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PREVIEW

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**Dispositional optimism and academic achievement on a required
Mathematics Placement Examination**

Parker, Claire S. Marion, Ph.D.

The University of Nebraska - Lincoln, 1992

PREVIEW

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PREVIEW

**DISPOSITIONAL OPTIMISM AND ACADEMIC ACHIEVEMENT ON
A REQUIRED MATHEMATICS PLACEMENT EXAMINATION**

by

Claire S. Parker

A DISSERTATION

Presented to the Faculty of
The Graduate College of the University of Nebraska
In Partial Fulfillment of the Requirements
For the Degree of Doctor of Philosophy

Major: Interdepartmental Area of Community
and Human Resources

Under the Supervision of Professor Birdie Holder

Lincoln, Nebraska

May, 1992

DISSERTATION TITLE

DISPOSITIONAL OPTIMISM AND ACADEMIC ACHIEVEMENT ON

A REQUIRED MATHEMATICS PLACEMENT EXAMINATION.

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DISPOSITIONAL OPTIMISM AND ACADEMIC ACHIEVEMENT ON
A REQUIRED MATHEMATICS PLACEMENT EXAMINATION

Claire S. Parker, Ph.D.

University of Nebraska, 1992

Adviser: Birdie Holder

This study explores the relationship between dispositional optimism and scores on a Mathematics Placement Examination.

Optimism scores were obtained from a 32-item, six-point Likert scale questionnaire which was administered to students taking a Mathematics Placement Examination (MPE). Twelve items were taken from the Life Orientation Test (LOT) and the remaining items were taken from the Hopelessness Scale (HS). Items were arranged randomly within each instrument, with LOT items numbered 1 through 12 and HS items numbered 13 to 32 on the combined questionnaire. An optimism score was calculated from 8 of the 12 responses on the LOT. The remaining items on the LOT were fillers. A hopelessness score was obtained from the 20 items on the HS. The Mathematics Placement Examination (MPE) contained 25 items, and the number right constituted the math score.

Pearson coefficients were computed to examine the relationship between optimism and scores on the MPE and between optimism and hopelessness. Further analysis consisted of examining the effects of the intervening variables gender, age, marital status, and ethnic

background, and the perception variables mathematics ability, importance of mathematics to current career plans, use of guessing techniques, perceived luck, and perceived test difficulty, with the level of optimism, using the ANCOVA procedure.

All relationships were in the anticipated direction. Significant main effects were found for gender, age, perceived mathematical ability, perceived importance of mathematics, perceived test difficulty, perceived luck, and use of guessing techniques separately, but no main effects for optimism were found. No relationship between optimism and academic achievement was found, with optimism remaining constant across all levels of the number right score. Optimism and pessimism were negatively related. Gender and age are relative constants. The intervening variables of perceived math ability, perceived test difficulty, and perceived luck and use of guessing techniques are all subject to change through intervention, and with the application of appropriate techniques may be modified to reduce their effect on academic achievement as represented by the number right score on a Mathematics Placement Examination.

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Chapter 1

Introduction

Context of the Study

Poor performance on a required Mathematics Placement Examination can have devastating effects on an academic career. Academic progress may be slowed if the results of the Mathematics Placement Examination indicate the examinee has a need for some remedial mathematics work or independent study before the Mathematics Placement Examination must be retaken. If the examinee perceives the required mathematics Placement Examination to be important to his future academic career plans, then he may think his future career success is dependent upon successful completion of the required placement examination (Raynor, 1970). A poor grade in the Mathematics Placement Examination means that the examinee is unable to register for any mathematics course until the examinee has upgraded his/her basic knowledge and is able to pass the Mathematics Placement Examination. Non-enrollment in a college mathematics course may cause the student to delay enrollment in other courses for which a college mathematics course is a prerequisite. Thus failure to pass the Mathematics Placement Examination may be an impediment to future career goals.

Self-esteem is a multifaceted personality trait which is partially affected by dispositional optimism (Dember &

Brooks, 1989). Dispositional optimism can be viewed as an internal, unstable, and controllable attribution for academic achievement (Arkin, 1980; Marsh, 1984; Weiner, 1979). The most commonly attributed causes for academic success or failure are ability and effort, but other causes like luck, task difficulty, and other idiosyncratic factors have been implicated (Weiner, 1979). Among the idiosyncratic factors that may have an effect on academic achievement is dispositional optimism. Dispositional optimism has been defined as a generalized expectancy that good things will happen irrespective of causal and situational influences (Scheier & Carver, 1985).

Dispositional optimism has been shown to have beneficial effects in several health care areas such as chronic pain, insulin dependent diabetes, rheumatoid arthritis, and metastatic breast cancer (Affleck, McGrade, Allen & McQueeney, 1985; Affleck, Tennen, Croog, & Levine, 1987; Spiegel & Bloom, 1989; Tennen, Affleck, Allen, McGrade, & Ratzan, 1984; Tennen, Affleck, & Gershman, 1986). Strack and Blaney (1987) have shown that an optimistic outlook can be beneficial when patients are in an aftercare program following treatment for alcoholism.

Individuals who have, in general, an optimistic outlook have been reported to use cognitive problem-solving techniques rather than emotional centered techniques when coping with adversity (Scheier & Carver, 1985). Optimists

often appear to be optimistic "in general." They often appear to have a happy personality. Usually their positive expectations are not limited to a particular behavioral setting or to a set pattern. In the same fashion, pessimistic persons often give the appearance of being universally glum and morose.

Since these individual differences are easily and readily observed, and are seen in many and varied situations, it would seem that the literature would be replete with research on this personality trait. But this is not the case. A review of the literature relevant to this personality characteristic, dispositional optimism, and expectancy theory reveals that very little attention has been paid to individual differences in this area, and to the possibility that these individual differences may have important implications and consequences for behavior.

The Purpose of the Study

The primary purpose of this research is to examine the possibility that dispositional optimism, construed as a stable personality characteristic, has important implications for academic achievement in the area of mathematics. In particular, this research will examine the relationships between dispositional optimism, hopelessness, and the score achieved on a required Mathematics Placement Examination (MPE). Dispositional optimism will be measured by the Life Orientation Test (LOT). The LOT is a self

reported 12-item questionnaire developed by Carver (1987) which assesses the general overall optimistic outlook for the respondent.

In this study the sample population consisted of students at a midwestern university who were required to take a Mathematics Placement Examination prior to their enrollment in their first Mathematics class.

In addition to the LOT, the Hopelessness Scale which is a measure of pessimism, and certain demographic data, which may have an impact on performance, will be collected. The Hopelessness Scale is a 20-item true-false questionnaire developed by Beck, Weissman, Lester, and Trexler (1974). Among the demographic variables will be age, gender, marital status, ethnic background, mathematics history, importance of mathematics to career plans, perceived mathematical ability, perceived test difficulty, perceived use of a guessing technique, perceived luck, and college of choice.

This study is unique in that most studies that relate to academic achievement in mathematics have been conducted in an experimental or laboratory situation with self selected volunteers, while this study will be conducted in a real life situation. In addition, since there is little or no research on dispositional optimism as a single construct related to academic achievement in mathematics, this study will provide an initial step in examining the link between

academic achievement in mathematics and dispositional optimism.

Statement of the Problem

The problem that has lead to this study is the paucity of information on the effects of dispositional optimism on academic performance. Dispositional optimism has been shown to have beneficial effects in many areas of health care problems, but few examples of its effect on academic performance have been found.

This study was designed to answer three research questions dealing with optimism as a personality characteristic. Each research question was then used to generate several hypotheses in order to fully examine the question.

Research Question 1

Is there a relationship between dispositional optimism as measured by the LOT and academic achievement as measured by the number right on the Mathematics Placement Examination?

Associated Hypotheses:

Hypothesis 1: There is no overall relationship between optimism and academic achievement.

Hypothesis 2: There is no difference in the number right score for subjects with differential levels of optimism.

Hypothesis 3: There is no difference in the number right score for subjects with differential levels of optimism controlling for gender.

Hypothesis 4: There is no difference in the number right score for subjects with differential levels of optimism controlling for age.

Hypothesis 5: There is no difference in the number right score for subjects with differential levels of optimism controlling for marital status.

Hypothesis 6: There is no difference in the number right score for subjects with differential levels of optimism controlling for mathematics history.

Hypothesis 7: There is no difference in the number right score for subjects with differential levels of optimism controlling for the importance of mathematics to current career plans.

Hypothesis 8: There is no difference in the number right score for subjects with differential levels of optimism controlling for perceived mathematical ability.

Hypothesis 9: There is no difference in the number right score for subjects with differential levels of optimism controlling for perceived test difficulty.

Hypothesis 10: There is no difference in the number right score for subjects with differential levels of

optimism controlling for perceived use of guessing patterns or techniques.

Hypothesis 11: There is no difference in the number right score for subjects with differential levels of optimism controlling for perceived luck.

Hypothesis 12: There is no dependence between the number right score classification and the college of choice.

Research Question 2

Is there a relationship between optimism as measured by the LOT and hopelessness as measured by the HS score?

Associated Hypotheses:

Hypothesis 13: There is no overall relationship between optimism and hopelessness.

Hypothesis 14: There is no difference in the pessimism score for subjects with differential levels of optimism.

Hypothesis 15: There is no difference in the pessimism score for subjects with differential levels of optimism controlling for gender.

Hypothesis 16: There is no difference in the pessimism score for subjects with differential levels of optimism controlling for age.

Hypothesis 17: There is no relationship between the levels of optimism and hopelessness controlling for marital status.

Research Question 3

Is there a predictive formula for the number right on a Mathematics Placement Examination, given the optimism and hopelessness scores and the other intervening variables?

Associated Hypothesis:

Hypothesis 18: There is no parsimonious predictive equation for a number right score on the Mathematics Placement Examination, given the scores on optimism, hopelessness, and other intervening variables.

In addition to the three major areas of concern shown above, certain descriptive questions will be answered.

Descriptive Questions

1. What is the mean performance of the examinees on the Mathematics Placement Examination?
2. What is the mean optimism score for the examinees?
3. What is the mean hopelessness (pessimism) score for the examinees?
4. What is the sample profile?
5. What is the relationship between the variables?

Definitions

Often there will be found in the literature unique meanings for common words, and every discipline has its own special nomenclature. For this reason it is sometimes necessary to provide operational definitions for common terms which will be found in a research study and have

meanings distinct for that study. It is also helpful to the reader to have a common meaning with the author for certain terms that occur in the context of the discussion.

Operational definitions define the height, width, and depth of a term as used by the author and clarify the use to which a word, idea, or theory will be put. To this end the following definitions are offered.

Dispositional optimism is the generalized outlook that an individual has about his/her life as measured by the Life Orientation Test.

Level of Optimism is the three-way categorical split of the score obtained on the LOT scale when Optimism is used as an independent variable.

Expectancy-value is the anticipated outcome of an event.

Valance is the positive or negative sign that is attached to the anticipated outcome of an event. The sign is positive if success is anticipated and negative if failure is anticipated.

Motivating factor is any personal or task characteristic that promotes or deters action.

Life Orientation Test is a 12-item questionnaire developed by Carter and Schrier (1985) for the measurement of a person's generalized outlook on life.

Hopelessness Scale is a 20-item questionnaire designed by Beck et al. (1974) for the measurement of an individual's degree of feelings of hopelessness or pessimism.

Assumptions

1. Student perceptions of their generalized outlook on life can be measured.
2. The Life Orientation Test (LOT) is a suitable and appropriate instrument for the measurement of a student's generalized outlook on life.
3. The Hopelessness Scale (HS) is a suitable and appropriate instrument for the measurement of a student's degree of feelings of hopelessness and depression.
4. The procedures used to select the subjects for this study are valid and the subjects so selected are a representative sample of the total population of the institution.

Delimitations and Limitations

Delimitations

1. The population involved in this study was restricted to those students who were required to take a Mathematics Placement Examination at the large midwestern university where the experiment was carried out during the period January 1991 to May 1991.

2. The study will concentrate on the concept of dispositional optimism and academic achievement as measured by the number right on a required Mathematics Placement Examination.
3. The design of the study was quantitative and correlational.

Limitations

1. Conclusions of this study are applicable only to students who participate in the Mathematics Placement Examination at the large midwestern university where the experiment was conducted.
2. The number right on the Mathematics Placement Examination was to be determined by the director of the testing center. This score was subject to the weaknesses inherent in the testing and grading system.
3. This study was subject to those weaknesses inherent in a quantitative and correlational design such as non-equivalent groups.

Historical Perspective

The theoretical background upon which this study is based is the expectancy-value model. This theory will be helpful in explaining the relationship between dispositional optimism and academic achievement on a required Mathematics Placement Examination because this theory attempts to

explain expectations of success and avoidance of failure in terms of the characteristics of the task and of the person.

Expectancy-value models were developed by Lewin, Dembo, Festinger, and Sears (1944), Tolman (1948), Rotter (1954), Atkinson (1957), Edwards (1954), and Feather (1959). These psychologists were interested in such diverse fields of inquiry as aspiration levels, cognitive maps of rats, social learning and clinical psychology, achievement motivation, subjectively expected utilities (SEU) decision theory, and the study of object preference. Although the psychologists' areas of interest were very diverse, the concepts they developed were very similar and the generalized name given to this class of theories has come to be known as expectancy-value (valance) models. The term positive valance is used to denote the expectation of a positive result and negative valance to denote the expectation of a negative result.

All the expectancy-value models have a common thread. There is a common recognition that behavior and its potential consequences are grounded in a complex interwoven behavior-reward/punishment structure that involves an individual's beliefs about him/herself and the expected results of his/her own actions. Of particular interest and application to this study is the concept of expectancy-value as it relates to achievement motivation.