AN ABSTRACT OF THE THESIS OF

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Individuals participating in the environmental sport activity courses of backpacking-orienteering, mountaineering, and scuba diving responded to pre- and post-test trials of the Self-Cathexis Scale and the Body-Cathexis Scale. Two control groups composed of random samples of the university student population responded to the Self-Cathexis Scale and Body-Cathexis Scale: one group responded to the pre-test; one group responded to the post-test. Test administrations were separated by a six to seven week interval. An ANOVA groups x trial and subjects x trials design indicated that: (a) no significant difference in pre-test mean scores of self-cathexis or body-cathexis existed among the groups; (b) no significant difference in post-test mean scores of self-cathexis or body-cathexis existed among the experimental groups; (c) no significant difference in post-test mean self-cathexis scores existed among the experimental groups and the control group; (d) no significant difference in post-test mean body-cathexis scores existed among the backpacking-orienteering, mountaineering, and control groups;

(e) a significant difference in post-test mean body-cathexis scores existed between the scuba diving group and the control group; and (f) no significant difference existed between the pre- and post-test measures of self-cathexis or body-cathexis of any of the groups. Stepwise discriminant analysis was utilized to compare the cathexis profiles among the groups. Results of the discriminant analysis indicated that: (a) groups which demonstrated no significant difference in pre-test mean self-cathexis scores exhibited no significant difference in pre-test self-cathexis profiles; (b) groups which demonstrated no significant difference in pre-test mean body-cathexis scores exhibited a significant difference in pre-test body-cathexis profiles; (c) groups which demonstrated no significant difference in post-test self-cathexis or body-cathexis mean scores exhibited a significant difference in both cathexis profiles; and (d) groups which demonstrated a significant difference in post-test body-cathexis mean scores exhibited a significant difference in post-test body-cathexis profiles.

Self-Cathexis and Body-Cathexis of Participants in Selected Environmental Sport Activities

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CHAPTER I

INTRODUCTION

> Man moves to survive.
> Man moves to discover and understand his environment.
> Man moves to control and adjust to his environment.
> (Allenbaugh, 1967, p. 64).

Growth toward a positive self-concept is related to the individual's satisfaction with one's "self," "body," and "movement." The manner in which an individual views one's self and the security one has in one's self and body are directly related to the way in which the individual perceives and faces the world.

Movement educators often assume that involvement in movement activities results in the positive development of the self-concept and body-image. At present, research does not conclusively support this assumption, although studies have indicated some interesting variables which may contribute to the accomplishment of the development of the phenomenal self. The variables discussed in the literature which are purported to have a positive effect upon the development of the self-concept and body-image are those of success and failure in a competitive situation, increases in the level of physical fitness and cardiorespitory fitness, and the acquisition of specific motor skills. Contradicting results exist for all of the purported variables except "success and failure." These contradictions tend to lead to the conclusion that

other controlling or influencing variables obviously exist. Perhaps two variables influencing previous results have been the variability in the type of specific motor activity experienced and the importance of the specific skill to the life of the individual participant.

Although phenomenological theory emphasizes the effects of environmental experience on self- and body-image development and indirectly implies that a relationship may exist between environmental sport activities and the development of the self, little research has dealt with the effects of motor acts which are related to the individual's survival and harmonious interaction with the physical environment. The theory that one's self is influenced by experience with the environment would appear to indicate that the entire area of the study of environmental sport activities may be of significance. Also, the new emphasis and increasing popularity of environmental sport activities call for research and understanding of the potential of these activities as they relate to the development of the individual's level of self-understanding and satisfaction. If a relationship exists between specific movement activities and positive self-development, educators and other professionals must be aware of those activities which have the greatest potential relative to personal development and should consider the inclusion and application of these activities in their various programs.

Purpose of the Study

The purpose of this study was to compare measures of self-cathexis and body-cathexis among groups of individuals participating in the environmental sport activity courses of backpacking-orienteering,

mountaineering, and scuba diving. The study was designed to indicate possible answers to the following questions: (a) Does a significant difference occur in the self-cathexis and/or body-cathexis of groups of individuals during participation in an environmental sport activity course? (b) Does the self-cathexis and/or body-cathexis of groups of individuals who participate in environmental sport activity courses differ from those of a control group comprised of a random sample of university students? (c) Do groups of individuals who participate in different environmental sport activity courses differ in self-cathexis and/or body-cathexis? (d) Does a significant difference in cathexis profiles exist among groups which exhibit no significant difference in mean cathexis scores? and, (e) Does a significant difference in cathexis profiles exist among groups which exhibit a significant difference in mean cathexis scores?

Hypotheses

The following hypotheses were established to accomplish the stated purposes:

1. No significant difference in scores of self-cathexis and/or body-cathexis exists between two random samples of university students.
2. No significant difference in pre-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who elect to participate in different environmental sport activity courses and a random sample of university students.

3. No significant difference in pre-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who elect to participate in different environmental sport activity courses.
4. No significant difference between pre- and post-test scores of self-cathexis and/or body-cathexis occurs in groups of individuals during participation in environmental sport activity courses.
5. No significant difference in post-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who participated in different environmental sport activity courses and a random sample of university students.
6. No significant difference in post-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who participated in different environmental sport activity courses.
7. If no significant difference in mean cathexis scores exists among the groups, then no significant difference exists among the group cathexis profiles.
8. If a significant difference in mean cathexis scores exists among the groups, then no significant difference exists among the group cathexis profiles.

Experimental Design

The following groups were involved in this study: (a) an experimental group composed of those individuals enrolled in backpacking-

orienteering courses; (b) an experimental group composed of those individuals enrolled in a mountaineering course; (c) an experimental group composed of those individuals enrolled in a scuba diving course; and (d) two control groups composed of two random samples of university students.

An analysis of variance design of groups x trial and subjects x trials was utilized to analyze the scores of the criterion instruments (the Self-Cathexis Scale and the Body-Cathexis Scale). Multiple discriminant function analysis was utilized to analyze and compare group cathexis profiles on both the pre- and post-tests.

Definitions

For the purpose of this study, the following terms were utilized:

Self: "Those aspects of the perceptual field to which we refer when we say 'I' or 'me'" (Combs & Snygg, 1959, p. 43).

Self-Image or Self-Concept: Self-image or self-concept refers to an individual's conscious evaluation and knowledge of his or her own personal characteristics.

Body-Image or Body-Concept: Body-image or body-concept refers to an individual's conscious image, feelings, and attitudes toward his or her body.

Self-Cathexis: Self-cathexis is the degree of satisfaction reported by an individual for various conceptual aspects of the self (Second & Jourard, 1953). Self-cathexis is an aspect of the self-concept. For the purpose of this study, self-cathexis was measured by Jourard and Second's Self-Cathexis Scale.

Body-Cathexis: "Body-cathexis is defined as the degree of satisfaction reported by an individual for the parts of his body" (Jourard & Second, 1955, p. 137). Body-cathexis is an aspect of the body-image. For the purpose of this study, body-cathexis was measured by Jourard & Second's Body-Cathexis Scale.

Environmental Sport Activities: Environmental sport activities are those activities in which the individual directly interacts with the physical environment and attempts to overcome or deal with the environmental elements. For the purpose of this study, environmental sport activities include backpacking-orienteering, mountaineering, and scuba diving.

Assumptions

The present study was based on phenomenological theory which assumes that individual differences in response to questions are representative of the differences in the individuals' view of self and environment (Wylie, 1974, p. 8).

Delimitations

Only the constructs of self-cathexis and body-cathexis as measured by Jourard and Second's Self-Cathexis Scale and Body-Cathexis Scale were included in this study. The study was limited to Oregon State University students enrolled Spring Term 1976. Members of the experimental groups were those students enrolled in backpacking-orienteering, mountaineering, and scuba diving courses who participated in both the pre- and post-tests. The control groups were comprised of two random

samples of the Oregon State University student population as listed in the Oregon State University Directory.

Limitations

Interpretation of scores from a self-report method of measurement is limited to the extent that individuals are willing and able to honestly evaluate their feelings. Respondents can be influenced by a conscious or unconscious tendency to respond in a given manner resulting on a response set. However, responding anonymously to such instruments was thought to increase the accuracy of the measurement relative to conscious response. Another limitation relative to the subjects was a varying level of experience in environmental sport activities. Also, subjects participated in courses taught by different instructors.

CHAPTER II

REVIEW OF THE LITERATURE

Phenomenological Theory

The phenomenological approach to psychology attempts to understand the behavior of the individual from the individual's own point of view (Combs & Snygg, 1959, p. 11). Phenomenological theorists believe that behavior is dependent upon the individual's phenomenal field; that is "the entire universe, including himself, as it is experienced by the individual..." (Combs & Snygg, 1959, p. 20). Thus, it is the belief of the phenomenological theorists that for human behavior to be understood and accurately predicted, one must have knowledge of the individual's conscious perception of his or her self, the environment, and the relationship of the environment to the self (Wylie, 1974, p. 8).

Knowledge of the individual's conscious self is not necessarily directly observable by others or by the individual. However, phenomenological theory assumes that psychological processes which cannot be directly observed can be inferred from observable behavior in the form of a self-report. "The self-report is the individual's self description as he reports it to an outside observer" (Combs & Snygg, 1959, p. 440). Individual differences in self-reports are assumed to be representative of the individual's view of self and environment (Wylie, 1974). Therefore, every evaluative statement is considered a representation of the phenomenal self and inferences my follow (Strong & Feder, 1961, p. 1970).

The study of self-concept and body-image is phenomenological in nature. The most commonly studied aspects of the phenomenal (conscious) self are attitudes of satisfaction (cathexis), esteem, self-favorability, and discrepancy-congruence scores between the self and the ideal self (Wylie, 1974, p. 127).

Self-Concept

Self, as defined by phenomenological theorists and recognized in this study, refers to the conscious self - "the self as object of the person's own knowledge and evaluation" (Wylie, 1974, p. 1). Thus, the self-concept is the person's conscious knowledge of one's own cognitive, affective, and physical characteristics and abilities and one's personal positive or negative evaluation of those characteristics (Harris, 1973; Wylie, 1974). In other words, the self-concept is one's conscious interpretation of one's own unique relationship with the environment. This concept of self controls and determines the individual's behavior. The person's view of self, regardless of discrepancies with what may actually be true, determines his or her actions. These actions will be congruent with the self-concept, whether it be accurate or inaccurate (Maltz, 1960, 1970, 1974; Wylie, 1974). Generally the individual with a positive self-concept feels more secure and satisfied about one's self and has a more positive attitude toward others and the environment (Brownfair, 1952; Hellison, 1970; Jarvis, 1959; Stock, 1949). The lack of a positive self-concept is demonstrated by a discrepancy between the individual's actual self-concept and the desired self. According to Rogers and Dymond (1954), "a discrepancy between the self-concept and the concept of the desired or valued self reflects a sence of self-dissatisfaction which in turn

generates the motivation for coming into counseling" (p. 58).

"The phenomenal self is both product of the individual's experience and producer of whatever new experiences he is capable of" (Combs & Snygg, 1959, p. 146). The self is formed by one's entire life experiences and is comprised of various aspects including body-image, self-concept, movement concept, body-cathexis, and self-cathexis (Allen, 1972; Doudlah, 1962). Social interaction and environmental interactions are basic to molding and determining the self, and occur relative to the individual's body, movement, and self (Doudlah, 1962; Maltz, 1970; Wylie, 1974). Thus, self, body, and movement experiences are all important to the development of the self-concept. In addition, movement has been viewed as a symbol of the self-concept (Ulrich, 1968, p. 38). Therefore, a dual relationship appears to exist between movement and the development of the self. According to Joki (1968), there is a "close relationship between inner attitude and posture and movements... From a given attitude motor acts derive spontaneously... Visa versa, posture and movements may elicit corresponding mental experiences" (p. 67).

If experience is the source of formation of the self-concept, then a change in experience could result in a change in self-concept. Negative feelings regarding worth and acceptance are learned through experience and, therefore, can be unlearned and replaced by more positive feelings (Maltz, 1970; Satir, 1972). Thus, the self-concept is generally thought to be vulnerable to change, and "at any point in a person's life he can begin to feel better about himself" (Satir, 1972, p. 27). These changes take place readily when one acquires abilities and realizes the degree of control one can exercise over the living

environment (Maltz, 1974). As concluded by Allen (1972), "it would seem...that the self-concept can be shaped to a great degree by the kinds of experiences available to the individual" (p. 37).

Body-Image

The concept of body-image is a component of the self-concept and stems from neurological, psychological, and physiological observations. "Body-image" or "body-concept" as defined by Fisher and Cleveland (1968) is:

> a term which refers to the body as a psychological experience, and focuses on the individual's feelings and attitudes toward his own body. The body image is literally an image of his own body which the individual has evolved through experience. (p. x)

Because every human experience involves, and is relative to, one's own body, all of man's expressive communication, feelings, and experiences are in terms of the body. Thus, it has been discussed that the physical self is the base of construction of the psychological self and the outward manifestation of the individual's being and identity (Fisher, 1972, p. 27; Morris & Whiting, 1972, p. 141). Body attitudes may reflect a great deal about the self and affect the individual's entire being (Myers, 1969; Morris & Whiting, 1971).

The body-image develops gradually, relative to experience, as does the self-concept. Specific experiences purported to develop the body-image are those which involve visual, tactile, and proprioceptive stimuli (Critchley, 1950, p. 335). Other major factors affecting the formation of the body-image are pain, motor control of the legs and arms, one's physical characteristics, one's feelings about one's self,

and social interaction with others (Fisher & Cleveland, 1968; Frostig, 1970; Schilder, 1950). The motor component is especially significant to the development of the body-image as it is during motion that we are most aware of our body. Movement sharpens and refines one's perception of the body (Schilder, 1950). Through movement and the resulting contacts with the outside world one's knowledge of his or her body increases, and one's potential is identified relative to environmental elements (Schilder, 1950; Slusher, 1967). In support and explanation of the preceding statement Schilder (1950) wrote:

> ...movement leads to a better orientation in relation to our own body. We do not know very much about our body unless we move it. By movement we come into a definite relation to the outside world and to objects, and only in contrast with the outside world are we able to correlate the diverse impressions concerning our own body. The knowledge of our body is to a great extent dependent upon our action (p. 112).

The feelings or attitudes an individual has toward his or her body are definitely affected by experience. These feelings modulate the individual's behavior responses and interpretation of the world (Fisher, 1970, 1972; Gottesman & Caldwell, 1966). The body will undoubtedly have a great influence on the individual as it is a surrounding object from which one cannot escape and is synonymous with one's existence (Fisher, 1970, p. viii). Jourard and Secord (1955) further emphasize this point when they wrote: "There can be little doubt that feelings about the body have marked behavioral consequences, as both casual and clinical observations attest" (p. 130).

An individual's body-image is highly vulnerable to change as exemplified through responses and feelings related to illness, injury, and exterior factors such as clothing (Critchley, 1950; Fisher, 1970).

Body-image is also altered with each new postural position or pattern of muscle tonus (Fisher, 1970; Schilder, 1950), feelings of cold and heat, and distortions such as experiencing vertigo (Critchley, 1950, p. 340). The vulnerability of the body-image relative to change is an important factor relating to the possibility of body-image modification through given movement experience.

Relationship of Body-Image to Self-Concept

Self-concept and body-image are known to be separate constructs but correlate in a positive direction. A study by Pollard (1975) involving college women indicated a significant positive relationship of .37 between body-concept, as measured by the Body-Cathexis Scale, and self-concept as measured by Bills' Index of Adjustment and Values.

Similar results were found by Doudlah (1962) when she employed the Q Sort Method of evaluating body-concept, self-concept and movement-concept. Significant positive correlations were found to exist between self-concept and body-concept. Body-concept was also shown to correlate positively with movement-concept. No significant relationship was found to exist between self-concept and movement-concept. However, a study by Nelson (1967) indicated a significant positive relationship between movement-concept and self-regard. Nelson's study supported Doudlah's in that significant relationships were found in the following areas: (a) between self-concept, as measured by the Q Sort Technique, and body-cathexis, as measured by the Body-Cathexis Scale; (b) between body-cathexis and movement-concept; and (c) among body-cathexis, self-concept, and movement-concept.

From various studies with the Cathexis Scales, Jourard and Secord (1955) have reported positive correlations from .58 to .66 between body-cathexis and self-cathexis significant at the .01 level. Body-cathexis and self-cathexis showed significant negative correlations with the trait of insecurity as measured by the Maslow Test of Psychological Security and Insecurity (Jourard & Remy, 1955). Security as measured by the Maslow Test refers to "the belief that one is adequate to handle life problems, and that one is well liked both by oneself and by significant others" (Jourard & Remy, 1955, p. 364).

Zion (1965) reported a significant linear relationship to exist between self-description and body-description; between ideal self and ideal body; and between self-ideal-discrepancy and body-ideal-discrepancy. In conclusion, as stated by Zion, "it appears that the security one has in one's body is related to the security with which one faces one's self and the world" (p. 494).

Physical Activity, Self-Concept, and Body-Image

A basic assumption within the field of physical education has been that movement experiences can affect aspects of one's self-concept and body-image. The basis for this assumption has been related to the process of development of the self and the variables of experience, one's total self-perception (including the perception of one's body and movement characteristics), and social interaction. As stated by Harris (1972a), "empirical evidence and observation suggest that physical activity may contribute immeasurably to the development of a sound body-image and perhaps a more positive self-image" (p. 8). Slusher (1967),

in his book Man, Sport, and Existence, supported this view and wrote: "There can be little doubt that, in sport, the body is brought into conscious awareness. Through a sport activity...man locates his body as belonging to him...the body is self-experienced" (p. 34). Continuing, Slusher wrote, "In the straining and alteration from normal pursuits, man feels his body as he never knew it before" (p. 36). However, much of the professional literature concerning the development of the self-concept and body-image through sport and movement tends to be contradictory and, thus, inconclusive. Although contradictions do exist, interesting theories have been brought forth.

Changes in one's physical condition are known to alter body-image and self-concept as demonstrated through individuals' reactions to conditions of poor health and good health. "For most people the smooth-running body in good condition is likely to give a feeling of enhancement of the self, as it makes its owner feel adequate, competent, and in control of situations" (Combs & Snygg, 1959, p. 77). Thus, it is purported that changes in the individual's level of physical fitness, or maintenance of high levels of fitness, would have some effect on the person's body-image and self-concept.

A study by Collingwood (1972) indicated that a positive self-concept could progress through the physical sphere. His study of male rehabilitation clients, who participated in a fitness program and responded to Bills' Index of Adjustment and Values, showed significant increases in fitness paralleled by significant positive changes in self-concept and self-acceptance. Similar results were reported by Gary and Guthrie (1972), who noted significant positive changes in the body-cathexis and

self-cathexis of alcoholics who participated in a jogging program.

Studies involving adult subjects indicated that individuals who maintained a higher level of fitness demonstrated more positive attitudes toward their self, their body, and others (Baron, 1969; Hellison, 1969; Rothfarb, 1970). Baron (1969) employed the Berger Scale as a measure of attitude toward others and the Discomfort Relief Quotient as a measure of attitude toward the self. From her results, she concluded that when an individual functions at a higher level, one tends to view one's self and others more positively. Similarly, Hellison (1969) reported that subjects with a history of inactivity demonstrated a more negative body attitude than did subjects with a history of activity. Also reporting similar results was Rothfarb (1970) who concluded that college men who exercised regularly demonstrated significantly greater self-esteem, as measured by the Tennessee Self-Concept Scale, than did non-exercisers or occasional exercisers.

The effect of physical fitness on the self- and body-concepts of children has also been studied. Sorenson (1975) evaluated the effects of a strength training program on seventh grade boys and reported a significant positive change in self-concept as measured by the Tennessee Self-Concept Scale. Johnson, Fretz, and Johnson (1968) found that a physical development program paralleled a decrease in the self-ideal-discrepancy in experimental subjects and concluded "that an individualized physical development program can be of significant value in the total functioning of the child" (p. 565).

Contradicting the previously discussed findings are studies which indicated no significant relationship to exist between fitness

and self-concept variables. Using the American Association of Health, Physical Education, and Recreation Physical Fitness Test and the Piers-Harris Self-Concept Scale as test instruments, Phelan (1974) reported no relationship between the physical fitness and the self-concept of seventh and eighth grade students. Similarly, Neale, Sonstroem, and Metz (1969) reported no significant difference in general self-esteem between high fit and low fit boys, as measured by the Rosenberg Self-Esteem method. Relative to college males, Christian (1969) and Johnston (1969) reported no relationship between physical fitness and self-concept as measured by the Tennessee Self-Concept Scale and the Q Sort Technique.

The ability to perform motor skills has been thought to influence the individual's concept of body and self. As purported by Bidolph (1954)

> ...The ability to control the nerve-muscle mechanisms of the body in acts of skill fosters the growth of an individual's sense of personal worth, self-reliance, personal freedom, and increases his worth as a social being (p. 6).

Motor development, as measured by the Lincoln-Oseretsky Motor Development Scale, has been reported to correlate significantly with body-image, as measured by the Draw-A-Person Test, in subjects six to seven years of age (Elbaum, 1965). A study by McBee (1962) indicated that the body-image security of college women was significantly related to the individual's secure feelings about her own movement patterns. Criterion instruments used in McBee's study were the Smith-Clifton Perception Checklist and the Hunt-Weber Body Image Projective Test.

Although some research has indicated a relationship between

motor skill performance and body-image, contrary results exist relative to self-concept. A study by Parker (1962), which utilized the Who Am I Test, indicated no significant relationship between the motor ability and self-concept of women physical education majors or non-physical education majors.

Positive development of the self-concept and body-image has been thought to be due to skill learning and success in activities rather than merely the act of partaking in physical activity (Allen, 1974). According to Bychowski, as cited by Belzer (1962), "new bodily skills acquired even late in life, modify the body image which thus acquires new characteristics and a new differentiation" (p. 18). This thought is supported by a study by Lay (1970) which indicated that college men and women who learned to swim demonstrated a significant positive change in self-concept, whereas those who failed to learn to swim registered a significant negative change in self-concept. For the purpose of Lay's study, self-concept was measured by the Tennessee Self-Concept Scale.

Lay's results are supported by a study by Gourley (1970). Having utilized the Berger Self-Acceptance Scale, Gourley reported a significant increase in the self-acceptance of junior high school girls who learned to swim. Members of a control group who were participating in a volleyball class were also studied by Gourley. No significant increase in the self-acceptance of those subjects participating in the control group occurred.

Sheppard (1971) was also concerned with changes in the self- and body-concepts of college students who learned to swim. She employed

the multi-method research design to measure the following variables of the self: 1) Osgood's Semantic Differential Technique as a measure of body-description; 2) Jourard and Secord's Body-Cathexis Scale as a measure of body-acceptance; and 3) Bills' Index of Adjustment and Values as a measure of self-description and self-acceptance. Although she reported no significant difference in any of the variables she concluded that learning to swim had a positive effect upon the subjects' self-description.

Studies of groups partaking in programs oriented toward the development of a sports skill have tended to show no significant results relative to the positive development of the body-image or self-concept (Gussis, 1971; Hurley, 1971; Johnston, 1969). These studies varied relative to the age of the subjects tested. All used either the Tennessee Self-Concept Scale or the Q Sort Technique as instruments of measurement.

The influence of success and failure in physical activity has been shown to have a direct effect on body- and self-concept variables. Read (1968) used the Body-Cathexis Scale and the Tennessee Self-Concept Scale to measure changes in the body concept and self-concept of constant winners and constant losers in competitive situations. The investigator concluded that constant winners showed significant positive gains in body-image and self-concept, whereas constant losers indicated negative changes. Those individuals who neither constantly won or lost showed little change in their measured body-image and self-concept. Read's findings were supported by Bash (1973) who reported that a greater increase in self-concept occurred in college basketball players who

participated on winning teams than in those who participated on frequently losing teams.

Success and failure situations have been applied to fitness programs where feedback to the subject has been manipulated or contrived through false reporting of results and false norms. McGowan (1974) controlled an endurance training program and informed (sometimes falsely) his experimental group that they had won each group competition as it occurred. Post-test scores of the Tennessee Self-Concept Scale indicated a positive increase in the self-concept of the members of the experimental group.

Having utilized false norms to communicate success or failure to his subjects, Thomas (1971) reported that college males who "failed" at a physical task involving a stationary exercise bicycle demonstrated a significant decrease in the physical activity component of body-image as measured by Osgood's Semantic Differential Scale. Those subjects who "succeeded" at the task showed an insignificant increase in all aspects of body-image. Results of the effects of success and failure in physical activity have indicated that activity which does not consistently involve successful experiences will not result in the positive development of the self.

Recent authors (Davis, 1973; Fried, 1974; Harris, 1970, 1972c; Kleinman, 1972; Naylor, 1975; Oates, 1973; Schnellbach-Nordmann, 1968; Slusher, 1968) have indicated that challenge and risk-oriented physical activities, which allow for the individual to overcome and deal with the environment, may result in an increased level of self-awareness and self-confidence. In this case "challenge" is generally defined as a contest

between man and nature while "risk" refers to the presence of uncertainty and danger (Vaughan, 1971). The presence or degree of "challenge" or "risk" are dependent on the participant's awareness and interpretation of them.

An area of environmentally oriented movement experience which appears to indicate consistent results relative to positive changes in self-concept variations is that of participation in the Outward Bound program (survival training, mountain climbing, rock climbing). Clifford (1967), in his study of Outward Bound, found that the self-concept of adolescents aged 16 to 21 became more positive and that there was a reduction in their ideal-self and self-discrepancies following the Outward Bound experience. For a criterion instrument, Clifford adapted the Self-Rating Scale originally designed by Dickey. According to Clifford, the development of physical stamina, the personal physical challenge, and the mutual support required from all members of the group were the major factors influencing the self-concept change. The researcher felt that the emphasis on physical conditioning and the successful acquisition of a new set of skills brought about a feeling of competence and, thus, affected the individuals' self-concept.

The Gough Adjective Check List was used as the measurement instrument in Koepke's (1973) study of Outward Bound participants. Koepke's results supported Clifford's and indicated that following the Outward Bound experience participants' evaluations of themselves more closely approached their ideal self. Subjects also ascribed fewer negative adjectives to their self-description. Like Clifford, Koepke proposed that the confrontation and the overcoming of the stresses

involved in such activities may have been the influencing factor relative to changes in one's self-perception.

Positive changes in self-concept following an Outward Bound experience have also been reported by Westmore (1973). Westmore used the Tennessee Self-Concept Scale to measure changes in the self-concept of adolescent boys participating in Outward Bound. Beyond indicating positive changes in self-concept, Westmore's results showed that the changes in self-concept were not related to the subjects' age, socio-economic level, educational background, race, or sports background. Results of follow-up testing indicated that the intensity of the change decreased after the subjects return to their home environment.

A survival training program consisting of hiking, rock climbing, rapelling, rescue training, and a solo survival experience was reported by Stimpson and Pederson (1970) to result in higher self-ratings of subjects as measured by the Self and Others Rating Scale. Following the experience subjects also rated their parents at a significantly higher level.

Two studies have indicated no significant changes in self-concept during participation in outdoor and survival training experiences (Duke, 1969; Wilden, 1974). Both studies were limited to experiences of less than one week in duration. Detailed descriptions of the activities involved were not available to this writer.

Participation in risk-oriented activity (also referred to as eustress- or stress-seeking activity) has been thought to be motivated by some aspect of the individual's self-perception or personality (Harris, 1970, 1972b; Huberman, 1968; Ogilvie, 1973). Allen (1972) indicated that

self-perceptions influence the individual's choice of physical activity when she wrote: "If some sports are not consistent with my perceptions and feelings, I cannot allow those experiences to happen, nor will they have a positive effect on my motivational level and my life" (p. 42). Similarly, Cratty (1973) indicated that body-perceptions "invariably mold the performance attitudes and the performance capacities of adults" (p. 248).

According to Ogilvie (1973), the fundamental motivation for risk-seeking behavior is a personality structure which he refers to as "stimulus addiction prone." Harris (1970) supported this concept when she wrote:

> Man's longing to fly, to go to the moon, to jump farther, to climb higher, all attest to his need to flirt with danger. This joy of being on the 'brink of catastrophe'; this need to encounter danger, to master it, to repeat this mastery until it loses the danger; and then go to further challenges supports man's need for this eustress-seeking (p. 39).

Physical activities which are oriented toward challenge and risk experiences are linked to the individual's survival and, thus, his or her sense of being. Perhaps it is the environmental and risk aspects within the skills (swimming, survival training, mountain climbing) that become the determining variables of self-concept and body-image development.

> Increased self-awareness can come about through participation in adventure type activities; presence of 'danger' and fears which accompany it attracts individuals to certain activities; conquering fear is most important to risk-takers; participants expect success, overcoming fear results in new levels of self-awareness (Davis, 1973, p. 6794).

The Self-Cathexis and Body-Cathexis Scales

As previously discussed, attitudes toward one's self and body are important aspects of the self- and body-concept. Jourard and Second's (1954) Self-Cathexis and Body-Cathexis Scales are direct measures of self and body-acceptance and are the only scales of their kind that have been frequently used. The scales are of Likert form, easy to administer, and are easily scored. The reliability of the Self-Cathexis Scale has been reported to be between .88 and .92 for split-halves analysis (Secord & Jourard, 1953). Split-halves analysis has indicated a reliability of .78 to .83 for the Body-Cathexis Scale (Secord & Jourard, 1953). However, Jourard and Remy (1955) reported a split-halves reliability of .91 for each scale. Test-retest reliability over a six to eight week interval has been reported as .72 (Wiley, 1974).

In her discussion of test validity, Wiley (1974) remarked that the validity of the Body-Cathexis Scale would be hard to establish due to the fact that no other test purports to measure the same aspect of the body. However, she stated that the scale has shown some validity since it has demonstrated theoretically predicted correlations with variables such as anxiety, insecurity, and self-concept. Validity of the Self-Cathexis Scale is similarly hard to establish but has also demonstrated theoretically predicted correlations with anxiety, insecurity, and self-concept.

Rosen and Ross (1968) have questioned the effect of the subjective importance of each evaluated characteristic on the individual's cathexis score. However, research by Mahoney (1974) has indicated that

no relationship exists between the degree of subjective importance to the individual and his or her cathexis score. Mahoney concluded that "in terms of how satisfaction with one's body aspects is related to self-esteem, the subject's report of the importance of body aspects is clearly irrelevant" (p. 30).

In conclusion, the authors of the Self-Cathexis and Body-Cathexis Scales state:

> although it is subject to some of the pitfalls and shortcomings already discovered in questionnaires or self-inventories, this method of study has the advantage of relative simplicity, reliability, and much previous work done with it (Jourard & Secord, 1955, p. 131).

Summary

Self-concept and body-image are positively correlated. Both constructs are developed from the entire sphere of an individual's experience and appear to be influenced by the successful performance of various motor skills, especially those which pertain to the individual's physical competency and his or her relationship with the physical environment.

> It appears that physical activity and sport experience provide tremendous opportunity for the individual to experience a sense of success and satisfaction which reinforces a positive sence of self. Further, with the interrelationship of the body and self-concept, it is apparent that any experience which serves to enhance a positive perception either of the body or the self will enhance the positiveness of the others (Harris, 1973, p. 175).

The review of literature has summarized psychological theory, research, and testing instruments related to the study of self-cathexis and body-cathexis.

CHAPTER III

METHODS AND PROCEDURE

The purpose of this study was to compare measures of self-cathexis and body-cathexis among groups of individuals participating in the environmental sport activity courses of backpacking-orienteering, mountaineering, and scuba diving. The research, testing, statistical analysis, and interpretation of the data necessary to accomplish the stated purpose were conducted at Oregon State University during the 1975-1976 school year. The methods and procedure utilized in the study are presented in this chapter.

Test Instrument

The criterion instruments used in this study were the Self-Cathexis and Body-Cathexis Scales (Jourard & Secord, 1955; Secord & Jourard, 1953). The scales were originally designed to measure the individual's degree of satisfaction or acceptance of self and body, and they have been previously used with college groups. Selection of the instruments was based on their purported criterion measure of self- and body-satisfaction, reliability of .91, and their simplicity of administration and scoring.

The Self-Cathexis Scale was comprised of 40 different items. The Body-Cathexis Scale was also comprised of 40 items. Criterion scores were of Likert nature and varied in value from "one" to "five". Thus,

the possible range of criterion scores for each complete scale was from 40, which represented a total response of strong negative feelings, to 200, which represented a total response of strong positive feelings.

To aid in the ease of test administration, the 40-item Self-Cathexis Scale and the 40-item Body-Cathexis Scale were combined into one 80-item test instrument (Appendix A). Items one through 40 were actually the Self-Cathexis Scale and comprised the self-cathexis measurement, whereas items forty-one through eighty represented the body-cathexis measurement.

Subjects

Approval for the use of human subjects for the purpose of this investigation was granted by the Oregon State University Committee for the Protection of Human Subjects (Appendix B).

Subjects comprising the experimental groups of this study were students enrolled in courses of backpacking-orienteering, mountaineering, and scuba diving during Spring Term of 1976. Instructors of the courses were contacted during Winter Term of 1976, and they agreed to permit class time for pre- and post-testing those students in their classes who were willing to participate in the study. During the second week of class meetings, each class was approached and presented with a brief description of the study to be undertaken and its requirements upon the subjects. As required by the Oregon State University Committee for the Protection of Human Subjects, written consent was obtained from those individuals agreeing to volunteer as subjects by way of the "Willingness to Participate" form (Appendix C). Only those individuals who gave

written consent and who responded to both the pre- and post-test were included as subjects of the experimental groups. The number of subjects comprising the final experimental groups was as follows: 41 subjects comprised the backpacking-orienteering experimental group; 28 subjects comprised the mountaineering experimental group; and 16 subjects comprised the scuba diving experimental group.

The control group consisted of two separate random samples, one for the pre-test control group and one for the post-test control group. All potential subjects of the control groups were enrolled in the University, Spring Term, and were randomly selected from the Oregon State University Directory. Each individual was contacted by a letter explaining the requirements of the study, and the dates, times and locations of testing (Appendix D). A return, self-addressed, stamped postcard was enclosed in each letter. The final control groups of the study consisted of those individuals who signed the "Willingness to Participate Form" (Appendix C) and who responded to the Self-Cathexis and Body-Cathexis Scales. Both the pre-test and the post-test control groups were comprised of 34 subjects.

Experimental Design

The experimental design of the present study was twofold; groups x trial and subjects x trials (Figure 1). Groups involved in the study were the following: (a) an experimental group comprised of those students enrolled in backpacking-orienteering; (b) an experimental group comprised of those students enrolled in mountaineering; (c) an experimental group comprised of those students enrolled in scuba diving; and (d)

CONTROL I Pre-Test: Self-Cathexis Body-Cathexis	BACKPACKING - ORIENTEERING Pre-Test: Self-Cathexis Body-Cathexis	MOUNTAINEERING Pre-Test: Self-Cathexis Body-Cathexis	SCUBA DIVING Pre-Test: Self-Cathexis Body-Cathexis	
	BACKPACKING - ORIENTEERING Post-Test: Self-Cathexis Body-Cathexis	MOUNTAINEERING Post-Test: Self-Cathexis Body-Cathexis	SCUBA DIVING Post-Test: Self-Cathexis Body-Cathexis	CONTROL II Post-Test: Self-Cathexis Body-Cathexis

Figure 1. Model of the Experimental Design.

two control groups comprised of two random samples of university students.

Pre- and post-test trials of the Self-Cathexis and Body-Cathexis Scales were administered to each experimental group. The Self-Cathexis Scale and the Body-Cathexis Scale were administered to the subjects of the "Control I" group during the same period of the term that the pre-test was administered to the experimental groups. The cathexis scales were administered as a post-test to the "Control II" group during the same period of the term that the experimental groups were post-tested. Because of the reliability (.91) of the criterion instruments utilized in this study, it was deemed possible to test two separate control groups. The purpose of testing two separate random samples of university students was to allow for the possible effect of the passage of time (such as seasons of the year or the period of time within the school term) on the cathexis scores of the general student population, while controlling for a possible lie factor or effect due to sensitivity from previous exposure to the test.

To determine the statistical significance of the hypotheses stated in Chapter I and listed in Table I the null hypothesis was utilized. The level of significance at which the hypotheses were to be rejected was selected as the .05 level and was evaluated by a two-tailed test. The .05 level of significance was selected due to the nature of the study.

The statistical procedures of analysis of variance and multiple discriminant function analysis were utilized to analyze the data (Table I). Analysis of variance was utilized to compare: (a) the self-cathexis score of each experimental group with the self-cathexis score of the

TABLE I. STATISTICAL DESIGN.

HYPOTHESIS:	STATISTICAL ANALYSIS	EXPERIMENTAL MODEL
1. No significant difference in scores of self-cathexis and/or body-cathexis exists between two random samples of university students.	ANOVA of Self-Cathexis; Body-Cathexis.	(C_1 vs. C_2)
2. No significant difference in pre-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who elect to participate in different environmental sport activity courses and a random sample of university students.	ANOVA of Self-Cathexis; Body-Cathexis.	(B_{pre} vs. C_{pre}) (M_{pre} vs. C_{pre}) (S_{pre} vs. C_{pre})
3. No significant difference in pre-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who elect to participate in different environmental sport activity courses.	ANOVA of Self-Cathexis; Body-Cathexis.	(B_{pre} vs. M_{pre} vs. S_{pre})
4. No significant difference between pre- and post-test scores of self-cathexis and/or body-cathexis occurs during participation in environmental sport activity courses.	ANOVA of Self-Cathexis; Body-Cathexis.	(B_{pre} vs. B_{post}) (M_{pre} vs. M_{post}) (S_{pre} vs. S_{post})

TABLE I. Continued

	HYPOTHESIS:	STATISTICAL ANALYSIS	EXPERIMENTAL MODEL
5.	No significant difference in post-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who participated in different environmental sport activity courses and a random sample of university students.	ANOVA of Self-Cathexis; Body-Cathexis.	(B_{post} vs. C_{post}) (M_{post} vs. C_{post}) (S_{post} vs. C_{post})
6.	No significant difference in post-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who participated in different environmental sport activity courses.	ANOVA of Self-Cathexis; Body-Cathexis.	(B_{post} vs. M_{post} vs. S_{post})
7.	If no significant difference in mean cathexis scores exists among the groups, then no significant difference exists among the group cathexis profiles.	MULTIPLE DISCRIMINANT ANALYSIS Self-Cathexis; Body-Cathexis.	Analysis of pre-test and post-test profiles of selected groups.
8.	If a significant difference in mean cathexis scores exists among the groups, then no significant difference exists among the group cathexis profiles.	MULTIPLE DISCRIMINANT ANALYSIS Self-Cathexis; Body-Cathexis.	Analysis of pre-test and post-test profiles of selected groups.

control group on both the pre- and post-tests; (b) the body-cathexis score of each experimental group with the body-cathexis score of the control group on both the pre- and post-tests; (c) the self-cathexis scores among the three experimental groups on both the pre- and post-tests; (d) the body-cathexis scores among the three experimental groups on both the pre- and post-tests; (e) the pre- and post-test self-cathexis scores for each group; and (f) the pre- and post-test body-cathexis scores for each group.

Multiple discriminant function analysis was utilized to analyze and compare group cathexis profiles on both the pre- and post-tests of self-cathexis and body-cathexis. This analysis was considered to be an appropriate test because groups of individuals could be equal relative to their total mean cathexis scores but differ in the individual variables comprising the total score (Kane, 1972).

Time Schedule

Pre- and post-tests were administered during Spring Term of 1976. The pre-test was administered to all subjects during the first one and one-half weeks of the eleven-week term. The post-test was administered to all subjects during the eighth and ninth week of the term. Therefore, the pre-test - post-test interval was six to seven weeks in length.

Testing Procedure

Prior to the formal testing, this investigator administered the combined cathexis scale to a small number of university students

who were not otherwise involved in the study. The practice test administration was for the purpose of developing clarity of instructions, efficiency of test administration, and consistency in test administration.

Pre- and post-tests were administered to the experimental groups and the control groups by this investigator. At each testing session a copy of the "80 item" cathexis instrument, an answer sheet, and a number two pencil were distributed to each subject. Subjects were asked to indicate their age, sex, and the last four digits of their social-security number as a means of anonymous test identification. For the purpose of accuracy, the investigator had marked group identification and pre-post code numbers on each answer sheet prior to the test administration.

Directions for taking the test (Appendix A) were read aloud to the subjects while the subjects read the directions to themselves. Following the reading of the directions, a brief explanation of the directions was given using an example situation. Subjects were then asked if they had any questions as to what they had been directed to do, and were told that they could ask questions at any point during the test. The confidentiallity of the test results and the importance of responding in an honest manner were also emphasized at this time.

Tests, pencils, and completed answer sheets were collected by the investigator when subjects were finished. After the collection of the testing tools, the investigator thanked the subjects for their cooperation. Following the post-test of the experimental group (as time permitted) the investigator answered questions which subjects had

relative to the purpose of the study. Many subjects indicated interest in obtaining the final results of the study. These subjects gave the investigator their mailing address so that copies of the results could be forwarded to them.

The procedure utilized in testing the control groups was the same as that utilized for the experimental groups, with the exception that subjects were tested during pre-set testing times of mutual convenience. The investigator-subject ratio during the control group testing was generally 1:1 or 1:2 and, thus, was much smaller than that of the experimental groups' testing environment.

Analysis of Data

Answer sheets were reviewed by this investigator after each test administration. Items which were not responded to were assigned the neutral response of "3." Six neutral responses (out of 80 total responses by each of 119 subjects) were assigned to pre-test data and eight neutral responses (out of 80 total responses by each of 119 subjects) were assigned to post-test data. The Oregon State University Computer Center's OPSCAN was utilized to transfer responses indicated on the answer sheets to computer deck cards.

The mean self-cathexis score of each group represented that group's self-cathexis score. Each group was represented by two separate self-cathexis scores; a pre-test self-cathexis score and a post-test self-cathexis score. The mean body-cathexis score of each group represented the body-cathexis score of that group. Each group was also represented by a pre-test and post-test body-cathexis score.

Early in the study, ANOVA was applied to the pre-test data to indicate whether the control group and the experimental groups were significantly different from each other in respect to self-cathexis and body-cathexis scores. No significant differences were found to exist among any of the groups, at this point in time, and, thus no adjustments in experimental design were deemed necessary.

Following the administration of the post-test, answer sheets of the experimental groups were reviewed by this investigator and those subjects who had not responded to both pre- and post-tests were dropped from the study. The data of the experimental subjects who participated in both the pre- and post-tests were included in the final statistical analysis.

Pre- and post-test self-cathexis and body-cathexis scores of the three experimental groups and the control groups were analyzed through ANOVA. This analysis was to indicate any significant difference in self-cathexis or body-cathexis scores: (a) among the experimental groups and the control groups; (b) among the experimental groups; and (c) between the pre- and post-test trials of each group.

Multiple discriminant function analysis was utilized to compare self-cathexis profiles and body-cathexis profiles among groups. Groups combined for the discriminant analysis were determined by the similarity of the group cathexis scores and the similarity of the environmental sport activity courses in which they were participating.

All data was processed at the Oregon State University Computer Center through the CDC 3300.

CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this study was to compare measures of self-cathexis and body-cathexis among groups of individuals participating in the environmental sport activity courses of backpacking-orienteering, mountaineering, and scuba diving. The results of the statistical analyses utilized to test the hypotheses of this study and the interpretation of the results are presented in this chapter.

Results

Group Mean Scores

Results of the analyses of variance among group scores of self-cathexis and body-cathexis are presented in accordance with the groups x trial and subjects x trials design of this study. Results of each of the ANOVA comparisons of group scores are depicted in tables presented in the following pages. *F* values required for significance at the .05 level differed according to the number of subjects composing the compared groups. The required *F* values and the degrees of freedom of each group comparison are presented in Table II. Group mean scores and ranges for the self-cathexis and body-cathexis pre- and post-test trials are presented as descriptive statistics in Table III. For the convenience of the reader, mean scores and ranges of the four groups are graphically illustrated in Figure 2 and Figure 3.

TABLE II. *F* RATIOS REQUIRED FOR SIGNIFICANCE AT THE .05 LEVEL

Group Comparisons	df	F Ratio
Backpacking-Orienteering vs. Control	73	3.98
Mountaineering vs. Control	60	4.00
Scuba Diving vs. Control	38	4.10
Backpacking-Orienteering vs. Mountaineering	67	3.98
Backpacking-Orienteering vs. Scuba Diving	55	4.02
Mountaineering vs. Scuba Diving	42	4.07
Control I vs. Control II	66	3.98
Backpacking-Orienteering Pre vs. Post	80	3.96
Mountaineering Pre vs. Post	54	4.02
Scuba Diving Pre vs. Post	30	4.17

TABLE III. MEAN AND RANGE OF PRE-TEST AND POST-TEST CATHEXIS SCORES OF EACH GROUP.

Group	n	Criterion Measure	PRE-TEST Mean	PRE-TEST Range	POST-TEST Mean	POST-TEST Range
Control	34	Self-Cathexis	144.82	117 - 168	141.62	95 - 178
		Body-Cathexis	142.65	88 - 183	143.53	103 - 187
Backpacking-Orienteering	41	Self-Cathexis	143.05	118 - 164	143.63	108 - 195
		Body-Cathexis	143.39	113 - 190	145.54	103 - 200
Mountaineering	28	Self-Cathexis	145.14	121 - 177	145.82	87 - 194
		Body-Cathexis	142.04	117 - 185	145.53	107 - 198
Scuba Diving	16	Self-Cathexis	145.69	94 - 169	151.63	127 - 179
		Body-Cathexis	147.63	109 - 181	158.19	131 - 198

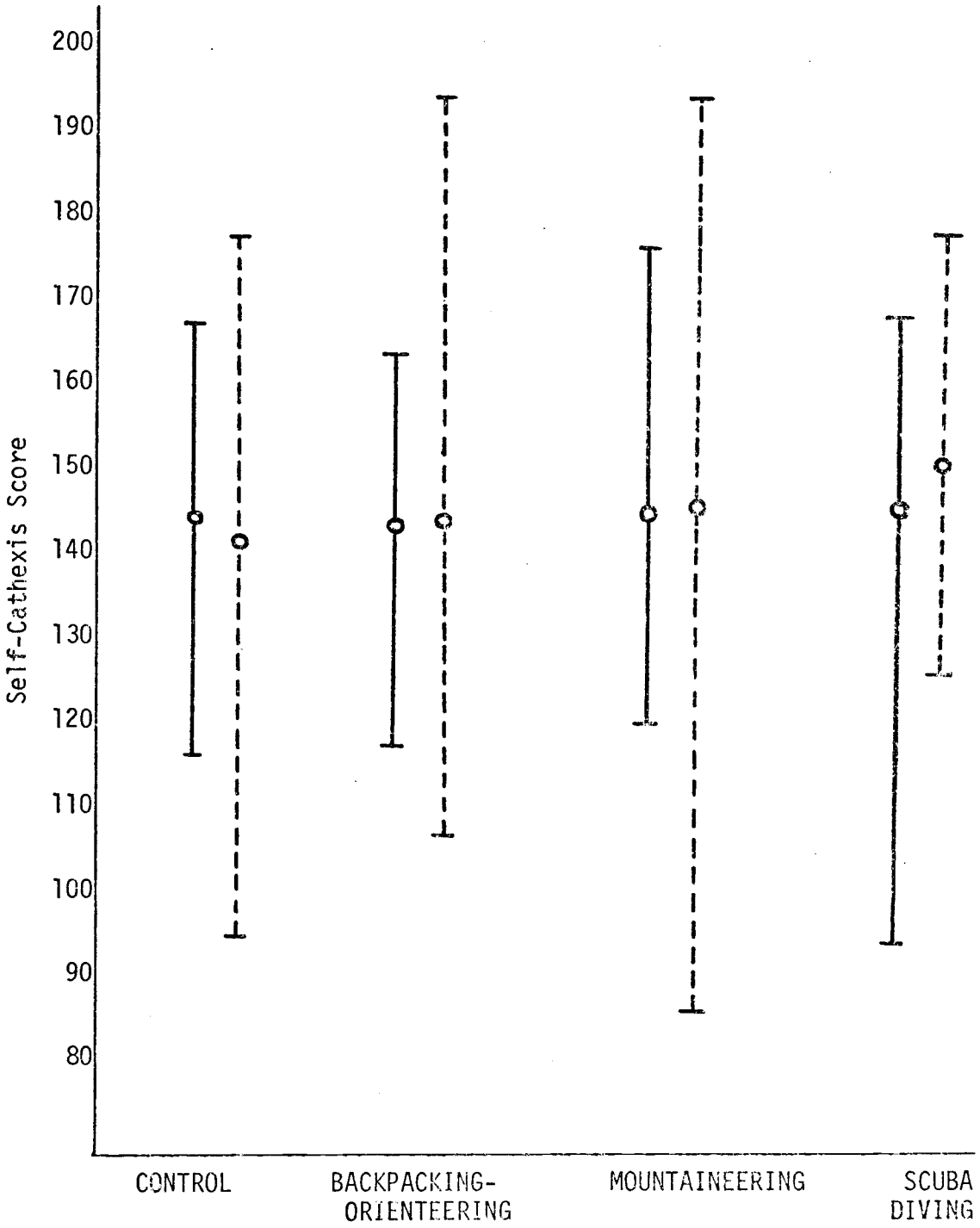

Figure 2. Mean Scores and Ranges of Responses to the Self-Cathexis Scale on Pre- and Post-Test Trials.

Mean Score c
Pre-Test Range ——
Post-Test Range ---

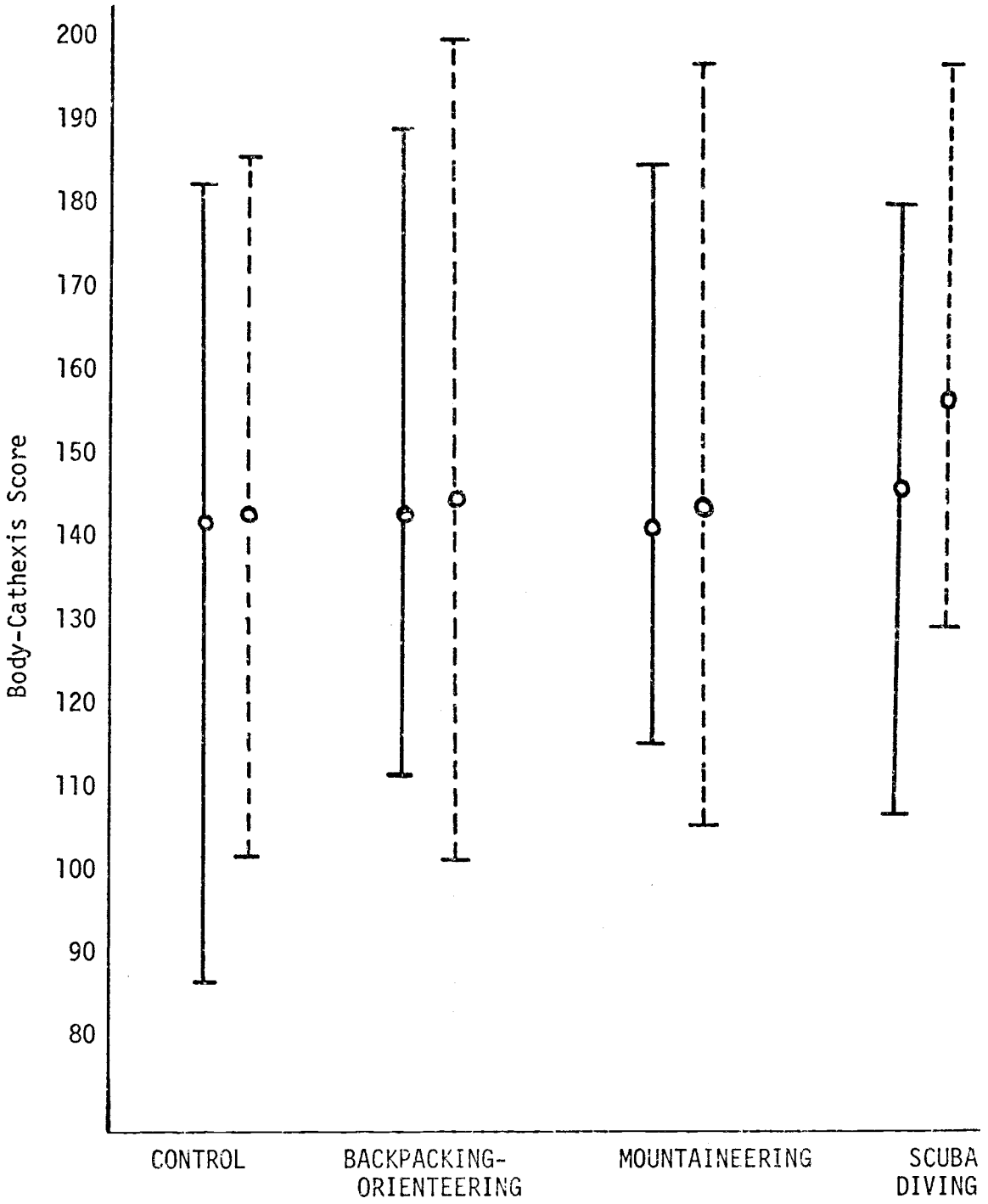

Figure 3. Mean Scores and Ranges of Responses to the Body-Cathexis Scale on Pre- and Post-Test Trials.

Mean Score o
Pre-Test Range ——
Post-Test Range ---

The mean pre-test self-cathexis scores did not significantly differ among the groups tested as indicated by the insignificant F values depicted in Tables IV through X.

Results of the analyses of variance among the group mean pre-test scores of body-cathexis indicated that no significant difference existed among the group pre-test body-cathexis scores (Tables XI through XVII). The F values depicted in Tables XI through XVII ranged from .02 to .89 and were not significant at the .05 level.

Results of the analyses of variance among the group post-test self-cathexis scores are illustrated in Tables IV through X. The F values presented in the ANOVA tables were not significant, indicating that no significant difference existed among the group post-test self-cathexis scores.

Results of the analyses of variance among the group post-test body-cathexis scores are presented in Tables XI through XVII. The significant F value depicted in Table XIII indicated that the scuba diving experimental group demonstrated a significantly more positive cathexis score than did the control group. No other significant difference among the group post-test body-cathexis scores was indicated by the analyses of variance.

No significant difference existed between the self-cathexis scores of the Control I (pre-test) and Control II (post-test) groups as indicated by the F value presented in Table XVIII. Similarly, no significant difference existed between the body-cathexis scores of the two control groups (Table XVIII).

TABLE IV. ANOVA OF SELF-CATHEXIS SCORES OF THE BACKPACKING-ORIENTEERING AND CONTROL GROUPS

Source of Variation	df	PRE-TEST SELF-CATHEXIS		POST-TEST SELF-CATHEXIS	
		MS	F Ratio	MS	F Ratio
Group	1	58.54	0.29	75.58	0.26
Error	73	204.45		286.76	
Total	74				

TABLE V. ANOVA OF SELF-CATHEXIS SCORES OF THE MOUNTAINEERING AND CONTROL GROUPS

Source of Variation	df	PRE-TEST SELF-CATHEXIS MS	PRE-TEST SELF-CATHEXIS F Ratio	POST-TEST SELF-CATHEXIS MS	POST-TEST SELF-CATHEXIS F Ratio
Group	1	1.57	0.01	271.35	0.55
Error	60	224.44		489.97	
Total	61				

TABLE VI. ANOVA OF SELF-CATHEXIS SCORES OF THE SCUBA DIVING AND CONTROL GROUPS

Source of Variation	df	PRE-TEST SELF-CATHEXIS MS	PRE-TEST SELF-CATHEXIS F Ratio	POST-TEST SELF-CATHEXIS MS	POST-TEST SELF-CATHEXIS F Ratio
Group	1	8.12	0.03	1089.60	2.85
Error	48	249.63		382.08	
Total	49				

TABLE VII. ANOVA OF SELF-CATHEXIS SCORES OF THE BACKPACKING-ORIENTEERING AND MOUNTAINEERING GROUPS

Source of Variation	df	PRE-TEST SELF-CATHEXIS MS	PRE-TEST SELF-CATHEXIS F Ratio	POST-TEST SELF-CATHEXIS MS	POST-TEST SELF-CATHEXIS F Ratio
Group	1	72.96	0.37	79.60	0.20
Error	67	198.77		405.97	
Total	68				

TABLE VIII. ANOVA OF SELF-CATHEXIS SCORES OF THE BACKPACKING-ORIENTEERING AND SCUBA DIVING GROUPS

Source of Variation	df	PRE-TEST SELF-CATHEXIS MS	PRE-TEST SELF-CATHEXIS F Ratio	POST-TEST SELF-CATHEXIS MS	POST-TEST SELF-CATHEXIS F Ratio
Group	1	80.13	0.37	734.88	2.50
Error	55	215.15		293.48	
Total	56				

TABLE IX. ANOVA OF SELF-CATHEXIS SCORES OF THE SCUBA DIVING AND MOUNTAINEERING GROUPS

Source of Variation	df	PRE-TEST SELF-CATHEXIS MS	PRE-TEST SELF-CATHEXIS F Ratio	POST-TEST SELF-CATHEXIS MS	POST-TEST SELF-CATHEXIS F Ratio
Group	1	3.02	0.01	342.94	0.59
Error	42	247.02		585.85	
Total	43				

TABLE X. SUMMARY OF F RATIOS AMONG GROUP SELF-CATHEXIS SCORES.

GROUP	SELF-CATHEXIS F RATIOS					
	PRE-TEST			POST-TEST		
	2	3	4	2	3	4
1. BACKPACKING-ORIENTEERING	0.37	0.37	0.29	0.20	2.50	0.26
2. MOUNTAINEERING	----	0.01	0.01	----	0.59	0.55
3. SCUBA DIVING	----	----	0.03	----	----	2.85
4. CONTROL	----	----	----	----	----	----

TABLE XI. ANOVA OF BODY-CATHEXIS SCORES OF THE BACKPACKING-ORIENTEERING AND CONTROL GROUPS

Source of Variation	df	PRE-TEST BODY-CATHEXIS MS	PRE-TEST BODY-CATHEXIS F Ratio	POST-TEST BODY-CATHEXIS MS	POST-TEST BODY-CATHEXIS F Ratio
Group	1	10.27	0.03	74.88	0.16
Error	73	368.08		482.20	
Total	74				

TABLE XII. ANOVA OF BODY-CATHEXIS SCORES OF THE MOUNTAINEERING AND CONTROL GROUPS

Source of Variation	df	PRE-TEST BODY-CATHEXIS		POST-TEST BODY-CATHEXIS	
		MS	F Ratio	MS	F Ratio
Group	1	5.74	0.02	61.81	0.11
Error	60	380.44		561.32	
Total	61				

TABLE XIII. ANOVA OF BODY-CATHEXIS SCORES OF THE SCUBA DIVING AND CONTROL GROUPS

Source of Variation	df	PRE-TEST BODY-CATHEXIS MS	PRE-TEST BODY-CATHEXIS F Ratio	POST-TEST BODY-CATHEXIS MS	POST-TEST BODY-CATHEXIS F Ratio
Group	1	269.61	0.66	2337.67	4.68[a]
Error	48	407.91		499.39	
Total	49				

[a]Significant at the .05 level.

TABLE XIV. ANOVA OF BODY-CATHEXIS SCORES OF THE BACKPACKING-ORIENTEERING AND MOUNTAINEERING GROUPS

Source of Variance	df	PRE-TEST BODY-CATHEXIS MS	PRE-TEST BODY-CATHEXIS F Ratio	POST-TEST BODY-CATHEXIS MS	POST-TEST BODY-CATHEXIS F Ratio
Group	1	30.53	0.09	0.0	0.0
Error	67	334.04		566.32	
Total	68				

TABLE XV. ANOVA OF BODY-CATHEXIS SCORES OF THE BACKPACKING-ORIENTEERING AND SCUBA DIVING GROUPS

Source of Variation	df	PRE-TEST BODY-CATHEXIS		POST-TEST BODY-CATHEXIS	
		MS	F Ratio	MS	F Ratio
Group	1	206.39	0.59	1841.93	3.59
Error	55	347.88		513.36	
Total	56				

TABLE XVI. ANOVA OF BODY-CATHEXIS SCORES OF THE SCUBA DIVING AND MOUNTAINEERING GROUPS

Source of Variation	df	PRE-TEST BODY-CATHEXIS MS	PRE-TEST BODY-CATHEXIS F Ratio	POST-TEST BODY-CATHEXIS MS	POST-TEST BODY-CATHEXIS F Ratio
Group	1	318.08	0.89	1629.78	2.56
Error	42	359.30		636.03	
Total	43				

TABLE XVII. SUMMARY OF F RATIOS AMONG GROUP BODY-CATHEXIS SCORES.

GROUP	BODY-CATHEXIS F RATIOS					
	PRE-TEST			POST-TEST		
	2	3	4	2	3	4
1. BACKPACKING-ORIENTEERING	0.09	0.59	0.03	0.00	3.59	0.16
2. MOUNTAINEERING	----	0.89	0.02	----	2.56	0.11
3. SCUBA DIVING	----	----	0.66	----	----	4.68[a]
4. CONTROL	----	----	----	----	----	----

[a]Significant at the 0.05 level.

TABLE XVIII. ANOVA OF PRE- AND POST-TEST SELF-CATHEXIS AND BODY-CATHEXIS SCORES OF THE CONTROL GROUPS

Source of Variation	df	SELF-CATHEXIS MS	SELF-CATHEXIS F Ratio	BODY-CATHEXIS MS	BODY-CATHEXIS F Ratio
Trials	1	264.82	0.94	10.50	0.02
Error	71	282.92		420.72	
Total	72				

Comparison of the pre-test self-cathexis score with the post-test self-cathexis score of each experimental group indicated that no significant difference existed between any group's pre- and post-test measures of self-cathexis (Tables XIX through XX). Similarly, F values depicted in Tables XIX through XXI illustrated that no significant difference existed between any experimental group's pre-test and post-test measures of body-cathexis.

Table XXII summarizes the results of the ANOVA of each of the four groups' pre- and post-test scores of self-cathexis and body-cathexis.

In summary, the results of the analyses of variance among group mean self-cathexis and body-cathexis scores were as follows:

1. No significant difference in mean pre-test self-cathexis or body-cathexis scores existed among the four groups.
2. No significant difference in mean post-test self-cathexis scores existed among the four groups.
3. A significant difference existed between the scuba diving experimental group's mean post-test body-cathexis score and the mean post-test body-cathexis score of the control group. No other significant difference existed among the group post-test mean body-cathexis scores.
4. No significant difference existed between the self-cathexis scores or the body-cathexis scores of the two control groups.
5. No significant difference existed between the pre- and post-test measures of self-cathexis or body-cathexis of any of the experimental groups.

TABLE XIX. ANOVA OF PRE- AND POST-TEST SELF-CATHEXIS AND BODY-CATHEXIS SCORES OF THE BACKPACKING-ORIENTEERING GROUP

Source of Variation	df	SELF-CATHEXIS		BODY-CATHEXIS	
		MS	F Ratio	MS	F Ratio
Trials	1	7.02	0.03	94.44	0.23
Error	80	209.44		411.80	
Total	81				

TABLE XX. ANOVA OF PRE- AND POST-TEST SELF-CATHEXIS AND BODY-CATHEXIS SCORES OF THE MOUNTAINEERING GROUP

Source of Variation	df	SELF-CATHEXIS		BODY-CATHEXIS	
		MS	F Ratio	MS	F Ratio
Trials	1	6.45	0.01	17.50	0.34
Error	54	440.03		507.04	
Total	55				

TABLE XXI. ANOVA OF PRE- AND POST-TEST SELF-CATHEXIS AND BODY-CATHEXIS SCORES OF THE SCUBA DIVING GROUP

Source of Variation	df	SELF-CATHEXIS		BODY-CATHEXIS	
		MS	F Ratio	MS	F Ratio
Trials	1	282.03	0.75	892.53	1.86
Error	30	373.97		480.81	
Total	31				

TABLE XXII. SUMMARY OF ANOVA OF PRE- AND POST-TEST SELF-CATHEXIS AND BODY-CATHEXIS SCORES OF EACH GROUP.

Group	df	Criterion Measure	Pre-Test Mean	Post-Test Mean	F Ratio
Control	66	Self-Cathexis	144.82	141.62	0.94
		Body-Cathexis	142.65	143.53	0.02
Backpacking-Orienteering	80	Self-Cathexis	143.05	143.63	0.03
		Body-Cathexis	143.39	145.54	0.23
Mountaineering	54	Self-Cathexis	145.14	145.82	0.01
		Body-Cathexis	142.04	145.43	0.34
Scuba Diving	30	Self-Cathexis	145.69	151.63	0.75
		Body-Cathexis	147.63	158.19	1.86

Group Profiles

Pre- and post-test self-cathexis and body-cathexis profiles were analyzed through the BMD07M Stepwise Discriminant Analysis program at the Oregon State University Computer Center. The stepwise discriminant analysis compared the self-cathexis and body-cathexis profiles among the following three groups: (a) a group composed of the subjects of Control I and Control II; (b) a group composed of those subjects participating in the backpacking-orienteering and mountaineering courses; and (c) the scuba diving experimental group. Groups combined for the discriminant analysis were determined by the similarity of the group cathexis scores and the similarity of the environmental sport activity course in which they were participating.

The discriminant analysis program analyzed group responses to the individual variables of the criterion measures and indicated those items which, when combined, discriminated among the group profiles. The program yielded two statistical measures; the F value and the U statistic. The F value represented the variance of the location of the means among the groups, whereas the U statistic represented the homogeneity of the variance around the group means. The U statistic is similar to a correlation in that the nearer its value is to 1.0 the more homogeneous the variance is around the group means.

The results of the discriminant analysis presented in this chapter will emphasize those variables which in combination exhibited an F value significant at the .05 level (F = 3.91). However, those variables which, when taken in combination with each other, indicated an F value of greater than 2.0 and a U statistic of .75 or above will

also be presented due to the nature of the F and U statistics and their possible inference relative to the trends among group profiles.

Table XXIII illustrates the discriminating variables among the pre-test self-cathexis group profiles. "Procrastination," "capacity for work," and "imagination" were the variables which in combination exhibited the greatest F values and U statistics among the pre-test self-cathexis profiles of the combined backpacking-orienteering and mountaineering group, the scuba diving group, and the control group. The group or groups presented in the table which appeared to contribute the greatest difference among group means have been underscored for the convenience of the reader. The F values of the three variables did not reach the .05 level of significance (F = 3.91). The U statistic of each of the three variables indicated a homogeneity among the variances around the group means of .89 or above. The combined backpacking-orienteering and mountaineering group exhibited the most positive mean relative to "procrastination" and the lowest mean with respect to "capacity for work." The participants of the scuba diving group exhibited the most positive response toward "imagination."

Variables which discriminated among the group pre-test body-cathexis profiles are depicted in Table XXIV and included "muscular strength," "width of shoulders," "keenness of senses," "profile," and "sex organs." The F value for the combination of the responses to "muscular strength," "width of shoulders," "keenness of senses," and "profile" was significant at the .05 level. The corresponding U statistic indicated a homogeneity of .80 among the variances around the group means. As indicated in the table, "muscular strength" was the major

TABLE XXIII. VARIABLES WHICH DISCRIMINATED AMONG GROUP PRE-TEST SELF-CATHEXIS PROFILES.

ITEMS TAKEN IN ORDER	df	CONTROL MEAN (n = 68)	BACKPACKING & MOUNTAINEERING MEAN (n = 69)	SCUBA MEAN (n = 16)	F VALUE	U STATISTIC
Procrastination	150	2.59	3.03	2.56	2.91	.96
Capacity for Work	150	4.34	4.09	4.25	2.79	.93
Imagination	150	3.74	3.96	4.25	3.06	.89

TABLE XXIV. VARIABLES WHICH DISCRIMINATED AMONG GROUP PRE-TEST BODY-CATHEXIS SCORES.

ITEMS TAKEN IN ORDER	df	CONTROL MEAN (n = 68)	BACKPACKING & MOUNTAINEERING MEAN (n = 69)	SCUBA MEAN (n = 16)	F VALUE	U STATISTIC
Muscular strength	150	3.68	3.17	3.69	5.73[a]	.93
Width of shoulders	150	3.41	3.65	3.81	3.92[a]	.88
Keenness of senses	150	3.78	3.81	4.44	3.22	.85
Profile	150	3.13	3.28	3.06	3.96[a]	.80
Sex Organs	150	3.87	3.64	3.56	2.55	.78

[a]Significant at the .05 level.

discriminating variable (significant at the .05 level) and was cathected lower by the combined backpacking-orienteering and mountaineering group than by either of the other groups. The control groups exhibited a lower mean with respect to "width of shoulders" and a higher mean relative to "sex organs" than did the combined backpacking-orienteering and mountaineering group or the scuba diving group. "Profile" was cathected more positively by the backpacking and mountaineering group. "Keenness of senses" was scored more positively by the scuba diving participants than by either of the other groups.

Post-test self-cathexis profiles were significantly different with respect to the variable "athletic skills." As indicated in Table XXV, "athletic skills" exhibited an F value significant at the .05 level and a U statistic of .94. The combination of the variables "athletic skills," "procrastination," and "capacity for work" resulted in an F value of 3.18 (not significant at the .05 level) and a U statistic of .87. Scuba diving participants rated "athletic skills" more positively than did the other two groups. The mean score for "procrastination" was greater for the backpacking-orienteering and mountaineering subjects. Participants in backpacking-orienteering and mountaineering reported a lower mean score for "capacity for work."

Table XXVI illustrates the variables which discriminated among the group post-test body-cathexis profiles. "Width of shoulders" was significant at the .01 level as a discriminating variable among the group profiles and was rated more positively by the members of the scuba diving group than by the other two groups. The F value representing the variance of the group mean relative to "width of shoulders"

TABLE XXV. VARIABLES WHICH DISCRIMINATED AMONG GROUP POST-TEST SELF-CATHEXIS PROFILES.

ITEMS TAKEN IN ORDER	df	CONTROL MEAN (n = 68)	BACKPACKING & MOUNTAINEERING MEAN (n = 69)	SCUBA MEAN (n = 16)	F VALUE	U STATISTIC
Athletic skills	150	3.51	3.61	4.38	4.49[a]	.94
Procrastination	150	2.59	3.01	2.63	2.55	.91
Capacity for work	150	4.34	4.06	4.31	3.18	.87

[a]Significant at the .05 level.

TABLE XXVI. VARIABLES WHICH DISCRIMINATED AMONG GROUP POST-TEST BODY-CATHEXIS PROFILES.

ITEMS TAKEN IN ORDER	df	CONTROL MEAN (n = 68)	BACKPACKING & MOUNTAINEERING MEAN (n = 69)	SCUBA MEAN (n = 16)	F VALUE	U STATISTIC
Width of shoulders	150	3.41	3.68	4.38	7.14[a]	.91
Appearance of eyes	150	4.02	3.93	4.69	2.47	.88
Sex Organs	150	3.87	3.77	3.94	2.39	.86
Face	150	3.65	3.90	4.25	2.19	.83
Energy Level	150	3.68	3.54	4.13	2.33	.81
Profile	150	3.13	3.46	3.69	2.41	.78

[a]Significant at the .01 level.

was 7.14. The homogeneity of the variance around the group means was depicted by a U statistic of .91. "Appearance of eyes," "sex organs," "face," "energy level," and "profile," in combination with "width of shoulders," were those variables which discriminated among group profiles and exhibited an F value of 2.4 in combination with a U statistic of .78. The scuba diving group reported the highest mean score for each of the seven variables. The combined backpacking and mountaineering group exhibited the lowest mean score with respect to "sex organs." The control groups exhibited the lowest mean score relative to "profile."

Variables which were included as discriminating variables among the pre-test self-cathexis profiles but not among the post-test self-cathexis profiles, or vice versa, are presented in Table XXVII. Similarly, Table XXVIII illustrates those variables which discriminated among the pre-test body-cathexis profiles but not among the post-test body-cathexis profiles, and those which discriminated among the post-body-cathexis profiles but not among the pre-test body-cathexis profiles. Due to the nature of Tables XXVII and XXVIII the F values and U statistics of the items presented are the values of the item taken singularly.

Classification of subjects into groups by cathexis profiles was also a function of the stepwise discriminant analysis. Table XXIX depicts the number of cases from each group which exhibited self-cathexis profiles similar to that of their own group or to either of the other two groups of subjects for both the pre- and post-test trials. The chi square (X^2) analysis of the pre- and post-test profile classifications indicated that no significant shift occurred in the number of

TABLE XXVII. MAJOR POSITION CHANGES OF VARIABLES WHICH DISCRIMINATED AMONG GROUP SELF-CATHEXIS PROFILES ON THE PRE- AND POST-TESTS

ITEM	TEST	STEP RANK	CONTROL MEAN (n = 68)	BACKPACKING & MOUNTAINEERING MEAN (n = 69)	SCUBA MEAN (n = 16)	F VALUE	U STATISTIC
Athletic Skills	PRE-	33	3.51	3.58	3.81	0.98	.62
	POST-	1	3.51	3.61	4.38	4.49[a]	.94
Imagination	PRE-	3	3.74	3.96	4.25	2.93	.89
	POST-	33	3.74	3.88	4.06	0.96	.62

[a]Significant at the .05 level.

TABLE XXVIII. MAJOR POSITION CHANGES OF VARIABLES WHICH DISCRIMINATED AMONG GROUP BODY-CATHEXIS PROFILES OF THE PRE- AND POST-TESTS

ITEM	TEST	STEP RANK	CONTROL MEAN (n = 68)	BACKPACKING & MOUNTAINEERING MEAN (n = 69)	SCUBA MEAN (n = 16)	F VALUE	U STATISTIC
Appearance of Eyes	PRE-	37	4.03	4.00	4.19	1.35	.48
	POST-	2	4.03	3.93	4.69	4.75[a]	.88
Face	PRE-	25	3.65	3.65	3.75	1.97	.52
	POST-	4	3.65	3.90	4.25	3.56	.83
Energy Level	PRE-	5	3.68	3.52	4.19	3.54	.72
	POST-	7	3.68	3.54	4.12	3.33	.81
Muscular Strength	PRE-	1	3.68	3.17	3.69	5.73[a]	.93
	POST-	28	3.68	3.61	3.94	1.37	.58
Keennesses of Senses	PRE-	3	3.78	3.81	4.44	4.31[a]	.85
	POST-	15	3.78	3.75	4.25	2.17	.65

[a]Significant at the .05 level.

TABLE XXIX. CLASSIFICATION OF SUBJECTS BY PRE- AND POST-TEST SELF-CATHEXIS PROFILES.

GROUP	n	SELF-CATHEXIS PROFILE						X^2
		PRE-TEST			POST-TEST			
		CONTROL	BP & M	SCUBA	CONTROL	BP & M	SCUBA	
CONTROL	68	46	13	9	39	15	14	4.16
BP & M	69	20	41	8	14	44	10	2.21
SCUBA	16	3	4	9	2	2	12	2.33

subjects who exhibited self-cathexis profiles similar to that of their own group or to either of the other groups.

Table XXX illustrates the classification of subjects by pre- and post-test body-cathexis profiles. The results of the chi square analysis of the pre- and post-test classifications indicated that a significant shift occurred relative to the number of backpacking-orienteering and mountaineering subjects who exhibited post-test body-cathexis profiles similar to that of the scuba diving group. A significant shift was also indicated relative to the number of scuba diving subjects who exhibited post-test body-cathexis profiles similar to that of the combined backpacking-orienteering and mountaineering group.

In summary, the results of the discriminant analysis among self-cathexis and body-cathexis profiles were as follows:

1. No significant difference was found to exist among group pre-test self-cathexis profiles.
2. A significant difference existed among group pre-test body-cathexis profiles relative to the combination of the variables "muscular strength," "width of shoulders," "keenness of senses," and "profile."
3. A significant difference existed among group post-test self-cathexis profiles with respect to the variable "athletic skills."
4. A significant difference existed among group post-test body-cathexis profiles with respect to the variable "width of shoulders."

TABLE XXX. CLASSIFICATION OF SUBJECTS BY PRE- AND POST-TEST BODY-CATHEXIS PROFILES.

GROUP	n	BODY-CATHEXIS PROFILE						X^2
		PRE-TEST			POST-TEST			
		CONTROL	BP & M	SCUBA	CONTROL	BP & M	SCUBA	
CONTROL	68	43	19	6	41	18	9	2.90
BP & M	69	17	48	4	17	40	12	17.33[a]
SCUBA	16	1	1	14	0	5	11	17.64[a]

[a]Significant at the .005 level.

Discussion

Results of this investigation will be discussed in terms of the stated hypotheses and their potential contribution to the area of knowledge concerned with the effects of physical activity on the development of the self-concept and body-image.

In order to establish the reliability of the results of this study, two separate control groups were utilized to control the possible effects of the passage of time and of sensitivity toward the criterion instruments on post-test results. The following discussion supports the fact that the above-mentioned variables have been controlled.

As hypothesized (hypothesis one), no significant difference was found to exist between the cathexis scores of the pre-test control group (Control I) and the post-test control group (Control II). Since Control I and Control II were not significantly different with respect to measurements of self-cathexis and body-cathexis, the variable of the time of the year at which the test was administered did not appear to result in a significant effect on the scores of either sample of the population, thus inferring that similar results would occur with other samples of the population. In addition, the results of the ANOVA of the post-test groups x trial indicated that the cathexis scores of Control II (a group which participated in only the post-test and, thus, had no recent exposure to the testing instrument) were not significantly different from the post-test scores of the mountaineering and backpacking-orienteering experimental groups. Thus, the post-test scores of the populations tested did not appear to be attributable to a pre-established familiarity or sensitivity toward the testing instruments.

In summary, Control II was not significantly different from Control I on measures of self-cathexis and body-cathexis, nor significantly different from two experimental groups with respect to post-test measures of cathexis. This infers that any significant results among group criterion scores were attributable to some treatment or variable affecting the population and not to the effects of the natural passage of time or a pre-established sensitivity toward the criterion instrument.

Results of this study supported hypothesis two, which stated that no significant difference in pre-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who elected to participate in different environmental sport activity courses and a random sample of university students. Thus, hypothesis two was tenable (Tables X and XVII).

Hypothesis three, which stated that no significant difference in pre-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who elect to participate in different environmental sport activity courses, was tenable as indicated by the $\underline{F}$ values presented in Tables X and XVI. The results supporting hypotheses two and three indicated that the groups of individuals who elected to participate in the courses of backpacking-orienteering, mountaineering, and scuba diving did not differ from each other or from a random sample of the university students with respect to their reported degree of self-cathexis or body-cathexis. These results did not support the idea that groups of individuals who elect to participate in environmental sport activity courses demonstrate a significantly more positive or negative self-cathexis or body-cathexis than does the normal population.

Hypothesis five, which stated that no significant difference in post-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who participated in different environmental sport activity courses and a random sample of the university students, was rejected as results of this study indicated that the mean post-test body-cathexis score of the scuba diving group was significantly different from the post-test body-cathexis score of the control group (Table XIII). The participants in the scuba diving class exhibited a positive increase in body-cathexis which was not paralleled by a random sample of university students. No other significant difference was indicated among the group post-test scores of self-cathexis or body-cathexis (Tables X and SVII). From this result body-cathexis appeared to be more vulnerable to change through participation in an environmental sport activity course than did self-cathexis. This inferred vulnerability of the body-cathexis would appear to be logical considering that the individual's direct mode of contact with the physical environment is the body and that the body image is affected by visual, tactile, and proprioceptive stimuli (Critchley, 1950).

Analysis among the group mean post-test scores of self-cathexis and body-cathexis indicated that no significant difference existed among groups participating in different environmental sport activity courses (Table X). Thus, the sixth hypothesis was tenable.

Results of this study indicated that no significant difference occurred between the pre-test and post-test mean scores of self- or body-cathexis of the groups of individuals participating in courses of backpacking-orienteering, mountaineering, or scuba diving (Table

XXII). These results supported hypothesis four. Apparently, participation in the courses of backpacking-orienteering, mountaineering, or scuba diving did not have a significant effect on the participants' total self-cathexis or body-cathexis.

Although no significant difference occurred in group scores of self-cathexis or body-cathexis during participation in the selected environmental sport activity courses, scuba diving participants did demonstrate higher mean self-cathexis and body-cathexis scores on the post-test trial than on the pre-test administration (Table III).

An interesting occurrence with respect to the pre- and post-test cathexis scores can be seen relative to the scores of each of the experimental groups. The backpacking-orienteering and mountaineering groups exhibited a greater range in their post-test scores of self-cathexis and body-cathexis scores than was depicted by their pre-test scores (Figure 2 and 3). The range of scores for the post-test spread in both positive and negative directions. In contrast, the range of post-test self-cathexis and body-cathexis scores of the scuba diving group increased only in the positive direction. A possible explanation for the difference in the spreading of the ranges could be that participants in the scuba diving course had more frequent interaction with their activity environment than did the other groups and, thus, may have gained more experience and confidence in dealing with that environment. Perhaps the participants in the backpacking-orienteering and mountaineering courses were in situations where they were able to see their potential strengths and weaknesses but, by the nature of the structure of the courses, were unable to deal with or overcome these

factors on a frequent basis. Another possible explanation, although not dealt with in this study, would be the possible variations in the social interactions of the groups throughout the school term.

Pre-test self-cathexis profiles of the combined backpacking-orienteering and mountaineering group, the scuba diving group, and the control group exhibited no significant difference at the .05 level (Table XXIII). Although no significant difference was indicated among group self-cathexis profiles, the combination of the variables of "procrastination," "capacity for work," and "imagination exhibited an F value and a U statistic which may infer a tendency for the groups to differ relative to their evaluation of these three variables. The pre-test results indicated that the backpacking-orienteering and mountaineering group demonstrated a more positive mean score for "procrastination" and a lower mean score for "capacity for work" than did the scuba diving or control groups. Scuba diving participants exhibited a more positive mean score with respect to "imagination" than did either of the other groups.

Results of the discriminant analysis of pre-test body-cathexis profiles indicated that the combination of the mean scores for "muscular strength," "width of shoulders," "keenness of senses," and "profile" discriminated among the groups at the .05 level of significance. The scuba diving group exhibited the most positive mean score for the variables "muscular strength," "width of shoulders," and "keenness of senses." The backpacking-orienteering and mountaineering group indicated a lower mean score relative to "muscular strength" than did the scuba diving or the control groups and a higher mean score with respect to

"profile." Thus, hypothesis seven was rejected as groups which did not differ in total mean body-cathexis scores demonstrated significantly different body-cathexis profiles. The fact that groups significantly differed in their pre-test body-cathexis profiles lends support to the idea that an individual's perception of certain characteristics of his or her body may affect one's choice of physical activity.

The analysis of post-test self-cathexis profiles indicated that the variable "athletic skills" significantly discriminated among the groups at the .05 level (Table XXV). The scuba diving participants exhibited a higher mean score with respect to "athletic skills" than did either of the other groups. The control group exhibited the lowest mean score relative to "athletic skills." "Athletic skills" was not a variable which discriminated among the groups in the pre-test. Thus, scuba participants increased in their level of satisfaction toward "athletic skills" during the six-week period between tests. Other post-test results relative to self-cathexis profiles were similar to the pre-test results as the variables of "procrastination" and "capacity for work" were not variables which significantly discriminated among the groups at the .05 level when considered individually, but when combined with another single variable resulted in an $\underline{F}$ value and a $\underline{U}$ statistic indicative of a possible tendency for the groups to differ.

Relative to the post-test body-cathexis profiles the variable "width of shoulders" significantly discriminated among the groups at the .01 level (Table XXVI). The participants in the scuba diving course reported a higher mean score for the variable "width of shoulders" than did either of the other groups. The control group reported the

lowest mean score with respect to this variable. The significant results relative to "width of shoulders" indicated that groups which demonstrated a significantly different mean body-cathexis score also exhibited a significantly different body-cathexis profile. Thus, hypothesis eight was rejected. The analysis of post-test body-cathexis profiles also indicated a tendency for the groups to differ with respect to the combination of the variables "width of shoulders," "appearance of eyes," "sex organs," "face," "energy level," and "profile." The participants in the scuba diving course exhibited the higher mean score for each of the above-mentioned variables.

When the variables which significantly discriminated among the group pre-test body-cathexis profiles were compared with those that significantly discriminated among the group post-test body-cathexis profiles, "muscular strength" was found to be a significantly discriminating factor for the pre-test but not the post-test. Mean scores of the groups indicated that "muscular strength" was evaluated at a higher level by the participants of the experimental groups than it had been on the pre-test (Table XVIII). The post-test scores indicated that participants in the experimental groups increased in their level of satisfaction toward their "muscular strength" during the six to seven week interval between tests. The variables "keenness of senses" and "profile" were two additional factors which did not appear as significant discriminating variables of the post-test body-cathexis profiles.

The results of this investigation relative to self-cathexis and body-cathexis profiles indicated that groups significantly differed in their degree of feeling toward some aspects of the self and body.

An interesting result that lacks statistical interpretation is that the majority of the members of the experimental groups tended to load the profile classified as their own group or the profile classified as that of another experimental group. In other words, the majority of the members of the experimental groups tended to exhibit profiles which were more similar to those of other experimental subjects than to the profiles of the control group (Tables XXIX and XXX). The scuba diving participants were an extreme example of this occurrence in that none of the scuba diving subjects were classified as exhibiting post-test body-cathexis profiles similar to that of the control group.

The chi square analysis of pre- and post-test body-cathexis profile classifications indicated a significant shift in the number of scuba diving subjects who exhibited post-test body-cathexis profiles similar to that of the combined backpacking-orienteering and mountaineering group (Table XXX). In addition, a significant shift was indicated relative to the number of backpacking-orienteering and mountaineering subjects who exhibited post-test body-cathexis profiles similar to that of the scuba diving group. The significant results of the chi square analysis illustrated that the subjects of the experimental groups became more alike in their evaluation of body-cathexis during the six to seven week interval between tests.

Summary

In summary, the results of this investigation indicated that the group of individuals who participated in the scuba diving course exhibited a more positive post-test body-cathexis score than did the

control group composed of a random sample of university students. No other significant difference was found in the pre- or post-test scores of self-cathexis or body-cathexis among the scuba diving, backpacking-orienteering, mountaineering, and control groups. Similarly, no significant difference was found between the pre- and post-test scores of self-cathexis or body-cathexis for any of the four groups.

The results of this investigation also indicated that pre- and post-test body-cathexis profiles significantly differed among the control, scuba diving, and the combined backpacking-orienteering and mountaineering groups. A significantly different self-cathexis profile was apparent among the groups following the experimental groups' exposure to the environmental sport activity courses but not preceding their participation in the courses. The scuba diving participants exhibited the most positive mean scores toward each of the variables which significantly discriminated among the groups.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary

Physical activity has been thought to result in the positive development of the participants' self-concept and body-image. Even though research has been done in this area, results are often inconclusive or contradictory. Thus, questions remain to be answered relative to the types of activities which contribute to the development of the self. This investigation was undertaken in an attempt to contribute to the study of the relationship between physical activity and the development of the self-concept and body-image.

The purpose of this study was to compare measures of self-cathexis and body-cathexis among groups of individuals participating in the environmental sport activity courses of backpacking-orienteering, mountaineering, and scuba diving. The goal of this investigation was to indicate possible answers to the following questions: (a) Does a significant difference occur in the self-cathexis and/or body-cathexis of groups of individuals during participating in an environmental sport activity course? (b) Does the self-cathexis and/or body-cathexis of groups of individuals who participate in environmental sport activity courses differ from those of a random sample of university students? (c) Do groups of individuals who participate in different environmental sport activity courses differ in self-cathexis and/or body-cathexis?

(d) Does a significant difference in cathexis profiles exist among groups which exhibit no significant difference in their mean cathexis scores? and, (e) Does a significant difference in cathexis profiles exist among groups which exhibit a significant difference in their mean cathexis scores? The research, testing, statistical analysis, and interpretation of the data necessary to accomplish the stated goal of this investigation were conducted at Oregon State University during the 1975-1976 school year.

The experimental subjects utilized in this study were students enrolled in the environmental sport activity courses of scuba diving, backpacking-orienteering, and mountaineering during Spring Term of 1976 at Oregon State University. The control groups were two random samples of Oregon State University students and were enrolled in the University during Spring Term of 1976. Subjects of the experimental groups responded to the Self-Cathexis Scale and the Body-Cathexis Scale on a pre- and post-test basis while members of the control group responded to the criterion instruments on either the pre- or post-test administration. The interval of time separating the pre- and post-test administrations was six to seven weeks in length.

An analysis of variance design of groups x trial and subjects x trials was utilized to analyze the mean scores of the criterion instruments. Multiple discriminant function analysis (specifically, stepwise discriminant analysis) was utilized to compare group profiles on both the pre- and post-tests of each criterion measure. The F values resulting from the statistical analyses were utilized to test the hypotheses stated in Chapter I. Significance at the .05 level of confidence was

required to reject the null hypotheses.

A summary of the results and conclusions as they relate to the stated hypotheses is presented in Table XXXI.

In conclusion, the results of the present study indicated that individuals who were participating in backpacking-orienteering or mountaineering courses did not differ from a random sample of university students in measures of self-cathexis or body-cathexis. They also did not differ from each other or from a group of individuals participating in a scuba diving course. However, participants in the scuba diving course were found to significantly differ from a random sample of university students in respect to post-test body-cathexis scores. No significant difference was indicated between the self-cathexis scores of the scuba diving participants and the random sample of university students.

Participation in the selected environmental sport activity courses did not appear to result in a significant increase or decrease in the mean self-cathexis or body-cathexis scores of any of the experimental groups.

A significant difference in self-cathexis and body-cathexis profiles was found to exist among groups which demonstrated no significant difference in mean cathexis scores. A significant difference in body-cathexis profiles was also found to exist between groups which exhibited significantly different mean body-cathexis scores.

Results of the study also indicated that no significant difference existed in the self-cathexis or body-cathexis scores of two random samples of university students.

TABLE XXXI. SUMMARY OF THE RESULTS AND CONCLUSIONS.

HYPOTHESIS:	RESULTS	CONCLUSION
1. No significant difference in scores of self-cathexis and/or body-cathexis exists among two random samples of university students.	No significant difference existed between the group scores.	The hypothesis was tenable.
2. No significant difference in pre-test scores of self-cathexis and/or body cathexis exists among groups of individuals who elect to participate in different environmental sport activity courses and a random sample of university students.	No significant difference existed among the groups.	The hypothesis was tenable.
3. No significant difference in pre-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who elect to participate in different environmental sport activity courses.	No significant difference existed among the groups.	The hypothesis was tenable.
4. No significant difference between pre- and post-test scores of self-cathexis and/or body-cathexis occurs during participation in environmental sport activity courses.	No significant difference existed.	The hypothesis was tenable.

TABLE XXXI. Continued

HYPOTHESIS:	RESULTS	CONCLUSION
5. No significant difference in post-test scores of self-cathexis and/or body-cathexis exists among groups of individuals who participated in different environmental sport activity courses and a random sample of university students.	A significant difference existed between the post-test body-cathexis score of the scuba diving group and the control group.	The hypothesis was rejected.
6. No significant difference in post-test scores of self-cathexis and/or body cathexis exists among groups of individuals who participated in different environmental sport activity courses.	No significant difference existed among the groups.	The hypothesis was tenable.
7. If no significant difference in mean cathexis scores exists among the groups, then no significant difference exists among group cathexis profiles.	A significant difference existed among group pre-test body-cathexis and post-test self-cathexis profiles.	The hypothesis was rejected.
8. If a significant difference in mean cathexis scores exists among the groups, then no significant difference exists among group cathexis profiles.	A significant difference existed among the group post-test body-cathexis profiles.	The hypothesis was rejected.

Recommendations

The following are recommendations for further study:

1. Studies similar to the present study should be conducted utilizing other environmental sport activities.
2. Studies similar to the present study should be conducted utilizing criterion instruments which measure other aspects of the self-concept and body-image.
3. A study of the effects of the social interactions occurring during participation in risk-oriented activity courses should be conducted.
4. A study of the effect of participation in environmental sport activity courses on the self-concept and body-image of individuals who exhibit negative self- and body-perceptions should be conducted.

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APPENDICES

A P P E N D I X A

Criterion Instrument

SELF-CATHEXIS AND BODY-CATHEXIS SCALE

DIRECTIONS:

This scale consists of 80 items designed to sample your degree of satisfaction or feeling toward various characteristics of your self and body. There are no right or wrong answers. What is wanted is your own personal feeling about each given characteristic. Read each item and decide how you feel about it. Then mark your answer in the space provided on the answer sheet. Be sure to respond to every item.

Mark: 1 2 3 4 5

☐ ☐ ☐ ☐ ☐ if you have strong negative feelings.

☐ ☐ ☐ ☐ ☐ if you have moderate negative feelings.

☐ ☐ ☐ ☐ ☐ if you have no feelings one way or the other.

☐ ☐ ☐ ☐ ☐ if you have moderate positive feelings.

☐ ☐ ☐ ☐ ☐ if you have strong positive feelings.

---

1. Sense of humor 1 2 3 4 5
2. Independence 1 2 3 4 5
3. Temper 1 2 3 4 5
4. Ability to express self 1 2 3 4 5
5. Self understanding 1 2 3 4 5
6. Artistic talents 1 2 3 4 5

7.	Tolerance	1	2	3	4	5
8.	Moods	1	2	3	4	5
9.	General Knowledge	1	2	3	4	5
10.	Imagination	1	2	3	4	5
11.	Popularity	1	2	3	4	5
12.	Self-confidence	1	2	3	4	5
13.	Ability to accept criticism	1	2	3	4	5
14.	Memory	1	2	3	4	5
15.	Thriftiness	1	2	3	4	5
16.	Personality	1	2	3	4	5
17.	Ability to concentrate	1	2	3	4	5
18.	Procrastination	1	2	3	4	5
19.	Self-assertiveness	1	2	3	4	5
20.	Ability to express sympathy	1	2	3	4	5
21.	Sensitivity	1	2	3	4	5
22.	Ability to lead	1	2	3	4	5
23.	Impulses	1	2	3	4	5
24.	Intelligence level	1	2	3	4	5
25.	Athletic skills	1	2	3	4	5
26.	Happiness	1	2	3	4	5
27.	Creativeness	1	2	3	4	5
28.	Love life	1	2	3	4	5
29.	Sex appeal	1	2	3	4	5
30.	Skill with hands	1	2	3	4	5
31.	Gracefulness	1	2	3	4	5

32.	Fears	1	2	3	4	5
33.	Capacity for work	1	2	3	4	5
34.	Ability to meet people	1	2	3	4	5
35.	Vocabulary	1	2	3	4	5
36.	Self discipline	1	2	3	4	5
37.	Suggestibility	1	2	3	4	5
38.	Will power	1	2	3	4	5
39.	Ability to make decisions	1	2	3	4	5
40.	Self consciousness	1	2	3	4	5
41.	Hair	1	2	3	4	5
42.	Facial complexion	1	2	3	4	5
43.	Appetite	1	2	3	4	5
44.	Hands	1	2	3	4	5
45.	Distribution of hair (over body)	1	2	3	4	5
46.	Nose	1	2	3	4	5
47.	Physical stamina	1	2	3	4	5
48.	Elimination	1	2	3	4	5
49.	Muscular strength	1	2	3	4	5
50.	Waist	1	2	3	4	5
51.	Energy level	1	2	3	4	5
52.	Back	1	2	3	4	5
53.	Ears	1	2	3	4	5
54.	Age	1	2	3	4	5
55.	Chin	1	2	3	4	5
56.	Body build	1	2	3	4	5

57.	Profile	1	2	3	4	5
58.	Height	1	2	3	4	5
59.	Keenness of senses	1	2	3	4	5
60.	Tolerance of pain	1	2	3	4	5
61.	Width of shoulders	1	2	3	4	5
62.	Arms	1	2	3	4	5
63.	Chest	1	2	3	4	5
64.	Appearance of eyes	1	2	3	4	5
65.	Digestion	1	2	3	4	5
66.	Hips	1	2	3	4	5
67.	Resistance to illness	1	2	3	4	5
68.	Legs	1	2	3	4	5
69.	Appearance of teeth	1	2	3	4	5
70.	Sex drive	1	2	3	4	5
71.	Feet	1	2	3	4	5
72.	Sleep	1	2	3	4	5
73.	Voice	1	2	3	4	5
74.	Health	1	2	3	4	5
75.	Sex activities	1	2	3	4	5
76.	Knees	1	2	3	4	5
77.	Posture	1	2	3	4	5
78.	Face	1	2	3	4	5
79.	Weight	1	2	3	4	5
80.	Sex organs	1	2	3	4	5

A P P E N D I X B

Approval for the Use of Human Subjects

OREGON STATE UNIVERSITY

Committee for Protection of Human Subjects

Summary of Review

Title: Body-Cathexis and Self-Cathexis of Participants in Selected Environmental Sport Activities

Program Director: Suttie, Sandra J. (Judy A. O'Neill)

Recommendation:

XX Approval

____ Provisional Approval

____ Disapproval

____ No Approval

Remarks:

Date: January 26, 1976 Signature: J. Ralph Shay

J. Ralph Shay
Assistant Dean of Research
Phone: 754-3437

cc Dr. MacDonald

mep

A P P E N D I X C

Acknowledgement of Willingness to Participate

ACKNOWLEDGEMENT OF WILLINGNESS TO PARTICIPATE

The undersigned acknowledges the willingness to volunteer as a participant in the Self-Cathexis - Body-Cathexis study being conducted at Oregon State University during Spring Term of 1976. The task to be performed by the subject will be that of anonymously responding to the Self-Cathexis and Body-Cathexis Scale on a pre- and post-trial basis.

Previous research with the cathexis scale has reported no risks or discomforts relative to participation by the subjects. However, the subject is free to withdraw from the study at any time. Inquiries concerning procedures will be answered by the investigator on a one-to-one personal basis.

Signed_____

Date_____

Address_____

Phone_____

Age_____

ACKNOWLEDGEMENT OF WILLINGNESS TO PARTICIPATE

The undersigned acknowledges the willingness to volunteer as a participant in the Self-Cathexis - Body-Cathexis study being conducted at Oregon State University during Spring Term of 1976. The task to be performed by the subject will be that of anonymously responding to the Self-Cathexis and Body-Cathexis Scale.

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Signed_____

Date_____

Address_____

Phone_____

Age_____

A P P E N D I X D

Letters to the Subjects

Dear

In order to better understand the college students of the mid-1970's, attempts are being made, through research, to determine how a student perceives himself or herself. One such research study is being conducted during Spring Term of 1976 utilizing Oregon State University students as subjects. Through a selection process, you have been chosen to participate in this study. Your responses would be confidential and would constitute part of a group result.

We would like to request your cooperation, if you are willing, to serve as a subject for this investigation. As a subject, you will be asked to anonymously respond to two self-inventories measuring "cathexis" - a degree of satisfaction. These inventories are in the form of a paper and pencil test. The entire process will require a maximum of 30 to 40 minutes of your time and would take place during the first week of spring term. Numerous testing times during this period are available for your convenience. Testing dates, times, and places are as follows:

Date	Anytime From	Place
Monday - 3/29 (schedule pick-up day)	9:00AM - 5:00PM	Women's Bldg. 207
Tuesday - 3/30	12:00 - 4:00PM	Women's Bldg. 207
Wednesday - 3/31	2:00PM - 5:00PM	Langton Hall 124
Thursday - 4/1	3:30PM - 6:30PM	Langton Hall 124

Please fill out the enclosed self-addressed stamped postcard indicating whether you are willing to serve as a subject. If you are so willing, please mark (x) the date and time of testing which you plan to attend.

The research investigator will be present at all testing times and will be available to answer questions you may have at that time, or you may call Judy O'Neill at 754-2631 - Women's Building 107A.

Thank you for your time and consideration. We hope to see you at one of the testing times.

Sincerely,

Judy O'Neill

Sandra Suttie, Ph.D.
Associate Professor

Dear

In order to better understand the college students of the mid-1970's, attempts are being made, through research, to determine how a student perceives himself or herself. One such research study is being conducted during Spring Term of 1976 utilizing Oregon State University students as subjects. Through a selection process, you have been chosen to participate in this study. Your responses would be confidential and would constitute part of a group result.

We would like to request your cooperation, if you are willing, to serve as a subject for this investigation. As a subject, you will be asked to anonymously respond to two self-inventories measuring "cathexis" - a degree of satisfaction. These inventories are in the form of a paper and pencil test. The entire process will require a maximum of 15 to 20 minutes of your time. Numerous testing times are available for your convenience. Testing dates, times, and place are as follows:

Date	Anytime From			Place
Tues 5/18	8:00-9:00AM	- 11:30-2:00PM	3:45-5:30PM	Women's Bldg.207
Weds 5/19	8:30-12:30PM	- ---	---	Women's Bldg.207
Thur 5/20	---	11:30-2:00PM	5:30-8:30PM	Women's Bldg.207
Fri 5/21	9:45-1:15PM	- ---	3:30-5:00PM	Women's Bldg.207
Mon 5/24	---	11:00-12:00noon	4:45-6:00PM	Women's Bldg.207
Tues 5/25	8:00-9:00AM	- 11:30-2:00PM	3:45-5:30PM	Women's Bldg.207
Weds 5/26	---	---	4:45-7:00PM	Women's Bldg.207

Please fill out the enclosed self-addressed stamped postcard indicating whether you are willing to serve as a subject. If you are so willing, please mark (x) the testing date you plan to attend.

The research investigator will be present at all testing times and will be available to answer questions you may have at that time, or you may call Judy O'Neill at 754-2631 - Women's Building 107A.

Thank you for your time and consideration. We hope to see you at one of the testing times.

Sincerely,

Judy O'Neill

Dr. Donald Campbell
Professor