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LA THÈSE A ÉTÉ
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THE EFFECT OF THE PERSONALITY VARIABLE LOCUS OF CONTROL ON IMITATION LEARNING

A Thesis
Presented to
the Faculty of Education
Ottawa University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

by

Elizabeth Fredericka Cork

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ABSTRACT

The purpose of this study was to test an hypothesis that internal locus of control subjects imitate more of a relevant rewarded behavior than do external locus of control subjects. Rationale for such an hypothesis was based on (i) Rotter's (1966) theory that certain individuals (internals) tend to perceive reinforcements in life as being controlled by themselves while others (externals) tend to perceive reinforcements in life as being controlled by outside forces, and on (ii) Bandura's (1971) theory that imitative behavior is controlled by anticipated consequences of imitation.

Subjects were fourth and fifth grade students from eleven classes of seven public schools within an urban city in Western Canada. Instruments were the Children's Nowicki Strickland Internal External (CNS-IE) Scale and Sequential Tests of Educational Progress (STEP), form 4B Spelling. Treatment consisted of a series of 35 mm cartoon slides ("B.C. Productions") showing a student receiving a high mark, teacher smile and teacher praise for performing a spelling exercise quickly and carefully. A control condition was introduced to control for effects other than treatment effect. In a 2 x 2 design, imitation scores, as indicated by the number of STEP 4B spelling items attempted in

four minutes, were analysed according to condition (treatment or control) and locus of control (internal or external). Results indicated no significant differences for main effects, but there was significant interaction between condition and locus of control, as predicted. ($F_{1,192} = 2.91, p < .10$). Imitation of a relevant rewarded modeled behavior was concluded to be one socially defined situation in which internal and external locus of control subjects differ.

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INTRODUCTION

In recent years there has been increasing interest in the personality characteristic Locus of Control. In Rotter's (1966) formulation, locus of control is viewed as a generalized expectancy variable, reflecting the extent to which an individual perceives that he has control over the reinforcements he experiences. "Internal Locus of Control" refers to the belief that reinforcement follows as a consequence of one's own behavior. "External Locus of Control" refers to the belief that reinforcements are controlled mainly by forces external to the individual (luck, fate or powerful others). An individual, according to his locus of control, can be positioned along a continuum between internal and external extremities.

While much attention has been paid to measurement of locus of control in adults, particularly in student populations, (Rotter 1966; Lefcourt 1972) little attention has been paid to the measurement of locus of control in children. This is primarily because valid general purpose instruments for measuring locus of control in children have only recently become available. For example, prior to the Children's Nowicki Strickland Internal External Scale, children's instruments either lacked standardization (Bailer 1961), were confined to projective methods (Dies 1968) or specialized in

perceived control of academic achievement (Crandall 1962). Recent measurement of locus of control in children is precipitating a body of literature which, for example, relates locus of control to children's achievement, as well as to various cognitive and personality variables. (Nowicki and Strickland 1973; Nowicki and Walker 1974). As such, a child's possession of one of the locus of control related variables may be regarded as a measurement of his locus of control.

Imitation of a relevant behavior in a relevant modeling situation may be a way to measure what internals and externals will do in a given socially defined situation. The concept of imitation learning, as formulated by Bandura (1971), regards performance of a given imitative behavior as controlled by the consequences (reinforcements) anticipated for performing that behavior. The anticipated consequences may result from direct experiences of the observer, may be inferred from the observed consequences of the model's behavior, or may be transmitted verbally to the observer. It is because anticipation of consequences is based on information, and because information, according to Bandura (1971), is provided by reinforcements observed occurring to the model or experienced by the imitator, that Bandura's (1971) formulation of imitation can be linked with Rotter's (1966) theory of the locus of control construct.

In the evolvement of locus of control as a personality

variable, Rotter's students found that, in performance, information from past experience was used moreso by individuals who perceived events as being controlled by their own skill than by individuals who perceived events as being controlled by chance or luck. It is this use of information, made by imitators of modeled behaviors and by those who perceive events as controlled by skill, that suggests imitation as a correlate of locus of control.

The purpose of the present study is to explore the relationship between locus of control and performance on a modeling task. It is hypothesized that subjects scoring at the internal end of a locus of control scale are more apt to modify their behavior on a relevant task when exposed to a positively reinforced model than are subjects scoring at the external end of the scale.

The procedure for the first chapter will be to trace the development of a theory of the locus of control construct, to trace the development of imitation learning, to investigate the possibility of linkage between locus of control and imitation learning, and to formulate an hypothesis regarding such a relationship. The remaining chapters will elaborate on the design, report results, discuss the results and summarize the study.

CHAPTER 1

REVIEW OF LITERATURE

1. Rotter's Locus of Control Construct

Locus of control, also referred to as internal-external control or control orientation, is described by Rotter (1966) as follows:

> When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate or under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labeled this belief in "external" control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in "internal" control. (Rotter 1966, p. 1)

The theory of the locus of control construct has two principal components (i) social learning theory (Rotter 1954) and (ii) findings that human behavior differs in situations or conditions people believe are controlled by their own skill and situations or conditions people believe are controlled by chance, luck or powerful others, (Phares 1957; James and Rotter 1958; Rotter, Liverant and Crowne 1961; Blackman 1962). Within the remainder of the Review of Literature

each of the components of the locus of control construct, the convergence of the components in formation of the locus of control construct and several variables related to the locus of control construct will be examined.

In social learning theory, Rotter (1954) refers to behaviour as a measurable response to a meaningful stimulus. This implies that behavior is learned, and contains stimulus and response components. Reinforcement also is part of learning in that reinforcement changes behavior in some observable way. Behavior is predictable according to the occurrence or non-occurrence of reinforcements. Rotter postulates that the potential for a specific behavior to occur in a specific situation is a function of both (i) expectancy, the probability held by an individual that particular reinforcement will occur in the situation and (ii) reinforcement value, the importance of that reinforcement in the situation to the individual.

Reinforcements can be generalized according to their functional value. For example a child might generalize such reinforcements as candy, ice cream, cookies, received after various visits to the doctor, as "sweets." Expectancy for reinforcement to occur after visiting the doctor might then become a generalized

expectancy for sweets. To show further how generalized expectancy for reinforcement functions in behavior prediction, the child, referred to above, on being told that she couldn't have a candy bar before supper, might not expect to get ice cream either. An expectancy for a class of reinforcements, generalized from several functionally related reinforcements, when measurable, might be considered a personality trait. One such trait conceived by Rotter is the generalized expectancy for internal or external control of reinforcement or locus of control construct. Particular reinforcement arising from one's own skill, referred to as "internal control," or luck, chance, or powerful others referred to as "external control," may be generalized to an expectancy that all reinforcements are so controlled.

Subsequent to Rotter's (1954) rationale that individuals generalize expectancy for reinforcements to occur, Rotter and associates conducted studies of human behavior in chance described and skill described situations. Skill described situations, also referred to as skill instructed conditions, are situations or conditions in which the subject is led to believe that his performance is due to his own skill. Chance described situations, also referred to as chance instructed conditions, are situations or conditions in which the subject is led to believe that his performance is due to luck, chance or powerful others. Findings that human behavior differed on several accounts in chance

described and skill described situations led Rotter to identify chance described and skill described situations as influencing performances. From the finding of one such study (Phares 1957), it was concluded that humans in skill described situations, given feedback as to correctness for performance, differed in predictions of success on future performances from those in chance described situations who had been given equal feedback.

Phares' study attempted to validate Rotter's (1954) theory that humans would choose to behave according to value of reinforcements and the expectancy that a given reinforcement would occur in a given situations or class of situations. It was hypothesized that a subject, when told that success in a requested performance depended on his skill, would relate the occurrence of reinforcement (feedback as to correctness) to his performance; when told that success depends on luck or chance, would not relate the occurrence of reinforcement to his performance. The rationale was that reinforcement to a task which the subject is told is skill controlled would be regarded by the subject as valued reinforcement. According to Rotter (1954), valued reinforcement would be used in expectancy for success on future performance of the task.

In two similar experiments, using as tasks, line matching and color matching with standard sets, subjects in skill and chance conditions received the same fixed feedback as to

correctness for trials. The subjects, psychology students, were asked after each matching trial accompanied by feedback, to bet on a scale from one to ten their prediction of success on the next trial. The dependent variable was the amount bet; conditions were "skill" and "chance." Results were as hypothesized. Subjects in the skill condition, had a greater mean magnitude of bets about success on a next trial than had subjects in the chance condition ($t = 2.6$, $p < .004$). Phares concluded that categorizing a situation as "skill" led a performer to use the results of past performance to predict success on future performance to a greater degree than categorizing a situation as "chance." James and Rotter (1958) concur with the finding.

Rotter, Liverant and Crowne (1961) extended the results of the above studies by finding that subjects had differing expectancy for success in tasks determined by the culture to involve either the subject's skill or the subject's luck. In a task which consisted of pulling on a string to lift a platform containing a half-inch steel bearing to a required height without its falling off (considered in the culture to be a task of skill), subjects made a significantly greater mean magnitude of bets as to future success than did subjects on a task which consisted of guessing if a blank flash card were marked on the back with an "X" or an "O" (considered in the culture to be a task of chance). Trials for both tasks were followed by the same feedback: correct

or not correct. It was found that subjects betting or expecting success for future performance differ in use of knowledge of past performance according to skill or chance conditions. Skill or chance conditions could be determined by experiment instructions (Phares 1957), or by the culture.

Studies referred to above constitute one of the two major components of the personality variable internal-external control (see page 4). These studies consistently demonstrated that subjects led by the experimenter or by the culture to believe either that performance is influenced by their own skill, or influenced by chance, vary in their use of feedback to predict future success. In the evolvement of internal-external control, this finding precipitated a question as to expectancy for performance on tasks that are "ambiguous"; that is, when skill or chance conditions are not clearly defined by the culture or by the experimenter.

Rotter postulates that expectancy for reinforcement can be generalized according to functional similarity of the tasks reinforced. Expectancy for an ambiguous task to belong to either a skill condition class or to a chance condition class would take place because of the tasks's functional similarity to a task already categerized as in a skill or chance condition. For example, a subject, informed that color matching depends on skill, might generalize that line matching or all matching

tasks or even all tasks also depend on skill. Individuals would differ in generalization of a task to a skill or chance condition because their perceptions of which tasks are similar vary, and because perceptions of skill or chance conditions as defined by the culture, vary. Rotter assumes that any task or event (reinforcement in life) can be generalized to membership in the skill condition or chance condition class, providing the task has reinforcement value, i.e., is relevant or of value to the individual.

Generalized expectancy for skill control or for chance control of reinforcements is referred to by Rotter (1966) as generalized expectancy for internal-external control of reinforcements (internal-external control), or as the personality variable locus of control. Perception of the degree of control over reinforcement varies from one person to another. Individuals who tend to have a generalized expectancy for internal control are those who tend to see themselves as a causal link between their own behavior and rewards. Those who tend to have a generalized expectancy for external control tend not to see themselves as a causal link between behavior and rewards. On Rotter's (1966) scale for measuring the locus of control construct, an individual's score represents his placement on a continuum of scores between external and internal extremities. Those subjects who score within a specified distance of the external

extremity are defined as externals; those who score at other end, as internals.

Research Relating Locus of Control to Selective Learning Variables

It is important to the present study that internals have been shown to differ from externals in several learning variables. These variables are: attention to information, retention of information and susceptibility to influence. The following studies are examined in the light of each of the above learning variables.

Locus of control and attention to information. Lefcourt and Wine (1969) investigated attentiveness of internals and externals to environmental stimuli. It had been shown by Rotter and Mulry (1965) that internals, perceiving themselves to be in control of reinforcements, spend more time considering reinforcements, events or tasks that have reinforcement value for them. Lefcourt and Wine hypothesized that in the case of a valued problematic event, internals, perceiving themselves to be in control of a possible solution, would pay more attention to such an event than would externals, who would perceive a solution to be beyond their control. Subjects were groups of internal and external psychology students, as designated by Rotter's (1966) I-E Scale. The experiment consisted of interviews conducted by the subjects with confederates. The confederates' behavior

was either normally attentive to the interviewer or unexplainably avoidant. As hypothesized, internals looked more frequently at the avoidant person than did externals. It was inferred that internals perceived themselves to be in control of solutions to problems (Rotter 1966), and were, therefore, attentive to the avoidant (problematic) interviewee; while externals perceived themselves not to be in control, and, therefore, had less need to be attentive. The conclusion was that internals tend to pay more frequent visual attention to a valued problematic event than do externals.

Davis and Phares (1967) predicted from Rotter's (1966) theory that internals, moreso than externals, tend to seek information which would help them control their own environment. It was proposed that internals, given the task of influencing the attitude of another person to the Viet Nam War, would seek more information about the person and about the Viet Nam issue than would externals.

Internal and external psychology students, as designated by Rotter's (1966) Locus of Control scale, having been provided with test and interview information about persons they were commissioned to influence, were given the opportunity to seek information about such persons and about the topic of influence. Dependent variables were the number of questions asked and time spent reading available magazine articles on Viet Nam. Results

showed that internals asked significantly more questions than externals, but did not differ significantly from externals in time spent reading magazine articles. The authors attribute the latter finding to the possibility that subjects were already in possession of the information in the articles. Williams and Stack (1972) concurred with the finding.

From these studies, it may be concluded that attending to relevant information by questioning is more related to internal control than to external control.

Locus of control and retention of information. Seeman (1962, 1963, 1966, 1967) based research on the Rotter (1954) theory that an external, perceiving that the reinforcements he seeks are beyond his control, feels powerless, while an internal, perceiving personal control over the reinforcements he seeks, feels powerful. Seeman hypothesized that internals, seeking to influence events (reinforcements), would possess more information about such events than would externals. Externals, though they may wish to influence such events, regard outcomes as beyond their control and therefore have less need for relevant information.

Seeman and Evans (1962) found internal locus of control hospitalized tuberculosis patients had significantly more knowledge of their own illness than external locus of control hospitalized tuberculosis patients. A weakness in the study was that it did not take into account subjects' knowledge of tuberculosis

prior to illness.

Seeman (1963) replicated the above study in a reformatory setting, using, as relevant knowledge, parole information new to prisoners. Also, Seeman controlled the reformatory study for knowledge of non-relevant information by including additional general information about the reformatory setting. It was hypothesized that internals, desiring to decrease time required before parole, and perceiving themselves to be in control, would retain more parole information than would externals, who, though they may desire parole, believe decreasing time required before parole to be beyond their control. No differences were anticipated between internals and externals in knowledge about the reformatory setting. Results, as expected, showed internals to be significantly superior to externals in retention of parole information, but not to differ in information about the reformatory setting. Also, as time approached the parole date, internals increased in superiority of retention of parole information over externals.

Seeman's findings that internality is related to a greater amount of relevant knowledge were again replicated with political knowledge in Swedish workers (Seeman 1966), and with knowledge of the implications of neutrality in Swedish students (Seeman 1967).

Phares (1968), based on Rotter's (1966) theory that

internals have an expectancy that reinforcements result from their own efforts while externals do not have that expectancy, hypothesized that internals would better utilize information about valued events or tasks. Psychology students, designated as internals or externals by Rotter's (1966) internal-external scale, were provided with a task of matching specified females with marriage partners and listing reasons for the match. Matching and listing of reasons was conducted according to lists of male candidates and facts about each. Lists and facts were memorized to the same criterion level by internals and externals. The dependent variable was the number of reasons for matches each subject listed. It was shown, as hypothesized, that internals used significantly more of the acquired information by listing more reasons and more correct reasons, than did externals. It was assumed by the experimenter that subjects, being psychology students, would regard the experiment as valuable. The rationale was that internal subjects, thinking they could influence the compatibility of the matches, made better use of the memorized list of facts to help them do so. External subjects, thinking the outcome was controlled by chance, would not have such need.

In summary, Seeman's (1962, 1963, 1966, 1967) findings indicate that internals retain more relevant information than do externals; Phares' (1968) finding indicates that when internals

and externals have learned relevant information to the same criterion level, that internals discriminate more of this information for use in performance of a relevant task, than do externals.

Locus of control and susceptibility to influence. Gore (1962), Getter (1962), Strickland (1962) and Liverant and Crowne (1963) found that, in task performance, externals were more susceptible than internals to subtle influence from the experimenter. Ritchie and Phares (1969) and Biondo and MacDonald (1971), acknowledging the above studies, further demonstrated that in performance of a highly important task, externals were more susceptible to either subtle or overt prestigeous influence than were internals.

Biondo and MacDonald, according to Rotter's (1966) theory that internals perceive themselves as controlling their reinforcements while externals perceive outside forces as controlling their reinforcements, predicted that externals would, moreso than internals, be susceptible to both overt and subtle influences from prestige sources in performance of a task highly important to themselves. Such a task, in contrast to the laboratory type tasks of the Gore, Getter and Strickland studies, was the rating of a grading procedure posed as being under consideration at an education institution, by students at that institution. Treatment consisted of dissemination of information about the proposed grading procedure under three

levels of influence from prestige sources, (i) overt (ii) subtle and (iii) no influence. Pre and post-testing for treatment effect indicated that externals were more susceptible to both overt and subtle influence from prestige sources. The finding was supported by Pines and Julian (1972).

Pines and Julian (1972) helped resolve the conflicting evidence regarding locus of control and learning variables. In an attempt to replicate the findings that externality, moreso then internality, is subject to influence from demands of the experimenter (e.g., Biondo and MacDonald 1971) and internality, moreso than externality, is subject to influence from cognitive demands of a task (e.g., Seeman 1963), Pines and Julian provided internals and externals with a task of remembering (i) easy and (ii) difficult cues on a Layfayette memory drum, in (a) experimenter presence and (b) experimenter absence. Analysis for cue conditions indicated that on early learning trials of the easy cue condition, internals performed better than externals. Analysis for experimenter presence, showed that when the experimenter was present, externals performed better, while internals were not affected.

Pines and Julian's study suggests internals and externals both tend to be susceptible to influence. Internals tend to be influenced by information processing demands of a task whereas externals tend to be influenced by factors external to

the task such as the experimenter or prestige sources.

Summarizing the studies cited in this section relating locus of control to selective learning variables, internality (as opposed to externality) has been found to be more related to attention to information, retention of information, and more susceptible to influence from demands of a task in task performance. Externality (as opposed to internality) has been found to be more related to influence from demands of an experimenter or of a prestige person in task performance. In conclusion, it would be expected that internality would be related to more use of real-life reinforcements, while externality would be related to more use of reinforcements provided by an experimenter.

Summary of Rotter's Locus of Control Construct

Locus of control is a personality characteristic which denotes an individual's tendency to regard events (reinforcements) in life as controlled either by his own skill, or by chance, luck, powerful others. Two principal components of the development of the locus of control characteristic were (i) Rotter's theory of social learning and (ii) findings that humans behave differently in situations which they believe to be controlled by their own skill and in situations which they believe are controlled by chance, luck or powerful others.

Rotter's theory of social learning posits that behavior is

learned, is directed toward learned goals and consists of traditional stimuli, responses and reinforcements. Stimuli, responses and reinforcements can each be generalized according to similarity of their functions. Also, expectancy or anticipation of stimuli, responses and reinforcements can be generalized according to functional similarity of anticipated stimuli, responses or reinforcements. Rotter postulates that behavior occurrence in a specific situation is the result of (i) expectancy for a behavior to occur in a specific situation and (ii) the value of that behavior in that specific situation.

Studies of human behavior in "skill controlled" and "chance controlled" situations have demonstrated that subjects who believed that their performance was controlled by their own skill (skill controlled), when given feedback as to correctness, had a greater expectancy for success on future performance than subjects, who, given the same feedback, believed their performance was controlled by chance (chance controlled).

Findings that humans vary in use of feedback to predict success in skill controlled and chance controlled situations were combined by Rotter with his (1954) theory to develop the locus of control construct. Rotter ascertained that skill and chance controlled situations were classes of situations to which all tasks (reinforcements in life) could be generalized according to similarity of their control function; that is, tasks which a

subject is told, or otherwise believes, to be controlled by his own skill would be generalized to the skill class. On the other hand, tasks a subject believes to be controlled by chance, would be generalized to the chance class. Furthermore, an individual would classify a task to be skill controlled or chance controlled according to its similarity of function to a task already classified as skill controlled or chance controlled. Such a generalization could be extended to all tasks (reinforcements) for any one individual. An individual's generalized expectancy for skill or chance control of tasks (reinforcements), Rotter refers to as a personality characteristic "locus of control" or "generalized expectancy for internal (skill) or external (chance) control of reinforcements." Locus of control varies with individuals and is measurable.

It has been concluded from research that internals (as opposed to externals) tend to exhibit greater attention to, and retention of information in task performance, also that internals (as opposed to externals) tend to be more susceptible to influence from cognitive demands of a task in task performance. It has been concluded from research that externals (as opposed to internals) tend to be more susceptible to external influences e.g., persuasion from an experimenter or from a prestige source, in task performance.

2. Bandura's Imitation Learning Theory

One socially defined situation in which internals and externals may behave differently is in imitation of a model's performance that is relevant to the observer. Bandura's explanation of imitation learning provides support for such a notion. The remainder of this subsection will define and outline imitation learning according to Bandura (1971).

Imitation learning, also referred to by Bandura (1969) as vicarious learning, learning by example, or simply, imitation, denotes change in the individual's behavior as the result of his observing the behavior of another person and the consequences of that behavior for the other person. The behaviors observed may be live performances or symbolic performances in the form of pictures or verbal instructions. Bandura (1971) affirms that consequences of behavior for the model, and likely consequences to the observer for imitation, lead the observer to anticipate certain consequences if he should imitate the behavior. How the observer's anticipation of consequences governs imitation is central to Bandura's theory. This topic will be examined in the remainder of the present section of the Review of Literature.

Bandura's (1969) imitation learning theory includes the traditional stimulus, response and reinforcement components of

learning. A modeled event, real, pictorial or auditory, serves as a stimulus. An observer provides the matching performance or response. Reinforcement may be externally applied or self applied either to the model or to the observer for imitating. It is with such reinforcement, also referred to by Bandura (1969) as consequences, that control of imitative behavior originates. Bandura 1961, 1962, 1963, 1965 found that imitative performance of modeled aggression was influenced by reinforcement to the aggressing model.

Bandura's studies did not take into account imitation which occurred without observed reinforcement to the model or reinforcement to the imitator for performing. For example, Bandura, Ross and Ross (1963b) demonstrated that imitation of aggressive models, while strongest when the model was positively reinforced, also occurred when the model was not reinforced. To account theoretically for such imitation, Bandura posited the imitator's anticipation of reinforcement or consequences to be the necessary condition for imitation of the model's behavior. In other words, nonreinforced imitation takes place because reinforcement is anticipated. Following from this theory, it is argued that the boys in Bandura's (1965) study who immediately performed aggressive behaviors while the girls did not, did so because of anticipation of consequences in the form of social approval. The girls, who later performed the observed aggressive

behaviors, did so upon anticipating juice treats.

Retention, a process of imitation posited by Bandura (1969), and first illustrated by Bandura (1965), is important to the present study. Anticipated consequences, as a controlling variable in imitation, accounts for that imitation which takes place when the modeled stimulus is no longer present. During the time of delay, the girl subjects referred to above, retained the modeled stimulus, but reproduced it only upon anticipation of juice treats. In other words, anticipation of consequences controls reproduction of a retained modeled stimulus. Retention was posited as a process of imitation by Bandura (1969) and supported with research by Bandura and Barab (1971), Gerst (1971) and Bandura and Jeffrey (1973).

The informative and discriminative (attentional) functions of reinforcement in imitation are also of particular importance to the present study. The informative function is the provision of information to the potential imitator, either from observed reinforcement to a model or from reinforcement to himself, upon which the imitator anticipates outcome of imitation (Bandura 1971). The discriminative function is the imitator's attention to or discrimination of a certain modeled behavior from amongst other available modeled behaviors for imitation, or for retention and

subsequent imitation. The attention to or discrimination of the modeled behavior is based on information provided by observed or experienced reinforcements. Studies referred to by Bandura to support anticipated consequences as controlling imitation, and consequences as having discrimative and informative functions, follow.

McDavid (1964) indicated that imitative performance was contingent on consequences anticipated from information about the model's experience of reward. McDavid investigated the most effective amount of congruity between reinforcement to an adult model and reinforcement to a child for imitation. It was proposed that, when the subject (child) was always reinforced for imitation, most imitation would occur when reinforcement to the model was in 100% congruity with the imitating subject's reinforcement. Subjects, aged 57 months, were reinforced for pushing only the yellow button in a button pushing task. Congruity of button pushing was manipulated by having models for each of four groups rewarded 100%, 67%, 33% or 0% for pushing the yellow button. Imitation of yellow button pushing by the child was rewarded with a marble for each push. The dependent variable was the number of marbles obtained. Results showed that more congruity of reinforcement to the model with reinforcement to the imitator was significantly more effective in imitation learning. Relevant to the present study is that varying reinforcements to a modeled cue

provide information from which an imitator, also reinforced for imitation, ascertains the congruity of reinforcements to model and imitator. Total congruity of reinforcement to model and imitator seemed to the imitator to best represent a situation in which actions might be well received.

The finding that information about the model and the model's reinforcements leads to anticipated consequences for performance is also documented in a study by Wilson (1958). Wilson's study indicated that cues from a model's environment, in the absence of the model, led to imitative performance of the model's behavior. An implication for Bandura's (1971) theory is that the environmental cue provides information about model and rewards in the absence of the model. From this information, the observer anticipates consequences for imitative performance and imitates accordingly.

Bandura and Barab (1971), in an attempt to show that anticipated consequences govern imitation, tested groups of kindergarten children and retardates combined, for imitation. Subjects, trained in imitative responding, were individually exposed to variously reinforced motor and vocal behaviors which were modeled and reinforced by the experimenter. It was predicted that subjects would imitate those behaviors demonstrated by a rewarding model, as well as similar non-rewarded behaviors, but refrain from imitating non-similar, non-rewarded behaviors. The

rationale was that if, as according to Bandura's (1971) theory, anticipated consequences control imitation, all those behaviors for which the subject expected reinforcement would be imitated, whether or not the reinforcements were applied.

Comparison groups and the results in percentage of correct imitation scores for each group were (i) reinforced motor behaviors, 94.6 per cent; (ii) reinforced and non-reinforced motor behaviors mixed, 93.8 per cent; (iii) non-reinforced vocal behaviors, 69.9 per cent; (iv) nonreinforced motor behaviors separately grouped, 52.2 per cent. The prediction was supported.

A post experimental interview with each subject illustrated the informative and discriminative functions of reinforcement within Bandura's imitation theory. The informative function is illustrated by the revelation of interviewed subjects that imitation of non-reinforced behaviors, when it did occur, was due to erroneous judgments about likely response consequences. For example, some subjects thought they should reproduce all modeled behaviors, others thought the non-rewarding model might become more beneficent. The discriminative function is illustrated by the fact that, when asked, the interviewed subjects correctly identified behaviors which had been reinforced during the experiment from amongst a newly presented similar set of non-reinforced behaviors.

Bandura and Barab concluded from subjects' imitation of

reinforced and non-reinforced motor behaviors mixed, that subjects imitated the non-reinforced behaviors because they anticipated reinforcement similar to that of the reinforced behaviors. This conclusion, i.e., that anticipation of consequences governs imitation, was supported by subjects' reports, in a post experimental interview, that imitation of non-reinforced behavior, when it did occur, was the result of erroneous expectations.

In summary, examined within this subsection has been the mechanism by which the modeled stimulus and conditions external to the modeled stimulus influence imitative performance. Bandura (1971) ascertained that reinforcements to model or imitator did not control imitation because (i) non-reinforced imitation took place; (ii) cues from a model's environment, in the absence of the model, influenced imitation. In order to account for such imitation, Bandura established consequences anticipated by the imitator as controlling imitation. The modeled stimulus and conditions surrounding the stimulus provide information upon which the observer anticipates consequences for imitation. On the basis of anticipated consequences, modeled performances are discriminated for imitation.

Summary of Bandura's Imitation Learning Theory

For Bandura, imitation involves a modeled stimulus (model) and an observer's imitative response. The modeled stimulus may be live, pictorial or verbally instructional. Reinforcement is

also part of imitation in that reinforcement to either the model's or observer's performance influences the observer's imitation (Bandura 1969). In order to account for a variety of imitative situations, e.g., those in which reinforcement does not appear present, Bandura (1971) posited anticipated reinforcement as controlling the observer's imitation. Reinforcement can be anticipated by the observer from either observing reinforcement occurring to the model's behavior, or experiencing reinforcement for his own imitative behavior. The imitator's anticipated reinforcement is thus a product of an informative function of prior reinforcements occurring to the model's or imitator's performances.

Reinforcement also has a discriminative (attentional) function in imitation. On the basis of reinforcement anticipated, the oberserver selects one from an array of modeled stimuli for imitative performance. The observer discriminates a modeled stimulus for performance on the basis of information conveyed by the observed or experienced reinforcement. Support for the formulations (i) that anticipated reinforcement controls imitation (ii) that reinforcements to the model or to the observer have informative and discriminative functions for the observer, appears in Bandura and Barab (1971).

Also of importance to the present study is the retention process in Bandura's theory of imitation learning. The formulation

that anticipated reinforcement controls imitation assumes that the observer retains an observed stimulus prior to imitation. After a shorter or longer period of time the modeled stimulus is, or is not, performed, according to anticipated reinforcement. During the delay in time the observed stimulus must be retained. Support for retention as an imitation learning process is provided by (Bandura and Barab (1971), Gerst (1971) and Bandura and Jeffrey (1973)). For Bandura, anticipated reinforcement is based on knowledge conveyed by observed or experienced reinforcement. Anticipated reinforcement also (i) controls i.e., motivates the observer in imitation (ii) controls the observer's retention of an observed modeled stimulus for possible subsequent imitation and (iii) controls discrimination of a particular modeled stimulus from amongst other modeled stimuli for imitation.

3. Link Between Bandura's Imitation Learning Theory and Rotter's Theory of the Locus of Control Construct

Common to the formulations of Bandura and Rotter is the notion that certain individuals, when performing, use relevant knowledge of previous performance. These individuals are Bandura's imitators and Rotter's internals. Bandura's imitators use relevant knowledge as a basis for anticipation of consequences when selecting a modeled cue for imitation. Rotter's internals use relevant knowledge as a basis for the development of the

characteristic internal locus of control. In short, Bandura's cue selectors and Rotter's internals, in performance, use relevant knowledge of past performance. Since relevant knowledge for Bandura's cue selectors includes knowledge about observed models; and since literature leading to Rotter's theory has not dealt with relevant knowledge about observed models, Rotter's internals and Bandura's imitators are not equivalent as to the sources of relevant knowledge. However, relevant knowledge functions in the same manner for Bandura's imitators and Rotter's internals, that is, as a basis on which to anticipate (predict) performance. Relevant knowledge therefore, serves as a theoretical link on which to formulate an hypothesis regarding the relation of the locus of control construct to imitation learning.

Studies that may be viewed as supporting a link between the locus of control construct and imitation learning appear primarily among the literature on the locus of control construct. One such group of studies shows internal (as opposed to external) control to be more (as opposed to less) related to the learning variables attention, acquisition and retention of information, and in task performance susceptible to influence from task demands. Another group of studies shows external (as opposed to internal control) more (as opposed to less) related to susceptibility to external reinforcement (e.g., influence from prestige sources) in task performance. The studies all are based on Rotter's (1966)

theory that certain individuals (internals) perceive themselves in control of reinforcements in life, while others (externals) do not. Rationale for the studies is that internals, perceiving themselves in control of events, will, when the situation arises, perform more of the behaviors which help them control events, while externals will not have the need. On the other hand, externals, perceiving events as being controlled by external sources, will yield to those reinforcements from external sources which will help achieve their goals.

Although they may overlap, the learning variables appear to have attentional (discriminative), retentional and informative functions in Bandura's (1971) theory of imitation learning. Such variables are discussed below as common to Bandura's (1971) imitation learning theory and Rotter's (1966) theory of the locus of control construct.

Attentional variables. Bandura and Barab (1971), reported in the present study, established that imitators attend to those stimuli which signify consequences for imitation. Specifically, retardates and kindergarten children reported that they imitated because they thought they were supposed to, or that they would eventually be rewarded. Lefcourt and Wine (1969) and Davis and Phares (1967) found that internals (more than externals) attend to those stimuli which help them control events. Specifically, Davis and Phares found that internals asked significantly more

questions than externals about a person they were commissioned to influence; Lefcourt and Wine found that internals paid more frequent attention to a problematic event than did externals. Imitators in the Bandura and Barab study, and the internals in the Lefcourt and Wine and Davis and Phares studies, pay more attention to relevant stimuli. According to Bandura's theory, imitators attend to those modeled stimuli which signify information as to consequences of imitation. In studies by Lefcourt and Wine and Davis and Phares, internals attend to those stimuli which are useful in controlling events.

Retention variables. Bandura (1965), Bandura and Barab (1971), Bandura and Jeffrey (1973, 1974) and Gerst (1971) supported theory that images of observed stimuli are retained over shorter or longer periods of time prior to imitative performance. Selective retention of images for storage is made in anticipation of consequences for retention. Seeman (1962, 1963, 1966, 1967) found that internals, perceiving that they control a relevant event, retained more information about the event than did externals, who did not have the need. Also Seeman (1963) involving retention of parole information for prisoners, showed, that as time approached the parole date, prisoners exhibiting internality increased in recall of parole information. Implied is that parole information was progressively better recalled by internals because it continued to become more relevant (Rotter, 1954).

Phares (1968) found that after internals and externals had learned task relevant information to the same criterion level, internals used more of the relevant information to perform the task than did externals. For Bandura's imitators, retention of relevant information is part of imitation; for Seeman's and Phares' internals, retention of relevant information assists in controlling events.

Information (motivation) variables. Bandura and Barab (1971) found that reinforcing conditions for the model, and probable reinforcing conditions to the imitator for performing, provide the imitator with information as to consequences of imitation. On the basis of this information, the imitator is motivated to select certain modeled behaviors for imitation.

One group of studies, cited in preceding subsections (e.g., Seeman 1963, Phares 1968, Lefcourt and Wine 1969) has demonstrated internal (as opposed to external) locus of control to be more related te attention to (discrimination) and retention of information; in other words, internal locus of control is more related to influence from certain information processing variables. The rationale is that internals, perceiving personal control of events, use more information to assist them in controlling events, while externals, not perceiving personal control of events, do not have that need.

A second group of studies (e.g., Gore 1962, Biondo and

MacDonald 1971) has demonstrated that internal (as opposed to external) locus of control is less (as opposed to more) related to influence from experimenter or prestige sources in task performance. The rationale for such studies is that internals, perceiving personal control of events, do not yield to outside influences to help accomplish their goals, while externals, perceiving outside control of events, do yield to outside influences to help accomplish their goals. Such rationale is not inconsistent with, but in addition to, the rationale of the above first group of studies namely, that to assist them in personal control, internals (as opposed to externals) take into account more, and process more, information in task performance.

Briefly, motivation to perform which arises from using additional information, or from the processing of information, is common to Bandura's imitators and Rotter's internals. Motivation to perform which arises from prestige or experimenter sources is not common to Bandura's imitators and Rotter's internals.

In summary, use of relevant knowledge of past performance to predict future performance is an important link between Rotter's theory of the personality characteristic locus of control and Bandura's theory of imitation learning. Support for such a link is provided by those studies which demonstrate internal (opposed to external) locus of control more (as opposed to less) related to certain learning variables found in Bandura's theory

of imitation learning. Support for such a link is not provided by studies which show external (as opposed to internal) locus of control more related to susceptibility to experimenter or prestige source influence.

In conclusion, one use of the proposed link between the locus of control construct and imitation learning is that locus of control, being measurable, can help identify those individuals more prone to imitation of a relevant behavior. Such a relevant behavior would be one whose reinforcements are from real life, as opposed to prestige or experimenter sources.

Statement of the Problem and Hypothesis

The problem. The present study proposes to investigate the subject's ability to imitate a relevant rewarded behavior as a function of his level of locus of control.

The problem precipitated the following considerations in selection of a relevant rewarded modeled behavior for use as treatment in the present study.

First, relevance of a modeled behavior implies that the potential imitator of that behavior is likely to experience the rewards of relevance (e.g. real life rewards) for imitative performance. Relevance then functions for a potential imitator as information about consequences for imitation. As such, relevance assists in control of imitation (Bandura 1971).

Second, relevance of a modeled behavior implies that the

modeled behavior is of value to the imitator, i.e., contains "reinforcement value," postulated as essential to behavior prediction (Rotter 1954, 1975; Lefcourt 1976).

Third, a relevant modeled behavior with rewards to the model for performance had been demonstrated to elicit imitative performance by internal locus of control subjects (Cork 1976). This behavior, depicted in a series of fourteen 35 mm cartoon slides, exhibits to students in a school setting, a student writing a spelling exercise rapidly (and carefully) and receiving a high mark, teacher smile and teacher praise. Such a modeled behavior was considered by the experimenter to be relevant to student observers because (i) spelling is taught regularly in school, both separately and combined with other subjects, and (ii) spelling progress is evaluated by teachers and reported on regularly to students and parents.

Fourth, rewards by a teacher to the model create the possibility that some externals might, if they regard the teacher as a prestigeous person, imitate more of the model's behavior than internals. Such a possibility would be consistent with the findings of Biondo and MacDonald (1971) that externals, moreso than externals, are susceptible to influence from a prestigeous source in task performance; and Bandura (1971) that imitation takes place because of consequences anticipated from information provided by e.g., reinforcements to a model. If, in the present

study, some externals were influenced by prestigeous source reinforcement to a model, the effect would be to lessen the overall differences in imitation between internals and externals, i.e., those differences created by the rewards of relevance and information processing which have been demonstrated from theory and research to be more related to internality than to externality (c.f. Seeman 1963, Davis and Phares 1967, Lefcourt and Wine 1969). In summary, the available modeled behavior will likely elicit more imitation from internals than from externals, but because of the possibility that rewards to the model may be regarded as coming from a prestigeous source, the extent of the superiority of imitation by internals over externals will likely be lessened.

Hypothesis. Following from (i) the theoretical link that Bandura's imitators and Rotter's internals both use knowledge of previous performance to anticipate performance, (ii) support for such a link from studies demonstrating internal (as opposed to external) locus of control more related to the imitation learning variables attentional, retentional and certain motivational (informational) processes, the following hypothesis concerning internal-external control and imitation is to be tested. It is hypothesized that

General hypothesis. Internal locus of control subjects surpass external locus of control subjects in imitation of a relevant, rewarded modeled behavior.

Specific hypothesis. In a school situation, where an observed student model is rewarded by a high mark, teacher smile and teacher praise for performing a spelling exercise quickly and carefully (situation r_q), internal locus of control student observers (I's) exhibit greater imitative behavior (rapid exercise writing) than external locus of control student observers (E's).

Dependent Variable

The dependent variable used to test imitative behavior is the number of items completed in four minutes of a spelling exercise after experimental subjects have been exposed to a set of slides showing a model rewarded for quickness and care in doing a similar exercise.

CHAPTER II

THE DESIGN OF THE STUDY

1. Sample

Subjects were 294 fourth and fifth grade students from seven public schools within an urban centre in western Canada. The total sample consisted of five fourth grade classes, six fifth grade classes and one combined fourth and fifth grade class. Subjects in each grade were divided into internal, intermediate and external locus of control groups according to their score on the Children's Nowicki Strickland Internal External Scale (CNS-1E). Those subjects scoring in the lowest third of the CNS-1E were defined as "internals" (n = 98, $\bar{X}$ = 12.91, s.d. = 2.33). Similarly, subjects scoring in the middle third are defined as "intermediates" (n = 98) and in the top third, as "externals" (n = 98, $\bar{X}$ = 20.77, s.d. = 2.59). Only internal and external subjects were used. (See Table 1). Subjects were from classes where students were considered by school administrators to be of average scholastic ability and from areas which tended to be of middle income.

2. Instruments

Measure of Locus of Control

The instrument used was the Children's Nowicki Strickland Internal External (CNS-1E) Scale (Nowicki and Strickland 1973; Nowicki 1976). (Appendix A) Prior to the CNS-1E, locus of control scales for children were inadequate, either because they lacked standardization (Bailer-Cromwell 1961; Dies 1968), or measured only perception of personal or outside control of intellectual achievement (Crandall 1965). The personal characteristic which the CNS-1E attempts to measure is based on Rotter's (1966) definition of the Internal-External control dimension.

Internal consistency via the split half method corrected by the Spearman Brown Formula has been found to be r = .63 for grades three, four and five. Test-retest reliabilities calculated over a period of six weeks, are .63 for grade three, .66 for grade seven and .71 for grade ten. Variables related to the Nowicki-Strickland scale which are of relevance to the present study are race, socioeconomic status, and age. (Nowicki-Strickland, 1973). Scoring in the direction of externality, arithmetic means ranged from 17.97 (N = 44, grade 3 males) to 11.38 (N = 39, grade 13 males), suggesting that students' responses tend to become more internal with age. The finding is supported in fourth and fifth grade scores collected by the author, and sixth grade scores collected by Budd Rowe (1978).

Measure of Imitation of a Relevant Behavior

Four minutes of the Sequential Tests of Educational Progress (STEP), Mechanics of Writing, Form 4B, Spelling section, was chosen to measure imitation of the modeled relevant behavior, in this case a student's rewarded speedy performance on a spelling exercise, in a classroom setting. (Appendix B). Speedy performance while writing a spelling exercise followed by reward was chosen for a modeled behavior because such behavior is relevant to a fourth or fifth grade student in school. Since imitation of speed of test writing, not spelling ability, was being measured, scores obtained were the number of items attempted, not the number of correct answers. The task was presented as an untimed exercise. Actual time allotment was four minutes, measured with a stop watch.

Consistent with Rotter (1966), a condition to render the task ambiguous, that is one in which the student perceives neither luck nor skill conditions as essential to doing well in spelling, was presented. (Appendix B). This condition was achieved by including the conflicting instructions that some people believe success in spelling to be controlled by luck or chance in getting words the student already knows, while other people believe that success in spelling is due to the amount of study time and effort the student devotes to spelling.

3. Treatment

Treatment for the present study consisted of a series of fourteen 35 mm cartoon slides depicting a model rewarded for quickness. (Appendix C). The series, entitled "BC Productions," (r_q) was designed to present to experimental subjects a model performing a behavior highly relevant to the school situation along with the consequences of that behavior.

"BC Productions" depicts two students in a regular class writing a non-timed spelling exercise. One student is obviously doing the exercise at a much faster rate than the other. Upon completion, he receives a mark of 95%, smiles and is told by the smiling teacher that he made a high mark because he has worked quickly. Showing time is ten minutes.

Validation of Treatment

In order to test the hypothesis that internals will more readily imitate a relevant rewarded modeled behavior, it was important to demonstrate first that BC Productions does elicit imitative behavior, at least in internal subjects. A pilot study (Cork 1976), using B.C. Productions as treatment, was therefore designed to compare the number of STEP II Spelling items attempted by those internals who viewed the slides with the number of items attempted by a control group of internals.[1]

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[1] Cork (1976) found CNS-1E scores for "internals" to have a mean of 12.89 and standard deviation of 2.01 (n = 30), for "externals" to have a mean of 21.41 and standard deviation of 2.14 (n = 29).

It was hypothesized that internals who viewed "BC Products" would score significantly higher in the number of STEP II Spelling items attempted than would a control group of internals, who viewed a series of slides on the Appollo II Moon Landing.

Subjects were 237 students from six fourth grade and two fifth grade classes of five public schools in a midwestern Canadian city. Fifty-one subjects were eliminated due to absence from one of two required sessions. In the first session, subjects, in regular classes, completed the CNS-1E Scale and four minutes of STEP 4A spelling. Subjects were then divided into internal, intermediate and external thirds according to CNS-1E score. Internals only (n = 62), were used for the validation study. Before the second session, internals for each grade, within each school, were randomly assigned to treatment or control groups. Three weeks after the first session, control groups internals in each school were shown Appollo II and completed four minutes of STEP 4B Spelling. Similarly, treatment internals, in each school, were shown "BC Productions" and completed four minutes of STEP 4B Spelling.

The dependent measure for validation of BC Productions was the number of STEP 4B Spelling items attempted in four minutes by treatment and control internals after their respective treatments. Pre treatment comparisons of treatment and control internals in the number of STEP 4A Spelling items attempted in four minutes

indicated no significant differences between groups. ($F_{1,60}$ = .85, NS) (See Table 9). Post treatment comparisons of treatment and control internals in the number of STEP 4B Spelling items attempted in four minutes indicated significant differences between groups. ($F_{1,60}$ = 5.02, $p < .10$) (See Table 10). That is, B.C. Productions did elicit imitative behavior in internals.

4. Procedure

Following administration of the CNS-1E Scale in regular classes, scores were ranked, and subjects of each grade divided, according to score into three equal groups, designated as "internal" "intermediate" and "external." To control the study for effects on the results other than treatment effect, control groups of 34 internals and 35 externals were randomly selected, within schools where this was feasible, from subjects designated as internals and external in that school. Treatment group subjects, in each school, were then shown BC Productions and administered four minutes of STEP 4B Spelling. Control group subjects in each school were shown a set of slides depicting the Appollo II Moon Landing, and administered four minutes of STEP 4B Spelling.

To validate the hypothesis, internals who observed BC Productions were compared with other groups in the number of STEP 4B Spelling items attempted in four numbers. No significant differences were expected between internals and externals in the

control condition, nor were there significant differences expected between treatment externals and either of the control groups.

A question as to baseline differences, that is differences between internals and externals in speed of spelling exercise writing prior to viewing "BC Productions," was answered by Cork (1976). Using data collected for the pilot sutdy, referred to in the previous subsection, Cork compared groups of internals and externals, similar in all respects to internals and externals of the present study, for number of spelling items attempted in four minutes prior to viewing "BC Productions." As hypothesized, results showed no significant differences ($F_{1,57} = .62$; NS). (See Table 11) The finding was further supported by combining pretest scores of internals in the treatment group with those of internals in the control group; similarly combining the pretest scores of externals in those groups. There were no significant differences between internals and externals in the combined groups prior to treatment ($F_{1,123} = .13$, NS) (See Table 12). A similar result had been found by Cork (1974).

5. Statistical Analysis

The hypotheses was tested by means of a two factor analysis of variance for unequal n's, using condition (treatment or control) and locus of control (internal or external) as independent variables. The dependent variables was the number of

STEP 4B items attempted in four minutes. The alpha level was designated as .10. The alpha level of .10, rather than the more common .05, was used because of the previously elaborated conclusions (see page 36) that, although internals should exhibit greater imitative behavior, such behavior should also be displayed to a limited extent by those externals who view as prestigeous the source of the reinforcements provided.

Because of a characteristic of the treatment instrument, i.e., pretigeous rewards to the model, the present experiment is not likely to be a highly sensitive test of the hypothesis. Winer (1971) suggests that for an experiment which does not provide a highly sensitive test of the hypothesis, the designated level of significance may be lower than the conventional .01 or .05.

CHAPTER III

RESULTS

This chapter consists of a report of group means, standard deviations and statistical comparisons of internals and externals in treatment and control conditions in the number of STEP 4B Spelling items attempted in four minutes. An analysis of STEP 4B Spelling items attempted by internals and externals in treatment and control conditions is made in order to test the hypothesis. Reported also in this chapter is a separate analysis of the results (in the treatment condition) for sex differences, using locus of control (internal and external) and sex (male and female) as independent variables.

After viewing BC Productions, internals indicated a mean of 18.23 and standard deviation of 6.8 in the number of STEP 4B Spelling items attempted in four minutes, while externals indicated a mean of 16.06 and standard deviation of 6.33 on the same test. After viewing Appollo II, internals indicated a mean of 15.64 and standard deviation of 5.09, while externals indicated a mean of 16.66 and standard deviation of 5.94. (See Table 2). A two-way analysis of variance performed on these data indicated significant interaction between condition and locus of control as hypothesized, i.e., internals in the treatment

TABLE 1

CHILDREN'S NOWICKI STRICKLAND INTERNAL EXTERNAL (CNS-IE) SCALE GROUP SIZES, MEANS AND STANDARD DEVIATIONS FOR INTERNALS AND EXTERNALS*

TREATMENT	INTERNALS	EXTERNALS
Group Size	64	63
Mean	12.89	20.84
Standard Deviation	2.33	2.59
CONTROL		
Group Size	34	35
Mean	13.03	20.80
Standard Deviation	2.16	2.65

*Lower scores on the CNS-IE Scale represent more internality

TABLE 2

GROUP SIZE, MEANS AND STANDARD DEVIATIONS OF INTERNALS AND EXTERNALS IN NUMBER OF STEP 4B SPELLING ITEMS ATTEMPTED IN FOUR MINUTES IN TREATMENT AND CONTROL CONDITIONS

TREATMENT	INTERNALS	EXTERNALS
Group Size	64	63
Mean	18.23	16.06
Standard Deviation	6.80	6.33
CONTROL		
Group Size	34	35
Mean	15.65	16.66
Standard Deviation	5.09	5.94

TABLE 3

A TWO-WAY ANALYSIS OF VARIANCE OF THE NUMBER OF STEP 4B SPELLING ITEMS ATTEMPTED IN FOUR MINUTES WITH CONDITION (TREATMENT AND CONTROL) AND LOCUS OF CONTROL (INTERNAL AND EXTERNAL) AS INDEPENDENT VARIABLES

Source	df	MS	F	Signif of F
Main Effects	2	49.34	1.27	.28
Condition	(1)	44.54	1.15	.28
Locus of Control	(1)	54.14	1.39	.23
Interactions	1	113.08	2.91	.089*
Residual	192	38.83		
Total	195	39.32		

*p $\leq$ .10

TABLE 4

A TWO-WAY ANALYSIS OF VARIANCE OF THE NUMBER OF STEP 4B SPELLING ITEMS ATTEMPTED IN FOUR MINUTES IN TREATMENT CONDITION WITH LOCUS OF CONTROL (INTERNAL AND EXTERNAL) AND SEX (MALE AND FEMALE) AS INDEPENDENT VARIABLES

Source	df	MS	F	Signif of F
Main Effects	2	77.66	1.77	.174*
Locus of control	(1)	153.02	3.50	.064**
Sex	(1)	5.71	.13	.718
Interactions	1	9.69	.22	.639
Residual	123	43.77		
Total	126	44.04		

*$p < .25$
**$p < .10$

condition attempted significantly more of the spelling items than did the other groups. ($F_{1,192} = 2.91$, $p < .10$) See Table 3). There were no significant differences, either between levels of locus of control, or between conditions, as anticipated.

Because it is conventional for results of studies of children to be analysed for sex differences, and because sufficient data were available, a second separate analysis was performed on the data, using locus of control and sex as independent variables. Specifically, scores representing the number of STEP spelling items attempted in four minutes after viewing the speeding model were analysed by a two-way analysis of variance for unequal N's, using locus of control (internal and external) and sex (male and female) as independent variables.

On the CNS-IE, internal males (n = 36) show a mean of 12.69 and standard deviation of 2.17, while internal females (n = 28) show a mean of 13.14 and standard deviation of 2.46. External males (n = 31) show a mean of 20.35 and standard deviation of 2.72, while external females (n = 32) show a mean of 21.31 and standard deviation of 2.32 on the same test.

After viewing "BC Productions," internal males show a mean of 17.81 and standard deviation of 7.13 in the number of STEP Spelling items attempted, while internal females show a

mean of 18.79 and standard deviation of 6.44 on the same test. Also, on the same test, external males show a mean of 16.13 and standard deviation of 6.76, while external females show a mean of 16.00 and standard deviation of 5.99.

A two-way analysis of variance for unequal n's was performed on the number of STEP 4B items attempted, using locus of control (internal and external) and sex (male and females) as independent variables. (Table 4) Results indicate significant differences for locus of control, as reported also in Table 3, but no significant differences for sex, or for the interaction of sex and locus of control.

CHAPTER IV

DISCUSSION

This chapter interprets the findings, comments on the modeling instrument, explains the level of significance chosen, and discusses the analysis of the results for sex differences.

The Findings

Results indicate that internals significantly surpass externals in imitation of a relevant rewarded behavior. ($p < .10$). Specifically, when performing a spelling exercise in school, internal locus of control subjects imitate significantly more of a model's speed of spelling exercise writing than do external locus of control subjects.

Superior imitation by internals over externals is as predicted in the Review of Literature. Such a prediction is based on linkage between Bandura's theory of imitation learning and Rotter's theory of the locus of control construct. Specifically, Rotter's internals and Bandura's imitators both use information regarding past performance to predict or anticipate future performance. According to Rotter, the information referred to is the subject's knowledge of consequences of his own past performance.

According to Bandura, the information referred to is the subject's knowledge of consequences of both his own past performance and the performance of others. On the basis of the common use of knowledge, internals (as opposed to externals) were hypothesized and found to imitate more of those performances of others that were relevant, i.e., had reinforcement value for their own lives. Knowledge that rapid spelling exercise writing is relevant accrued in internals after observing the speeding model receive a mark of 95%, the teacher's smile and the teacher's praise (Cork 1976).

In summary, the hypothesis that internals surpass externals in imitation of a relevant rewarded modeled behavior is confirmed at the .10 level of significance. This is as expected, the level of significance having been designed as .10.

The Modeling Instrument

According to the rationale presented in Chapter One, the modeling treatment instrument would not likely bring about highly significant superior imitation of internals over externals. Use of such an instrument is considered by the author to be justifiable because it is the best instrument available. The instrument had been demonstrated to elicit significantly more of the modeled behavior in internals who observe the model, than does a non-related modeling instrument (Cork 1976). According to Bandura (1971) imitation is controlled by the

imitator's anticipation of consequences for imitating. Such imitation is based on both the imitator's personal history of reinforcements and those reinforcements he observes occurring to the model. In addition, as the review of literature of the present study indicates, the modeled treatment must be relevant, and have reinforcement value for the observer. Because an imitator's personal history of reinforcements cannot be known by the researcher, a period of trial-and-error is required in order to construct an instrument to show modeled behavior that has reinforcement value for all observers. This difficulty has been overcome in the validation of the present modeling instrument.

A study, such as the present study, investigating imitation as a correlate of children's locus of control, represents a contribution to knowledge. Such a study requires a suitable modeling instrument. The modeling instrument described above is suitable for use with children in a classroom situation. Such an instrument has not previously been available.

The Level of Significance

Because of the modeling instrument's portrayal of a teacher as a source of rewards to a model, the significance level for superiority of internals over externals in imitation learning is designated as .10. The rewards, a teacher's smile and praise, if regarded by some viewers of the modeling instrument as coming from a prestigeous source, could influence external

locus of control viewers in imitation. Rationale for the prediction of such a phenomenon is based on studies indicating external locus of control subjects more susceptible than internal locus of control subjects to influence from prestige sources, (Biondo and MacDonald 1971) and the formulation that imitation is controlled by anticipation of consequences of behavior (Bandura 1971).

An advantage of a procedure using prestige rewards to a model and a designated alpha level of .10 is that the result can be generalized to situations where locus of control might be used to predict imitation of a relevant behavior rewarded from a prestige source. Such occasions are frequent in education where teacher (prestige source) reinforcements to a particular student are used in the presence of student observers, or in business organizations where supervisor reinforcement functions in a similar manner.

A possible alternative to designation of the alpha level as .10 might be to control the study for the subject's (imitator's) perceptions of the modeled task as either (i) controlled by the performer's skill (ii) controlled by a powerful other (the teacher) or (iii) neither, i.e., ambiguous. According to Rotter's (1966) theory, tasks must be defined either by instruction, or by the culture as ambiguous in order to be perceived as internally or externally controlled. Instructions to render

the task ambiguous from the point of view of "luck" in getting words the student already knows, or "skill" in the extent to which an individual has studied spelling, were provided along with instruction for the spelling exercise. (Appendix II). These instructions, however, did not render the task ambiguous from the viewpoint of being controlled by a powerful other.

It was considered by the experimenter that questioning of subjects as to their perceptions of a teacher as a controller of spelling success would not provide dependable data. If asked by the experimenter whether or not they regard the teacher as a prestigeous person, external subjects would give the answer the experimenter wanted to hear (Pines and Julian, 1971). This alternative, therefore, is not likely to identify those who consider the teacher a prestigeous person, influencing their spelling success.

Analysis for Sex Differences

A question may arise as to whether or not greater imitation by internals over externals is sex linked. An analysis of the number of spelling items attempted for both locus of control and

sex indicates that female internals might occasionally attempt more spelling items than male internals ($p < .174$) (See Table 4). Three possibilities may be examined.

First. Does greater imitation result from a greater degree of internality among females? According to CNS-1E means for male and female internals and externals reported on page 52, male internals ($\bar{X} = 12.69$) are at least as internal as female internals ($\bar{X} = 13.14$). Therefore, the answer to the above question appears to be negative.

On the other hand, Nowicki (1975) suggests that female internality is not accurately detected by available measuring instruments. Nowicki and Walker (1974) found that, in females, internality combines with low social desirability to predict higher academic achievement. Nowicki and Segal (1975) found that females who perceived their parents as internal scored higher in academic achievement than those who did not perceive parents as internal. Because achievement is, from theory, a correlate of locus of control, and has been found to be a consistent correlate of locus of control in males (Nowicki Strickland 1973), Nowicki (1975) concluded that females tend not to reveal their true internality in answering locus of control questionnaires. If this is so, the internal females of the present study could be more internal than indicated by the CNS-1E Scale. Superior female imitation, then, could take place according to the rationale

presented in Chapter One, i.e., that internals and imitators both use and process more information than externals and non imitators in performance.

Second. Does greater imitation result from a greater degree of prior success in Spelling among females? Stroud and Lindquist (1942), the STEP Handbook (1971) and the DAT Manual (1966) refer to females' superior performance over males' in spelling throughout all school grades. According to the rationale presented in Chapter One, if internal females have experienced more spelling success than internal males, they would anticipate more positive consequences than internal males for imitating a spelling success related behavior. Thus internal females would imitate more than internal males.

Third. Does cultural approval of rapid spelling exercise writing appear as a positive consequence to female internals moreso than to male internals? Bandura (1965), Brinker (1972), Cook and Smothergill (1973) suggest that sex role appropriateness of a modeled behavior functions as a consequence upon which same sex observers imitate. From Rotter's (1966) theory that internals perceive reinforcements as being controlled by themselves while externals perceive reinforcements as controlled by forces outside themselves, it is predictable that such findings do not apply to internals.

Pines and Julian (1971) indicate that demands of a task itself, as opposed to demands outside the task, e.g., cultural approval, influence internals in task performance. Therefore, cultural approval is likely not a more savory consequence to female than to male internals in imitation of a spelling related behavior.

To conclude this subsection, an analysis of imitation scores for both locus of control and sex, suggests no significant differences between male and female internals in imitation. Superior imitation by female internals over male internals, if it should occur ($p = .174$), could be explained either by a possible inadequacy of the locus of control instrument to measure true internality in females or by females' having experienced more prior spelling success than males.

Summary and Conclusions

This chapter has discussed the findings with reference to (i) their interpretation (ii) the value of the modeling instrument used (iii) the level of significance chosen and (iv) an analysis for sex differences. Conclusions are that (i) the hypothesis that internals surpass externals in imitation is supported at the $.10$ level, (ii) the modeling treatment instrument, though predictably weak in eliciting differences between internals and externals in imitation, is useful because it is the best instrument available, (iii) the level of significance be designated

as .10, and (iv) there are likely no significant differences between male and female internals in imitation.

CHAPTER V

SUMMARY AND CONCLUSIONS

The following chapter consists of (i) a summary of the review of literature, design and results of the present study and (ii) conclusions regarding results of the present study.

1. Summary

The purpose of the present study was to investigate the relationship of the personality variable locus of control to imitation learning. On examination of Bandura's (1969, 1971) theory of imitation learning and Rotter's (1954, 1966) construct of the locus of control, it was concluded that both Bandura's imitators and Rotter's internals use knowledge of past performance in anticipation of future performance.

The above conclusion was based in part, on studies using Rotter's social learning theory. The conclusions of such studies were that individuals who believe performance is controlled by their skill (internals) use knowledge of past performance to anticipate future performance, while subjects who believe performance is controlled by chance (externals) do not. In Bandura's theory of imitation learning, this same notion appears as the observer's

anticipation of consequences for imitation as the controlling variable in imitative performance. Bandura theorizes that imitators anticipate consequences for imitative performance either from knowledge of consequences observed occurring to the model, or consequences likely to be experienced by the imitator for performing, or both.

Linkage between Bandura's imitation learning theory and Rotter's locus of control construct was supported by those studies in the literature on locus of control which show internal (as opposed to external) locus of control more (as opposed to less) related to certain learning variables which occur in Bandura's theory of imitation learning. On the basis of a common aspect of Bandura's (1969) theory of imitation and Rotter's (1966) theory of locus of control, i.e., that Bandura's imitators (as opposed to non imitators) and Rotter's internals (as opposed to externals) use and process more relevant knowledge in anticipation of performance, an hypothesis was formulated. The hypothesis was that internals surpass externals in imitation of a relevant behavior with positive consequences. Specifically, it was hypothesized that in a situation where an observed model experiences positive consequences for doing a spelling exercise rapidly, internal observers surpass external observers in rapid exercise writing.

Some positive consequences to the model selected for this

study were in the form of rewards from a teacher. Rewards from a prestigeous source had been found to influence externals moreso than internals toward improved task performance (Biondo and MacDonald, 1971). Because some externals may consider a teacher a prestigeous person, there could be a tendency for their performance (speed in spelling exercise writing) to improve. Therefore imitation of the model by internals would not exceed that of externals by as great a margin as would otherwise be expected. Therefore, the level of significance was designated as .10 rather than .05.

The dependent variable used to test imitative performance was the number of STEP 4B Spelling items attempted in four minutes after internals and externals had been exposed to a set of slides showing a student model in school, rewarded by a teacher for quickness (and care) in doing a spelling exercise. The slides had been shown to elicit imitative behavior from internals (Cork 1976). To control the study for effects other than treatment, control groups, randomly selected from internals and externals, observed a series of slides on the Appollo II Moon Landing.

Subjects were 294 fourth and fifth grade students from eleven classes of seven public schools of a Western Canadian city. Instruments were the Children's Nowicki Strickland Internal External Scale (CNS-IE) and Sequential Tests of Educational Progress form 4B Spelling, adjusted to meet the

needs of the study. Treatment consisted of a set of fourteen 35 mm cartoon slides, "BC Productions," depicting the rewarded model described above.

In their regular classrooms, subjects were administered the CNS-1E Scale and accordingly designated as "internals," "intermediates" and "externals." In order to control for effects other than treatment, control subjects were selected from among internals and externals within each school. Subsequently, in each school, internals and externals in the treatment condition were shown BC Productions and administered four minutes of STEP 4B Spelling. Similarly, in each school, internals and externals in the control condition were shown Appollo II and administered four minutes of STEP 4B Spelling. Scores of STEP 4B Spelling items attempted were submitted to a two-way anova, with condition (treatment or control) and locus of control (internal or external) as independent variables. Results indicated a significant interaction between condition and locus of control; as predicted. That is, internals in the treatment condition, performed significantly more STEP spelling items than did the other groups.

Pilot studies, conducted with similar population samples, showed, as predicted, that, prior to viewing "BC Productions," there were no significant differences between internals and externals in the number of spelling items attempted in four minutes. (Cork 1974, 1976). The present study predicts and

shows that, after viewing "BC Productions," internals surpass externals in imitation of the number of spelling items attempted in four minutes ($F_{1,192} = 2.91$, p less than .10). That is, internals imitate more of the model's behavior than do externals.

2. Conclusions

The contribution of the present study is the presentation of evidence that the observer's knowledge of relevance of a modeled behavior is one kind of reinforcement to which internal locus of control subjects are more susceptible than external locus of control subjects in imitative performance. The evidence presented has supported a common aspect of Bandura's theory of imitation and Rotter's theory of locus of control, i.e., that internals (as opposed to externals) (Rotter 1966) and imitators (as opposed to non imitators) (Bandura 1971) both use more (as opposed to less) relevant knowledge in anticipation of performance.

The present study provides evidence that a situation involving imitation of a relevant rewarded modeled behavior is one type of situation in which internal and external locus of control subjects differ. Specifically, imitation of a relevant behavior is a correlate of locus of control as measured by the Children's Nowicki Strickland Internal External scale. This evidence may also be regarded as an extension of Bandura's theory of imitation learning. That is, locus of control, as an

observer characteristic, assists in the "attentional" process, a process by which the observer, through anticipation of consequences, selectively attends to certain modeled stimuli for imitation.

The hypothesis that internals surpass externals in imitation of a relevant rewarded modeled behavior, has been confirmed at the designated .10 level of significance. Since the study has shown statistical significance, it should be useful in a classroom, although less dependable than if confirmation of the hypothesis were at the .05 level. The possibility can never be excluded that smaller than desirable overall differences between internals and externals in imitation may not be due to other explanations.

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APPENDIX A

SOCIAL REACTION INVENTORY: THE CHILDREN'S NOWICKI STRICKLAND LOCUS OF CONTROL SCALE.

THE NOWICKI-STRICKLAND LOCUS OF CONTROL SCALE FOR CHILDREN

The Instrument

Development of the Nowicki-Strickland scale began with the distribution of 101 tests items to nine clinical psychologists along with Rotter's (1966) description of the locus of Control dimension. Results showed agreement among the psychologists that fifty-nine of the items were congruent with the Rotter definition. The fifty-nine item scale was then administered to 152 children in grades three to nine. Analysis of the fifty-nine items to produce a somewhat more homogeneous scale led to the present 40 item scale. The scale was then administered to 1,017 U.S. students from grades three through twelve in four Caucasion communities. The scale, consisting of forty questions, is distributed to subjects and read aloud by the administrator to insure comprehension. The questions are answered by placing a check mark under a "yes" or "no" column of a separate answer sheet.

SOCIAL REACTION INVENTORY

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

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

29. Do you believe that when bad things are going to happen they just are going to happen no matter what you try to do to stop them?

30. Do you think that kids can get their own way if they just keep trying?

31. Most of the time do you find it useless to try to get your own way at home?

32. Do you feel that when good things happen they happen because of hard work?

33. Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters?

34. Do you feel that it's easy to get friends to do what you want them to?

35. Do you usually feel that you have little to say about what you get to eat at home?

36. Do you feel that when someone doesn't like you there's little you can do about it?

37. Do you usually feel that it's almost useless to try in school because most other children are just plain smarter than you are?

38. Are you the kind of person who believes that planning ahead makes things turn out better?

39. Most of the time, do you feel that you have little to say about what your family decides to do?

40. Do you think it's better to be smart than to be lucky?

SOCIAL REACTION INVENTORY

CODE ..... GRADE .....

AGE ..... SEX (Circle M or F ..... SCHOOL .....

.....

	YES	NO		YES	NO
1	(*)	( )	21	(*)	( )
2	( )	(*)	22	( )	(*)
3	(*)	( )	23	(*)	( )
4	(*)	( )	24	(*)	( )
5	(*)	( )	25	( )	(*)
6	( )	(*)	26	( )	(*)
7	(*)	( )	27	(*)	( )
8	(*)	( )	28	( )	(*)
9	( )	(*)	29	(*)	( )
10	(*)	( )	30	( )	(*)
11	(*)	( )	31	(*)	( )
12	(*)	( )	32	( )	(*)
13	( )	(*)	33	(*)	( )
14	(*)	( )	34	( )	(*)
15	( )	(*)	35	(*)	( )
16	(*)	( )	36	(*)	( )
17	(*)	( )	37	(*)	( )
18	(*)	( )	38	(*)	( )
19	(*)	( )	39	(*)	( )
20	( )	(*)	40	( )	(*)

*Responses Scoring "External"

APPENDIX B

SEQUENTIAL TESTS OF EDUCATIONAL PROGRESS,

MECHANICS OF WRITING, 4B

SEQUENTIAL TESTS OF EDUCATIONAL PROGRESS (STEP), MECHANICS OF WRITING 4B, SPELLING

STEP spelling was used to measure the imitator's speed in performing a spelling exercise after observing the model. The test was considered suitable because: (i) adequate reliability data are available (STEP, Series II, 1971), and (ii) the organization of the four item multiple choice answers and the lists of words lend themselves to scanning and to rapid marking if the test writer is so inclined. The behaviors referred to in (ii) above are characteristic of the model exhibited. STEP Spelling consists of 45 groups of words. The correct choice of each group is indicated by filling in the appropriate box on a separate answer sheet.

Because imitation of speed of test writing, not spelling ability, was being obtained, scores obtained were the number of items attempted, not the number of correct answers. Subjects had been instructed to answer items in order. In order to present the task as an untimed exercise, only the list of words removed from the test booklet, accompanied by an answer sheet, was presented. Standard STEP test instructions (Appendix B_2) were read orally by the administrator. The statement "15 minutes" was removed from the test page. The instruction was given that the exercise was not a timed one, but more like a reading exercise in which the subject would be asked to circle the number of the item he

is doing now, complete that item and continue on. A concealed stop watch was used for timing. Students were instructed that they were not expected to finish the exercise.

A condition to render the task "ambiguous" was presented. This was achieved by including in the instructions the conflicting perceptions that some people think that doing well on spelling depends on how much the student has studied spelling and on marks the student has made on spelling in the past, while others think that doing well depends on luck or chance in being presented with words the student already knows.

APPENDIX B_1

INSTRUCTIONS, STEP MECHANICS OF WRITING

PREVIOUSLY COPYRIGHTED MATERIAL IN APPENDIX B

LEAVES 86, 87.

NOT MICROFILMED

MATERIAL MAY BE OBTAINED FROM:

Cooperative Test and Services Educational Testing Services
Princeton, New Jersey
Berkeley, California

APPENDIX B_2

ADDITIONAL INSTRUCTIONS STEP MECHANICS OF WRITING

ADDITIONAL INSTRUCTIONS

"Some people think that doing well on spelling depends on how much the student has studied spelling and on the marks he has made on spelling in the past. Other people think that doing well on spelling depends on luck in getting words the student already knows."

"This is not a timed exercise, but rather like a reading exercise. At times I will ask you to circle the item you are doing now, complete that item and continue on." (Put on board (6) A B C D) "If you are doing number six, circle the six."

"You are not expected to finish the exercise."

APPENDIX C

BC PRODUCTIONS

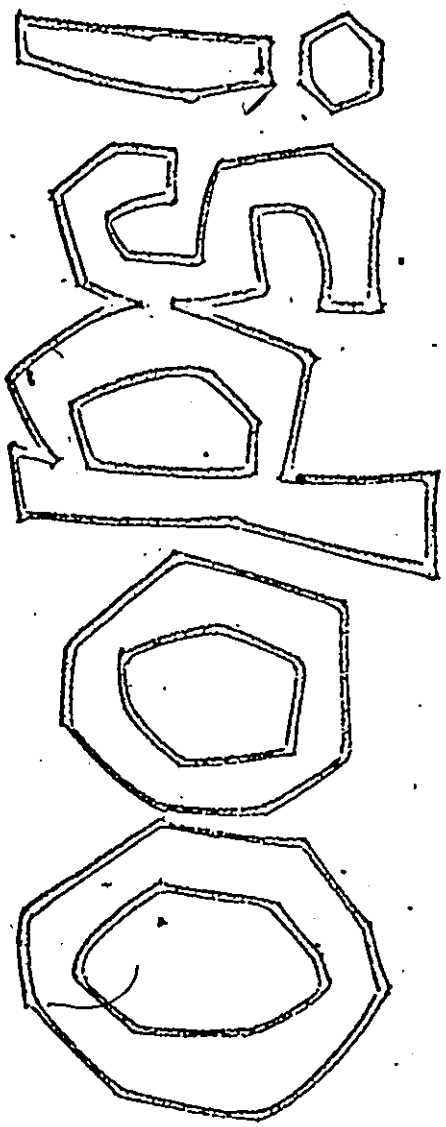
BC PRODUCTIONS PRESENTS

ANDY FINDS OUT HOW TO DO WELL IN SPELLING

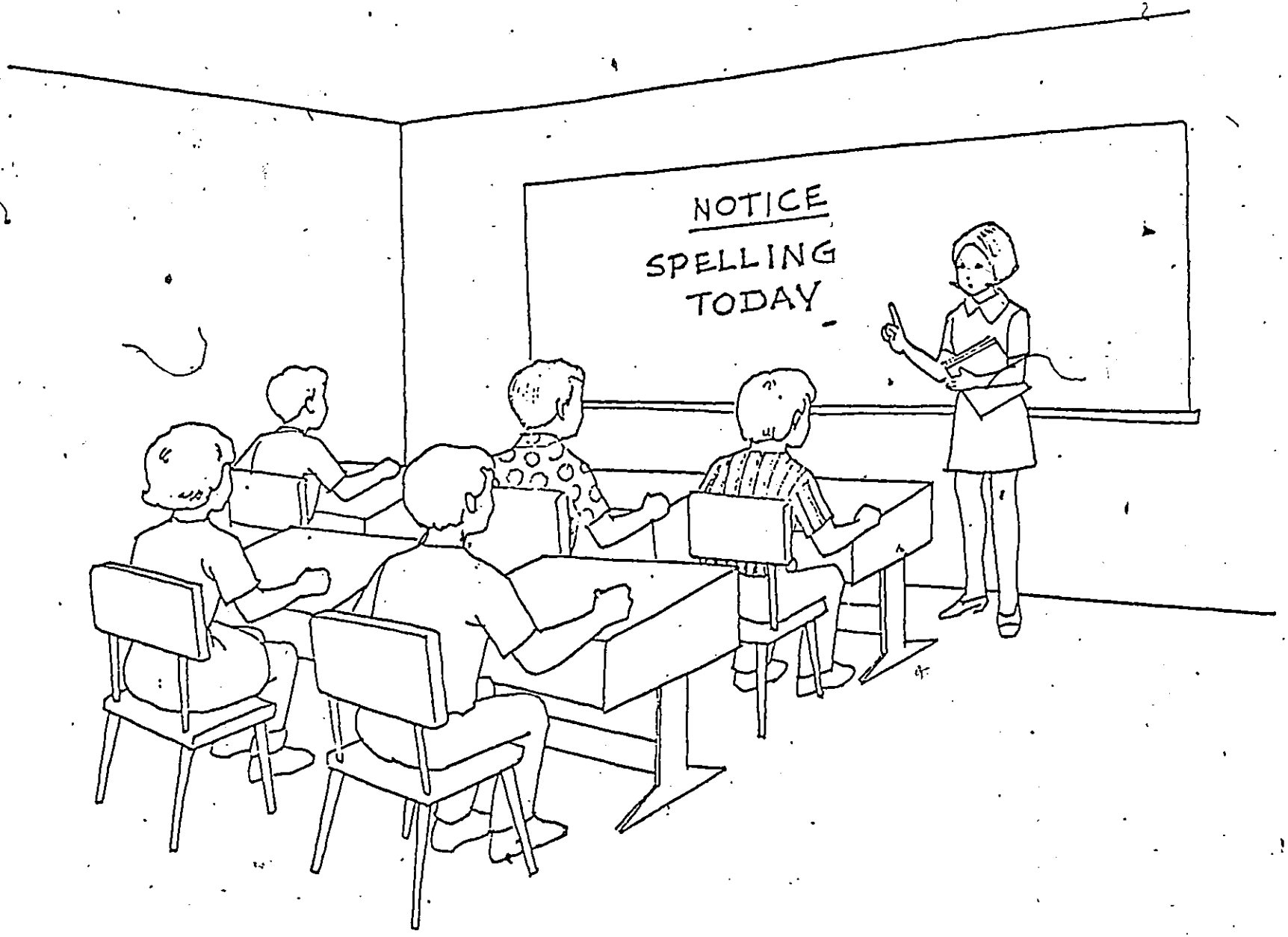
ANDY

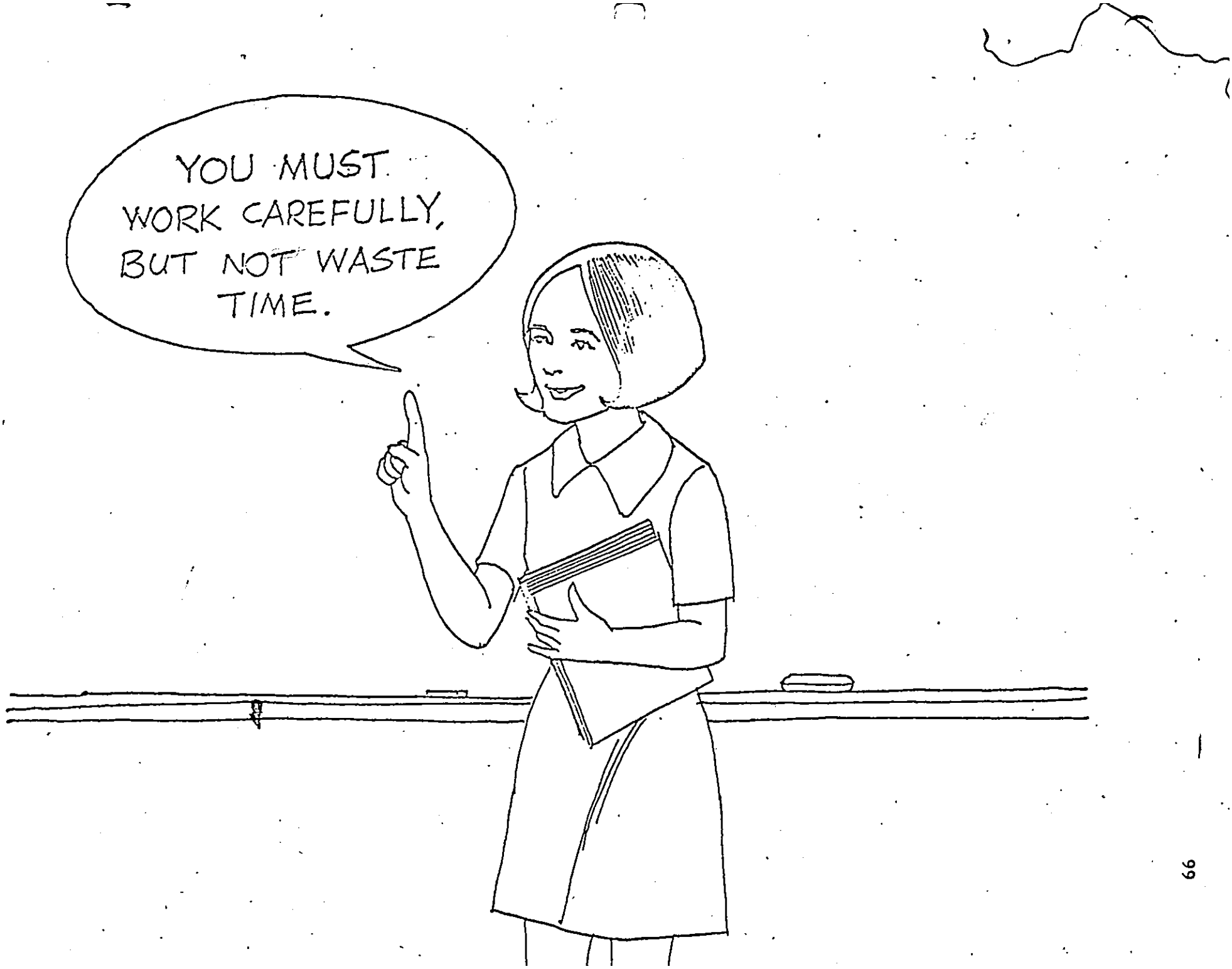
ENDING

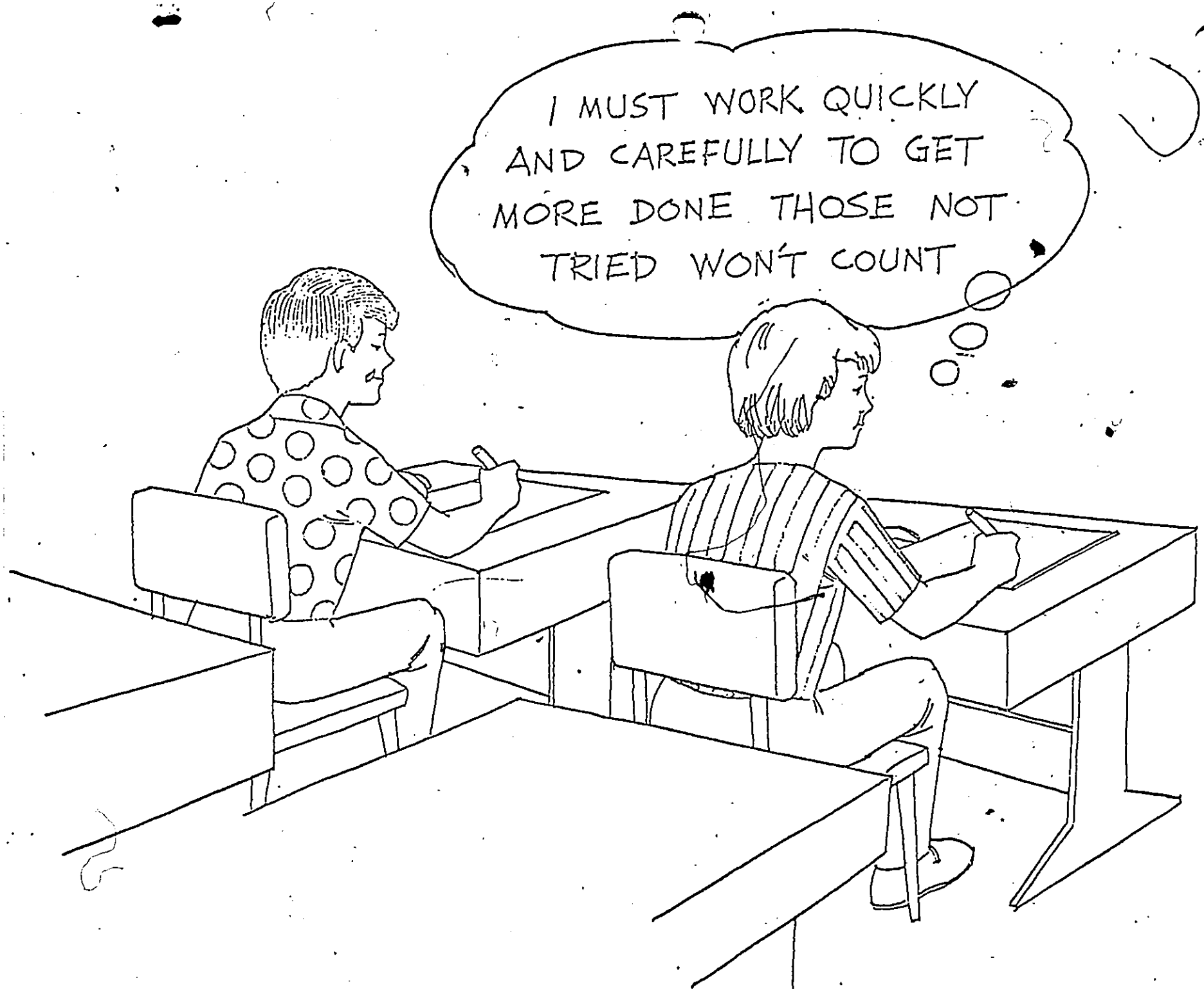

GOOD WORK; ANDY
YOU GOT A GOOD MARK BECAUSE
YOU WORKED QUICKLY AND
GOT LOTS DONE.
GOOD WORK
95

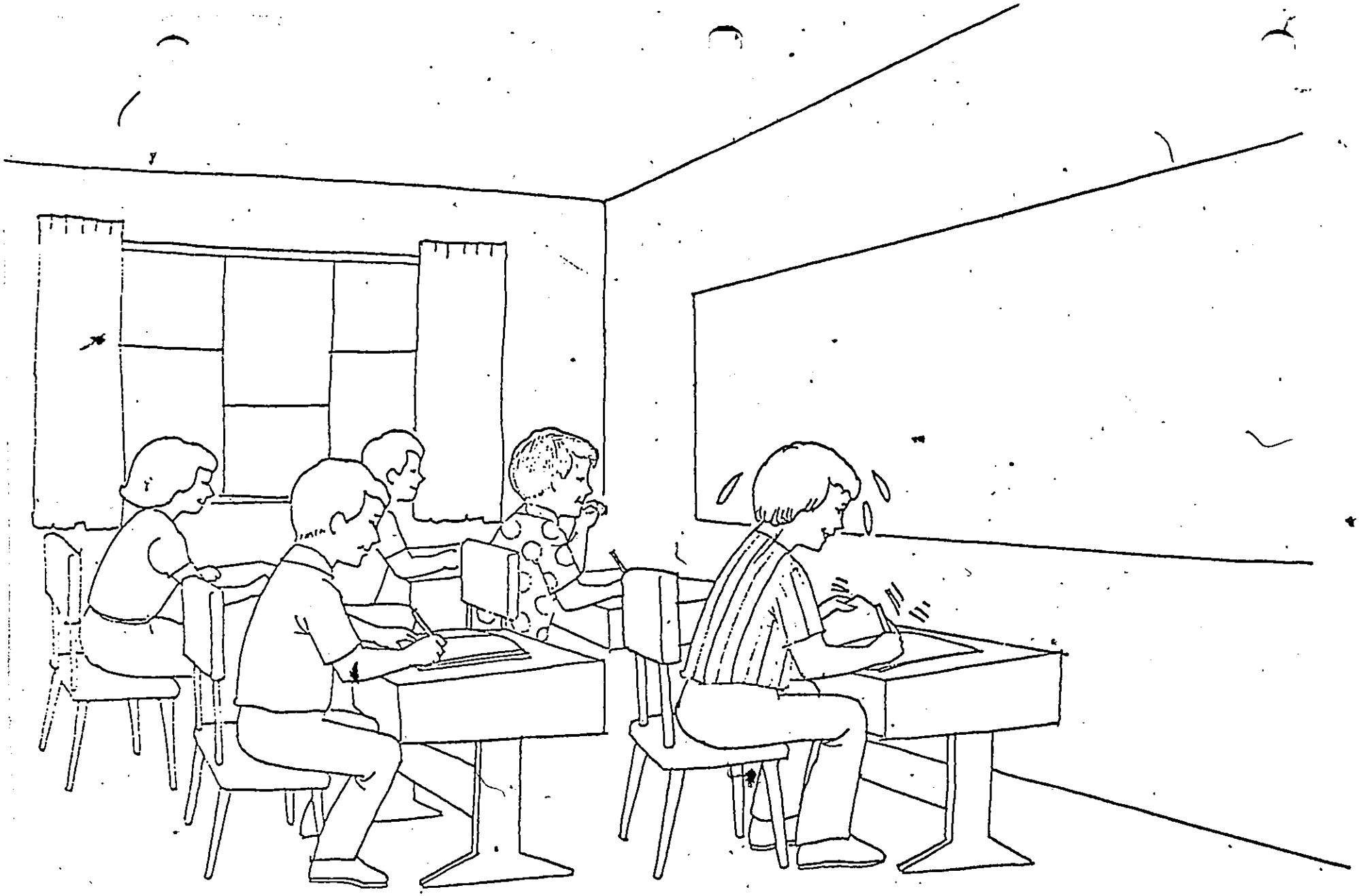

SOL

BEGINNING

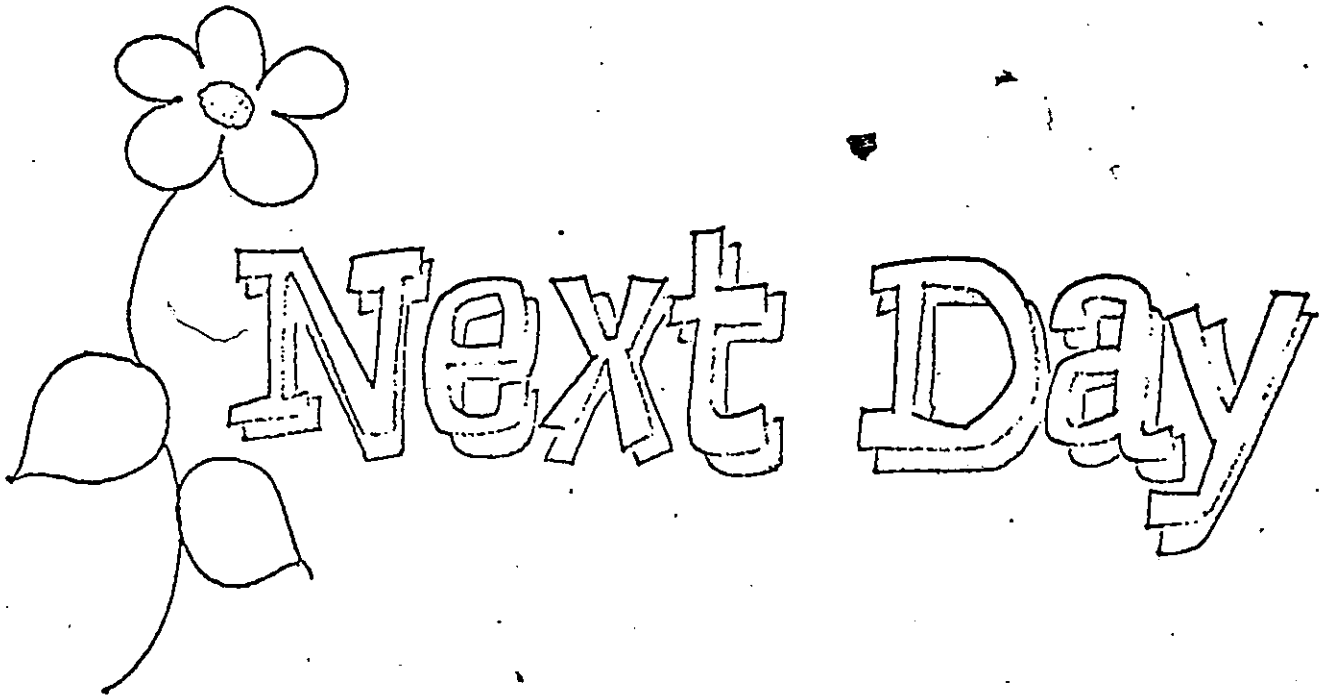

NOTICE
SPELLING
TODAY


YOU MUST WORK CAREFULLY, BUT NOT WASTE TIME.


I MUST WORK QUICKLY
AND CAREFULLY TO GET
MORE DONE THOSE NOT
TRIED WON'T COUNT




I'M AHEAD OF DAVID


Next Day


GOOD WORK, ANDY
YOU GOT A GOOD MARK BECAUSE
YOU WORKED QUICKLY AND
GOT LOTS DONE.
GOOD WORK
95

APPENDIX D

DATA, INTERNALS

TABLE 5

DATA, INTERNALS, r TREATMENT GROUP: LOCUS OF CONTROL SCORES, AND POSTTEST OF NUMBER OF STEP 4B SPELLING ITEMS ATTEMPTED IN 4 MINUTES. (n = 64)

LC	Posttest	Sex	LC	Posttest	Sex	LC	Posttest	Sex
10	21	M	12	20	M	13	21	F
11	14	F	14	30	F	14	11	M
12	19	M	16	33	M	14	19	F
12	25	M	16	18	F	06	12	M
13	10	M	13	16	M	11	14	M
13	20	M	15	32	F	11	22	F
13	18	F	15	23	F	11	13	F
13	13	M	16	31	M	12	24	M
16	17	F	07	10	M	13	16	F
09	23	F	09	19	F	13	04	M
11	25	M	13	15	M	14	17	M
13	13	F	14	15	F	14	10	F
13	32	F	15	25	F	08	24	F
13	16	F	15	18	F	10	20	M
14	15	M	15	21	M	11	18	M
14	22	M	17	32	M	12	08	M
14	21	F	08	08	F	12	18	M
14	18	M	12	12	F	13	12	M
15	11	F	13	05	M	13	09	M
17	25	F	13	24	M	13	12	M
16	20	M	13	21	M	13	26	M
17	11	F						

APPENDIX D_1

DATA, EXTERNALS

TABLE 6

DATA, EXTERNALS, r TREATMENT GROUP: LOCUS OF CONTROL SCORES AND POSTTEST[9] OF NUMBER OF STEP 4B SPELLING ITEMS ATTEMPTED IN FOUR MINUTES (n = 63)

LC	Posttest	Sex	LC	Posttest	Sex	LC	Posttest	Sex
19	22	M	22	09	M	21	15	F
19	21	F	25	13	F	22	12	M
19	31	M	23	12	F	29	11	M
21	16	F	23	31	F	17	17	M
22	16	F	21	38	M	18	13	F
22	16	F	18	23	F	18	12	M
23	09	F	20	20	F	19	04	F
23	15	F	21	27	F	19	13	M
25	14	M	21	15	F	20	13	F
19	29	F	21	15	M	22	15	F
19	13	M	21	18	M	22	17	F
20	12	M	21	12	M	27	18	F
20	13	M	21	11	F	18	09	M
20	21	F	22	11	M	18	19	M
21	19	F	28	12	M	18	31	M
25	17	F	21	16	M	18	13	M
27	10	F	18	18	M	18	19	M
20	15	F	18	18	F	19	18	M
21	14	M	19	11	F	19	08	M
22	05	F	19	12	F	19	21	M
21	15	F	20	13	M	21	16	M

APPENDIX D_2

DATA, INTERNALS AND EXTERNALS, CONTROL CONDITION

TABLE 7

DATA, INTERNALS AND EXTERNALS, CONTROL GROUP: LOCUS OF CONTROL SCORES AND POSTTEST OF NUMBER OF STEP 4B SPELLING ITEMS ATTEMPTED IN FOUR MINUTES

INTERNALS (n=34)				EXTERNALS (n=35)			
LC	POST	LC	POST	LC	POST	LC	POST
04	20	15	10	18	23	25	10
11	08	06	15	18	06	18	14
12	10	13	16	19	09	18	17
13	13	14	09	19	22	18	13
14	10	14	19	19	24	20	15
14	27	14	16	20	18	20	16
14	14	14	21	23	05	21	16
14	10	15	24	23	16	21	22
14	12	15	14	25	15	22	13
14	13	16	16	28	21	26	09
07	16	10	28	18	13	19	16
07	14	14	18	18	15	20	29
12	09	15	20	18	13	21	17
12	11	16	24	18	16	25	22
17	17	13	16	18	12	18	32
14	12	15	16	21	20	21	15
15	17	16	17	21	13	23	23
						27	23

APPENDIX E

ADDITIONAL TABLES

TABLE 8

GROUP SIZES, MEANS AND STANDARD DEVIATIONS OF NUMBER STEP ITEMS ATTEMPTED IN 4 MINUTES IN TREATMENT AND CONTROL CONDITIONS

	INTERNALS			EXTERNALS		
TREATMENT	x	n	sd	x	n	sd
Pretest	14.77	30	5.68	13.62	29	5.44
Posttest	20.40	30	6.44			
CONTROL						
Prestest	13.50	32	5.01	13.82	34	6.17
Posttest	16.94	32	5.51			

*Cork (1976)

TABLE 9

ANALYSIS OF VARIANCE OF NUMBER OF SPELLING ITEMS COMPLETED IN FOUR MINUTES OF PRETEST FOR TREATMENT AND CONTROL GROUPS OF INTERNALS*

Source	df	MS	F
Between SS	1	24.84	.85**
Within SS	60	29.09	
TOTAL	61		

*Cork (1976)
**NS at the .10 level

TABLE 10

ANALYSIS OF VARIANCE OF NUMBER OF ITEMS COMPLETED IN FOUR MINUTES OF POSTTEST FOR TREATMENT AND CONTROL GROUPS OF INTERNALS*

Source	df	MS	F
Between SS	1	185.63	5.02**
Within SS	60	36.95	
TOTAL	61		

* Cork (1976)
** Significant at the .10 level

TABLE 11

ANALYSIS OF VARIANCE OF NUMBER OF STEP 4A SPELLING ITEMS ATTEMPTED IN FOUR MINUTES BY INTERNALS AND EXTERNALS PRIOR TO TREATMENT*

Source	df	MS	F
Between SS	1	19.37	.62**
Within SS	57	30.99	
TOTAL	58		

*Cork (1976)
**Not significant at the .10 level.

TABLE 12

ANALYSIS OF VARIANCE OF NUMBER OF STEP 4A ITEMS ATTEMPTED IN FOUR MINUTES BY INTERNALS AND EXTERNALS PRIOR TO TREATMENT (PRETEST CONTROLS AND PRETEST TREATMENT GROUPS COMBINED)*

Source	df	MS	F
Between SS	1	4.34	.13**
Within SS	123	31.45	

*Cork (1976)

**Not significant at the .10 level

TABLE 13

DATA, INTERNALS, CONTROL GROUP: LOCUS OF CONTROL SCORES, POSTTEST AND PRETEST SCORES OF NUMBER OF SPELLING ITEMS COMPLETED IN 4 MINUTES. (n = 32)

LC	Posttest	Pretest	LC	Posttest	Pretest
10	13	10	14	10	13
12	26	17	14	12	12
12	13	06	14	13	11
13	21	16	15	12	05
14	24	21	15	11	09
14	15	14	16	18	10
14	25	18	15	25	22
14	17	15	15	15	17
14	14	18	10	28	30
04	20	13	14	18	13
11	08	08	15	20	10
12	10	16	16	24	17
13	13	07	13	16	14
14	10	10	15	16	11
14	27	12	16	17	09
14	14	13	13	17	15

Cork (1976)

TABLE 14

DATA, INTERNALS, r_g TREATMENT GROUP: LOCUS OF CONTROL SCORES, POSTTEST AND PRETEST OF NUMBER OF SPELLING ITEMS COMPLETED IN 4 MINUTES. (n = 30)

LC	Posttest	Pretest	LC	Posttest	Pretest
10	21	19	14	22	12
11	14	11	14	21	17
12	19	13	14	18	15
12	25	15	15	11	04
13	10	10	17	25	28
13	20	06	16	20	20
13	18	08	17	11	10
13	13	12	12	20	14
16	17	10	14	30	19
9	23	21	16	33	05
11	25	22	16	18	14
13	13	15	13	16	11
13	32	17	15	32	20
13	16	16	15	23	18
14	15	16	16	31	25

Cork (1976)

TABLE 15

DATA, EXTERNALS, r TREATMENT GROUP: LOCUS OF CONTROL SCORES, AND PRETEST OF NUMBER OF SPELLING ITEMS ATTEMPTED IN 4 MINUTES (N=29)*

LC	Prestest	LC	Prestest
19	18	21	15
19	12	25	26
19	13	27	11
21	11	20	17
22	09	21	25
22	08	22	07
23	06	21	12
23	10	22	11
25	08	25	13
19	18	23	07
19	17	23	14
20	10	21	15
20	13	18	18
20	18	20	08
		21	25

*Cork (1976)

TABLE 16

DATA, EXTERNALS, CONTROL GROUP: LOCUS OF CONTROL SCORES, AND PRETEST OF NUMBER OF SPELLING ITEMS ATTEMPTED IN 4 MINUTES (N=34)*

LC	Prestest	LC	Pretest
19	16	23	13
19	17	25	12
19	11	28	13
20	09	21	13
20	14	22	17
21	16	24	12
21	19	19	06
22	12	20	04
23	12	21	13
20	11	19	17
18	20	20	30
18	10	21	20
19	04	25	26
19	12	18	20
19	22	24	09
20	09	23	15
23	03	21	13

* Cork (1976)