REVISION OF THE PERCEIVED ENVIRONMENTAL CONTROL MEASURE

by

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Abstract

It has been proposed that knowing about an individual's locus of control (L of C) can help predict his/her potential for taking environmental action. The purpose of this study was to construct a L of C instrument which could be used to measure an individual's perceived L of C for taking environmental action in generally stated situations. The L of C instrument created was modeled after Champeau's (1982) Perceived Environmental Control Measure (PECM), labeled the Revised Perceived Environmental Control Measure (RPECM), and tested for evidence of reliability and validity.

The final instrument was comprised of 45 items in three L of C belief orientations: 1) Internal (I); 2) Powerful Others (P); 3) Chance (C). These three belief systems were in turn applied equally across five categories of environmental action: 1) Ecomanagement; 2) Economic Action; 3) Legal Action; 4) Political Action; 5) Persuasive Action. Subjects were asked to respond to the RPECM statements as if they actually pertained to their lives. Participants in this study included sample populations of college students.

Results of this study support the proposed relationship between L of C and environmental action taking behavior. The majority of subjects perceived themselves as having some personal control over the generally-stated environmental concerns. However, powerful others and chance were also identified as agents having some control over the potential

for environmental action. Subjects showed a tendency to feel most in control with ecomanagement practices and least in control in the case of political action.

The RPECM exhibited evidence of reliability, content validity and construct validity. It contains a set of subscales which show potential for diagnosing environmental action taking behavior and for evaluating the effectiveness of environmental education curricula.

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CHAPTER I

INTRODUCTION

General Rationale

The year 1969 saw the incident of the Santa Barbara oil spill and the start of what was to become known as the Environmental Decade. A Gallup Poll done following the oil spill incident indicated that for the first time environmental pollution was perceived as a major problem. Public concern increased then and remains high today over the destruction and loss of our natural resource base. Examples of these concerns include: overpopulation and food supplies; hazardous and toxic wastes; pesticide and fertilizer use; nuclear waste disposal; groundwater pollution; air and water pollution.

The Global 2000 Report requested by President Carter in 1977 and presented in 1980 predicted that "...unless the nations of the world act decisively to alter current trends" we could see a world "less stable ecologically and more vulnerable to disruption than the world we live in now" (President's Council on Environmental Quality, 1980). These predictions don't stand alone. Reputable books and research studies published in the last twenty years echo similar projections.

A logical question would be "How can we act decisively in order to resolve our environmental problems?" The answer is obviously one of a complex nature, however, there are those who believe the answer lies in environmental education (EE); environmental education not just for scientific and

governmental leaders, but for the entire citizenry.

Environmental education emerged in the late 1960's and early 1970's as a distinct discipline, and it advocates clearly the need to broadly educate our entire citizenry. Stapp et al. (1969) stated that very idea in the premier issue of Environmental Education (now the Journal of Environmental Education). Hungerford and Peyton (1976) proposed the development of an "environmentally literate citizenry". That is, a citizenry capable of identifying and investigating environmental issues and ultimately willing and able to take responsible action toward remediating those issues.

Environmental literacy seems like a justifiable goal in light of the fact that our human survival depends on the remediation of several current environmental problems. This need to develop individuals who are responsible action-takers has been advocated in the writings of several EE professionals. Knapp (1972) spoke of EE as enabling students to participate effectively in environmental problem-solving. In 1973, Hawkins and Vinton proposed that EE is oriented toward the development of values which are translated into action awareness. Rillo (1974) described EE as a lifetime, inter-disciplinary process which results in the total involvement of millions of people in action programs.

In 1978 these beliefs received international recognition through the publication of the Tbilisi Declaration, the result of a UNESCO sponsored meeting attended by representatives of 68 countries. Amadou-Mahtar M'Bou, UNESCO's Director General,

said EE should be "an essential component of a global, lifelong problem-solving education that prepares people for active participation" (Tbilisi Declaration, 1978, p. 16).

Hungerford and Peyton (1976) formulated a list of environmental literacy components which describes a citizen who is capable and motivated to take environmental action. The specific components are as follows:

A. Cognitive Knowledge - citizens who have acquired cognitive knowledge may be identified as those who:

1. have knowledge of those ecological concepts which infringe upon a thorough understanding of communities, ecosystems, and man as an ecological factor.

2. are aware of major environmental issues and can communicate the ecological implications of those issues.

3. are aware of how they personally interact with the environment and the implications of these interactions. This would infer some sort of prior personal ecological impact assessment.

4. have knowledge of the impact of man's cultural activities on the environment, e.g., business, industry, agriculture, government, consumer practices, religion, etc.

5. have knowledge of the role played by differing human values in the creation of environmental issues and can communicate the need for values clarification as one step in the solution of environmental problems.

6. have knowledge of and the ability to communicate the need for environmental action strategies, i.e., persuasion, legal action, political action, consumerism, and ecomanagement.

B. Cognitive Process - citizens who have acquired cognitive process may be identified as those who:

1. have the ability to apply ecological principles to an analysis of and the remediation of environmental issues.

2. have the ability to use both primary and secondary source inquiry strategies to utilize the cognitive process in environmental problem-solving.

3. have the ability to use those skills inherent in environmental action strategies.

4. have the ability to inspect personally held values in the light of new information.

C. Affect - citizens who have acquired affect may be identified as those who:

1. have a desire to maintain an environmental perspective--or ethic--consistent with ecological stability, i.e., a willingness to strive for a homeostatic relationship with the biosphere.

2. are willing to enter into the process of values clarification.

3. are willing to use environmental action strategies in an effort to remediate environmental issues. (pp. 11-12)

Hungerford, Peyton and Wilke (1980) further described objectives for EE in the Goals for Curriculum Development in Environmental Education (GCDEE) which defines a standard performance for environmentally literate citizens. The GCDEE consists of a superordinate goal and four subordinate hierarchical goals which were validated by comparison with the Tbilisi Declaration and a nationwide panel of environmental educators. The superordinate goal reads:

> ...to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work individually and collectively toward achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

The four subordinate goals set down by Hungerford, Peyton and Wilke are:

A. Ecological Foundations-- This level seeks to provide the receiver with sufficient ecological foundations knowledge to permit him/her eventually to make ecologically sound decisions with respect to environmental issues.

B. Conceptual Awareness - Issues and Values-- This level seeks to guide the development of a conceptual awareness of how individual and collective actions may influence the relationship between quality of life and quality of the environment...also, how these actions result in environmental issues which must be resolved through investigation, evaluation, values clarification, decision making, and finally, citizenship action.

C. Investigation and Evaluation-- This level provides for the development of the knowledge and skills necessary to permit receivers to investigate environmental issues and evaluate alternative solutions for remediating these issues. Similarly, values are clarified with respect to these issues and alternative solutions.

D. Environmental Action Skills - Training and Application -- This level seeks to guide the development of those skills necessary for receivers to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment. (pp. 43-44)

This research will primarily examine subordinate goal level D, Environmental Action Skills. Research has shown the development of environmental action skills to be considered an appropriate educational goal by schools that provide EE programs. Childress (1978) surveyed 301 schools and 57% of them considered investigation and environmental problem-solving skills to be of primary importance. Champeau, Gross and Wilke (1980) reported that 87% of 129 teachers surveyed in central Wisconsin agreed that environmental action skills should be "an important component of every student's education" (p. 223). Volk (in press) surveyed professional environmental

educators nationwide regarding their perceptions about the desired state and the current status of EE curricula. She reported that "at most academic levels there is a slight decrease in importance for the citizenship action goals. This decrease is particularly distressing, given the posture among leading environmental educators that this goal level (i.e., citizenship action) is the major outcome upon which EE efforts are, or should be, focused."

If environmental action is an important goal of EE, it is imperative that different types of environmental action be defined. Hungerford and Peyton (1980) introduced a three-part paradigm consisting of (a) Categories and Definitions of Environmental Action, (b) Levels of Decision Making for Environmental Action, and (c) Action Analysis Criteria. Of particular interest to this study are the categories and definitions of environmental action; these are listed and defined below.

Categories of Environmental Action

1. Persuasion: An effort to verbally motivate human beings to take positive environmental action as a function of modified values, e.g., argumentation, debate, speech making, letter writing.

2. Consumerism: An economic threat by an individual or a group aimed at some form of behavior modification in business or industry (e.g., boycotting) or some conservative mode of behavior with respect to goods and/or services (e.g., discriminating and conservative use of goods and services).

3. Political Action: An effort aimed at persuading an electorate, a legislator (or legislature), or executive governmental agency to conform

to the values held by the person or persons taking that action, e.g., lobbying, voting, supporting candidates.

4. Legal Action: Any legal/judiciary action taken by an individual and/or organization which is aimed at some aspect of environmental law enforcement or, a legal restraint preceding some environmental behavior perceived as undesirable, e.g., lawsuits, injunctions.

5. Ecomanagement: Any physical action taken by an individual or a group aimed directly at maintaining or improving existing ecosystems, e.g., reforestation, landscaping, installing bird boxes. (p. 132)

Champeau (1982) argued that one component, namely consumerism, was not well represented. He felt that indirect economic actions, such as membership in environmental organizations or donations to environmental causes constitute environmentally responsible behavior. Such actions involve more than verbal commitment. Therefore, Champeau proposed the Consumerism component be changed to Economic Action, and redefined as follows:

> Economic Action: Constitutes an action similar to one of the following: a) an economic threat by an individual or a group aimed at some form of behavior modification in business or industry, e.g., boycotting; b) some conservative mode of behavior with respect to consumption of goods and services, e.g., purchase of recycled materials; c) some monetary contribution to an individual, group or institution that actively favors or works for a position supported by the contributor, e.g., donations to environmental causes; membership fees paid to environmental activist organizations. (pp. 35-36)

Champeau's Economic Action component will be utilized throughout the remainder of this study in place of Hungerford and Peyton's (1980) Consumerism component.

In order for EE to be effective in achieving environ-

mental literacy, it is essential to identify and understand those factors which influence an individual's ability and willingness to participate in environmental action. A general goal of this study was to create a research instrument which could be used to increase EE's effectiveness in encouraging environmental action taking behaviors.

Many efforts to study the variables which might impinge upon a citizen's taking action have been based on the belief that if a person is knowledgeable about the importance of a safe and clean environment, or has strong emotional feelings towards the environment, he would take action to resolve some of its problems. Based on this assumption, many EE program objectives have been directed at only knowledge or attitude development (Childress, 1978).

Several studies, however, discredit the hypothesis stated above. Borden and Schettino (1979) administered a test to 530 Purdue University undergraduates. They correlated the variables of environmental knowledge, environmental feeling, verbal commitment and actual commitment to the environment from the test and concluded that those high in affect and knowledge were not necessarily committed to solving environmental problems. Ramsey (1979) found a low correlation between increased knowledge and increased environmental action among eighth graders. Winston (1974) found no significant relationship between increased environmental awareness and environmental action among Chicago high school students. Furthermore, studies by Heberlein (1973), Ramsey and Rickson (1976), and Burrus-Bammel (1978)

also showed the assumption of a linear relationship to be in error.

Hines (1984) conducted an analysis of research on responsible environmental behavior. She found the following variables to be associated with responsible environmental behavior: knowledge of issues, knowledge of action strategies, locus of control, attitudes, verbal commitment, and an individual's sense of responsibility. Sia (1984) investigated responsible environmental behavior variables and found both knowledge of and skill in using environmental action strategies to be strong predictors of responsible environmental behavior.

Studies do seem to indicate the interacting variables affecting a person's environmental action taking behavior to be more complex than first thought (Peyton and Miller, 1980).

Locus of Control and Environmental Action

Locus of Control

One variable which may impinge on an individual's environmental action taking behavior is that person's belief of whether his/her action would be useless. This perceived belief about whether an individual has personal control or non-control of a situation is directly related to locus of control, a psychological construct embodied in Rotter's (1966) Social Learning Theory (SLT). A formula for Rotter's SLT appears in Chapter two.

Rotter's (1966) SLT contains four components: behaviors,

expectancy for reinforcement, value of reinforcement, and the psychological situation. The following definitions and descriptions pertain to these components.

1. Reinforcement -- "anything that has an effect on the occurence, direction or kind of behavior" (Phares, 1976, p. 15).

2. Expectancy for reinforcement -- "the probability held by an individual that a particular reinforcement will occur as a function of a specific behavior on his part in a specific situation or situations" (Rotter, 1954, p. 107).

3. Value of reinforcement -- "the degree of preference for any reinforcement to occur if the possibilities of their occurring were all equal" (Rotter, 1954, p. 107).

4. Psychological situation -- "the total sum of cues that directly affect the expectancies and reinforcement values" (Phares, 1976, p. 17).

A person's locus of control is based on his/her expectancy for reinforcement. Phares (1976) describes locus of control as "determined not just be one's objective past history of reinforcement but also by expectancies generalized from other, related behavior-reinforcement sequences" (p. 16).

Rotter distinquished two perception positions an individual may have with respect to general or specific situations.

> 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, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him... We have labeled this a belief in <u>external control</u>. 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 <u>internal control</u> (Rotter, 1966, p. 1) (emphasis added).

A conceptual summary of the locus of control construct is presented in Chapter two of this study.

Research on locus of control in the past 30 years has shown that interanlly-oriented people behave differently than externally-oriented people across a wide range of situations. Many of those situations are relevant to environmental action. It is possible that a person's willingness and ability to take environmental action will be affected by his/her locus of control. If an individual perceives he/she has some personal control over the outcome of a particular situation, that person could be described as being internal about taking action. On the other hand, if an individual perceives that he/she has little or no control over the outcome of an event, that person could be described as external about taking action. It could also be hypothesized that an internally oriented person might be more likely to take action than an externally oriented person.

Measuring Locus of Control

Research on locus of control originally started with reliance on instruments designed to measure locus of control in general situations. Probably the most widely tested locus of control instrument is Rotter's (1966) Internal-External (I-E) Scale (Appendix A). The scale is designed to measure expectancies across a wide range of situations (Phares, 1976, p. 42).

In recent years, however, there has been a call for the

development of specific scales to help differentiate between internals and externals in specific situations (Rotter, 1975). The first attempt to assess the relationship between locus of control and environmental action using a specific scale was a study done by Smith (1979) using Tomera's (1979) four-item Environmental Locus of Control instrument (ELC). Partial validation for the ELC was achieved through a comparison with Rotter's I-E scale. Its brevity, however, prevented further interpretation of the data. Smith (1979) recommended further research to investigate the relationship of locus of control and environmental action.

Champeau (1982) developed the Perceived Environmental Control Measure (PECM) (Appendix B) to be used as a measurement of locus of control in an environmental action specific situation. High correlations between various groups of his data suggested evidence of construct validity, content validity, and reliability.

Tulman (1983) used the PECM to gather further evidence of construct validity. As a result of his study, limited evidence was found to support the construct validity of the instrument, and he suggested revision of the PECM.

Statement of Problem

The purpose of this study is to determine whether revision of the PECM will produce stronger evidence of the instrument's construct validity. An ancillary study will assess the effect of a college course on students' locus of control.

Significance of Problem

Rotter (1966) developed the locus of control construct to be used in conjunction with other variables to explain and/or predict human social behavior.

Peyton and Miller (1980) reviewed locus of control research and found that the study of locus of control has value in that environmental education training and experience in EE could possibly bring about a change in an individual's locus of control toward internality. Those in the EE community agree that EE's ultimate goal is to develop an environmentally literate citizenry which will take responsible action toward remediating environmental problems. To help bring this about, it would seem worthwhile for educators to better understand the variables impinging on an individual's willingness and ability to take action.

Peyton and Miller (1980) identified and presented the following locus of control generalizations and their implications for EE.

1. Internals more frequently participate in productive action taking than externals.

   ...The relationship between internality and individual action taking has strong implications for EE. Achieving the goals of EE depends on developing individuals willing to initiate positive, rational environmental action taking. In view of the generalizations reported here, this would seem to make internality desirable.

2. Internals differ from externals in their ability to recall relevant material, and in how actively they seek additional information.

...Having greater recall of relevant material and more actively seeking additional information are certainly important abilities for effective environmental problem solving. If it is accurate that becoming more internal leads to increases in the above characteristics (causal relationship), then developing an internal L of C among citizens may be an important goal of EE.

3. Internal individuals are superior to externals in their utilization of information.

...Rational, objective problem solving would be enhanced by an increased ability to accurately apply information. If the relationship between this characteristic and internality is a causal one (i.e., becoming more internal would cause a greater utilization of information), citizens' perception of L of C should be an important consideration of environmental educators.

4. Internal individuals are more resistant to subtle manipulation and are less influenced by high-prestige individuals than externals.

...It is essential that the value positions and credibility of informational sources be carefully assessed when investigating the dimensions of an environmental issue. It seems reasonable to expect internals to be more capable and/or willing to reject information which comes from biased or prestigious, but uninformed sources.

5. Internal individuals exhibit a superior capacity to delay gratification in order to attain greater, long-term gains.

...Solving environmental (and other social) problems, often requires behaviors that sacrifice short-term rewards for the attainment of greater, long-term gains. If EE is to produce citizens capable and willing to adopt behaviors to improve and/or maintain environmental quality, increased internality may be an important part of the process.

6. Internals respond differently to those tasks which they perceive to be skilled-related, than to tasks

they perceive to be chance-related.

...In view of the above findings, it appears important for EE to present citizens with the perception that the outcomes of environmental actions are skill-related and not due entirely to chance events.

7. An individual's perceived L of C is susceptible to change.

...Given that an internal L of C in citizens is accepted as a desired perspective in an environmentally literate individual, it is significant that L of C is responsive to training and experience. The nature and extent of such training to be offered by EE are by no means clear yet. However, the implications seem evident that environmental educators should begin to examine EE curricula and teaching methods to determine how an internal L of C may be best developed in citizens.

The relationship between locus of control and environmental action has been inferred in several research studies, and today efforts are being made to substantiate this supposition. To date, several valid locus of control instruments have been developed to assess individuals' locus of control in specific situations. The PECM attempts to assess environmental action taking behavior and individuals' locus of control. Continued use and revision of the PECM may help to promote additional investigation of the inferred relationship between L of C and environmental activism. A valid instrument could then be used in evaluating EE curricula for potential in developing internality in individuals.

Limitations

Two specific groups of limitations can be identified in

this study: (1) limitations imposed by population variables; (2) limitations imposed by instrument design.

Population Limitations

1. The subjects were limited to undergraduate and graduate students enrolled in an environmental issues course, an upper level geography course, an introductory environmental studies course, and an upper level education course at the University of Wisconsin at Stevens Point.
2. The sample size and characteristic homogeneity of the populations tested were affected by the availability of participants.
3. Due to the lack of random sampling, generalizations resulting from this research can be applied to non-test populations only with extreme caution.

Limitations of Instrument as Designed

1. The instrument was designed to measure an individual's perceived expectancy for personal use of environmental actions. It is possible that a person's perceived expectancy will not reflect actual behavior.
2. In several cases, the wording between two or three statements differed by only one or two words. It is possible respondents may see this as unreasonable repetition, and as a result, this may bring about test fatigue.
3. Strong evidence of instrument validity can only be achieved through continued application of the

instrument. This study only attempts to initiate evidence of instrument validity.

4. The instrument used in this study was not tested against a generalized L of C instrument to determine its potential power in distinquishing between L of C's I, P, and C subscales.

Definition of Terms

1. Environmental Action: A behavior undertaken by an individual or group of individuals intended to resolve an environmental problem. Environmental actions may be classified as (a) persuasion, (b) consumerism (economic action), (c) political action, (d) legal action, (e) ecomanagement, or any combination of the above (Hungerford and Peyton, 1976).
2. Environmental Education: That aspect of man's education that deals with culturally-imposed, ecologically-related problems in man's environment. Further, the acquisition and application of human values as related to the cultural use and misuse of biotic and abiotic resources (Hungerford and Litherland, 1973).
3. Environmental Issue: A problem in the environment that is culturally imposed and ecologically related (Hungerford and Peyton, 1976).
4. Environmentally Literate Citizen: A human being that is aware of, and concerned about the total environment and its associated problems, and who has the knowledge,

attitudes, motivations, commitments, and skills to work individually and collectively toward solutions of current problems and the prevention of new ones (Wilke, 1979).

5. Environmental Problems: The same as environmental issue, above.
6. External Locus of Control: A person's perception that reinforcements are contingent upon chance, luck, fate, or powerful others (Rotter, 1966).
7. Internal Locus of Control: A person's perception that reinforcements are contingent upon his own behavior (Rotter, 1966).
8. Reinforcement: Those things which have an effect on the occurence, direction or kind of behavior (Phares, 1976).

CHAPTER II

REVIEW OF RELATED LITERATURE

Locus of control is proposed as one of several interacting variables which affect the environmental action taking behavior of an individual. Over 600 research articles have been published about locus of control and considerable research continues today, including numerous doctoral dissertations and masters theses (Rotter, 1975).

This chapter will represent a summary of recent locus of control research showing evidence to support the proposal stated above. Discussion will include the following: (1) the theoretical origin of the locus of control concept; (2) techniques used to measure locus of control; and (3) studies indicating a relationship between locus of control and environmental action taking behavior.

Theoretical Origin of Locus of Control

Locus of control as a major psychological theory was first introduced as one of four components of J. B. Rotter's Social Learning Theory (SLT) (Rotter, 1954). The SLT was first theorized in an attempt to explain the social behavior of psychotherapy patients.

Rotter's SLT states that a person's actions are a function of four interacting components: behaviors, expectancy for reinforcement, value of reinforcement, and the psychological situation. Phares (1976) defined "reinforcement" as "anything that has an effect on the occurence, direction, or

kind of behavior." "Value of reinforcement" may be defined as "the degree of preference for any reinforcement to occur if the possibilities of their occuring were all equal" (Rotter, 1954). The "expectancy for reinforcement" is the "probability held by the individual that a particular reinforcement will occur as a function of a specific behavior on his part in a specific situation or situations" (Rotter, 1954).

Figure 2.1 presents a formula outlining Rotter's social learning theory (adapted from Lefcourt, 1976, p. 26). Locus of control is an individual's expectancy for reinforcement. Figure 2.2 presents a conceptual model of the locus of control construct. An explanation of the model follows.

An individual's expectancies can be either specific or general. As a person gains experience with a given set of situations, he acquires a generalized expectancy regarding them (Lefcourt, 1976). As one continues to experience more of the same situation type, his expectancies become more specific.

Rotter (1966) also identified two belief orientations which may occur as a result of an individual's general and/or specific expectancies for reinforcement.

> 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, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him... We have labeled this a belief in <u>external control</u>. 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 <u>internal control</u> (Rotter, 1966, p. 1). (emphasis added)

$$BP_{x,S_1R_a} = (E_{x,R_aS_1} \text{ and } RV_{aS_1})$$

The potential for behavior (x) to occur in situation (1) in relation to reinforcement (a)

is a function of

the expectancy of the occurence of reinforcement (a) following behavior (x) in situation (1)

and

the value of reinforcement (a) in situation (1).

Figure 2.1 Formula and Diagrammatic Representation of Rotter's Social Learning Theory (adapted from Lefcourt, 1976, p. 26).

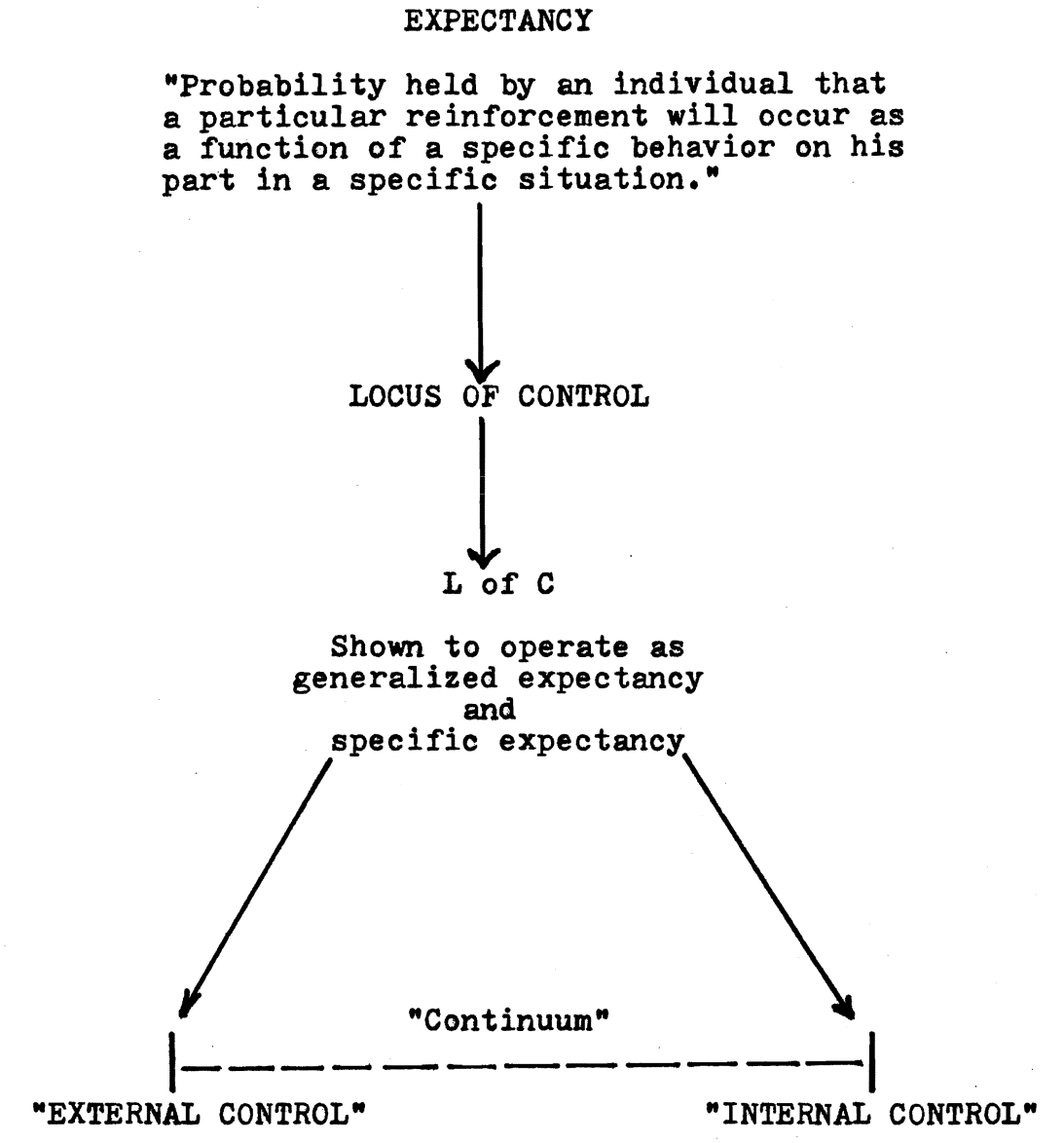

Figure 2.2 Conceptual Summary of the Locus of Control Construct (Champeau, 1982, p. 21).

Locus of control was developed as the result of a specific incident. Psychologists were puzzled by a severely apathetic patient who failed to respond to any stimulus/response treatment. Eventually it became evident that the patient perceived all factors affecting him as coming from outside himself. He didn't perceive any event in his life as being contingent on his own behavior. He was a classic example of an extremely externally-oriented personality (Phares, 1973).

Rotter (1966) also described an individual's locus of control to rest on a continuum, internal resting on one end and external on the other (Figure 2.2). Lefcourt (1976) noted that persons are not entirely internal or external. This is not to imply that locus of control is a trait. Internal and external are terms which describe an individual's perceptions as to who or what controls certain events in his/her life.

Measuring Locus of Control

The instrument used most often to measure locus of control is Rotter's Internal-External Scale (I-E Scale) (Appendix A). It consists of 29 forced-choice items which attempt to sample an individual's beliefs across a broad range of situations. Such situations include government, interpersonal relationships, politics, school and work (Phares, 1976). The I-E scale has been successful in establishing validity of the locus of control construct, and additional efforts have been made to improve and refine

measurement of locus of control. Two improvements relevant to this study are (1) development of situation specific instruments, and (2) distinquishing between different types of externals.

Generalized vs. Situation Specific Measures of Locus of Control

Rotter's I-E scale samples beliefs across a wide range of situations, so it is a generalized expectancy scale. An instrument designed to measure expectancy in one content area such as environmental action would serve as a situation specific scale (Phares, 1976).

Expectancy prediction in a large number of different situations would be at a low level with a generalized expectancy scale. (Lefcourt, 1966; Phares, 1976; Rotter, 1975) More accurate predictions could be measured by a situation specific scale designed for the particular situation in mind. If the researcher wishes to measure locus of control of a homogeneous set of situations, a situation specific scale would be justified. On the other hand, if the goal is to measure locus of control across a wide variety of situations, a generalized expectancy scale should be utilized.

Research has shown support for the postulation that a specific situation locus of control instrument produces more refined predictions in a particular situation than a generalized locus of control scale for that same situation.

Donovan and O'Leary (1978) were able to distinquish between alcoholics and non-alcoholics using a situation specific instrument addressed to drinking related behavior.

Their use of Rotter's I-E scale (generalized expectancy) reported no difference between the populations.

Wallston, Maides, and Wallston (1976) designed a health related locus of control scale to be used against Rotter's I-E scale in predicting the relationship between internality and health behaviors. College students were given a written message about the dangers of hypertension. Then, while waiting in a room which had a number of medical pamphlets, internal students were seen to pick up and read significantly more hypertension pamphlets than the external students.

In a second study by Wallston et al. (1976) 22 overweight women were randomly assigned to one of two weight loss programs: an internally oriented self-directed treatment or an externally oriented group treatment.

Significant interactions were noted between the women's scores on a special Health Locus of Control measure and the satisfaction gained from their program results. Those internally-oriented women in a self-directed program showed more satisfaction than those assigned to the group program. Externally-oriented women were more pleased with the group program than the self-directed. Rotter's I-E scale scores for the same women didn't indicate any difference in perceived satisfaction between the two treatments.

Taking into account the research cited above, it would seem that a generalized locus of control measure such as Rotter's I-E scale has limited utility in predicting behavior in specific situations.

Dimensionality of Locus of Control

Based on factor analyses of his 1966 data, Rotter asserted that the I-E scale represented a unidimensional trait. It measures the degree to which people perceive they have control over their own lives (internal) or the degree to which they feel the events in their lives are a result of fate, chance, or powerful others (external). However, several studies suggest that I-E functions as a multi-dimensional construct rather than a unidimensional one.

Gurin, Gurin, Lao and Beattie (1969) reported two factors delineated in their study, labeled control ideology and personal control. Control ideology refers to a person's belief in how internal and external forces determine one's success in society overall. Personal control considers the individual's attitude toward himself.

Gurin et al. (1969) pointed out that contrary to Rotter's assertion, many people face external forces not related to chance. External forces may be perceived as operating systematically, as in instances of racial discrimination and abject poverty (Lao, 1970). Hersch and Scheibe (1967) agreed with Rotter that internals represent a generally homogeneous group, but felt this way about externals.

> One may be an external individual because he is in fact physically or intellectually weak in relation to those around him. On the other hand, a person may describe himself as an external because he is in a highly competitive social situation, where the actions of others may have a great relevance for the success of his own efforts. Both of these situations may be described as simultaneously realistic and pessimistic (p. 613).

Hersch and Scheibe (1967) also reported other conditions which could suggest an external orientation, such as feelings of persecution and a belief in fate. Davis and Davis (1972) and Collins (1974) made similar arguments.

After the Gurin study, several other researchers evaluated Rotter's assessment of the I-E unidimensionality. Mirels (1970) found two elements in Rotter's instrument which he suggested could be used as subscales in their own right. One subscale was identified as a person's inclination to give more or less importance to one's ability over luck as determining influence in one's life. Called individual control, this factor is comparable to Gurin et al.'s (1969) control ideology factor.

Mirels' second factor, the socio/politcal factor, assesses an individual's perception that citizens can influence political and global matters. Mirels noted that not one of the statements related to this factor was worded in the first person. Dixon, McKee and McRae (1976) noted this and asserted that the wording of the items significantly affect a respondent's reaction to test instruments. Abrahamson, Schludermann and Schludermann (1973) duplicated the study by Mirels and related similar results.

Levenson's I, P, C Scales

The recognition of locus of control's multidimensionality is important because it adds predictive and discriminative power to the concept. Eventually, researchers created new scales based on this concept of a multidimensional locus of

control construct. Hannah Levenson (1973a) has probably been the most influential having devised the IPC instrument.

Levenson (1972b) proposed her scale to consist of three independent subscales: Internal (I), Powerful Others (P), and Chance (C). Powerful Others and Chance represent two separate external control beliefs. Her rationale for distinquishing two external scales was that people who believe in luck or fate (chance-oriented) would behave differently than those who believe that certain others (powerful others) are in control of events in their lives. In the case of powerful others, a potential for externals to become more internal exists (Levenson, 1974).

In factor analyses done on a population of college males (N=239) and a population of psychiatric patients (N=165), the internal, powerful others, and chance factors accounted for 60% of the variance with almost no overlap of the items on the factors (Levenson, 1973b).

Another study done by Walkey (1979) administered to 71 male and 85 female college students showed support of the three-factor structure of Levenson's scale.

To test the I, P, C scale in relationship to anti-pollution behavior, Levenson (1972a) studied a population of 96 adults. Results showed those scoring high on both the I and P subscales were significantly more active than those scoring high on the C subscale. She reasoned that the perception of control by powerful others didn't necessarily diminish activism because the potential for control still exists.

Levenson also found IPC factors functioning differentially among prison inmates (Levenson, 1974) and among psychiatric patients (Levenson, 1973b).

Levenson's refinement of the I-E scale into the tripartite I, P, C division has been justified in a number of studies. If those who believe in powerful others differ in cognitive and behavioral outcomes from chance oriented people, it would prove worthwhile to apply these belief systems toward environmental action taking behavior. A more sensitive analysis of the proposed relationship between locus of control and environmental activism would be more revealing than the use of the unidimensional I-E approach.

Relationship Between Locus of Control and Environmental Action

An ample amount of research has assessed locus of control over a variety of ages and subject areas. The data indicate that there is differential behavior between internally and externally oriented subjects. For example, Lefcourt and Wine (1969) observed internals to notice more unique items in unfamiliar surroundings, indicating a higher alertness to environmental cues. Cromwell, Rosenthal, Shakow and Kahn (1961) observed internals to do better in reaction-time tasks under autonomous conditions. Pines and Julian (1972) reported internals to be affected by the informational demands of a situation, whereas externals were more keyed into the social conditions.

Liverant and Scodel (1960) reported that internals utilize

different betting strategies than externals, depending on whether the situation involved skill or not.

Abramowitz (1973) proposed that a person being more of an internal nature should increase the potential for behaviors aimed at changing certain conditions in that person's surroundings. Supporting this, several research efforts have shown evidence of a correlation between internal orientation and four pertinent environmental action taking behaviors: delay of gratification, resistance to authority and manipulation, information seeking and use, and activism. Peyton and Miller (1980) described these four behaviors and three others in a report supporting locus of control research and its implications for environmental education. Their generalizations were summarized in Chapter one of this study.

Delay of Gratification

Due to their complex nature, the resolution of many environmental issues often requires long periods of time to pass before certain goals are achieved. Peyton and Miller (1980) pointed out that often short-term rewards must be sacrificed to achieve the long-term gains.

Delay of gratification is a phrase which refers to a person's willingness to forego small immediate rewards for the larger rewards of the future. Environmentally active people often find themselves in such a position. For example, opponents to Connecticut's interstate highway I-291 have battled now for over 25 years, often rejecting jobs for their community and profits from home sales in lieu of keeping a

tract of forest unspoiled for the future.

Research has indicated that internals are more likely to exhibit such behavior. Walls and Miller (1970) described rehabilitation clients, significantly more internal than welfare clients in an experimental setting, as willing to wait two months to receive a small monetary reward. Roughtly half of the welfare clients were willing to wait the two months; the other half wanted payment right away or only after a one month delay.

Erikson and Roberts (1971) did a study in which a majority of internally oriented juvenile delinquents preferred to wait six months for release from a detention house in order to have fewer restrictions. Most external subjects chose release in one week's time with no lessening in restrictions.

Lefcourt (1976) summarizes the relationship between locus of control and delay of gratification:

> "It is plausible to assume that internals are more accustomed than are externals to engaging in the execution of long-range plans. The very process of planning and working for distant goals would only seem to be sufferable if the individual believed that he was able to determine the results of his own efforts" (p. 72).

Resistance to Authority and Manipulation

An important part of the environmental education process is the use of investigation and evaluation skills to guide the development of a conceptual awareness concerning environmental issues. This is outlined in the Goals for Curriculum Development in Environmental Education (Hungerford, Peyton and Wilke, 1980) and described in Chapter one. Inherent

in an environmentally active individual will be the need to carefully consider different value positions for possible bias, such as the subtle manipulation used in advertising. This would be especially prevelant in consumerism (economic action), a component of the Environmental Action Paradigm (Hungerford and Peyton, 1976).

Research has shown internals to be less responsive to subtle manipulation than externals. In three studies (Getter, 1963; Gore, 1962; Strickland, 1970), subjects were asked to express their opinions on various issues. In the cases where the experimenter expressed his opinions subtly, internals were more resistant to his suggestions and expressed more independent opinions than the externals did. In the cases when the experimenter's opinion was stated blatantly, the difference between internals and externals was less significant.

Just as important as the type of manipulation is the nature of the source itself. Research has shown the news media to be very dependent upon official sources, whether they be governmental, industrial or organizational. Witt (1974) conducted a survey of newspaper reporters responsible for environmental articles. Over 90% replied that they relied on agencies of business, government and environmental organizations as their primary sources. Bowman (1978) did a similar study which suggested that environmental reporters took more initiative in gathering evidence for their stories, but still gave a lot of weight to "official" sources.

Ritchie and Phares (1969) hypothesized externals to be more conforming than internals. In a study involving 84 males, each subject was asked to fill out a questionnaire prior to and after they listened to the opinions of either a "high government official" or a college undergraduate. Those previously diagnosed as external showed a wide difference in susceptibility to influence attempts based on whether the source was of low or high prestige. The internals showed no apparent susceptibility.

Information Seeking and Use

Both Peyton and Miller (1980) and the Goals for Curriculum Development in Environmental Education (Hungerford, Peyton and Wilke, 1980) either profess or imply that the seeking of information is important in effectively solving environmental problems. Effective use of acquired information could be a decisive aspect of the persuasion and political action components of the Environmental Action Paradigm (Hungerford and Peyton, 1976).

In a 1963 study, Seeman investigated 85 inmates and their use of information. Provided with information concerning parole, long-range opportunities for inmates, and the current reformatory situations, internals were found to more highly value the information regarding parole and to recall more of the information than externals.

Seeman and Evans (1962) did a study of tuberculosis patients and found internally oriented patients to more frequently question the truthfulness of their doctors' infor-

mation then externals. The internals also sought more outside informational sources.

In the Wallston, Maides and Wallston (1976) study on hypertension discussed earlier in this chapter, after reading a written message on the dangers of hypertension, internal subjects were observed reading more informational pamphlets on hypertension than externals.

In cases where subjects seek out information in order to influence others, Phares (1965) found internal students to be more effective in influencing opinions about college life than externals. In a study by Davis and Phares (1967), the task was to influence views on the Vietnam War. Neither the internal nor external subjects were more effective in influencing opinions, but the internals did seek out more information about the people they were trying to influence than did the externals.

Activism

Most important to this study is whether there is a link between locus of control and the willingness of people to partake in social and/or political action. Research shows a strong correlation between activism and an internal orientation.

The civil rights movement, which can be likened to environmental action, has been researched by Gore and Rotter (1963). Their study described internal black students to be more likely to verbally commit themselves to the civil rights movement than externals. Strickland (1965) reported internal

black college students to demonstrate significantly more behavioral commitments than externals.

Similar studies have shown analogous results. Sanger and Alker (1972) and Pawlicki and Almquist (1973) both concluded there was a positive correlation between internality and membership in women's rights groups. Hoffman (1978) reported a positive relationship between internality and involvement in the United Farm Workers Organization.

Rosen and Salling (1971) reported that internal college students were more politically active than their external classmates. Cox (1980) explored the political behavior of persons 55 or older. Those who were more external were more likely to have attitudes of political dissatisfaction and political inadequacy.

Arbuthnot (1977) developed a study to examine the characteristics of persons known to use a recycling center (N=85) with those who did not use the center (N=60 conservative rural church members). Internal belief was found to be one of the four best predictors of the use of the recycling center. Locus of control was found by Tucker (1978) to be an important variable in differentiating between members of the Audubon Society and the Sierra Club from the general public. The former showed a greater tendency toward environmental responsibility. Locus of control used in conjunction with other variables proved to be an effective discriminator of environmental responsibility in the general population.

Levenson (1972a) conducted a locus of control study with

96 adults in an attempt to correlate their scores with anti-pollution behaviors. As in previous research, there appeared to be a definite link between internality and actual pro-environmental behavior.

Integration of Locus of Control and Environmental Action Theory

As the studies cited above indicate, locus of control is an important variable when predicting environmental behavior. In addition to their list of locus of control implications for environmental education, Peyton and Miller (1980) presented a model which attempts to relate some variables and processes which can bring about environmental action taking behavior (Figure 2.3). Labeled "Anatomy of an Environmental Behavior", the model incorporates the locus of control construct as an impinging variable on environmental action. This model analyzes those factors involved in the writing of a letter about the Alaskan Land Bill. Peyton and Miller explain the model as follows:

> The left side of the model included those impinging variables (knowledge and experiences), beliefs (B_1 and B_2), and attitudes (A_1), which EE has traditionally dealt with. More recently EE literature has encouraged, including a knowledge of, and experiences with, environmental problem solving as reflected by the impinging variable on the upper right side of the model... in addition, L of C implies that other beliefs (B_3 and B_4) and attitudes (A_2) are important considerations in bringing about a specific environmental action.
>
> The processes involved as precursors to an environmental action are implied by the frame of reference component. The paradigm assumes that a citizen has a frame of reference which reflects all past learning experiences, values, beliefs, and attitudes, and which serves to process any new knowledge and/or experience. Some of this new input is modified to "fit" into the existing frame of reference (assimilation). In other cases, the frame of reference itself is adjusted to

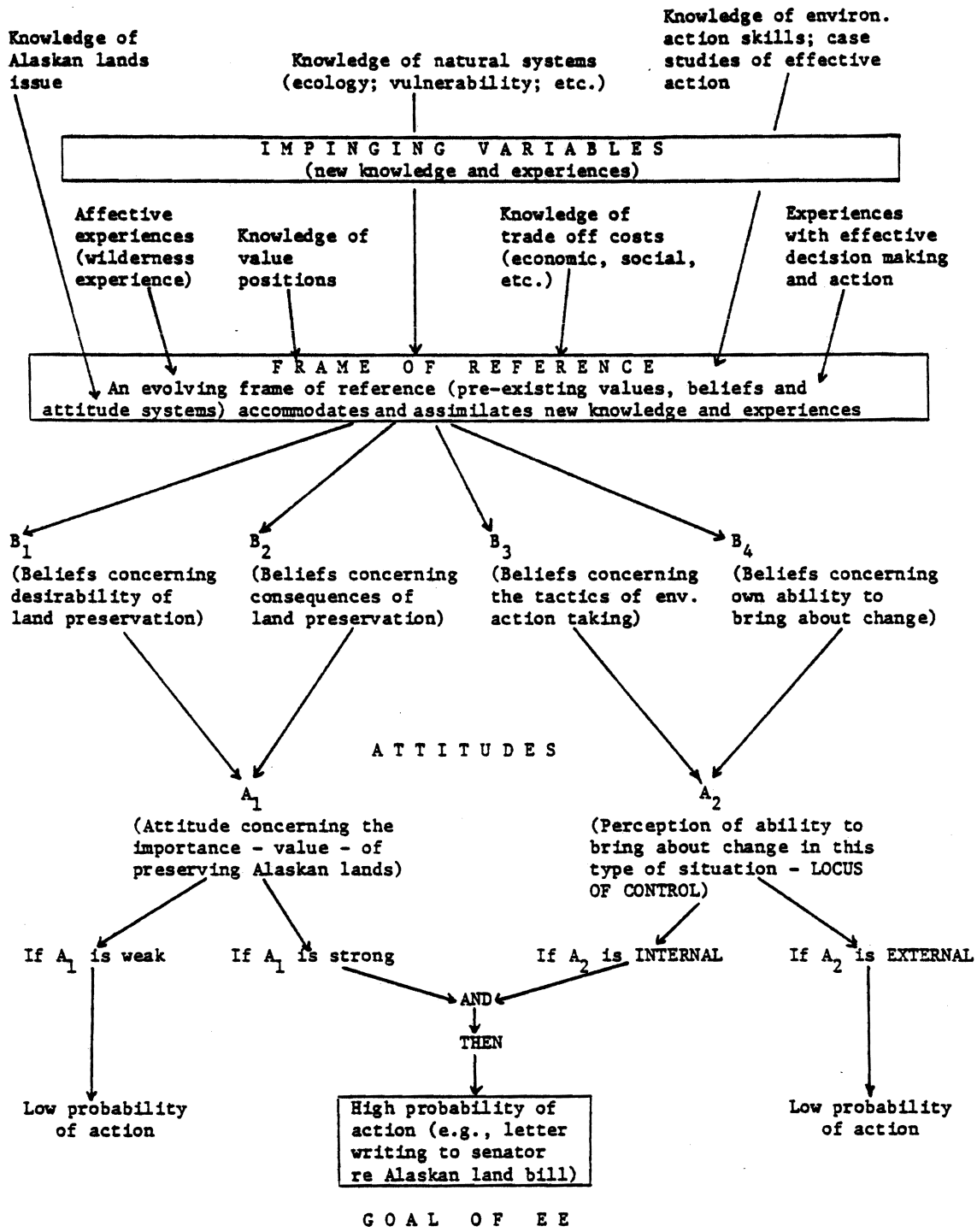

Figure 2.3 Anatomy of an Environmental Behavior (Peyton and Miller, 1980).

> accept new perspectives (accomodation). The result is a constantly evolving frame of reference comprised of new beliefs and attitude systems prevailing at any given time will determine the types of behaviors, if any, that are engaged in (pp. 183-185).

Tomera (1979) devised the Environmental Locus of Control instrument (ELC), made up of 4 forced-choice items. Smith (1979) conducted a study to validate the ELC by administering it along with Rotter's (1966) I-E scale and Bluhm's (1979) Environmental Action Questionnaire (EAQ). In an attempt to explore the relationship that might exist between locus of control and a measure of environmental participation, the three instruments were given to the following four groups: in-service elementary teachers (N=21), pre-service elementary teachers (N=17), environmental interpretation students in college (N=22), and environmental education college students (N=43).

The results of Smith's study showed that the environmental education students perceived themselves to be more involved in environmental behavior than the other three groups. The other groups' scores showed no significant differences. These findings supported those reported by Bluhm's (1979) study assessing environmental activism among various groups.

Further analysis of Smith's data showed significant correlations between three of the groups on the Rotter I-E scale and the ELC. Smith inferred, based on these findings, that both instruments were measuring the same construct. It was not clear, however, whether the ELC actually measured the locus of control construct with respect to environmental action. The fact that the ELC's correlation with the EAQ

was only r = .331, and that it correlated with only the environmental education group would indicate that the ELC has little predictive power regarding environmental behavior.

The ELC's validity and reliability were seriously questioned since item and/or whole test reliabilities were low. Test-retest scores obtained from a one-month time gap revealed reliabilities of .068 (N=17) and .438 (N=23). Smith hypothesized that the ELC may be too brief. She also stated that there was the possibility that some of the environmental education students may have already been exposed to the locus of control theory prior to taking the questionnaire. Due to these indecisive findings, Smith (1979) strongly recommended that further attempts be made to develop a more valid and reliable locus of control scale specific to environmental behavior.

In 1980, Miller studied Youth Conservation Corps (YCC) participants to see if their experience had an effect on their locus of control. Levenson's IPC scales were used to measure participants' locus of control before and after their experience. The results showed no indication that the participants' locus of control was affected by their YCC experience. However, positive correlations were found between internality and the number of environmental actions reportedly taken. Based on these findings, Miller recommended the creation of a locus of control instrument specific to environmental action taking so the locus of control relationship to environmental behavior might be more extensively explored.

The Perceived Environmental Control Measure

Champeau (1982) devised a situation specific locus of control questionnaire called the Perceived Environmental Control Measure (PECM) (Appendix B). After two pilot studies utilizing a 150-item pool, the final 45-item instrument was developed.

The PECM consists of three sections. The first section is a summary of an environmental issue. After reading the summary, subjects are asked to respond to the 45 items in Section II. The respondents are asked to consider the situation as if it were a real part of their life, and as if they were personally involved in it.

Champeau included a third section not intended to remain a permanent section of the PECM. Section III, the Citizen Action Questionnaire, was used to validate the locus of control instrument by measuring each respondent's actual-perceived environmental behavior.

Champeau administered the PECM to the following four participant groups: undergraduates in an introductory environmental issues course (N=81), undergraduates in an introductory biology course for non-science majors (N=78), members of the Michigan State University/Central Michigan Sierra Club (N=10), and K-9 teachers in the western Michigan area (N=51). Cronback's alpha reliability coefficients were calculated to measure the PECM's internal consistency. Champeau's 54 coefficients based on total PECM scores and various subscale scores were all higher than .8500; 25 of those

coefficients were greater than .9500. From these results, Champeau concluded the PECM, as a whole and within its various subscales, had high internal consistency. Champeau achieved content validity using two criteria established by Nunnally (1978). They are the use of item pools to select final items with a specific set of objectives and high item subscale and/or item total correlations.

To assess construct validity, Champeau calculated Pearson Product-Moment correlations between the PECM, its various subscales and the Citizen Action Questionnaire. He hypothesized that if a subject's score showed him/her to be of an internal orientation, there should be a significant correlation with that same respondent's citizen action score. If the PECM truly measured the locus of control construct, then the internals should show a corresponding increase in actual-perceived environmental activity. His data tended to support this. Of 48 Pearson Product-Moment correlations, all were in the hypothesized direction, and 37 were significant statistically.

In light of these findings, Champeau still recommended that further research utilizing the PECM be done to help refine it.

Tulman (1983) conducted a study to gather more data on the PECM's construct validity and to investigate the potential influence of social desirability on subjects' responses. To assess whether the PECM was prone to eliciting socially desirable responses, Tulman added the Marlowe-Crowne Social

Desirability Scale (MCSDS) as a fourth section to the PECM. This version of the PECM was then administered to the following three groups: college students in an introductory psychology course (N=38), college students in an environmental interpretation course (N=45), and members of the Central Wisconsin chapter of the Audubon Society (N=54).

Correlating data from the PECM with the MCSDS yielded only one low ($r = -.372$) significant relationship out of nine comparisons. From this Tulman concluded that the variable measured by the PECM was relatively uninfluenced by social desirability. However, an analysis of the data pertaining to the construct validity of the PECM was not as conclusive. In comparing each of the three groups' action scores with their I, P, and C scores, only three correlations out of nine were statistically significant. In each of those three cases, it was the Audubon group which showed the significant correlations. Tulman suggested that factors other than locus of control may have influenced this outcome. Constraints of time and financial resources may have limited the abilities and/or opportunities for the college students to participate in environmental action. Based on the evidence of his research, Tulman could not support the strong relationship Champeau found between the PECM and citizen/environmental action. He did, however, advise that comparisons made between his study and Champeau's be interpreted with caution.

Tulman (1983) made several recommendations, one of which was to develop a generalized environmental locus of control

instrument not utilizing a specific environmental issue summary.

Literature Review Summary

The concept of locus of control stems from Rotter's (1954) social learning theory in which locus of control constitutes a personality dimension used in interpreting and predicting behavior. Placed on a continuum, internals at one end generally perceive events in their lives as being a result of their own actions. Externals, on the other end, perceive events as being the result of chance, luck, or more powerful others.

A significant amount of research has indicated the locus of control concept may be one of many variables which has an effect on the environmental action taking behavior of a person. Internals appear to have a greater tendency to exhibit delay of gratification (Walls and Miller, 1970; Strickland, 1973), to resist authority and subtle manipulation (Gore, 1962; Getter, 1963; Crowne and Liverant, 1963), to seek out and make better use of information (Seeman, 1963; Seeman and Evans, 1962; Phares, 1965), and to participate in more environmental remediation activities than do externals. Consequently, locus of control research findings may have implications for the design of more effective environmental education programs.

Research shows the possible relationship of locus of control and environmental action to be based on the use of generalized instruments. On recommendations, locus of control researchers have made moves to create situation specific

locus of control measures. Moving from general personality or general situations scales to specific scales has apparently added to the instrument's predictive power.

Recently, Champeau (1982) developed the Perceived Environmental Control Measure (PECM). This situation specific measure related to environmental action taking behavior was modeled after Levenson's (1973a) IPC scale in its use of three independent subscales. Champeau reported initial evidence of reliability, content validity, and construct validity. While the PECM shows promise, more data and refinement are needed. Incorporating refinements into the PECM to further explore locus of control's relationship to environmental action taking behavior is the major purpose of this study.

CHAPTER III

RESEARCH PROCEDURES

The purpose of this study was to construct a Locus of Control (L of C) instrument which could be used to measure the perceived expectancy of an individual for taking specific types of environmental action in a generally stated situation. This instrument was also tested for evidence of reliability and validity. The instrument designed in this study is modeled after Champeau's (1982) Perceived Environmental Control Measure (PECM) (Appendix B) and is thus named the Revised Perceived Environmental Control Measure (RPECM) (Appendix D).

This chapter describes procedures used in instrument design, pilot and field testing of the instrument, and methods used for data analysis.

Instrument Design

The final RPECM is composed of two major sections. The first section contains the RPECM statements. The second section contains questions on the extent and types of environmental actions actually taken by the respondent. Collection of data in the second section was necessary to assess construct validity of the RPECM.

Rationale for content development and inclusion of each section is presented below.

Section I - RPECM Statements

Section I of the RPECM is designed to measure the

"expectancy" for reinforcement (i.e., desired outcome), the final component of Rotter's SLT, through the use of various environmental actions. In order to get respondents thinking in the proper context for completing the instrument, a brief preface regarding environmental concern preceded the L of C statements. As they read through each statement pertaining to environmental issues, they were asked to consider each statement as though it were a real part of their lives.

Item Content and Scale Construction of the RPECM

Initially, an item pool was developed with 120 statements; forty each in three L of C belief orientations - Internal (I), Powerful Others (P), and Chance (C). These belief orientations were applied equally across five environmental action categories - ecomanagement, economic action, legal action, political action, and persuasive action. (Environmental action categories are defined in Chapter one.)

Examples of I, P, and C statements as they related to one of the five environmental action categories are presented in Figure 3.1. Letters in the parentheses indicate the belief orientation of I, P, or C.

Use of the tripartite division of I, P, C allows the instrument to be more sensitive to the different external orientations as identified by Levenson (1972b). Wording the expectancy statements toward environmental action allows the instrument to address specific types of environmental action behaviors in general situations.

Figure 3.1 Examples of Internal (I), Powerful Others (P), and Chance (C) statements as they relate to Legal Action.

LEGAL ACTION: Any legal/judiciary action taken by an individual and/or organization which is aimed at some aspect of environmental law enforcement or, a legal restraint preceding some environmental behavior perceived as undesirable, e.g., lawsuits, injunctions, etc.

(I) The legal testimony I could give on an environmental issue would help to influence the decisions made on the issue.

(P) Any legal action I could pursue would be of little value in maintaining a quality environment because such actions are only effective when employed by a few key individuals.

(C) If I were to report the violation of an environmental law, it would really be a coincidence if the violator was charged with the violation.

RPECM Scale Construction

A six-point Likert-type scale was used to quantify responses to RPECM statements. Researchers support the use of a Likert-type format in measuring attitudes or beliefs. Oppenheim (1966) states that the Likert scale tends to yield "good" reliability due to the wide range of answers permitted to respondents. Millward (1975, p. 50 in Burrus-Bammel, 1978, p. 44) states that Likert-type scales are "valid and reliable in measuring attitudes towards a variety of environmental topics."

Scoring the RPECM

In the RPECM, the I items are written in the internal direction and items in the P and C scales are written in the external direction.

The P and C items were scored by the following key:

Disagree strongly = 1
Disagree somewhat = 2
Disagree slightly = 3
Agree slightly = 4
Agree somewhat = 5
Agree strongly = 6

The I items were scored by the following key:

Disagree strongly = 6
Disagree somewhat = 5
Disagree slightly = 4
Agree slightly = 3
Agree somewhat = 2
Agree strongly = 1

The I item scoring is reversed from P and C scoring so that all three scales reflect a common direction with regard to the internal and external continuum. A relatively high score on the I items will reflect a low belief in that orientation; a relatively low score on the I items will reflect

a high belief in that orientation. A relatively high score on P or C items will reflect a high belief in those orientations, whereas a relatively low score on P and C items reflects a lack of belief in those orientations.

Analysis of data from Likert-type scales is usually based on summated scores. The final RPECM contains 45 - I, P, C items divided equally across the five categories of environmental action. Three scoring systems were utilized: I, P, and C scores summed across all environmental action categories; combined I+P+C scores for each environmental action category; and combined I+P+C scores summed across all environmental action categories.

Table 3.1 presents the number of items and range of scores for the scoring system that recognized I, P, and C scores summed across all environmental action categories (total I, P, or C score). The range of each score falls between 15 (internal direction) and 90 (external direction). This differentiates between the P and C of the external orientation.

The second scoring system used was the combined I+P+C scores for each individual in each action category. Five scores were calculated for each individual. Table 3.2 presents the number of items involved and the range of scores. This scoring system works well with the L of C unidimensional approach. Differentiation between different external (P and C) orientations are not considered. A relatively low score would reflect an internal orientation toward the particular action

Table 3.1 Number of Items and Range of Scores for Total I, P, and C Variables in the RPECM.

Variable	Total Number of Items	Range of Scores Internal	External
Internal Score (I)	15=3 I's (5 action categories)	15---------90	
Powerful Others (P) Score	15=3 P's (5 action categories)	15---------90	
Chance Score (C)	15=3 C's (5 action categories)	15---------90	
	45 Total Items		

Table 3.2 Number of Items and Range of Scores for Total Action Category Variables in the RPECM.

Variable	Total Number of Items	Range of Scores Internal External
Ecomanagement Score	9=(3I + 3P + 3C)	9----------54
Economic Action Score	9=(3I + 3P + 3C)	9----------54
Legal Action Score	9=(3I + 3P + 3C)	9----------54
Political Action Score	9=(3I + 3P + 3C)	9----------54
Persuasive Action Score	9=(3I + 3P + 3C)	9----------54
	45 Total Items	

category the score represents.

The third scoring system utilized is the combined I+P+C scored across all action categories (i.e., total score). The number of items involved and the possible range of scores are presented in Table 3.3. With this system each respondent receives only one score for the entire RPECM. A relatively low total score might be interpreted to reflect internality toward taking environmental action in general; a relatively high score might reflect externality toward taking environmental action in general.

Section II - Citizen Action Questions

The second section of the RPECM consists of questions designed to assess an individual's actual-perceived use of ecomanagement, economic, legal, political and persuasive actions. It is included in this study to test for evidence of construct validity. Theoretically those who score internal on the RPECM should also score relatively high on the citizen action questions.

Scoring Citizen Action Questions

One summated score was used to quantify the action taking reported by each respondent. An individual's final citizen score could range from 0 to 121 points.

Each subject was asked to state the number of times he/she had taken action within the last two years. Each action cited was worth one point, and a maximum of six was allowed. An example (Part A) is presented below.

Table 3.3 Number of Items and Range of Scores for Total RPECM Scores.

Variable	Total Number of Items	Range of Scores Internal	External
Total Score	45=15I + 15P + 15C 45 Total Items	45	45--------270

How many times during the past two (2) years have you...

A) ...been involved in filing a lawsuit or filing for an injunction concerning some issue?

2 (no. of times)

B) ...(Please list up to three (3) topics of such injunctions/lawsuits below.)

1. company dumping waste into river
2. _____
3. _____

In the above case, the individual received two points. A response of eight would have received the maximum of six points. For no response, zero points are received.

As a further check on activism, subjects were asked to list up to three examples of action they had taken (Part B above). Two points were received for each example they listed. In the above example, the individual receives two points. If no activities were listed, zero points would be received.

In the final two citizen action questions of Section II, the respondent was asked to place a check mark in front of each activity he/she had participated in. The two questions are restated below.

Have you used your right to vote in an attempt to improve situations (issues) about which you are concerned?

✓ Yes _____ No

Please place a check mark (✓) in front of each activity you have participated in over the last two (2) years.

1. _____ I have picked up litter and/or organized a litter campaign.

2. ✓ I have taken steps to reduce energy consumption.

3. _____ I have avoided the purchase of a product because of its negative effect on the environment.

4. ✓ I have taken steps to reduce my water consumption.

5. _____ I have recycled paper, glass, metals, and/or organic refuse.

6. _____ I have participated in a habitat improvement project (e.g., planting shrubs for wildlife, putting up birdhouses, stream renovation).

The respondent receives one point for checking "yes" to using the "right to vote." A "no" response receives zero points. In the second question each statement checked is worth one point. A maximum score for this question would be six points.

Validity and Reliability of the RPECM

Establishing Evidence of Content Validity

In order to establish initial evidence of content validity for the RPECM, two approaches were used. First, the item pool was developed based on a set of objectives. Second, items selected from the pool for the final instrument were based on relatively high item subscale and item total correlations.

The development of the RPECM items was based on I, P, C locus of control orientations applied to five categories of environmental action (i.e., ecomanagement, economic, legal, political and persuasive action). The specific objectives are presented below.

1. Items in the I-Scale were constructed to elicit responses which measure the degree to which an individual perceives his/her own use of an environmental action will have an effect, or control, the outcome of a stated situation.

2. Items in the P-Scale were constructed to elicit responses which measure the degree to which an individual perceives powerful others, more than his/her own use of an environmental action, will control or have an effect on the outcome of a stated situation.

3. Items in the C-Scale were constructed to elicit responses which measure the degree to which an individual perceives chance or fate, more than his/her own use of an environmental action, will control or have an effect on the outcome of a stated situation.

Based on these objectives, an item pool of 120 statements was developed. Through a pilot study item total correlations (how well an item score correlated with the total test score) were calculated. Items with relatively high item total correlations ($r \geq .500$) were retained for the final RPECM. This method is recommended by Nunnally (1978), Tuckman (1978), and Oppenheim (1966). It should yield a measure with a set of items that measure something in common. This measure supports evidence of content validity.

Establishing Evidence of Construct Validity

Borg and Gall define construct validity as "the extent to which a particular test can be shown to measure a hypothetical construct" (1979, p. 216).

As discussed in Chapter two, research has shown a degree of relationship between internality and environmental action taking behavior. Theoretically, these findings should show up with the RPECM. The more action taking an individual is involved in, the more internal he/she should score on the RPECM. To investigate this, scores on Section II, a series of citizen action questions, were correlated with RPECM scores. To provide evidence of construct validity those individuals who scored internal on the RPECM should also score relatively high on the questions regarding perceived use of the various environmental actions.

Establishing Reliability of the RPECM

The method used for establishing reliability was Cronback's alpha which yields a reliability coefficient based on average correlations among items within the instrument. Nunnally (1978) has recommended that this type of reliability test should be applied to all new measurement methods.

Pilot Study

Initially, a RPECM item pool was developed and a pilot study run for the purpose of analyzing and selecting valid and reliable items for the final instrument.

A validity panel was selected to study the item pool and

make suggestions for content improvement. The panel consisted of four professional environmental educators, each familiar with both locus of control orientations and the environmental action categories.

A list of the 120 statements and a score sheet were mailed to the panel members. Each panel member was asked to do two things: first, they were to determine which L of C orientation each statement best represented, and second, to determine which environmental action category each item expressed. Each member was provided with definitions of the action categories and the set of objectives on which the item pool was developed.

Each score sheet was returned and results compared. If three of the four panel members agreed on both the L of C orientation and the environmental action category for each statement, that item was retained for the pilot instrument. The results of the comparison reduced the item pool from 120 items down to 88. These 88 statements made up Section I of the pilot RPECM instrument (Appendix C). The I, P, C statements were randomly arranged using a random number table.

Two objectives set for the pilot study were: (1) to analyze and select reliable items for the final RPECM, and (2) to test the RPECM for evidence of construct validity.

The instrument developed for the pilot study had the same format as the final RPECM with the exception of having more RPECM statements.

The pilot instrument was administered to a sample of

undergraduate and graduate forestry students at the University of Wisconsin-Stevens Point (N=118). The class was selected based on size and availability. Reliability coefficients of the I, P, C scoring variables were .93, .95, and .95, respectively. Results of the pilot study are presented in Chapter IV. Based on this supporting evidence, the RPECM was revised and field tested for additional evidence of reliability and validity.

Field Testing the RPECM

The RPECM developed from the pilot study was subjected to eight field tests, four pre-tests and four post-tests. The purpose of the field tests was to estimate instrument validity and reliability, to further explore the relationship which might exist between perceived environmental action taking and L of C, and to discern if there is a change in a group's L of C as a result of participation in an environmental issue investigation course which teaches environmental action taking skills.

This section presents a description of the final RPECM, the four groups it was administered to, and the research questions which were posed.

Description of the RPECM

The RPECM used in the field tests was of a similar format to the pilot instrument; however, the final instrument consisted of only 45 I, P, C items rather than 88 (Appendix D).

Sample Sources and Procedures for Data Collection

Field testing of the RPECM involved four groups of participants from the University of Wisconsin-Stevens Point: (1) undergraduate and graduate students in an environmental issues investigation course; (2) undergraduate and graduate students in an upper level geography course; (3) undergraduate and graduate students in an introductory environmental studies course for education majors; and (4) undergraduate and graduate students in an upper level education course.

Each group was administered the pre-test during the first week of spring semester classes and the post-test (the same instrument again) during the final examination week of that same semester. Time was given so each student could fill out the instrument in class and return it upon completion.

Group I: This group consisted of undergraduate and graduate students enrolled in a course entitled "Community Environmental Issue Investigation" (N=20). The course analyzes environmental issues and problems through the use of problem solving strategies and is required for the environmental education/interpretation minor. Students in the course represent juniors, seniors and graduates in the field of resource management. This class was the focus of a research question to be stated in the next section.

Group II: This group consisted of undergraduate and graduate students enrolled in a geography course entitled " Environmental Degradation: A World Survey" (N=20). The course reviews the critical locations of man's destructive

effects on the physical environment. It is offered as an elective to meet part of the requirements for natural sciences in several programs at UW-Stevens Point. With the exception of one student, the class consisted of science majors. The group was chosen based on its similarity to group I with one major difference: it does not deal with environmental action taking skills.

Group III: This group consisted of 22 students enrolled in an introductory environmental studies course. Members of this group represented a variety of majors, although approximately 35% listed broadfield social science as their major field of study.

The class was chosen based on availability and course content (an introduction to ecological relationships and principles).

Group IV: This group consisted of 58 elementary education students (undergraduate and graduate) taking a course entitled "Tests and Measurements". The group was chosen based on size, availability and its potential to serve as a control group for the other three groups.

Research Questions

The purpose of this study is to answer the following research questions. Several of the research questions are followed by research hypotheses. Some hypotheses are offered to test the RPECM for evidence of construct validity; the remaining are of an exploratory nature.

Research Question 1. Can evidence of reliability and validity (content and construct) be established for an instrument developed to measure perceived L of C toward taking specific categories of environmental action in generally stated situations?

Research Question 2. What relationship exists between scores on a measure of citizen action and total RPECM scores within the environmental issues class, the geography class, the environmental studies class, and the education class?
Research Hypothesis 2.1. A significant correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total RPECM scores within each of the selected groups.

Research Question 3. What relationship exists between scores on a measure of citizen action and total I, P, and C scores for the environmental issues class, the geography class, the environmental studies class, and the education class?
Research Hypothesis 3.1. A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total I scores for the selected groups.
Research Hypothesis 3.2. A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total P scores for each selected group.
Research Hypothesis 3.3. A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total C scores for each selected group.

Research Question 4. What relationship exists between scores on a measure of citizen action and total I+P+C scores for each environmental action category within the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Hypothesis 4.1. A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total I+P+C scores for each environmental action category within each of the selected groups.

Research Question 5. What relationship exists between total I, P, and C scores within the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Hypothesis 5.1. A significant positive correlation ($p \leq .05$) will exist between I, P, and C scores with each of the groups selected. (A relatively high I score refers to lack of belief in internal control.)

Research Question 6. Is there a significant difference ($p \leq .05$) between total I, P, or C scores across the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Question 7. Is there a significant difference ($p \leq .05$) between citizen action scores across the environmental issues class, the geography class, the environmental studies

class, and the education class?

Research Question 8. Is there a significant difference ($p \leq .05$) between total I+P+C scores across the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Question 9. Does the environmental issues class differ significantly ($p \leq .05$) from the pre-test to the post-test on total RPECM scores, I, P, C scores and/or citizen action scores?

Research Question 10. If there exists a change from pre-test to post-test scores of the environmental issues class, does the amount of change differ significantly ($p \leq .05$) from any of the other sample groups on total RPECM scores, I, P, C scores, and/or citizen action scores?

Research Question 11. Based on total RPECM scores and/or citizen action scores, do science-oriented students (groups I and II) differ significantly ($p \leq .05$) from education-oriented students (groups III and IV)?

Data Analysis

All data were analyzed using the Statistical Packages for the Social Sciences (SPSS).

Cronback's alpha reliability coefficients were calculated

for the total RPECM and for each of the various subscales. In addition, these coefficients were calculated for each class independently.

Research questions 2 through 5 addressed an investigation of relationships between certain variables. A Pearson Product-Moment correlation (Pearson r) was utilized for analysis. The Pearson r was used to determine the degree of relationship between two variables. Significance of the various coefficients was assessed at the .05 level.

Research questions 6 through 11 addressed an investigation of significant differences between certain scores or certain groups. One-tailed Student t-tests were employed to determine significance at the .05 level.

CHAPTER IV

ANALYSIS OF DATA

The results of data analysis for the pilot study which was used to develop the final Revised Perceived Environmental Control Measure (RPECM) are presented in this chapter. In addition, the final RPECM was subjected to several field tests. The objectives of these field tests were to assess the instrument's reliability and validity and to further explore relationships that might exist between locus of control and environmental action taking behavior.

Pilot Study Data Analysis Results

The pilot RPECM was administered to a class of undergraduate and graduate students (N=118) in a forestry course at the University of Wisconsin-Stevens Point. The class was chosen based on size and availability. Of the 118 instruments returned, 87 were usable.

The primary objective of the pilot study was to select a relatively homogeneous set of items for the final RPECM. Critieria used for the retention of items for the final RPECM were relatively high item total correlations (how well the item score correlated with the total test score) and relatively high item subscale correlations (i.e., how well the item correlated with total scores of a specific L of C orientation, i.e., how well a C item correlated with the other 28 C items of the pilot instrument). As discussed in Chapter three, this method of item selection is recommended by Nunnally (1978), Tuckman (1978) and Oppenheim (1966).

Based on the preceding analysis, 45 items (15I, 15P, 15C) were selected from the pilot. All items selected had a Pearson Product-Moment correlation coefficient (Pearson r) of greater than .50 with their respective total and subscale scores.

A second objective of the pilot study was to determine reliability coefficients for the various scoring systems being considered. Cronback's alpha reliability coefficients (a measure of internal consistency) were calculated for all of the RPECM scoring systems being considered. Nunnally (1978, p. 245) states that "in the early stages of research on predictor tests or hypothesized measures of a construct... reliabilities of .70 or higher will suffice." All of the reported reliabilities for the pilot study were above .90 (Table 4.1) which indicates that the various scoring systems being considered show evidence of high internal consistency (reliability).

A third objective of the pilot study was to test the various RPECM scoring systems for evidence of construct validity. It is hypothesized that subjects who score relatively internal on the RPECM will also score high on citizen action questions.

A series of Pearson Product-Moment correlation coefficients (Pearson r) were calculated to investigate the relationship between the various RPECM scores and the citizen action scores. The Pearson r can be used to determine the degree of relationship between two sets of variables. Significance of the

Table 4.1 Pilot Study, Reliability Coefficients for RPECM Scoring Variables.

Variable	Alpha
Total I, P, and C Scores	
Internal (I)	.93
Powerful Others (P)	.95
Chance (C)	.95
Total Action Category Scores	
Ecomanagement	.92
Economic	.90
Legal	.91
Political	.91
Persuasive	.91
Total RPECM Scores	.98

various coefficients was determined at or below the .05 level.

For each of the various RPECM scoring systems, a significant negative correlation ($p \leq .05$) was achieved with citizen action scores (Tables 4.2, 4.3, 4.4). Individuals with relatively internal scores (low IPC scores) perceived themselves to be taking more actions than their comparatively external counterparts. This finding supports the proposed hypothesis and indicates evidence of construct validity for each of the RPECM scoring systems used in the pilot study.

Field Testing Data Analysis Results

Field testing of the RPECM involved collecting pre- and post-test data from four groups of participants. The pre-test, given during the first week of the spring semester of classes, was primarily used for initial reliability and validity analysis. The post-test, administered during the final examination week of the same semester, served as a check on the initial analysis and as a source of data for research questions 9 and 10.

Group I consisted of undergraduates and graduates enrolled in an environmental issue investigation course (N=20). A total of 18 usable instruments were returned for the pre-test. Fourteen usable instruments were returned at the time of the post-test. Students were given time in class to fill out and return the questionnaire.

Group II consisted of undergraduate and graduate students enrolled in an upper level geography course on environmental degradation (N=20). Students were given time in class to fill

Table 4.2 Pilot Study, Pearson Product-Moment Correlation Coefficients for Total I, P, and C Scores with Citizen Action Scores.

Variables Correlated	Correlation Coefficient r	Significance Level p	Sample Size N
Total Internal (I) Scores/ Citizen Action Scores	-.4339	.000*	87
Total Powerful Others (P) Scores/Citizen Action Scores	-.3702	.000*	87
Total Chance (C) Scores/ Citizen Action Scores	-.3814	.000*	87

*significant relationship ($p \leq .05$).

Table 4.3 Pilot Study, Pearson Product-Moment Correlation Coefficients for Total Action Category Scores and Citizen Action Scores.

Variable Correlated with Citizen Action Scores	Correlation Coefficient r	Significance Level p	Sample Size N
Total Ecomanagement Scores	-.3476	.001*	87
Total Economic Scores	-.4103	.000*	87
Total Legal Scores	-.4280	.000*	87
Total Political Scores	-.3694	.000*	87
Total Persuasive Scores	-.4151	.000*	87

*significant relationship ($p \leq .05$).

Table 4.4 Pilot Study, Pearson Product-Moment Correlation Coefficient for Total RPECM Scores and Citizen Action Scores.

Variables Correlated	Correlation Coefficient r	Significance Level p	Sample Size N
Total RPECM Scores/Citizen Action Scores	-.4336	.000*	87

*significant relationship ($p \leq .05$).

out the instrument. A total of 16 usable instruments were returned from the pre-test and a total of 11 usable post-test instruments were returned.

Group III consisted of students (undergraduate and graduate) enrolled in an introductory environmental studies course (N=22). Participants were allowed time in class to fill out the questionnaire. A total of 19 usable pre-tests and 17 usable post-tests were returned.

Group IV consisted of undergraduate and graduate students enrolled in an upper level education course (N=58). Students were given time in class to fill out and return the instrument. Fifty-four usable pre-test and 48 usable post-test instruments were returned.

Results of data analysis utilized to explore research questions and hypotheses for data collection from group I-IV are presented below.

Research Question 1

Can evidence of reliability and validity (content and construct) be established for an instrument developed to measure perceived L of C toward taking specific categories of environmental action in generally stated situations?

Cronback's alpha reliability coefficients (measure of internal consistency) were calculated for the total RPECM and for each of the RPECM subscales. These coefficients were also calculated for data collected from each sample group.

Table 4.5 presents the alpha reliability coefficients

Table 4.5 Reliability Coefficients of Total RPECM Scores for each of the Sample Groups.

Group	N	Variable Total RPECM* Alpha
I Env. Issues Class	18	.96805
II Geography Class	16	.94944
III Env. Studies Class	19	.94811
IV Education Class	54	.95227
All Groups Combined	107	.95843

*Total items = 45

for total RPECM scores within each sample group. Coefficients were above the .70 alpha recommended by Nunnally (1978) for each group. This would indicate that the RPECM measure, as a whole, exhibits evidence of high internal consistency (reliability).

Table 4.6 presents alpha reliability coefficients for total I, P, and C subscales per group. Table 4.7 presents the reliability coefficients for total action category subscales within each sample group. Across all sample groups and for each subscale, acceptable (alpha $>$ .70) reliability coefficients were achieved. These findings support evidence of high internal consistency for the various subscales.

Field study research questions two through five, along with corresponding hypotheses, are based on locus of control/ I,P,C theory and were tested to determine if the RPECM exhibits evidence of construct validity. To help clarify the analysis used to test the proposed hypothesis, descriptive statistics for each of the sample groups are presented in Tables 4.8 through 4.17.

Table 4.8 presents descriptive statistics of total RPECM scores for each sample group. All group means are located in the lower half (internal portion) of the possible range of scores (i.e., 45-270). A comparison of means to medians indicates that total RPECM scores seem to approximate a normal distribution.

On a relative basis, group I (environmental issues class) achieved the lowest mean identifying it as the most internal

Table 4.6 Reliability Coefficients of Total I, P, and C Subscales for each of the Sample Groups.

Group	N	Variables: Internal (I)* Alpha	Powerful Others (P)* Alpha	Chance (C)* Alpha
I Env. Issues Class	18	.92665	.90162	.91385
II Geography Class	16	.80070	.89236	.87811
III Env. Studies Class	19	.88470	.90269	.86702
IV Education Class	54	.86510	.89774	.88553
All Groups Combined	107	.88621	.90544	.89529

*Total items = 15 per variable.

Table 4.7 Reliability Coefficients of each Environmental Action Category Subscale for each of the Sample Groups.

Group	N	Variables				
		Political* Alpha	Persuasive* Alpha	Ecoman.* Alpha	Economic* Alpha	Legal* Alpha
I Env. Issues Class	18	.86972	.88915	.92069	.80719	.93102
II Geography Class	16	.83862	.82413	.79957	.83422	.87135
III Env. Studies Class	19	.81353	.77479	.82740	.86465	.80297
IV Education Class	54	.84397	.79611	.88918	.83835	.79866
All Groups Combined	107	.84899	.83945	.88236	.84496	.85160

*Total items = 9 per variable.

Table 4.8 Range of Scores, Means, Medians and Standard Deviations of Total RPECM Scores for each Sample Group.

Group	N	Range* high	Range* low	M	Md	SD
I Env. Issues Class	18	160 (n=1)	46 (n=1)	97.167	100.500	31.925
II Geography Class	16	152 (n=1)	52 (n=1)	112.813	114.500	29-319
III Env. Studies Class	19	167 (n=1)	63 (n=1)	126.895	135.750	29.170
IV Education Class	54	207 (n=1)	49 (n=1)	124.148	127.000	28.093

*Possible Range of Scores 45-270
Theoretical Midpoint 157.5

of the groups. Group III (environmental studies class) achieved the highest mean score identifying it as the most external of the groups.

Descriptive statistics for total I, P, and C scores of each group are presented in Tables 4.9, 4.10 and 4.11. All group means for each subscale are located in the lower half (internal portion) of the possible range of scores (i.e., 15 -90). Based on a mean and median comparison, scores seem to approximate a normal distribution.

On a relative basis, group I scored lowest (most internal) on each subscale. Group III scored the highest on the I and C subscales; group IV (education class) scored highest (most external) on the P subscale.

In comparing I, P, and C scores within each sample group, no substantial differences seem apparent between I, P or C scores.

Table 4.12 presents the descriptive statistics of the citizen action scores for each group. Members of groups I and II reported more action taking than groups III and IV. The environmental studies class reported the least amount of citizen action taking.

Tables 4.13 through 4.17 present descriptive statistics for each sample group based on total environmental action category scores. All group means for each subscale are located in the lower half (internal portion) of the possible range of scores (i.e., 9-54). Subscale scores for each group also seem to approximate normal distributions.

Table 4.9 Range of Scores, Means, Medians and Standard Deviations of Total Internal (I) Scores for each Sample Group.

Group	N	Range* high	Range* low	M	Md	SD
I Env. Issues Class	18	52 (n=1)	15 (n=1)	32.556	33.000	10.913
II Geography Class	16	52 (n=1)	21 (n=1)	39.750	40.500	8.637
III Env. Studies Class	19	64 (n=2)	23 (n=1)	42.842	43.250	11.211
IV Education Class	54	77 (n=1)	17 (n=1)	42.426	43.000	9.822

*Possible Range of Scores 15-90
Theoretical Midpoint 52.5

Table 4.10 Range of Scores, Means, Medians and Standard Deviations of Total Powerful Others (P) Scores for each Sample Group.

Group	N	Range* high	Range* low	M	Md	SD
I Env. Issues Class	18	52 (n=1)	15 (n=1)	32.944	35.833	10.871
II Geography Class	16	52 (n=1)	15 (n=1)	36.938	39.000	11.687
III Geography Class	19	57 (n=1)	17 (n=1)	41.526	43.250	11.438
IV Education Class	54	74 (n=1)	17 (n=1)	41.889	42.500	10.714

*Possible Range of Scores 15-90
Theoretical Midpoint 52.5

Table 4.11 Range of Scores, Means, Medians and Standard Deviations for Total Chance (C) Scores for each Sample Group.

Group	N	Range* high	Range* low	M	Md	SD
I Env. Issues Class	18	57 (n=1)	16 (n=2)	31.667	31.500	11.566
II Geography Class	16	50 (n=1)	16 (n=1)	36.125	38.000	10.506
III Env. Studies Class	19	58 (n=1)	19 (n=1)	42.526	44.750	10.129
IV Education Class	54	58 (n=1)	15 (n=1)	39.833	39.833	9.952

*Possible Range of Scores 15-90
Theoretical Midpoint 52.5

Table 4.12 Range of Scores, Means, Medians and Standard Deviations of Citizen Action Scores for each Sample Group.

Group	N	Range* high	Range* low	M	Md	SD
I Env. Issues Class	18	81 (n=1)	1 (n=1)	26.111	18.500	22.746
II Geography Class	16	50 (n=1)	9 (n=1)	23.563	15.500	13.376
III Env. Studies Class	19	24 (n=1)	3 (n=2)	8.105	7.125	5.109
IV Education Class	54	52 (n=1)	1 (n=1)	8.981	6.500	8.608

*Possible Range of Scores 0-121

Table 4.13 Range of Scores, Means, Medians and Standard Deviations of Total Economic Action Scores for each Sample Group.

Group	N	Range* high	Range* low	M	Md	SD
I Env. Issues Class	18	35 (n=1)	9 (n=1)	21.444	22.500	7.147
II Geography Class	16	39 (n=1)	10 (n=1)	23.500	23.167	6.653
III Env. Studies Class	19	42 (n=1)	13 (n=1)	26.526	28.000	7.784
IV Education Class	54	47 (n=1)	11 (n=1)	25.889	25.500	6.840

*Possible Range of Scores 9-54
Theoretical Midpoint 31.5

Table 4.14 Range of Scores, Means, Medians and Standard Deviations of Total Ecomanagement Scores for each Sample Group.

Group	N	Range* high	Range* low	M	Md	SD
I Env. Issues Class	18	33 (n=1)	9 (n=2)	15.611	14.000	6.617
II Geography Class	16	28 (n=1)	9 (n=2)	18.188	17.500	6.242
III Env. Studies Class	19	30 (n=1)	9 (n=2)	21.000	22.250	6.523
IV Education Class	54	41 (n=1)	10 (n=3)	21.426	22.300	6.666

*Possible Range of Scores 9-54
Theoretical Midpoint 31.5

Table 4.15 Range of Scores, Means, Medians and Standard Deviations of Legal Action Scores for each Sample Group.

Group	N	Range* high	Range* low	M	Md	SD
I Env. Issues Class	18	36 (n=1)	9 (n=1)	18.500	18.167	7.205
II Geography Class	16	45 (n=1)	9 (n=1)	23.313	23.833	7.914
III Env. Studies Class	19	32 (n=1)	10 (n=1)	24.211	24.667	6.124
IV Education Class	54	37 (n=1)	9 (n=1)	24.074	25.100	5.955

*Possible Range of Scores 9-54
Theoretical Midpoint 31.5

Table 4.16 Range of Scores, Means, Medians and Standard Deviations of Total Political Action Scores for each Sample Group.

Group	N	Range* high	Range* low	M	Md	SD
I Env. Issues Class	18	36 (n=1)	9 (n=1)	22.944	22.250	7.704
II Geography Class	16	36 (n=1)	11 (n=1)	26.000	27.500	7.403
III Env. Studies Class	19	41 (n=1)	12 (n=1)	30.053	30.333	7.352
IV Education Class	54	48 (n=1)	9 (n=1)	27.352	27.300	6.860

*Possible Range of Scores 9-54
Theoretical Midpoint 31.5

Table 4.17 Range of Scores, Means, Medians and Standard Deviations of Total Persuasive Action Scores for each Sample Group.

Group	N	Range* high	Range* low	M	Md	SD
I Env. Issues Class	18	32 (n=1)	9 (n=2)	18.667	18.500	6.800
II Geography Class	16	31 (n=1)	9 (n=1)	21.813	22.000	6.358
III Env. Studies Class	19	36 (n=1)	12 (n=1)	25.105	26.000	5.971
IV Education Class	54	43 (n=1)	9 (n=1)	25.407	25.500	6.160

*Possible Range of Scores 9-54
Theoretical Midpoint 31.5

Group I (environmental issues class) scored the most internal across all subscales. Groups III (environmental studies class) and IV (education class) shared the higher scores (more external) across the five subscales. One notable trend was for all groups to score ecomanagement lower (more internal) than other actions. All groups also tended to score higher (more external) in the political action category.

Research Question 2

What relationship exists between scores on a measure of citizen action and total RPECM scores within the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Hypothesis:

2.1 A significant ($p \leq .05$) negative correlation will exist between scores on a measure of citizen action and total RPECM scores within each of the selected groups.

Correlational statistics were utilized to investigate research questions two through five. Pearson r was calculated for the variables indentified in each question.

Results of the Pearson r between total RPECM scores and citizen action scores for each sample group are presented in Table 4.18. For groups I and IV, significant negative correlations ($p \leq .05$) were obtained. These significant correlations support the proposed hypothesis (2.1) and indicate that for each group, citizen action scores decreased as RPECM

Table 4.18 Pearson Product-Moment Correlation Coefficients for Total RPECM Scores with Citizen Action Scores for each of the Sample Groups.

Group	Total RPECM Scores/Citizen Action Scores Correlation Coefficient r	Significance Level p	Sample Size N
I Env. Issues Class	-.5897	.005*	18
II Geography Class	-.3999	.063	16
III Env. Studies Class	.0329	.447	19
IV Education Class	-.4889	.000*	54
All Groups Combined	-.5097	.000*	107

*significant relationship ($p \leq .05$)

scores increased.

Group II's correlation (r=-.3999, p=.063) was relatively close to the a priori level of significance (alpha=.05). Group III did not yield a significant result.

Research Question 3

What relationship exists between scores on a measure of citizen action and total I, P, and C scores for the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Hypotheses:

3.1 A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total I scores for the selected groups.

3.2 A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total P scores for the selected groups.

3.3 A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total C scores for the selected groups.

Results of Pearson r correlations between citizen action scores and I, P, C scores are presented in Tables 4.19 through 4.21. For groups I and IV, significant negative correlations were obtained between I, P, C scores and citizen action scores. Significant findings support hypotheses 3.1, 3.2 and 3.3 and indicate that as I, P, or C scores increase, citizen action decreases.

Table 4.19 Pearson Product-Moment Correlation Coefficients for Total Internal (I) Scores with Citizen Action Scores for each of the Sample Groups.

Group	Internal (I) Scores/Citizen Action Scores Correlation Coefficient r	Significance Level p	Sample Size N
I Env. Issues Class	-.6733	.001*	18
II Geography Class	-.4332	.047*	16
III Env. Studies Class	-.0084	.487	19
IV Education Class	-.4431	.001*	54
All Groups Combined	-.5064	.000*	107

*significant relationship ($p \leq .05$)

Table 4.20 Pearson Product-Moment Correlation Coefficients for Total Powerful Others (P) Scores with Citizen Action Scores for each of the Sample Groups.

Group	Powerful Others (P) Scores/Citizen Action Scores Correlation Coefficient r	Significance Level p	Sample Size N
I Env. Issues Class	-.5255	.013*	18
II Geography Class	-.3192	.067	16
III Env. Studies Class	.1036	.337	19
IV Education Class	-.4166	.001*	54
All Groups Combined	-.4453	.000*	107

*significant relationship ($p \leq .05$)

Table 4.21 Pearson Product-Moment Correlation Coefficients for Total Chance (C) Scores with Citizen Action Scores for each of the Sample Groups.

Group	Chance (C) Scores/Citizen Action Scores Correlation Coefficient r	Significance Level p	Sample Size N
I Env. Issues Class	-.4987	.018*	18
II Geography Class	-.3245	.110	16
III Env. Studies Class	-.0129	.479	19
IV Education Class	-.4943	.000*	54
All Groups Combined	-.4753	.000*	107

*significant relationship ($p \leq .05$)

One significant correlation was achieved for group II on the I subscale. With the exception of group III on the P subscale, all non-significant correlations were in the hypothesized direction. Thus, with the exception of one incidence, all I, P, C subscale scores for each sample group correlated negatively with reported citizen action taking.

Research Question 4

What relationship exists between scores on a measure of citizen action and total I+P+C scores for each environmental action category within the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Hypothesis:

4.1 A significant negative ($p \leq .05$) correlation will exist between scores on a measure of citizen action and total I+P+C scores for each environmental action category within each of the selected groups.

Pearson r correlations between total environmental action category scores and citizen action scores are presented in Tables 4.22 through 4.26. Significant correlations ($p \leq .05$) support hypothesis 4.1 and indicate that as the respective environmental action category score increases, the amount of reported citizen action decreases.

The ecomanagement and economic subscales (Tables 4.22, 4.23) provided the fewest number of significant correlations (2 out of 4) across groups. The legal, political and persuasive

Table 4.22 Pearson Product-Moment Correlation Coefficients for Total Economic Action Scores with Citizen Action Scores for each of the Sample Groups.

Group	Total EC Scores/Citizen Action Scores Correlation Coefficient r	Significance Level p	Sample Size N
I Env. Issues Class	-.5405	.011*	18
II Geography Class	-.2446	.181	16
III Env. Studies Class	.0963	.348	19
IV Education Class	-.3526	.005*	54
All Groups Combined	-.3898	.000*	107

*significant relationship ($p \leq .05$)

Table 4.23 Pearson Product-Moment Correlation Coefficients for Total Ecomanagement Scores with Citizen Action Scores for each of the Sample Groups.

Group	Total EM Scores/Citizen Action Scores Correlation Coefficient r	Significance Level p	Sample Size N
I Env. Issues Class	-.4492	.031*	18
II Geography Class	-.0197	.471	16
III Env. Studies Class	.0633	.399	19
IV Education Class	-.3422	.006*	54
All Groups Combined	-.3737	.000*	107

*significant relationship ($p \leq .05$)

Table 4.24 Pearson Product-Moment Correlation Coefficients for Total Legal Action Scores with Citizen Action Scores for each of the Sample Groups.

Group	Total LG Scores/Citizen Action Scores Correlation Coefficient r	Significance Level p	Sample Size N
I Env. Issues Class	-.5775	.006*	18
II Geography Class	-.4432	.043*	16
III Env. Studies Class	-.2600	.141	19
IV Education Class	-.4899	.000*	54
All Groups Combined	-.4994	.000*	107

*significant relationship ($p \leq .05$)

Table 4.25 Pearson Product-Moment Correlation Coefficients for Total Political Action Scores with Citizen Action Scores for each of the Sample Groups.

Group	Total POL Scores/Citizen Action Scores Correlation Coefficient r	Significance Level p	Sample Size N
I Env. Issues Class	-.4870	.020*	18
II Geography Class	-.4403	.044*	16
III Env. Studies Class	.0797	.373	19
IV Education Class	-.4520	.001*	54
All Groups Combined	-.4377	.000*	107

*significant relationship ($p \leq .05$)

Table 4.26 Pearson Product-Moment Correlation Coefficients for Total Persuasive Action Scores with Citizen Action Scores for each of the Sample Groups.

Group	Total PER Scores/Citizen Action Scores Correlation Coefficient r	Significance Level p	Sample Size N
I Env. Issues Class	-.5999	.004*	18
II Geography Class	-.5042	.023*	16
III Env. Studies Class	.1344	.292	19
IV Education Class	-.4909	.000*	54
All Groups Combined	-.5411	.000*	107

*significant relationship ($p \leq .05$)

subscales (Tables 4.24 - 4.26) each achieved a higher number (3 out of 4) significant negative correlations.

Group III (environmental studies class) showed no significant correlations on any of the environmental action subscales, however, its correlation for legal action was in the hypothesized direction. All the other groups (I, II and IV) have negative correlations on all five action subscales.

Research Question 5

What relationship exists between total I, P, and C scores within the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Hypothesis:

5.1 A significant positive ($p \leq .05$) correlation will exist between I, P, and C scores within each of the groups selected. (A relatively high I score refers to lack of belief in internal control.)

Pearson r was used to calculate correlations between I, P, and C scores within each of the sample groups (Table 4.27). Significant positive correlations which support hypothesis 5.1 were determined between I, P, and C scores within each of the sample groups.

To clearly interpret these results, it must be remembered that I item scoring is reversed from P and C item scoring. A relatively high score on the I items will reflect a low belief in that orientation (external control). A relatively high score on the P or C items will reflect a high belief in those

Table 4.27 Pearson Product-Moment Correlation Coefficients for Total I, P, and C Scores within each Sample Group.

Group	N	Variables Correlated P/C r	P/I r	C/I r
I Env. Issues Class	18	.8401* p=.000	.9191* p=.000	.8670* p=.000
II Geography Class	16	.9089* p=.000	.7970* p=.000	.8482* p=.000
III Env. Studies Class	19	.8117* p=.000	.7459* p=.000	.4949* p=.016
IV Education Class	54	.8574* p=.000	.7905* p=.000	.6636* p=.000

*significant relationship ($p \leq .05$)

orientations. Alternately, relatively low scores on the I items will reflect a high belief in that L of C orientation, whereas a relatively low score on P and C items reflects a lack of belief in those orientations.

Correlations in Table 4.27 indicate that as respondents agree or disagree with the P orientation, they respectively agree or disagree with the C orientation. However, as respondents agree with the I orientation (personal control), they tend to disagree with P and C orientations.

Research Question 6

Is there a significant difference ($p \leq .05$) between I, P or C scores across the environmental issues class, the geography class, the environmental studies class, and the education class?

If the RPECM effectively discriminates among persons taking environmental action, then it could be expected that those who score highest on a measure of environmental activism would also be the most internal. Further, if there exist significant differences in action taking, one might expect similar differences in measures of internality between the same groups.

Table 4.28 presents data on the mean I scores generated in this study. The environmental issues class was the most internal, averaging 32.6 points. The environmental studies class was the least internal (most external) with a mean of 42.8 points.

Analysis of Variance (ANOVA) of the data yielded an F-ratio of 4.73, significant at p=.0039 (Table 4.29). This suggests there are significant differences of mean I scores between groups.

Table 4.28 Mean Internal (I) Scores for each of the Sample Groups.

Group	N	M[1]	SD
I Env. Issues Class	18	32.6	10.91
II Geography Class	16	39.7	8.64
III Env. Studies Class	19	42.8	11.21
IV Education Class	54	42.4	9.82

[1]Possible range of scores 15-90

Table 4.29 ANOVA Summary of I Scores

Source	df	SS	MS	F	F prob.
Between	3	1449	483	4.73	.0039*
Within	103	10519	102		
Total	106	11968			

*significant relationship ($p \leq .05$)

The Tukey method (Table 4.30) was applied to determine which groups were significantly different. The data showed there was a significant difference between group I (environmental issues class) and both groups III (environmental studies class) and IV (education class).

Tables 4.31 through 4.33 present data for the P subscale. The environmental issues students were the most internal, averaging 32.9 points. Groups III and IV were relatively more external with 41.5 and 41.9 points, respectively. When ANOVA (Table 4.32) was performed, a significant F-ratio of 3.47 was obtained. Post-hoc comparisons of the means by the Tukey method (Table 4.33) showed a significant difference in P scores between group I (environmental issues class) and group IV (education class).

Data for the C scale are presented in Tables 4.34 through 4.36. The group most external was the environmental studies class ($\bar{x}$=31.7). An analysis of variance (Table 4.35) of the data calculated an F-ratio of 4.15. A significant relationship at p=.0080, calculation of the Q-statistic showed group I's C scores to differ significantly from group III and IV's C scores.

Research Question 7

Is there a significant difference ($p \leq .05$) between citizen action scores across the environmental issues class, the geography class, the environmental studies class, and the education class?

Mean scores for the citizen action questions are presented

Table 4.30 Calculation of the Q-Statistic, Tukey Method (Internal (I) Scores).

Group	I	II	III	IV
Mean	32.6	39.7	42.8	42.4
Difference between means		7.1	10.2	9.8
			3.1	2.7
				- .4
Q		2.81	4.39*	7.12*
			1.34	1.96
				- .29

*significant relationship ($p \leq .05$)
$Q_{cv}=3.69$ for df=103

Table 4.31 Mean Powerful Others (P) Scores for each of the Sample Groups.

Group	N	M[1]	SD
I Env. Issues Class	18	32.9	10.87
II Geography Class	16	36.9	11.69
III Env. Studies Class	19	41.5	11.44
IV Education Class	54	41.9	10.71

[1]Possible range of scores 15-90

Table 4.32 ANOVA Summary of P Scores

Source	df	SS	MS	F	F prob.
Between	3	1264	421	3.47	.0188*
Within	103	12496	121		
Total	106	13760			

*significant relationship ($p \leq .05$)

Table 4.33 Calculation of the Q-Statistic, Tukey Method (Powerful Others (P) Scores).

Group	I	II	III	IV
Mean	32.9	36.9	41.5	41.9
Difference between means		4.0	8.6	9.0
			4.6	5.0
				.4
Q		1.45	3.40	6.00*
			1.82	3.33
				.27

*significant relationship ($p \leq .05$)
$Q_{cv}=3.69$ for df=103

Table 4.34 Mean Chance (C) Scores for each of the Sample Groups.

Group	N	M[1]	SD
I Env. Issues Class	18	31.7	11.56
II Geography Class	16	36.1	10.51
III Env. Studies Class	19	42.5	10.13
IV Education Class	54	39.8	9.95

[1]Possible range of scores 15-90

Table 4.35 ANOVA Summary of C Scores

Source	df	SS	MS	F	F prob.
Between	3	1333	444	4.15	.0080*
Within	103	11025	107		
Total	106	12359			

*significant relationship ($p \leq .05$)

Table 4.36 Calculation of the Q-Statistic, Tukey Method (Chance (C) Scores).

Group	I	II	III	IV
Mean	31.7	36.1	42.5	39.8
Difference between means		4.4	10.8	8.1
			6.4	3.7
				-2.7
Q		1.70	4.55*	5.75*
			2.70	2.63
				-1.92

*significant relationship ($p \leq .05$)
$Q_{cv}=3.69$ for df=103

in Table 4.37. The environmental issues class scored highest, averaging 26.1 points out of a possible 121. The second highest mean was established by the geography class at 23.6 points, followed by the education class ($\bar{x}$=9.0) and the environmental studies class ($\bar{x}$=8.1).

Oneway ANOVA was performed on the data and the results presented in Table 4.38. The F-ratio of 13.24 proved to be significant, indicating that some of the mean differences were significant. Utilizing the Tukey method, Table 4.39 presents which group means were significantly different. Four of the six comparisons proved to be significant. Both group I and II's mean citizen action scores were significantly different from group III and IV's mean scores.

A major purpose of this study was to determine whether scores from the RPECM, through correlation with scores of citizen action, could serve as predictors of such action. It was important for the integrity of this study that differences exist between scores of citizen action among the groups. If the means were not significantly different, then no meaningful conclusions could be reached concerning any correlations derived from them.

Research Question 8

Is there a significant difference ($p \leq .05$) between total I+P+C scores across the environmental issues class, the geography class, the environmental studies class, and the education class?

Table 4.37 Mean Citizen Action Scores for each of the Sample Groups.

Group	N	M[1]	SD
I Env. Issues Class	18	26.1	22.75
II Geography Class	16	23.6	13.37
III Env. Studies Class	19	8.1	5.12
IV Education Class	54	9.0	8.61

[1]Possible range of scores 0-121

Table 4.38 ANOVA Summary of Citizen Action Scores

Source	df	SS	MS	F	F prob.
Between	3	6122	2041	13.24	.0000*
Within	103	15876	154		
Total	106	21998			

*significant relationship ($p \leq .05$)

Table 4.39 Calculation of the Q-Statistic, Tukey Method (Citizen Action Scores).

Group	I	II	III	IV
Mean	26.1	23.6	8.1	9.0
Difference between means		2.5	18.0	17.1
			15.5	14.6
				- .9
Q		.81	6.32*	10.12*
			5.44*	8.64*
				- .53

*significant relationship ($p \leq .05$)
$Q_{cv}=3.69$ for df=103

Table 4.40 presents the mean RPECM (I+P+C) scores for each sample group. Group I (environmental issues class) scored lowest (most internal) with an average of 97.2 points. Group III (environmental studies class) scored the highest (most external) of all the groups with a mean of 126.9 points.

A oneway ANOVA of the data (Table 4.41) produced an F-ratio of 4.63. Significant at .0045, the Q-statistic showed significant differences in mean scores to exist between group I and groups III and IV (Table 4.42). All other group comparisons were not significant.

Research Question 9

Does the environmental issues class differ significantly ($p \leq .05$) from the pre-test to the post-test on total RPECM scores, I, P, C scores and/or citizen action scores?

The researcher, with 18 usable pre-tests and 14 usable post-tests from the environmental issues class, was able to pair up a total of 13 participants' tests. A dependent Student-t test was performed on total RPECM, I, P, C and citizen action scores to determine whether there was any significant change from the pre-test scores to the post-test scores.

Table 4.43 presents the analysis of total RPECM scores. A dependent student-t test value of .55 was obtained. Smaller than the critical value of 1.782, there is no evidence of a significant change in the class' total RPECM scores. It should be noted, however, that the little change that did occur was

Table 4.40 Mean RPECM (I+P+C) Scores for each of the Sample Groups.

Group	N	M[1]	SD
I Env. Issues Class	18	97.2	31.93
II Geography Class	16	112.8	29.32
III Env. Studies Class	19	126.9	29.17
IV Education Class	54	124.1	28.09

[1]Possible range of scores 45-270

Table 4.41 ANOVA Summary of RPECM Scores.

Source	df	SS	MS	F	F prob.
Between	3	11770	3923	4.63	.0045*
Within	103	87366	848		
Total	106	99136			

*significant relationship ($p \leq .05$)

Table 4.42 Calculation of the Q-Statistic, Tukey Method (RPECM (I+P+C) Scores).

Group	I	II	III	IV
Mean	97.2	112.8	126.9	124.1
Difference between means		15.6	29.7	26.9
			14.1	11.3
				- 2.8
Q		2.14	4.45*	6.79*
			2.11	2.85
				- .42

*significant relationship ($p \leq .05$)
Q_{cv}=3.69 for df=103

Table 4.43 Environmental Issues Class:
Pre-test and Post-test Total RPECM Scores.

Variable	N	M	SD	Student-t[1]
Total RPECM Score				
Pre-test	13	91.62	31.81	.55
Post-test	13	87.85	25.25	

[1]Dependent student-t
t_{cv}=1.782, df=12

Table 4.44 Environmental Issues Class:
Pre-test and Post-test Total I, P, and C Scores.

Variable	N	M	SD	Student-t[1]
Total I Scores				
Pre-test	13	30.23	10.99	.48
Post-test	13	28.85	8.88	
Total P Scores				
Pre-test	13	30.85	11.18	1.04
Post-test	13	28.46	9.78	
Total C Scores				
Pre-test	13	30.54	10.86	0.0
Post-test	13	30.54	8.76	

[1]Dependent student-t
t_{cv}=1.782, df=12

in the hypothesized direction (more internal).

Changes in pre-test to post-test I, P, and C scores are recorded in Table 4.44. Once again, none of the differences in the pre- to post-test scores were significant. Mean total C scores stayed the same on both the pre-test and post-test. Though not significant, the little changes that did occur on the I and P subscale scores were in the internal direction.

Table 4.45 presents the pre-test and post-test citizen action scores of the environmental issues class. A dependent student-t test performed on the data revealed a t-value of -2.00. The critical value of 1.782 (one-tailed test) reveals that this value is not significant. It should be noted that the environmental issues class reported taking fewer environmental actions on the post-test than on the pre-test. This researcher speculates that familiarity with the test and test fatigue may have had something to do with these results.

Research Question 10

If there exists a change from pre-test to post-test scores of the environmental issues class, does the amount of change differ significantly ($p \leq .05$) from any of the other sample groups on total RPECM scores, I, P, C scores, and/or citizen action scores?

In analyzing the data for research question 9, it was found that there were no significant changes from pre-test scores to post-test scores for the environmental issues class on any of the scores (RPECM, I, P, C and citizen action).

Table 4.45 Environmental Issues Class:
Pre-test and Post-test Total Citizen Action Scores.

Variable	N	M	SD	Student-t[1]
Citizen Action Score				
Pre-test	13	33.0	23.12	-2.00
Post-test	13	28.0	22.72	

[1]Dependent student-t, one-tailed test
t_{cv}=1.782, df=12

Analysis of pre- to post-test score differences on the RPECM, I, P, C and citizen action scores for each of the other groups (II, III and IV) revealed no significant changes. Based on the fact that there were no significant changes across each scoring variable for each of the groups, this research question cannot be addressed and should be considered null.

Research Question 11

Based on total RPECM scores and/or citizen action scores, do science-oriented students (groups I and II) differ significantly ($p \leq .05$) from education-oriented students (groups III and IV)?

Table 4.46 presents the mean total RPECM scores for the science-oriented and education-oriented groups. The science students' mean RPECM value was 104.53 points, while the education students' was 124.86. Based on the possible range of scores (i.e., 45-270), this places both groups on the internal side of the L of C continuum, though the education students show themselves to be relatively more external than the science students.

A significant t-value of 3.24 was obtained when an independent student-t test was performed on the data. This yields supporting evidence that science-oriented students tend to be more internal than education-oriented students.

Total citizen action scores for the two groups are presented in Table 4.47. The science group's mean citizen action value was 24.91 points; the education group's mean

Table 4.46 Science Students Versus Education Students: Total RPECM Scores for each Group.

Group	N	M	SD	Student-t[1]
I & II Science	34	104.53	31.28	-3.24* (p=.002)
III & IV Education	73	124.86	28.20	
Total	107	118.40	30.58	

[1] t_{cv}=1.671, df=106

*significant relationship ($p \leq .05$)

Table 4.47 Science Students Versus Education Students: Total Citizen Action Scores for each Group.

Group	N	M	SD	Student-t[1]
I & II Science	34	24.91	18.69	6.034* (p=.000)
III & IV Education	73	8.75	7.82	
Total	107	13.89	14.40	

[1] t_{cv}=1.671, df=106

*significant relationship ($p \leq .05$)

was 8.75. Statistical analysis of these means and their standard deviations revealed a significant t-value of 6.034. In this particular field testing of the RPECM, science students have shown a tendency to report more citizen action taking than education students.

CHAPTER V

DISCUSSION OF FINDINGS AND RECOMMENDATIONS

This chapter includes a discussion of the findings as they relate to each research question, conclusions, and implications of the findings for environmental education. Recommendations for further research are presented in the final section of this chapter.

Findings for the Research Questions

Research Question 1. Can evidence of reliability and validity (content and construct) be established for an instrument developed to measure perceived locus of control (L of C) toward taking specific categories of environmental action in generally stated situations?

The RPECM is an instrument designed to measure a person's perceived L of C toward taking specific categories of environmental action in generally stated situations. Consistently high alpha coefficients (alpha $>$ .77) were achieved for total RPECM scores and for each of the subscales (i.e., I, P, C, economic, ecomanagement, legal, political, persuasive). These findings indicate that the RPECM exhibits strong evidence of internal consistency or reliability.

Content validity of an instrument depends upon the adequacy with which important content has been sampled and upon the adequacy with which content has been cast into the test items (Nunnally, 1978). It is assumed that the systematic procedures used to develop and select RPECM items provide

evidence of the instrument's content validity.

An item pool was developed based on a set of objectives well-grounded in L of C and environmental action theory. Item analysis and selection were made using data collected from a pilot study. Criteria for item retention were relatively high item total and item subscale correlations. Final RPECM items did yield substantial correlations with their respective subscales and/or with the total scale supporting the assumption of evidenced content validity.

In this study, construct validity is defined as the extent to which an instrument can be shown to perform in a manner prescribed by a particular construct. Construct validity cannot be claimed on the results of only one study. An accumulation of supporting results is necessary to provide further evidence of construct validity. A number of findings in this study contribute to the support of construct validity for the RPECM. These findings are discussed on the following pages and summarized following the discussion of research question 5.

Mean and median RPECM scores for each sample group were in the lower half (more internal) of the possible range of scores. This was true for total RPECM scores, I, P, C subscale scores and environmental action category subscale scores. These findings seem consistent with past L of C research. Levenson (1972a) found that very few of her subjects felt their lives were controlled by chance or powerful others to the extent that they felt they controlled their own lives. This tendency for people to evaluate internal attributes in a more favorable light

than external attributes seems to be a socially desirable response style that is characteristic in L of C measurement (Phares, 1976; Lefcourt, 1976).

Research Question 2. What relationship exists between scores on a measure of citizen action and total RPECM scores within the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Hypothesis:

2.1 A significant correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total RPECM scores within each of the selected groups.

Research Question 3. What relationship exists between scores on a measure of citizen action and total I, P, and C scores for the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Hypotheses:

3.1 A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total I scores for the selected groups.

3.2 A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total P scores for each selected group.

3.3 A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total C scores for each selected group.

Research Question 4. What relationship exists between scores on a measure of citizen action and total I+P+C scores for each environmental action category within the environmental issues class, the geography class, the environmental studies

class, and the education class?

Research Hypothesis:

4.1 A significant negative correlation ($p \leq .05$) will exist between scores on a measure of citizen action and total I+P+C scores for each environmental action category within each of the selected groups.

Past research using relatively generalized L of C instruments has given some indication of a relationship between internality and taking environmental action (Chapter II). Theoretically, similar findings should be achieved with the RPECM. Thus, it was hypothesized that total RPECM scores and its various subscale scores would correlate significantly with the amount of citizen action a person reports taking. Citizen actions are actions that include procedures synonymous with those found in the five environmental action categories.

Because the total RPECM and its subscales are scored in the external direction (i.e., the higher the score, the more external) it was hypothesized that significant negative correlations would be achieved between the various RPECM scores and citizen action scores.

Pearson r correlations between total RPECM scores and citizen action scores were negative for three of the four groups. Two of the four correlations were significant at the .05 level. When data from the four groups were collapsed, analysis produced a significant negative correlation between the two variables.

Significant findings support the proposed hypothesis (2.1) and indicate that as total RPECM scores move in the external direction there was a significant drop in citizen actions

reported.

Group II's (geography class) correlation (r= -.3999, p=.063) was not significant between total RPECM scores and citizen action scores. However, it was in the hypothesized direction and therefore provides a trend for overall findings related to research question 2.

The total RPECM is made up of a number of underlying subscales. Theoretically each subscale should show some degree of construct validity for it to be included in the RPECM. The pattern of correlations for I, P, and C subscales was similar to that of the total RPECM scores. Two of the four groups exhibited significant negative correlations between the P and C subscales and citizen action taking scores. Three of the four groups achieved significant correlations on the I subscale. Significant correlations indicate that as I, P, or C subscale scores move toward the external direction (high scores), citizen actions reported decreases. Alternately, as I, P, or C scores move toward the internal direction (low scores), reported citizen action taking increases.

While findings for group III (environmental studies class) were not significant, all correlation coefficients for the I and C subscales were in the hypothesized direction. With the exception of group III, all P subscale correlations were in the hypothesized direction. Collapsing data from all four groups revealed significant negative correlations for each subscale with citizen action scores. Overall, 14 of the 15 correlations were in the hypothesized direction adding some consistency to findings.

When the RPECM was broken down and analyzed according to environmental action category subscales, evidence of construct validity was still present. Across the four groups, each of the subscales (i.e., economic, ecomanagement, legal, political, persuasive) produced at least two significant correlations. Subscales not achieving significance differ from group to group. Twenty-one of the 25 correlations were in the hypothesized direction. Each of the five subscales shows some evidence of supporting hypothesis 4.1, and thus show some evidence of construct validity. Retention of each environmental action category within the RPECM seems justified.

Analysis of Tables 4.22 through 4.26 showed the ecomanagement and economic subscales to have the fewest significant correlations (2 of the 4 groups). The geography class achieved significant correlations for the legal, political and persuasive action categories. This may indicate that these three subscales have some degree of predictive potential over the ecomanagement and economic subscales, at least with reference to the geography class (group II).

Research Question 5. What relationship exists between total I, P, and C scores within the environmental issues class, the geography class, the environmental studies class, and the education class?

Research Hypothesis:

5.1 A significant positive correlation ($p \leq .05$) will exist between I, P, and C scores with each of the groups selected. (A relatively high I score refers to lack of belief in internal control.)

Theoretically the I, P, and C subscales all measure the same underlying construct. That is, they measure a belief in internal or external control. Since all three subscales are scored in the negative direction, it was hypothesized that significant positive correlations ($p \leq .05$) between the three subscales would be achieved. For all groups, I, P, and C subscale scores achieved significant positive correlations. These findings indicate that for all groups, as subjects increasingly agreed with personal control (I), their belief in powerful others and/or chance control decreased. Each sample group responded to the I, P, and C subscales in the same fashion.

Summary of Findings Which Support Construct Validity

Below is a summary of findings for research questions two through five. The majority of findings seem to support evidence of construct validity.

1) Correlations between total RPECM scores and citizen action scores were negative for three of the four sample groups. Three of the five correlation coefficients calculated (including all groups combined) were significant at the .05 level.
2) Correlations between I, P, and C subscale scores and citizen action scores were, with one exception (group III, P subscale), negative. At least three of the five correlation coefficients for each subscale were significant at the .05 level.

3) Correlations between environmental action category subscale scores and citizen action scores were consistently negative for groups I, II and IV. For at least two of the four groups on each subscale, correlations were significant at the .05 level.
4) Significant positive ($p \leq .05$) correlations were determined between I, P, and C subscale scores within each of the sample groups.

Research Question 6. Is there a significant difference ($p \leq .05$) between total I, P, or C scores across the environmental issues class, the geography class, the environmental studies class, and the education class?

Data pertaining to research question 6 were presented in Chapter IV. They indicated a moderate number of significant differences in mean scores among the I, P, and C subscales. Specifically, there were two significant ($p \leq .05$) differences on the I scale, one significant ($p \leq .05$) difference on the P scale, and two significant ($p \leq .05$) differences on the C scale. In sum, five out of eighteen possible paired-group comparisons yielded significant differences.

Noteworthy is the fact that each significant difference achieved was between a science-oriented class (group I) and an education-oriented class (groups III and IV). Mean I and C subscale scores were significant between group I (environmental issues class) and groups III (environmental studies class) and IV (education class). Mean P scores were significantly

different between group I and group IV. The Q-statistic for the mean difference between group I (environmental issues class) and group III (environmental studies class) was 3.40, close to the Q critical value of 3.69, yet not significant. All of these data add support to the evidence that science-oriented students show a tendency to score lower (more internal) on the RPECM than education-oriented students.

Research Question 7. Is there a significant difference ($p \leq .05$) between citizen action scores across the environmental issues class, the geography class, the environmental studies class, and the education class?

Analysis of variance results related to research question 7 were presented in Chapter IV. A statistically significant difference ($F=13.24$, $p=.000$) was found among the means of citizen action scores. Post-hoc analysis using the Tukey method yielded significant differences ($p \leq .05$) for four out of six paired-group comparisons.

Once again, it should be noted that each of the significant comparisons was between a science-oriented class (groups I & II) and an education-oriented class (groups III & IV). This lends support to the evidence that science students report more actual-perceived citizen action taking than education students. Further evidence will be explored in the discussion of research question 11.

A significant difference in mean citizen action scores was essential to the success of this study since a major purpose

of this research was to investigate the construct validity of the Revised Perceived Environmental Control Measure (RPECM), an instrument which was designed to measure the locus of control construct relative to environmental action. The strategy used in establishing construct validity included the following three steps:

1) Test for correlations between citizen action scores and I, P, C and total RPECM scores among the four groups selected. (Research questions 2-4)
2) Demonstrate differences in I, P, C and total RPECM scores among the four groups selected. (Research questions 6 and 8)
3) Demonstrate differences in citizen action behavior between the four groups selected. (Research question 7)

Had data relative to research question 7 shown no significant differences, then the logical sequence used to test for construct validity would have been questioned.

Research Question 8. Is there a significant difference ($p \leq .05$) between total I+P+C scores across the environmental issues class, the geography class, the environmental studies class, and the education class?

Analysis of variance results related to research question eight showed a significant difference ($F=4.63$, $p=.0045$) among the means on total RPECM scores. Closer analysis with the Q-statistic yielded two significant differences ($p \leq .05$) out of six paired-group comparisons. Each of the significant

differences existed between a science class (group I) and the education classes (groups III & IV).

A summary of the results from data collected for research questions 6, 7 and 8 reveals significant differences of mean RPECM scores, mean I, P, C scores, and mean citizen action scores to exist between science-oriented college students and education-oriented students. Science students showed a tendency to score more internal and to report more citizen action taking than the education students on the RPECM.

In general, research (Hersch and Scheibe, 1967; Lefcourt, 1976; Rotter, 1966) has shown college students to score internal on locus of control instruments. In spite of the homogeneity of the sample groups (all were college students), the RPECM has shown sensitivity to other differences in the population. One example has been the differences between science-oriented students and education-oriented students on total RPECM scores, total I, P, C scores and total citizen action scores. Champeau (1982) reported similar results with the PECM.

Research Question 9. Does the environmental issues class differ significantly ($p \leq .05$) from the pre-test to the post-test on total RPECM scores, I, P, C scores and/or citizen action scores?

It was hypothesized that participation in an environmental issues investigation course which teaches environmental action skills would bring about a change in respondents' L of C toward internality and ultimately, an increase in reported citizen

action. Research studies by Hines (1984) and Sia (1984) (summarized in Chapter I) both indicated that the knowledge of environmental action strategies was strongly associated with the prediction of responsible environmental behavior.

Analysis of the data for research question 9 was presented in Chapter IV. No significant changes in mean scores were observed in any of the scores (total RPECM, I, P, C subscales and citizen action) from the pre-test to the post-test.

No firm conclusions can be drawn from the data analysis for research question 9. Although there were no significant changes in total RPECM scores and I, P, C subscale scores, small changes did occur in the internal direction (lower scores).

This researcher questions the use of the RPECM for pre-test and post-test data collection over such a short period of time. (Field testing for this study took place over a 4-month period.) If there occurs a change in one's L of C and environmental action taking due, in part, to participation in a course that teaches environmental action skills, perhaps significant changes would best be measured over a longer period of time (a year or longer). Also to be considered is the fact that time and financial constraints often limit college students' opportunities to take action. Administering a pre-test and post-test while the students are still in school doesn't allow for the constraints mentioned above to be lifted.

It was also hypothesized that students knowledgeable in environmental action strategies would show an increase in

reported action taking. The change in pre-test to post-test citizen action scores was in the opposite direction expected. (Students reported taking fewer actions on the post-test than the pre-test.)

The same instrument was used for both the pre-test and the post-test. Familiarity with the test (knowing how long it was) may have influenced how much time each participant took with each question on the post-test. Filling it out completely a second time may have caused test fatigue.

Research Question 10. If there exists a change from pre-test to post-test scores of the environmental issues class, does the amount of change differ significantly ($p \leq .05$) from any of the other sample groups on total RPECM scores, I, P, C scores, and/or citizen action scores?

As discussed in Chapter IV, analysis of the data for research question 10 showed no significant changes in pre-test to post-test scores in any of the RPECM scoring systems for any of the sample groups. This particular research question was posed as an ancillary study to the hypothesis of research question 9.

The same speculations discussed above for research question 9 would be appropriate when analyzing each of the sample groups' post-test responses.

Research Question 11. Based on total RPECM scores and/or citizen action scores, do science-oriented students (groups I and II) differ significantly ($p \leq .05$) from education-oriented

students (groups III and IV)?

Analysis indicates that science students scored significantly lower (more internal) on mean total RPECM scores and significantly higher on mean total citizen action scores than education students.

Analysis of data for research questions 6, 7 and 8 adds supporting evidence to the hypothesis that science-oriented college students would score more internal and report more citizen action taking than education-oriented college students.

Many of the science students listed their major or minor courses of study as related to natural resources/environmental education. As upperclassmen, it is possible many of them already had some instruction dealing with environmental action techniques. This may help to explain the significant differences.

Conclusions

Based on the results of data analysis, the following general conclusions were made.

1) Reliability alpha coefficients for each of the RPECM scoring systems were greater than .77. This provides evidence of high internal consistency (reliability) for the RPECM. This implies that future use of the RPECM would provide the researcher with consistent, reliable results. Each participant would respond to each of the RPECM items in a similar fashion.

2) Development of the RPECM item pool was based on a specific set of objectives. Items were selected from the item

pool based on relatively high (alpha $>.50$) item subscale and item total correlations. These systematic procedures provide evidence of the instrument's content validity.

3) Construct validity cannot be claimed on the results of only one study, however findings in this study contribute to the support of construct validity for the RPECM. Based on past research, there are indications that there exists a relationship between internality and taking environmental action. It was hypothesized that total RPECM scores, I, P, C subscale scores and environmental action category scores would correlate significantly with citizen action scores. In this study it was found that there was a significant ($p \leq .05$) relationship between total RPECM scores, I, P, C subscale scores and environmental action category scores and citizen action scores. As citizen action scores increased, corresponding scores on the total RPECM scale, I, P, C subscales and environmental action category subscales decreased (more internal). Alternately, as citizen action scores decreased, corresponding scores on the total RPECM scale, I, P, C subscales and environmental action category scores increased (more external).

4) Theoretically, the I, P, and C subscales of the RPECM should all measure a belief in internal or external control. Analysis of the research data supports this. As subjects agreed with personal control (I), they disagreed with external control. Alternately, as they agreed with

external control, they disagreed with internal control. Each sample group responded to the I, P, C subscale items in the same fashion.

5) For each of the RPECM scoring systems (total RPECM scores, I, P, C subscale scores, environmental action category scores), each sample group's score was in the internal direction. In spite of the homogeneity of the sample groups (i.e., all were college students), the RPECM was sensitive to other differences in the population. Significant differences ($p \leq .05$) were found between science-oriented students and education-oriented students on total RPECM scores, I, P, C subscale scores and citizen action scores. In this study, science students showed a tendency to score more internal on the RPECM and to report more citizen action taking than education students.

6) Based on the results of this study, it is questionable whether the RPECM is useful for measuring changes in locus of control and environmental action taking behavior of college students over a short period of time. The financial and time constraints of being a college student may have influenced the results of this study.

Discussion of the Results

The results from this research generally suggest that a relationship between the RPECM and citizen action does exist. However, consideration of several factors is important when interpreting the results. First, the sample groups used were

not randomly selected. It is not known whether their backgrounds influenced the data. Second, unsolicited comments by several respondents indicated that the length and repetitiveness of Section I of the RPECM was bothersome. Once noticed, this could have altered participants' responses to the rest of the questionnaire.

The differences in action scores among the groups were expected, but variables other than locus of control may have been contributing factors. Out of the possible range of citizen action scores (i.e., 0-121 points), the highest mean score was 26.11. All four groups consisted of college students. As noted earlier in this chapter, it is possible that constraints of time and financial resources may have limited the opportunities for many of the students to participate in environmental action, while simultaneously their studies tended to enhance their internal perception.

This researcher also noticed that group III (environmental studies class) didn't achieve a single significant Pearson r correlation coefficient (Tables 4.18 through 4.26) in any of the various RPECM scoring systems. Scattergrams were analyzed to determine what may have brought about such low r-values.

It was found that for the majority of students in the environmental studies class, total RPECM scores, I, P, C subscale scores, and environmental action category subscale scores varied across the I-E continuum. However, the amount of citizen action remained relatively <u>low</u> for the class. If a group is sufficiently homogeneous on a variable (in this case, citizen action), the variance tends toward zero. When a group's

variable has a restricted range of scores, the correlation coefficient will be smaller (Hinkle, Wiersma and Jurs, 1979). In the case of the environmental studies class, there wasn't enough dispersion of citizen action scores to allow a relationship between the various RPECM scoring systems and citizen action to manifest itself.

Summary and Implications for Environmental Education

Investigation into the relationship between locus of control and environmental action has only begun recently. Peyton and Miller (1980) implied that an internal locus of control orientation is an important condition of environmental action taking. Several studies support this, linking locus of control with many behaviors which are related to environmental activism. These include social activism, information seeking and use, delay of gratification, and resistance to authority.

This study represented an effort to develop an instrument which could be used to investigate one of the many variables that impinge on environmental action taking behavior. The instrument is entitled the Revised Perceived Environmental Control Measure (RPECM), and it specifically attempts to measure the degree to which a person perceives that the solution to an environmental issue may be achieved partially as a result of actions he/she may personally pursue.

The RPECM shas shown initial evidence of reliability and content validity. Supporting evidence of construct validity has added further strength to the proposed relationship between L of C and environmental action taking behavior.

From an analysis of the data collected with the RPECM, the majority of subjects perceived themselves as having some personal control over generally stated environmental concerns. However, powerful others and chance were also identified as agents having some control over the outcome of issues. These findings appear to support the assertion that the Internal-External (I-E) construct is a multidimensional one.

Ultimately, the findings of this research have many implications for environmental education researchers and/or educators. Results of this study endorse the proposed relationship between locus of control and environmental action taking behavior. It also lends support to further research on the inferred relationship between internality and environmental action as proposed by Peyton and Miller (1980, pp. 13-15 of this study).

This research has provided an instrument which can potentially be used to investigate further the inferred relationship of L of C to environmental action taking behavior. The RPECM contains a set of subscales (showing evidence of reliability and validity) which have potential for diagnosing the environmental action taking behavior of individuals and/or groups. Further efforts to measure the theoretical locus of control construct with the RPECM are warranted.

Recommendations for Future Research

Based on the data generated by this study, and also on observations made while scoring the questionnaires, the author makes the following recommendations for research in this area.

1) Results of this study support the proposed relationship between L of C and environmental action taking behavior. Based on these results, it is recommended that further research in this area be continued. Specifically, the inferred relationship between internality and environmental action taking behavior as proposed by Peyton and Miller (1980).

2) The RPECM has shown potential for determining relationships between L of C and environmental action taking behavior. It is recommended that further research be conducted with the RPECM in an attempt to refute or further confirm its investigative abilities.

3) Research with the RPECM should be undertaken with adult, non-student populations. These adults should be chosen at random. This would help to eliminate the constraints associated with being a college student and make the results of the research more generalizable.

4) It is recommended that the RPECM be correlated with results of the Perceived Environmental Control Measure (PECM) (Appendix B) given to the same sample. This would help determine if the RPECM has a potential diagnostic advantage over a situation-specific instrument (PECM) with respect to environmental actions.

5) Given the RPECM's intended use (i.e., to aid in explaining environmental action taking behavior), it would be applicable to subject the RPECM to a study that tests or provides evidence of its predictive validity.

6) The RPECM should be tested in conjunction with other variables such as knowledge of issues, attitudes, verbal commitment, and personal responsibility, which may influence a person's environmental action behaviors.

7) Directions for Section II, the citizen action questions, could be modified to reflect only environmental actions. Where the questionnaire is administered in group fashion, verbal instructions could reinforce these directions.

8) The shortening of Section I should be considered. The 45 items in the current instrument are repetitive and may lead to test fatigue. An analysis of inter-item correlations from this study may help to reduce the number of items down to 30. (There would be 10 statements for each I, P, C subscale and 6 statements related to each environmental action category.)

9) The RPECM has the potential to diagnose the environmental action taking behavior of individuals and/or groups. If future research utilizing the RPECM should further validate its diagnositc potential with respect to environmental action behaviors, it is suggested that the RPECM be used to evaluate the success of environmental education curricula aimed at promoting responsible environmental behavior.

APPENDIX A

Rotter's Internal - External (I-E) Locus of Control Scale

APPENDIX A

Introduction

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief; obviously there are no right or wrong answers.

Please answer the items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. For each numbered question make an X on the line beside either the a or b, whichever you choose as the statement most true.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also try to respond to each item independently when making your choice; don't be influenced by your previous choice. Remember...

Select that alternative which you personally believe to be more true.

I MORE STRONGLY BELIEVE THAT:

1. ___ a. Children get into trouble because their parents punish them too much.

   ___ b. The trouble with most children nowadays is that their parents are too easy with them.

2. ___ a. Many of the unhappy things in people's lives are partly due to bad luck.

   ___ b. People's misfortunes result from the mistakes they make.

3. ___ a. One of the major reasons why we have wars is because people don't take enough interest in politics.

   ___ b. There will always be wars, no matter how hard people try to prevent them.

4. ___ a. In the long run people get the respect they deserve in this world.

   ___ b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. ___ a. The idea that teachers are unfair to students is nonsense.

   ___ b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. ___ a. Without the right breaks one cannot be an effective leader.

   ___ b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. ___ a. No matter how hard you try some people just don't like you.

   ___ b. People who can't get others to like them don't understand how to get along with others.

8. ___ a. Heredity plays the major role in determining one's personality.

   ___ b. It is one's experience in life which determine what they're like.

9. ___ a. I have often found that what is going to happen will happen.

   ___ b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. ___ a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.

    ___ b. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. ___ a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.

___ b. Getting a good job depends mainly on being in the right place at the right time.

12. ___ a. The average citizen can have an influence in government decisions.

___ b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. ___ a. When I make plans, I am almost certain that I can make them work.

___ b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. ___ a. There are certain people who are just no good.

___ b. There is some good in everybody.

15. ___ a. In my case getting what I want has little or nothing to do with luck.

___ b. Many times we might just as well decide what to do by flipping a coin.

16. ___ a. Who gets to be the boss often depends on who was lucky enough to be the right place first.

___ b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. ___ a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

___ b. By taking an active part in political and social affairs the people can control world events.

18. ___ a. Most people don't realize the extent to which their lives are controlled by accidental happenings.

___ b. There really is no such thing as "luck."

19. ___ a. One should always be willing to admit mistakes.

___ b. It is usually best to cover up one's mistakes.

20. ___ a. It is hard to know whether or not a person really likes you.

___ b. How many friends you have depends upon how nice a person you are.

21. ___ a. In the long run the bad things that happen to us are balanced by the good ones.

___ b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. ___ a. With enough effort we can wipe out political corruption.

___ b. It is difficult for people to have much control over the things politicians do in office.

23. ___ a. Sometimes I can't understand how teachers arrive at the grades they give.

___ b. There is a direct connection between how hard I study and the grades I get.

24. ___ a. A good leader expects people to decide for themselves what they should do.

___ b. A good leader makes it clear to everybody what their jobs are.

25. ___ a. Many times I feel that I have little influence over the things that happen to me.

___ b. It is impossible for me to believe that chance or luck plays an important role in my life.

26. ___ a. People are lonely because they don't try to be friendly.

___ b. There's not much use in trying too hard to please people, if they like you, they like you.

27. ___ a. There is too much emphasis on athletics in high school.

___ b. Team sports are an excellent way to build character.

28. ___ a. What happens to me is my own doing.

___ b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. ___ a. Most of the time I can't understand why politicians behave the way they do.

___ b. In the long run the people are responsible for bad government on a national as well as on a local level.

APPENDIX B

The Perceived Environmental Control Measure

SECTION I

Instructions

You are asked to read the following summary of an environmental issue. Please consider the situation as though it were a real part of your life and you were involved in this issue.

After you have read the summary, please respond to the questions in Section II.

The Issue

The city you are a resident of has a population of about 50,000. You live in a small house just within the city limits. Adjacent to your backyard, the city owns 150 acres of vacant farmland. You find your home and the area you live in to be quite safe, comfortable and aesthetically pleasing.

The city has developed a solid waste management problem. At present, the city dump or landfill is the exclusive means of waste disposal for the city. Recently, the city council was informed that the landfill site is filling up at an increasing rate and there is only enough available space at the site to last two more years.

The city council employed a consulting firm to identify alternative solid waste management plans for the city. The consulting firm report indicated four possible alternatives; continue landfilling at another site, resource recovery (recycling), incineration, or shipping to another city for handling. The report further suggested the use of the vacant farmland adjacent to your land as one of two "adequate" landfill sites. The site near you, it was reported, "could have potential groundwater contamination problems but it is close to - and already owned by - the city." Thus, it would be a more economical choice that the other site, if the landfill alternative was selected.

After a preliminary vote, the city council, by a slim margin, elected to draw up possible plans for the development of the landfill near you. One of the council members who voted for the landfill alternative said "it seemed to be the least burdensome for citizens of the community. All the other alternatives would substantially increase time and/or money input required from each citizen." He also stated that "this was only a preliminary vote and a final confirmation vote will have to be taken after the preliminary plans are in the public input is received."

Some civic groups, environmental groups and a few politicians openly oppose the landfill alternative. Many of these people point out that tragic health and environmental problems have been associated with landfills.

Obviously, whatever the outcome of this situation, it will have an effect on the quality of your life.

SECTION II

INSTRUCTIONS

In this section you will find the definitions (in italics) of five approaches that might be used to solve the problem that has been described.

Following each of the five definitions is a series of questions regarding your use of each approach. Read each statement and carefully circle the number at the left of each statement which best indicates how strongly you agree or disagree with the statement. Please respond to every statement.

Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly	POLITICAL ACTION: *An effort aimed at persuading an electorate, a legislator (or legislature), or executive governmental agency to conform to the values held by the person or persons taking that action, e.g., lobbying, voting, campaigning for candidates, etc.*
1	2	3	4	5	6	1. I believe that what is going to happen in this situation will happen regardless of any political action I take.
1	2	3	4	5	6	2. By participating in some type of political action, I can play an effective role in determining the outcome of this situation.
1	2	3	4	5	6	3. The political action I could take in this situation would be of little value in determining the outcome, because the outcome will mostly be influenced by a few people who already have their own ideas about the situation.
1	2	3	4	5	6	4. I can implement some type of political action which would directly or indirectly influence the outcome of this situation.
1	2	3	4	5	6	5. If this situation turns out the way I believe it should, it would be the result of luck more than the result of any political action I could participate in.
1	2	3	4	5	6	6. The political action I could take in relation to this situation would be of little or no value because it would not have an effect on the people who really decide on how this situation will turn out.

Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly	POLITICAL ACTION (Continued)
1	2	3	4	5	6	7. I believe I can be effective in determining the outcome of this situation through the use of political action.
1	2	3	4	5	6	8. How this situation turns out will be determined by people above me who would be unaffected by any political action I could employ.
1	2	3	4	5	6	9. It would only be a coincidence if I participated in some political action related to this situation, and the situation turned out the way I felt it should.

PERSUASIVE ACTION: *An effort to verbally motivate human beings to take positive environmental action as a function of modified values, e.g., argumentation, debate, speech making, letter writing, etc.*

1	2	3	4	5	6	10. Fate, more than any persuasive action I could take, will determine the outcome of this situation.
1	2	3	4	5	6	11. I believe the outcome of this situation will be influenced by what people in high social positions already think, more than by any persuasive action I could take.
1	2	3	4	5	6	12. I believe I can be effective in determining the outcome of this situation through the use of persuasive action.
1	2	3	4	5	6	13. How this situation turns out will be determined by people above me who would be unaffected by any persuasive action I could take.

Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly	PERSUASIVE ACTION (Continued)
1	2	3	4	5	6	14. By practicing some type of persuasive action, I could play an effective role in determining the outcome of this situation.
1	2	3	4	5	6	15. The persuasive action I could take in this situation will be of little value in determining the outcome, because the outcome will mostly be influenced by a few people who already have their own ideas about the situation.
1	2	3	4	5	6	16. It would be a coincidence if I participated in some persuasive action related to this situation, and the situation turned out the way I felt it should.
1	2	3	4	5	6	17. I can implement some type of persuasive action which would directly or indirectly influence the outcome of this situation.
1	2	3	4	5	6	18. I believe that what is going to happen in this situation will happen regardless of any persuasive action I take.
						ECOMANAGEMENT: *Any physical action taken by an individual or a group aimed directly at maintaining or improving the existing ecosystems, e.g., recycling, reforestation, erosion control, conservative use of resources, land use management, pollution control, etc.*
1	2	3	4	5	6	19. I can implement some type of ecomanagement strategy which would directly or indirectly influence the outcome of this situation.
1	2	3	4	5	6	20. It would be a coincidence if I practiced some ecomanagement related to this situation, and the situation turned out the way I felt it should.

Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly	ECOMANAGEMENT (Continued)
2	3	4	5	6	21. I can have a direct or indirect effect on the quality of the environment and thus on the outcome of this situation, through the use of ecomanagement practices.
2	3	4	5	6	22. I believe that what is going to happen in this situation will happen regardless of any ecomanagement I practice.
2	3	4	5	6	23. I believe the outcome of this situation will be influenced by what people in high social positions think and do, more than by any ecomanagement strategies I could practice.
2	3	4	5	6	24. I believe I can be effective in determining the outcome of this situation through the use of ecomanagement practices.
2	3	4	5	6	25. The ecomanagement strategies I could practice in this situation would be of little or no value because they would not override the influence more important people than I will have on the outcome of this situation.
2	3	4	5	6	26. If this situation turns out the way I believe it should, it would be the result of luck more than the result of any ecomanagement I could practice.
2	3	4	5	6	27. The ecomanagement activities I could practice in this situation would be of little value in determining the outcome, because the outcome will mostly be influenced by the actions of a few key individuals.

Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly	ECONOMIC ACTION: *Constitutes an action similar to one of the following: a) boycotting; b) selective consumption of goods and services, e.g., purchase of recycled materials; c) a monetary contribution to an individual or organization that actively works for a position supported by the contributor, e.g., donations to environmental causes, membership fees paid to environmental activist organizations, etc.*
1	2	3	4	5	6	28. I believe that what is going to happen in this situation will happen regardless of any economic action I take.
1	2	3	4	5	6	29. I believe the outcome of this situation will be influenced by what people in high social positions already think, more than by any economic action I could take.
1	2	3	4	5	6	30. In this situation, I can employ some type of economic action which will have a direct or indirect effect on the final outcome.
1	2	3	4	5	6	31. If this situation turns out the way I believe it should, it would be the result of luck more than the result of any economic contribution I could make.
1	2	3	4	5	6	32. I believe I can be effective in determining the outcome of this situation through the use of economic actions.
1	2	3	4	5	6	33. How this situation turns out will be determined by people above me who would be unaffected by any economic action I could take.
1	2	3	4	5	6	34. It would only be a coincidence if I participated in some economic action related to this situation, and the situation turned out the way I felt it should.
1	2	3	4	5	6	35. If I were to implement some type of economic action in this situation, I am sure it would have an effect on the final outcome.
1	2	3	4	5	6	36. The economic action I could take in this situation would be of little value in determining the outcome, because the outcome will mostly be influenced by a few people who already have their own ideas about the situation.

Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly	LEGAL ACTION: *Any legal/judiciary action taken by an individual and/or organization which is aimed at some aspect of environmental law enforcement or, a legal restraint preceding some environmental behavior perceived as undesirable, e.g., law suits, injunctions, etc.*
1	2	3	4	5	6	37. If this situation turns out the way I believe it should, it would be the result of luck more than the result of any legal action I could pursue.
1	2	3	4	5	6	38. I believe I can be effective in determining the outcome of this situation through the use of legal actions.
1	2	3	4	5	6	39. It would only be a coincidence if I pursued some legal action related to this situation, and the situation turned out the way I felt it should.
1	2	3	4	5	6	40. I believe the outcome of this situation will be influenced by what people in high social positions already think, more than by any legal action I could take.
1	2	3	4	5	6	41. I can implement some type of legal action which would directly or indirectly influence the outcome of this situation.
1	2	3	4	5	6	42. The legal action I could take in relation to this situation would be of little or no value because it would not have an effect on the people who really decide how the situation will turn out.
1	2	3	4	5	6	43. I believe that what is going to happen in this situation will happen regardless of any legal action I take.
1	2	3	4	5	6	44. The legal action I could pursue in this situation would have a direct or indirect effect on the final outcome.
1	2	3	4	5	6	45. The legal action I could take in this situation would be of little value in determining the outcome, because the outcome will mostly be influenced by a few people who already have their own ideas about the situation.

SECTION III

INSTRUCTIONS

In this section you are presented with a series of questions that deal with your actual use of some problem solving actions.

Please answer all the questions as completely and honestly as you can.

HOW MANY TIMES DURING THE PAST TWO (2) YEARS HAVE YOU...

46 ... paid membership dues to an organization because you thought they would take positive action on some issue for which you have concerns?

_____ (no. of memberships)

47 ... (Please list up to three (3) such organizations below)

(1) _____

(2) _____

(3) _____

48 ... donated money (other than membership fees) to support some project related to a concern you had for an issue:

_____ (no. of donations)

49 ... (Please list up to three (3) such projects/donations below)

(1) _____

(2) _____

(3) _____

HOW MANY TIMES IN THE LAST TWO (2) YEARS HAVE YOU...

50... avoided doing business with a company or refused to buy their product(s) in order to bring economic pressure to bear on some issue about which you have concerns.

_____ (no. of times)

51... (Please list up to three (3) such companies or products below)

(1) _____

(2) _____

(3) _____

52... reported to the proper authorities illegal actions taken or about to be taken by a person, group or organization.

_____ (no. of times)

53... (Please list up to three (3) such illegal actions below)

(1) _____

(2) _____

(3) _____

54... been involved in filing a lawsuit or filing for an injunction concerning some issue.

_____ (no. of times)

55... (Please list up to three (3) topics of such injunctions/lawsuits)

(1) _____

(2) _____

(3) _____

HOW MANY TIMES IN THE LAST TWO (2) YEARS HAVE YOU...

56... participated in rallies, marches or demonstrations with the intent of persuading others to support your beliefs or actions regarding a certain issue.

_____ (no. of times)

57... (Please list below up to three (3) causes for such rallies, marches or demonstrations)

(1) _____

(2) _____

(3) _____

58... signed or distributed a petition which encourages a person, group or organization to take action on an issue about which you have concerns.

_____ (no. of times)

59... (Please list below up to three (3) causes of such petitioning)

(1) _____

(2) _____

(3) _____

60... distributed or presented information/literature to the public about an issue for which you have concerns.

_____ (no. of times)

61... (Please list below up to three (3) issues of such information/literature distribution)

(1) _____

(2) _____

(3) _____

HOW MANY TIMES DURING THE PAST TWO (2) YEARS HAVE YOU...

62... contacted a politician to express your support or opposition to a bill they have introduced or are considering for passage.

_____ (no. of times)

63... (Please list up to three (3) titles or topics of such bills below)

(1) _____

(2) _____

(3) _____

64. How many candidates have you given of your time to campaign for over the last 5 years?

_____ (no. of candidates)

65. Have you used your right to vote in an attempt to improve situations (issues) about which you are concerned?

_____ yes _____ no

66. Please place a check mark (✓) in front of each activity you have participated in over the last two (2) years.

1. ____ I have picked up litter and/or organized a litter campaign.

2. ____ I have taken steps to reduce energy consumption.

3. ____ I have avoided the purchase of a product because of its negative effect on the environment.

4. ____ I have taken steps to reduce my water consumption.

5. ____ I have recycled paper, glass, metals and/or organic refuse.

6. ____ I have participated in a habitat improvement project (e.g., planting shrubs for wildlife, putting up birdhouses, stream renovation).

100. Sex: Male _____ Female _____

101. College major _____

102. College minor _____

103. Year in college: a. Freshman _____

b. Sophomore _____

c. Junior _____

d. Senior _____

e. Graduate _____

This completes the questionnaire. Thank you for your cooperation!

APPENDIX C

The Pilot

Revised Perceived Environmental Control Measure

(RPECM)

university of wisconsin/stevens point • stevens point, wisconsin 54481

Dear Participant,

Thank you for your willingness to participate in this study. This particular research is designed to gather information regarding attitudes with respect to environmental issues.

Although this instrument is several pages long, its completion should go quickly. There are two sections to this questionnaire. At the beginning of each section, you will find instructions on how to complete that section. Please complete all sections carefully because we will have to discard any instruments which are incomplete.

Your honesty in responding to the questions will be deeply appreciated. All of your responses will be kept confidential.

We know that your time is valuable, and we would like to express our thanks on your cooperation in this investigation.

Sincerely,

Michael Gross, Ph.D.
Professor
Interpretation/Environmental Education

Cynthia Sanford
Graduate Assistant
Environmental Education

SECTION I

INSTRUCTIONS

There is little question that the pollution of our natural environment and the subsequent erosion of our natural resource base constitute a major threat to man's continued welfare.

Public concern regarding such issues has increased since 1970 and is still alive today. Examples of these concerns, to name only a few would include: air, water and soil pollution; energy supplies; pesticide and fertilizer use; overpopulation and the food supply; solid waste disposal.

As you read through each of the following statements pertaining to environmental issues, consider each statement as though it were a real part of your life. Then carefully circle the number at the right of each statement which best indicates how strongly you agree or disagree with the statement. Please respond to every statement.

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
1.	Overall environmental quality is really a product of random occurrences so my individual ecological practices would be futile.	1	2	3	4	5	6
2.	If I were to organize a boycott on a certain product which was ecologically unsound and industry was to reduce output of that product, it would be the result of luck rather than the action I took.	1	2	3	4	5	6
3.	I could convince others to take action on an environmental concern and thereby help to determine the outcome of the issue.	1	2	3	4	5	6
4.	If I were to report environmental violations to the proper authorities I am sure this would promote a quality environment.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
5.	If I were to participate in a letter-writing campaign aimed at influencing a politician on an environmental issue, I am sure I could be effective.	1	2	3	4	5	6
6.	If I were to avoid the purchase of beverages in non-recyclable containers, it would most likely deter the continued production of those containers by industry.	1	2	3	4	5	6
7.	The actions of local, state, or national politicians on a particular environmental issue would be subject to change if I made them aware of my concerns.	1	2	3	4	5	6
8.	Any donation I could make to an environmental group would have little effect in determining the outcome of an environmental issue because only selected people can contribute enough money to be effective.	1	2	3	4	5	6
9.	By taking part in a law suit against an industry because of their violation of an environmental law, I can help to affect the final outcome of the case.	1	2	3	4	5	6
10.	If I regulate my actions with respect to water pollution, I am sure this will have a positive effect on overall water quality.	1	2	3	4	5	6
11.	The attention I pay to the individual physical influences I have on the environment will help to maintain environmental quality.	1	2	3	4	5	6
12.	Any donation I could make to an environmental group would be of little value since the outcomes of environmental problems are unpredictable.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
13.	I am sure I could convince others to support my position on an environmental issue and therefore affect its outcome.	1	2	3	4	5	6
14.	I am sure that if I used some type of legal action to prevent continued violations of an environmental law, I could be effective in reducing the unlawful degradation of the environment.	1	2	3	4	5	6
15.	Political decisions are really controlled by the hand of fate rather than by the result of influence exerted by people like me.	1	2	3	4	5	6
16.	I could prevent degradation of the environment by initiating legal action against a party whom I believe to be violating an environmental law.	1	2	3	4	5	6
17.	It would be a coincidence if I participated in an attempt to persuade others on an environmental issue and it caused them to take action on that issue.	1	2	3	4	5	6
18.	If I were to volunteer legal testimony on an environmental issue, it would have an effect on the outcome of the issue.	1	2	3	4	5	6
19.	Chance circumstances override any attempt I might make to physically maintain or improve environmental quality.	1	2	3	4	5	6
20.	My individual conservation practices related to energy, water, and air really have an effect on overall environmental quality.	1	2	3	4	5	6
21.	Any donations I could make to an environmental group would have little effect in determining the outcome of an environmental issue since the final decisions would be made by a few important people who already have their own ideas about the situation.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
22.	If I informed a politician of my stand on a particular environmental issue, it would be a coincidence if he acted in support of my stand.	1	2	3	4	5	6
23.	Fate, more than any persuasive strategy I could implement, determines the outcomes of most environmental issues.	1	2	3	4	5	6
24.	I could have an effect on an environmental issue by donating money to environmental groups which are active in solving such issues.	1	2	3	4	5	6
25.	Political decisions on environmental issues are not within the sphere of my influence, but rather are determined by key individuals.	1	2	3	4	5	6
26.	Any conservation practices I could implement would be of little value in determining the overall quality of the environment since they would be overshadowed by the activities of other individuals or groups.	1	2	3	4	5	6
27.	My vote for a politician matters little in determining the outcome of an environmental issue because whomever is elected is likely to be influenced by people more important than myself.	1	2	3	4	5	6
28.	Any donation I make to an environmental group would have little effect in determining the outcome of an environmental issue because only selected people have enough money to be effective.	1	2	3	4	5	6
29.	The outcome of an environmental issue is really determined by people in higher positions who would not be affected by any argument I could present.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
30.	The action of local, state or national politicians on a particular environmental issue would be affected if I were to make them aware of my concerns on the issue.	1	2	3	4	5	6
31.	The membership fees I could pay to a selected environmental group would serve to promote a healthy environment.	1	2	3	4	5	6
32.	It makes little difference if I regulate my actions which could affect environmental quality since it is really in the hands of industry.	1	2	3	4	5	6
33.	I believe that what will happen on an environmental issue will happen regardless of any attempt I make to influence others to support my point of view.	1	2	3	4	5	6
34.	If I were to contact a politician and inform him of my stand on a particular environmental issue, I am sure my input would be taken into consideration in his decision on the issue.	1	2	3	4	5	6
35.	My testimony at a legal hearing concerned with an environmental law violation would matter little. What will happen at the hearing will happen.	1	2	3	4	5	6
36.	Any conservation practices I could implement would be ineffective since maintaining environmental quality is similar to predicting the roll of a dice.	1	2	3	4	5	6
37.	It would really be a chance happening if the boycott I organized on ecologically unsound products was followed by a decline in industry's production of those products.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
38.	If I were to report the violation of an environmental law, it would really be a coincidence if the violator was charged with the violation.	1	2	3	4	5	6
39.	What a lucky break it would be if I contacted a politician and he later acted in support of my view on a particular environmental issue.	1	2	3	4	5	6
40.	My vote for a politician who is aligned with my particular views on an environmental issue matters little since politicial solutions to issues are really dictated by chance happenings.	1	2	3	4	5	6
41.	The environment is a victim of decisions made by a select few, so any positive ecological practices on my part would have little influence on environmental quality.	1	2	3	4	5	6
42.	It would be a chance happening if my boycott of certain ecologically unsound products was to coincide with a halt in the manufacture of those products.	1	2	3	4	5	6
43.	Individually, my implementation of conservation practices will have an effect on overall environmental quality.	1	2	3	4	5	6
44.	Even if I stop buying products because they degrade the environment, it would make little difference because the purchase habits of other individuals and groups are more important in this respect.	1	2	3	4	5	6
45.	If I were to make a donation to an environmentally active group, I am sure it could have an effect in determining the outcome of an environmental issue.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
46.	Unlike me, it takes a very influential person to convince others to support a particular stand on environmental concerns.	1	2	3	4	5	6
47.	The outcome of an environmental issue will really be determined by people above me who would not be affected by any argument I could present.	1	2	3	4	5	6
48.	If I were to contribute legal testimony on a particular environmental issue, it would have little bearing on the case since I am not an influential person.	1	2	3	4	5	6
49.	I could never be as effective as others in persuading people to take a particular type of action on an environmental issue.	1	2	3	4	5	6
50.	Regardless of my donation to an environmental group which lobbies for my point of view, it would be the result of luck if that group were able to affect the outcome of an environmental issue.	1	2	3	4	5	6
51.	Outcomes of environmental issues are unpredictable so my use of ecologically sound practices would seem pointless.	1	2	3	4	5	6
52.	I am sure I could present a persuasive argument which would sway the actions of other individuals on an environmental issue.	1	2	3	4	5	6
53.	It would be a stroke of luck if I persuaded others to take action on a particular environmental issue.	1	2	3	4	5	6
54.	I believe the outcome of an environmental issue will be influenced by what people in high positions think rather than by any persuasive strategy I might implement.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
55.	If I were inclined, I am sure I could convince others to take action on a particular environmental issue and therefore affect the outcome of that issue.	1	2	3	4	5	6
56.	Any legal action I could pursue would be of little value in maintaining a quality environment because the results of such actions are too chancy.	1	2	3	4	5	6
57.	The ecological practices of a person like myself will influence the quality of the environment.	1	2	3	4	5	6
58.	If I were to organize a boycott on certain ecologically unsound products, it would have an effect on the continued manufacture of those products.	1	2	3	4	5	6
59.	If I initiated a law suit against a party who I felt was violating an environmental law, it would be of little value since that type of action is really more effective when pursued by powerful other individuals or groups.	1	2	3	4	5	6
60.	My participation in a letter-writing campaign to influence a politician on a particular environmental issue would have little effect because certain others would influence him more than I.	1	2	3	4	5	6
61.	If I initiated legal action against a party accused of violating an environmental law, and the case turned out the way I thought it should, I would feel it was the result of luck and not the result of my action.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
62.	If I participated in legal action against a party accused of violating an environmental law, and the case turned out the way I thought it should, it would just be a chance happening.	1	2	3	4	5	6
63.	Achieving and maintaining environmental quality is really the result of chance happenings since any conservation practices I could utilize would be ineffective.	1	2	3	4	5	6
64.	In a law suit against an accused violator of an environmental law, my participation would be of little value in determining the outcome because it's really determined by fate.	1	2	3	4	5	6
65.	It would be a coincidence if I participated in a persuasive strategy to sway others on an environmental concern and there came about more action on that particular issue.	1	2	3	4	5	6
66.	Acts of chance, more than any political influence I could bring to bear, really determine political decisions made on environmental issues.	1	2	3	4	5	6
67.	I am sure I could implement ecologically sound practices which would help develop a quality environment.	1	2	3	4	5	6
68.	I believe I can be effective in determining the outcome of an environmental issue by persuading others to accept my point of view.	1	2	3	4	5	6
69.	If I used some type of legal action to prevent continued violation of an environmental law, I could be effective in determining the outcome of the situation.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
70.	By prompting others into action, I could play an effective role in determining the outcome of a particular environmental issue.	1	2	3	4	5	6
71.	If I were to contact a politician and make my point of view known on an environmental issue, I am sure this would be taken into consideration when the legislature takes action on the issue.	1	2	3	4	5	6
72.	Overall environmental quality is really a product of chance happenings so any conservation practices I could implement would be useless.	1	2	3	4	5	6
73.	If I were to initiate some type of legal action to prevent the violation of an environmental law, it would be useless since such actions are only effective when used by influential individuals.	1	2	3	4	5	6
74.	Since politicians probably form their own ideas about solutions to environmental problems, it would be ineffective to contact and present them with my views on an issue.	1	2	3	4	5	6
75.	Because a handful of key individuals really affect the decisions of a politician on an environmental issue, people like myself are relatively ineffective in determining the outcome of environmental quality.	1	2	3	4	5	6
76.	Because powerful individuals may affect the actions of a politician on an environmental issue, people like me are relatively ineffective in this respect.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
77.	If I were to use some type of legal action to prevent the violation of an environmental law it would be useless because such actions are only effective when used by selected individuals.	1	2	3	4	5	6
78.	Environmental quality is a victim of decisions made by a select few, so any positive ecological practices on my part would have little influence on the quality of the environment.	1	2	3	4	5	6
79.	Any positive ecological practices I could implement would be of little value in determining the quality of the environment since they would be overshadowed by the activities of other individuals or groups.	1	2	3	4	5	6
80.	The legal testimony I could give on an environmental issue would help to influence the decision made on the issue.	1	2	3	4	5	6
81.	Any legal action I could pursue would be of little value in maintaining a quality environment because such actions are only effective when employed by a few key individuals.	1	2	3	4	5	6
82.	Voting for or against a political candidate due to his/her position on an environmental concern is one way I can effectively influence the outcome of environmental quality.	1	2	3	4	5	6
83.	The attention I pay to the individual physical influences I have on the environment will help to maintain environmental quality.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
84.	Membership fees I could pay to environmental groups who lobby for a sound environment would be of little value since the outcomes of environmental problems are unpredictable.	1	2	3	4	5	6
85.	Even if I stop buying products because they degrade the environment, it would make little difference because the purchasing habits of other individuals and groups are more important than mine.	1	2	3	4	5	6
86.	Any monetary contributions I could make to an environmental group would be of little value since the solutions to environmental problems are unpredictable.	1	2	3	4	5	6
87.	If I make an attempt to regulate my actions with respect to air pollution, I am sure this will have a positive effect on air quality.	1	2	3	4	5	6
88.	I am sure that I, as an individual, could implement conservation practices which would help develop a quality environment.	1	2	3	4	5	6

SECTION II

INSTRUCTIONS

In this section, you are presented with a series of questions that deal with your actual use of some problem solving actions.

Please answer all the questions as completely and honestly as you can.

HOW MANY TIMES DURING THE PAST TWO (2) YEARS HAVE YOU...

89...paid membership dues to an organization because you thought they would take positive action on some issue for which you have concerns?

_____ (no. of memberships)

90...(Please list up to three (3) such organizations below)

(1) _____

(2) _____

(3) _____

91... donated money (other than membership fees) to support some project related to a concern you had for an issue?

_____ (no. of donations)

92... (Please list up to three (3) such projects/donations below)

(1) _____

(2) _____

(3) _____

93... avoided doing business with a company or refused to buy their product(s) in order to bring economic pressure to bear on some issue about which you have concerns?

_____ (no. of times)

94... (Please list up to three (3) such companies or products)

(1) _____

(2) _____

(3) _____

95... reported to the proper authorities illegal actions taken or about to be taken by a group, person, or organization?

_____ (no. of times)

96... (Please list up to three (3) such illegal actions below)

(1) _____

(2) _____

(3) _____

97... been involved in filing a lawsuit or filing for an injunction concerning some issue?

_____ (no. of times)

98... (Please list up to three (3) topics of such injunctions/ lawsuits)

(1) _____

(2) _____

(3) _____

99... participated in rallies, marches or demonstrations with the intent of persuading others to support your beliefs or actions regarding a certain issue?

_____ (no. of times)

100... (Please list up to three (3) causes for such rallies, marches or demonstrations)

(1) _____

(2) _____

(3) _____

101... distributed or presented information/literature to the public about an issue for which you have concerns?

_____ (no. of times)

102... (Please list below up to three (3) issues of such information/literature distribution)

(1) _____

(2) _____

(3) _____

103... contacted a politician to express your support or opposition to a bill they have introduced or are considering for passage?

_____ (no. of times)

104... (Please list up to three (3) titles or topics of such bills below)

(1) _____

(2) _____

(3) _____

105. How many candidates have you given of your time to campaign for over the last 5 years?

_____ (no. of candidates)

106. Have you used your right to vote in an attempt to improve situations (issues) about which you are concerned?

_____ yes _____ no

Please place a check mark (✓) in front of each activity you have participated in over the last two (2) years.

1. _____ I have picked up litter and/or organized a litter campaign.

2. _____ I have taken steps to reduce energy consumption.

3. _____ I have avoided the purchase of a product because of its negative effect on the environment.

4. _____ I have taken steps to reduce my water consumption.

5. _____ I have recycled paper, glass, metals and/or organic refuse.

6. _____ I have participated in a habitat improvement project (e.g., planting shrubs for wildlife, putting up birdhouses, stream renovation).

108. Sex: Male _____ Female _____

109. College major _____

110. College minor _____

111. Year in college: a. Freshman _____

b. Sophomore _____

c. Junior _____

d. Senior _____

e. Graduate _____

This completes the questionnaire. Thank you for your cooperation!!

APPENDIX D

The Final

Revised Perceived Environmental Control Measure

(RPECM)

university of wisconsin/stevens point • stevens point, wisconsin 54481

Dear Participant,

Thank you for your willingness to participate in this study. This particular research is designed to gather information regarding attitudes with respect to environmental issues.

Although this instrument is several pages long, its completion should go quickly. There are two sections to this questionnaire. At the beginning of each section, you will find instructions on how to complete that section. Please complete all sections carefully because we will have to discard any instruments which are incomplete.

Your honesty in responding to the questions will be deeply appreciated. All of your responses will be kept confidential.

We know that your time is valuable, and we would like to express our thanks on your cooperation in this investigation.

Sincerely,

Michael Gross, Ph.D.
Professor
Interpretation/Environmental Education

Cynthia Sanford
Graduate Assistant
Environmental Education

SECTION I

INSTRUCTIONS

There is little question that the pollution of our natural environment and the subsequent erosion of our natural resource base constitute a major threat to man's continued welfare.

Public concern regarding such issues has increased since 1970 and is still alive today. Examples of these concerns, to name only a few would include: air, water and soil pollution; energy supplies; pesticide and fertilizer use; overpopulation and the food supply; solid waste disposal.

As you read through each of the following statements pertaining to environmental issues, consider each statement as though it were a real part of your life. Then carefully circle the number at the right of each statement which best indicates how strongly you agree or disagree with the statement. Please respond to every statement.

	Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
1. The legal testimony I could give on an environmental issue would help to influence the decision made on the issue.	1	2	3	4	5	6
2. Because a handful of key individuals really affect the decisions of a politician on an environmental issue, people like myself are relatively ineffective in determining the outcome of environmental quality.	1	2	3	4	5	6
3. By prompting others into action, I could play an effective role in determining the outcome of a particular environmental issue.	1	2	3	4	5	6
4. If I were to report the violation of an environmental law, it would really be a coincidence if the violator was charged with the violation.	1	2	3	4	5	6

	Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
5. What a lucky break it would be if I contacted a politician and he later acted in support of my view on a particular environmental issue.	1	2	3	4	5	6
6. If I were to contact a politician and make my point of view known on an environmental issue, I am sure this would be taken into consideration when the legislature takes action on the issue.	1	2	3	4	5	6
7. It would be a chance happening if my boycott of certain ecologically unsound products was to coincide with a halt in the manufacture of those products.	1	2	3	4	5	6
8. If I make an attempt to regulate my actions with respect to air pollution, I am sure this will have a positive effect on air quality.	1	2	3	4	5	6
9. If I used some type of legal action to prevent continued violation of an environmental law, I could be effective in determining the outcome of the situation.	1	2	3	4	5	6
10. Because powerful individuals may affect the actions of a politician on an environmental issue, people like me are relatively ineffective in this respect.	1	2	3	4	5	6
11. If I were inclined, I am sure I could convince others to take action on a particular environmental issue and therefore affect the outcome of that issue.	1	2	3	4	5	6
12. The actions of local, state, or national politicians on a particular environmental issue would be subject to change if I made them aware of my concerns.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
13.	It would be a coincidence if I participated in a persuasive strategy to sway others on an environmental concern and there came about more action on that particular issue.	1	2	3	4	5	6
14.	Even if I stop buying products because they degrade the environment, it would make little difference because the purchasing habits of other individuals and groups are more important than mine.	1	2	3	4	5	6
15.	I am sure that if I used some type of legal action to prevent continued violations of an environmental law, I could be effective in reducing the unlawful degradation of the environment.	1	2	3	4	5	6
16.	Achieving and maintaining environmental quality is really the result of chance happenings since any conservation practices I could utilize would be ineffective.	1	2	3	4	5	6
17.	The action of local, state, or national politicians on a particular environmental issue would be affected if I were to make them aware of my concerns on the issue.	1	2	3	4	5	6
18.	The membership fees I could pay to a selected environmental group would serve to promote a healthy environment.	1	2	3	4	5	6
19.	The outcome of an environmental issue is really determined by people in higher positions who would not be affected by any argument I could present.	1	2	3	4	5	6
20.	I could have an effect on an environmental issue by donating money to environmental groups which are active in solving such issues.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
21.	Any legal action I could pursue would be of little value in maintaining a quality environment because such actions are only effective when employed by a few key individuals.	1	2	3	4	5	6
22.	Overall environmental quality is really a product of chance happenings so any conservation practices I could implement would be useless.	1	2	3	4	5	6
23.	The outcome of an environmental issue will really be determined by people above me who would not be affected by any argument I could present.	1	2	3	4	5	6
24.	The ecological practices of a person like myself will influence the quality of the environment.	1	2	3	4	5	6
25.	If I were to use some type of legal action to prevent the violation of an environmental law it would be useless because such actions are only effective when used by selected individuals.	1	2	3	4	5	6
26.	It would really be a chance happening if the boycott I organized on ecologically unsound products was followed by a decline in industry's production of those products.	1	2	3	4	5	6
27.	If I informed a politician of my stand on a particular environmental issue, it would be a coincidence if he acted in support of my stand.	1	2	3	4	5	6
28.	Any donation I make to an environmental group would have little effect in determining the outcome of an environmental issue because only selected people have enough money to be effective.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
29.	I believe that what will happen on an environmental issue will happen regardless of any attempt I make to influence others to support my point of view.	1	2	3	4	5	6
30.	Any donations I could make to an environmental group would have little effect in determining the outcome of an environmental issue since the final decisions would be made by a few important people who already have their own ideas about the situation.	1	2	3	4	5	6
31.	Fate, more than any persuasive strategy I could implement, determines the outcomes of most environmental issues.	1	2	3	4	5	6
32.	My vote for a politician who is aligned with my particular views on an environmental issue matters little since political solutions to issues are really dictated by chance happenings.	1	2	3	4	5	6
33.	Since politicians probably form their own ideas about solutions to environmental problems, it would be ineffective to contact and present them with my views on an issue.	1	2	3	4	5	6
34.	If I initiated legal action against a party accused of violating an environmental law, and the case turned out the way I thought it should, I would feel it was the result of luck and not the result of my action.	1	2	3	4	5	6
35.	It makes little difference if I regulate my actions which could affect environmental quality since it is really in the hands of industry.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
36.	If I were to make a donation to an environmentally active group, I am sure it could have an effect in determining the outcome of an environmental issue.	1	2	3	4	5	6
37.	Outcomes of environmental issues are unpredictable so my use of ecologically sound practices would seem pointless.	1	2	3	4	5	6
38.	I am sure I could present a persuasive argument which would sway the actions of other individuals on an environmental issue.	1	2	3	4	5	6
39.	Unlike me, it takes a very influential person to convince others to support a particular stand on environmental concerns.	1	2	3	4	5	6
40.	Any positive ecological practices I could implement would be of little value in determining the quality of the environment since they would be overshadowed by the activities of other individuals or groups.	1	2	3	4	5	6
41.	If I participated in legal action against a party accused of violating an environmental law, and the case turned out the way I thought it should, it would be just a chance happening.	1	2	3	4	5	6
42.	Environmental quality is a victim of decisions made by a select few, so any positive ecological practices on my part would have little influence on the quality of the environment.	1	2	3	4	5	6
43.	Regardless of my donation to an environmental group which lobbies for my point of view, it would be the result of luck if that group were able to affect the outcome of an environmental issue.	1	2	3	4	5	6

		Disagree strongly	Disagree somewhat	Disagree slightly	Agree slightly	Agree somewhat	Agree strongly
44.	If I were to initiate some type of legal action to prevent the violation of an environmental law, it would be useless since such actions are only effective when used by influential individuals.	1	2	3	4	5	6
45.	I am sure that I, as an individual, would implement conservation practices which would help develop a quality environment.	1	2	3	4	5	6

SECTION II

INSTRUCTIONS

In this section, you are presented with a series of questions that deal with your actual use of some problem solving actions.

Please answer all the questions as completely and honestly as you can.

HOW MANY TIMES DURING THE PAST TWO (2) YEARS HAVE YOU...

89...paid membership dues to an organization because you thought they would take positive action on some issue for which you have concerns?

_____ (no. of memberships)

90...(Please list up to three (3) such organizations below)

(1) _____

(2) _____

(3) _____

91... donated money (other than membership fees) to support some project related to a concern you had for an issue?

_____ (no. of donations)

92... (Please list up to three (3) such projects/donations below)

(1) _____

(2) _____

(3) _____

93... avoided doing business with a company or refused to buy their product(s) in order to bring economic pressure to bear on some issue about which you have concerns?

_____ (no. of times)

94... (Please list up to three (3) such companies or products)

(1) _____

(2) _____

(3) _____

95... reported to the proper authorities illegal actions taken or about to be taken by a group, person, or organization?

_____ (no. of times)

96... (Please list up to three (3) such illegal actions below)

(1) _____

(2) _____

(3) _____

97... been involved in filing a lawsuit or filing for an injunction concerning some issue?

_____ (no. of times)

98... (Please list up to three (3) topics of such injunctions/ lawsuits)

(1) _____

(2) _____

(3) _____

99... participated in rallies, marches or demonstrations with the intent of persuading others to support your beliefs or actions regarding a certain issue?

_____ (no. of times)

100... (Please list up to three (3) causes for such rallies, marches or demonstrations)

(1) _____

(2) _____

(3) _____

101... distributed or presented information/literature to the public about an issue for which you have concerns?

_____ (no. of times)

102... (Please list below up to three (3) issues of such information/literature distribution)

(1) _____

(2) _____

(3) _____

103... contacted a politician to express your support or opposition to a bill they have introduced or are considering for passage?

_____ (no. of times)

104... (Please list up to three (3) titles or topics of such bills below)

(1) _____

(2) _____

(3) _____

105. How many candidates have you given of your time to campaign for over the last 5 years?

_____ (no. of candidates)

106. Have you used your right to vote in an attempt to improve situations (issues) about which you are concerned?

_____ yes _____ no

Please place a check mark (✓) in front of each activity you have participated in over the last two (2) years.

1. _____ I have picked up litter and/or organized a litter campaign.

2. _____ I have taken steps to reduce energy consumption.

3. _____ I have avoided the purchase of a product because of its negative effect on the environment.

4. _____ I have taken steps to reduce my water consumption.

5. _____ I have recycled paper, glass, metals and/or organic refuse.

6. _____ I have participated in a habitat improvement project (e.g., planting shrubs for wildlife, putting up birdhouses, stream renovation).

108. Sex: Male _____ Female _____

109. College major _____

110. College minor _____

111. Year in college: a. Freshman _____

b. Sophomore _____

c. Junior _____

d. Senior _____

e. Graduate _____

This completes the questionnaire. Thank you for your cooperation!!

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