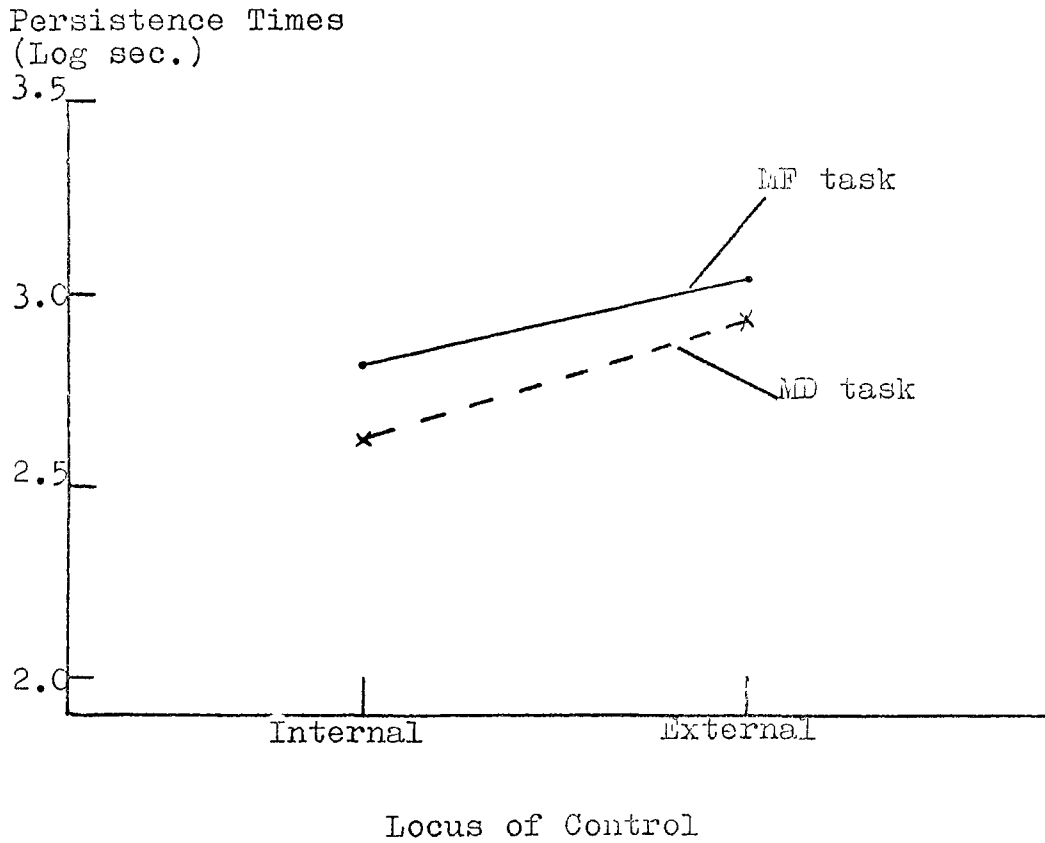


Figure 1.-Graph of Mean Persistence Times in Log Seconds of the Internal and External Locus of Control Groups on the MF task and the MD task.

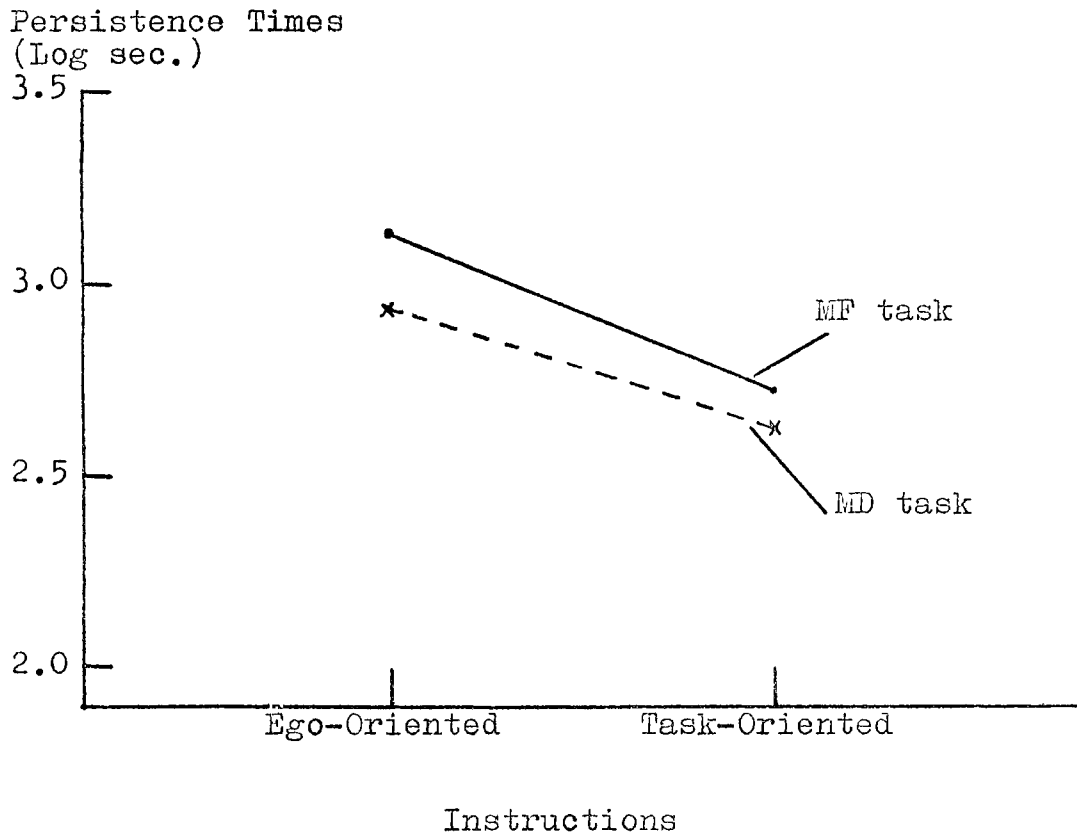


Figure 2.-Graph of Mean Persistence Times in Log Seconds of the Ego-Oriented and Task-Oriented Groups on the MF task and the MD task.

APPENDIX 3

ABSTRACT OF

Locus of Control, ego Involvement and the Persistence
of Mental Retardates in the Face of Monotony

APPENDIX 3

ABSTRACT OF

Locus of Control, Ego Involvement and the Persistence of Mental Retardates in the Face of Monotony¹

This study was directed towards investigating relationships between locus of control, ego involvement and persistence in the face of monotony among educable mental retardates. To this end, forty subjects who scored at either end of the Children's Locus of Control scale were obtained from a subject pool of eighty-three educable retardates, between the ages of 12 and 20, who had no diagnosed physical or emotional problems. The twenty internal locus of control and twenty external locus of control subjects were then randomly divided into groups given either ego-orienting instructions or task-orienting instructions. Each subject then performed two monotonous tasks, a moon face drawing task and a marble-dropping task, until they chose to stop. The examiner sat outside of the subject's range of vision and gave no reinforcement of any sort.

Persistence on both tasks was found to be quite reliable. Also, the tasks correlated highly with each other.

¹ George L. Reilly, Master's thesis presented to the Faculty of Psychology of the University of Ottawa, Ontario, August 1968, viii-76 p.

Statistical analysis indicated that persistence time on these monotonous tasks was related to locus of control, with the ELC subjects persisting longer than the ILC's, and was also related to ego-involving instructions with the ego-oriented subjects persisting longer than the task-oriented. The effects of interaction between these two independent variables on persistence did not reach significance although a trend in this direction was observed. Suggestions were made for methodological refinements in further research.