

AN ANALYSIS OF MEASURED PSYCHOLOGICAL CHANGES  
RESULTING FROM AN INTENSIVE  
WILDERNESS RECREATIONAL EXPERIENCE

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## CHAPTER I

### INTRODUCTION

The various aspects of recreational activity have been under study for some time. However, up to the present the major emphasis has been put on the physical effects of recreation activities such as muscle tone, strength, cardio-vascular and respiratory efficiency and chemical changes taking place in the body (Cooper 1968).

Very few researchers have considered the psychological effects of recreation. It is known that a cross country runner can maintain a heart rate of 200 beats per minute for an hour or more; the chemical composition of his blood is also known as is the amount of oxygen he consumes (Cooper 1968), but very little is known about the psychological effects the experience may have upon him.

Relative to the numerous research studies on the physiological merits of recreational exercise, little data is available regarding the psychological effects of such activity.

Cooper (1968) recognizes the psychological benefits of fitness. He relates that psychological well-being is an essential element of fitness, and that fitness is a desirable state for anyone who wants to lead a zestful and productive life and realize his fullest potential.

This research will attempt to identify psychological changes which take place as a result of recreation. The long duration (28 days) and

intensity of the experience, while not a typical recreation experience, are believed to be necessary in order to produce measurable changes in the subjects. The objective more precisely stated is as follows.

It is the intent of this research design to determine, for a specific sample, both observable and measurable psychological changes which were a result of an intensive wilderness recreation program involving strenuous activities and several cooperative problem solving experiences.

Similar research which has been done in the past has been primarily for the purpose of justifying a particular program. In most cases the measuring tools were constructed by the researcher. Such tests often lack reliability and validity.

Many of these studies utilize evaluator observation and criterion referenced rating scales as primary assessments of behavior change. The criterion is established by the researcher and as a result may be different in each case. Such results are not objectively measurable and perhaps biased by "pygmalion effect" (Lanyon & Goodstein 1971) or the tendency to observe only changes that one anticipates.

## CHAPTER II

### REVIEW OF THE LITERATURE

The potential psychological effects of exercise in general and of outdoor recreation in particular have become more evident in the literature within the past decade. It appears that the major source of research involves social emotional changes which have taken place as a result of a relatively strenuous wilderness program of physical activity, particularly as it applies to youth. This is, perhaps, in part a result of the increasing popularity of such programs as Outward Bound, Project Adventure, and Reach Out.

One of the major aspects of personality development under study is self concept. Several studies have identified an increased sense of self confidence and general well being in those participating in wilderness recreational programs.

Richards (1966) made an assessment of personality change with a group of 90 male subjects participating in the Colorado Outward Bound School. Using results from the Systematic Differential Test he observed a "substantial strengthening of the self-images of the great majority of the young men who went through the course." Richards employed an interview technique with a smaller sample and concluded that the results of the program appear to be felt more in areas of social functioning than in academic pursuits.

In a study of eighty-seven Toledo, Ohio high school students which used the goals of a high school guidance program as a frame of reference, Lovett (1971) concluded that students who participated in Project Adventure gained a more positive self-concept, became more confident in decision-making, and enjoyed better interaction with their peers.

An Alternate Semester Wilderness Experience Program at Lincoln-Sudbury Regional High School in Massachusetts was evaluated by Copp, Pierson, and Sargent (1972). Their study included student responses, questionnaire results from parents, and staff evaluations. Among their major findings is the statement, "if there is one consistent theme that runs throughout the evaluations it is that the majority of these students acquired a more positive, self-confident image of themselves."

A research program in England employed a combination of evaluation devices to assess personality changes resulting from a rigorous outdoor recreation program. Such change indices included the Sixteen Personality Factor Questionnaire which is a personality inventory designed to assess normal personality characteristics (Buros, 1972), the Intelligence Progressive Matrices Test, self-ratings, and confidential student reports. When subject results were compared to similar evaluations of a control group it was concluded that the girls who completed an Outward Bound course were relatively more stable, more dependable, more critical, livelier, less sensitive, and less conventional (Strutt, 1966).

Finally, in another study, Clifford and Clifford (1967) evaluated a group of adolescent boys who attended a three-week survival training course. Results indicated a broad ranging change in social emotional factors. The authors related that "an overall change in self-concept did take place in the appropriate direction, and that discrepancies between the self and the ideal self were reduced."

Another specific area of personality development closely associated with self-concept is the ability to relate to significant others within one's immediate environment. Several studies indicated positive changes in sociability for those subjects involved in outdoor programs.

Burton (1971) evaluated sociability changes in a group of high school students participating in a Vision Quest Program. He noted that this program served to "bring opposing groups together and initiate dialogue and interaction."

Using a combination of questionnaire and personal interview, Schultz (1970) concluded that the Wilderness Program course "is an intense personal experience frequently involving changes in personality and values," and, "enables participants to look differently at themselves and the world." Finally, he concluded that "one of the most significant results of the Wilderness Program course appears to be an appreciation and tolerance of others different from oneself."

Fletcher (1971) studied 3,000 students who participated in a Wilderness Initiatives Learning Course in England. His study results indicated that both students and their sponsors felt changes had occurred in increased self-confidence, greater maturity, greater awareness of the needs of others, and greater ability to relate to others. Fletcher also found that the majority of participants felt that "the influence of a single Wilderness Initiatives Learning Course is very persistent," with most believing that changes are permanent.

In an Outward Bound program designed for high school students from a large public school district Godfrey (1972) concluded that (1) project participants experienced significant personal growth and improved interpersonal relationships, (2) the project stimulated organizational change

in the district by involving a wide range of senior administrative personnel in addition to the teachers and pupils, (3) the initial positive response of participants exhibited an enduring quality as measured by a survey taken after six months.

Personality and academic changes have also been observed within different school-related subgroupings. For example, Naches and Roberts (1967) evaluated the effects of a Dare to Care program designed for the students of the Adams County School District Number 14 in Colorado. The researchers included professional psychologists regularly employed by the school district. In this study students were divided into three groups: 1) top students, 2) volunteers, and 3) potential drop-outs. All subjects were given the Student Attitude Survey, a High School Personality Questionnaire, and a staff rating scale. Results indicated that all students became more outgoing, affected by feelings, assertive, tender-minded, and self-controlled. While all test subjects reflected these changes, the degree of change was greatest for the potential drop-out.

A more formal look at Project Adventure was taken at Hamilton Wenham Regional High School in Massachusetts. Using a battery of tests (Rotter Scale of Internal and External Control, Tennessee Self-Concept Scale, student questionnaire, self-rating scale, School Climate Survey, and physical tests) the researchers major findings were (1) that there was an overall "positive change" for the sophomore class, (2) that students involved in the project showed a higher degree of internal control, (3) that students exhibited a significant decrease in general enthusiasm for the regular school program, and, (4) in general, girls experienced positive personality changes equal and in many instances greater than boys (Fersch and Smith, 1971).

Program research has also been compiled evaluating changes in other groups of interest. One of these is adjudicated youth, that is, those who are under judicial sentence. In a research project which involved 40 urban youth and delinquents who were low-achieving high school students, Schroeder and Lee (1967) found significant changes after attending the Venture Program School. The students came to see themselves as more active, stronger, more positive, and less alienated. Also, these students demonstrated a greater capacity to see other people as individuals and to rate peers and teachers as more positive and helpful. As a group, these students developed more mature and flexible goal-orientation and means of goal-achievement.

Kelly and Baer (1971) made a two-year study of 60 delinquent youths under the supervision of the Massachusetts Youth Service. These youth were subjected to an intensive outdoor recreation experience designed to foster confidence and cooperation. Of the 42 boys who completed the program the recidivism rate was 20% compared to 40% for the State of Massachusetts and 50-60% for the U.S.

Freeman, Spilka and Mason (1969) made an empirical study of adjudicated delinquents who participated in a cooperative program with the Colorado Outward Bound School. The results supported the hypothesis that "the consequences of aggression would come to be negatively viewed."

In summary, there appears from the literature to be an increasing interest in the psychological changes associated with rigorous outdoor recreational programs. However, in evaluating changes resulting from previous research, these findings may be of questionable value when universally applied to other samples and other programs. Many researchers are of the opinion that unique characteristics of people within a specific

community make it virtually impossible to use national norms to adequately describe a particular subject sample (Carroll, 1963).

Perhaps, then, it is important for each sample group to determine the psychological changes associated with its particular recreational activity in an attempt to evaluate the total effectiveness of that program.

## CHAPTER III

### EMPIRICAL RESEARCH

#### Objectives

The general objective of this project was to determine the relative extent to which psychological changes as indicated by several specific subtest measures from a standardized psychological inventory are affected by a controlled outdoor recreation program.

More specifically, the objectives were:

1. To identify measurable personality changes for a group of 24 male teen-age subjects who took part in an intensive outdoor recreational experience.
2. To identify potential personality changes for a control group of 24 male teen-age students who were enrolled in a regular high school academic curriculum.

#### Research Method

1. Subjects. The basic sample of this study consisted of 24 teen-aged male students from the Milwaukee, Wisconsin area. All subjects included in this research were between 16 to 18 years of age and obtained a doctor's permission to participate in the project.

2. Procedure. This program was designed to provide the subjects with a 28-day intensive recreational experience. The trip began with a chartered bus ride from Milwaukee, Wisconsin to Salida, Colorado. This travel covered 1,500 miles and required approximately 36 hours of

travel time. The trip began at 6:00 a.m. and arrival at Salida was calculated to be about 6:00 p.m. the following day. This time schedule allowed for campsite organization in the long hours of early summer daylight.

Arriving in Salida, the students began a 24-day rigorous hiking and learning experience. Travel was primarily by foot with packs filled with all the essential equipment and food necessary before the weekly resupply stop.

The backpacking route taken was a large loop among the peaks and passes of the Continental Divide for a total of approximately 150 miles with an average of 6.25 miles per day. The actual daily route followed was selected by the students in consultation with their leader. Leaders included the author of this research and four assistants.

In the field, subjects were put in a situation in which cooperation and group effort were necessary in nearly every aspect of daily activity. The twenty-four students were divided into two groups of twelve each which was further divided into three groups of four. Each group of four worked together to build its common shelter using a twelve-by-fourteen foot tie tarp and to organize a menu and prepare meals from its supply of rations.

An emphasis on total group involvement was developed early in the program with the use of a general introduction involving trust and confidence-building exercises. Included in this orientation program was the idea that a task was not complete, a goal was not achieved until every member of the group made a contribution or reached the goal.

Most of the participants had little or no experience at camping or wilderness travel. Most had lived in an urban environment all of their life so special instruction in camp crafts, shelter construction and food preparation was provided. In the field the more capable students were encouraged to assist the less skilled at a specific task as part of the cooperative aspect of the program.

Aside from the basic camp craft skills, a semi-formal program of instruction was provided with the goal of making the experience safer and more educational. The skill areas taught included emergency fire building, map and compass use, route finding, first aid, emergency evacuation, rock climbing, Indian crafts, geology, weather, astronomy, ecology and geography.

The overall goal of the instructional program was to make the student feel at home in a wilderness environment as a result of greater confidence in his skills and knowledge.

Also included in the activity program were a number of stress or fear provoking situations. In each case the person was provided with sufficient support to facilitate a successful experience. Among the stressful situations were (1) fatigue from hiking with a heavy load over rugged terrain at high altitude, (2) an isolation experience in which the subject spent three days alone with little or no food, (3) rock climbing and rappeling which may be fear inducing, (4) small group travel, and a final (5) marathon run. The purpose of these activities was to provide a series of challenging but successful experiences.

The associated test procedure was the administration of the California Psychological Inventory (Gough, 1969) the day before departure from Milwaukee and again on the 26th day of the project, the day before

departure on the return trip. All subjects were administered the same test under similar conditions on both occasions.

A control group of 24 male high school students between the ages of 16 and 18 was administered the California Psychological Inventory, participated in no atypical activities from the regular high school curriculum and was readministered this test after 26 days.

Test results were interpreted to the experimental and control group subjects independently only after the administration of the post test in order to prevent any possible degree of test sophistication or response faking (Chronback, 1970).

3. Measuring Instrument. The California Psychological Inventory (CPI), (Gough, 1969) was developed in an attempt to attain two goals of personality assessment. The first was to develop and use descriptive concepts which possess broad personal and social relevance. That is, it is concerned with characteristics of personality which have pervasive applicability to human behavior and which are a measure of positive aspects rather than of the pathological.

The second goal for the CPI was to devise brief, accurate and dependable subtests for the identification and measurement of the variables chosen for this inventory (Gough, 1969).

This test is intended for use with non-psychiatrically disturbed subjects. Its subtests are designed to evaluate personality characteristics determined essential for social interaction. Gough (1969) relates that one may expect to find this test in general use in schools, colleges, business and industry, and in counseling agencies whose clientele consists primarily of "socially-functioning" individuals.

The inventory contains 480 items yielding 18 scales; it has been used in research testing with groups from age 12 to 70. The test is widely standardized (see CPI manual). James Walsh, professor of psychology and statistics at Iowa State University, in a test critique in the Seventh Mental Measurements Yearbook (Buros, 1972) relates that one of the strongest points of the CPI is undoubtedly the very sizable and widely varied norm groups available. They included more than 6,000 men that range from machine operators to military officers, and 7,000 women from prison inmates to medical school students.

The CPI consists of 18 subtest measures which are divided into four classes. These include;

Class I: Poise Ascendancy and Self-Assurance.

This class is comprised of the scales Dominance (Do), Capacity for Status (Cs), Sociability (Sy), Social Presence (Sp), Self-acceptance (Sa), and Sense of Well Being (Wb).

Class II: Sociability, Maturity and Responsibility.

Subtests in this group include Responsibility (Re), Socialization (So), Self-control (Sc), Tolerance (To), Good impression (Gi), and Communality (Cm).

Class III: Achievement Potential and Intellectual Efficiency.

Achievement via conformance (Ac), Achievement via independence (Ai), and Intellectual efficiency (Ie), are submeasures in this class.

Class IV: Intellectual and Interest Modes.

This group consists of Psychological mindedness (Py), Flexibility (Fx), and Femininity (Fe).

Further, Gough (1969) in the CPI manual rather explicitly defines the different subtest measures and lists general tendencies characteristic of significantly high or low individual scores within these scales.

Subtest Descriptions

California Psychological Inventory

Class I. Measures of Poise, Ascendancy, Self-Assurance and Interpersonal Adequacy

High Scorers	Scale and Purpose	Low Scorers
Aggressive, confident, persistent, and planful; as being persuasive and verbally fluent; as self-reliant and independent; and as having leadership potential and initiative.	<u>Do (dominance)</u> To assess factors of leadership ability, dominance, persistence, and social initiative.	Retiring, inhibited, commonplace, indifferent, silent and unassuming; as being slow in thought and action; as avoiding of situations of tension and decision; and as lacking in self-confidence.
Ambitious, active, forceful, insightful, resourceful, and versatile; as being ascendant and self-seeking; effective in communication; and as having personal scope and breadth of interests.	<u>Cs (capacity for status)</u> To serve as an index of an individual's capacity for status (not his actual or achieved status). The scale attempts to measure the personal qualities and attributes which underlie and lead to status.	Apathetic, shy, conventional, dull, mild, simple, and slow; as being stereotyped in thinking; restricted in outlook and interests; and as being uneasy and awkward in new or unfamiliar social situations.
Outgoing, enterprising, and ingenious; as being competitive and forward; and as original and fluent in thought.	<u>Sy (sociability)</u> To identify persons of outgoing, sociable, participative temperament.	Awkward, conventional, quiet, submissive, and unassuming; as being detached and passive in attitude; and as being suggestible and overly influenced by others' reactions and opinions.
Clever, enthusiastic, imaginative, quick, informal, spontaneous, and talkative; as being active and vigorous; and as having an expressive, ebullient nature.	<u>Sp (social presence)</u> To assess factors such as poise, spontaneity, and self-confidence in personal and social interaction.	Deliberate, moderate, patient, self-restrained and simple; as vacillating and uncertain in decision; and as being literal and unoriginal in thinking and judging.

High Scorers

Scale and Purpose

Low Scorers

Intelligent, outspoken, sharp-witted, demanding, aggressive, and self-centered; as being persuasive and verbally fluent; and as possessing self-confidence and self-assurance.

Sa (self-acceptance) To assess factors such as sense of personal worth, self-acceptance and capacity for independent thinking and action.

Methodical, conservative, dependable, conventional, easy-going, and quiet; as self-abasing and given to feelings of guilt and self-blame; and as being passive in action and narrow in interests.

Energetic, enterprising, alert, ambitious, and versatile; as being productive and active; and as valuing work and effort for its own sake.

Wb (sense of well-being) To identify persons who minimize their worries and complaints, and who are relatively free from self-doubt and disillusionment.

Unambitious, leisurely, awkward, cautious, apathetic and conventional; as being self-defensive and apologetic; and as constricted in thought and action.

Class II. Measures of Socialization, Maturity, Responsibility, and Intrapersonal Structuring of Values

Planful, responsible, thorough, progressive, capable, dignified, and independent; as being conscientious and dependable, resourceful and efficient; and as being alert to ethical and moral issues.

Re (responsibility) To identify persons of conscientious, responsible, and dependable disposition and temperament.

Immature, moody, lazy, awkward, changeable, and disbelieving; as being influenced by personal bias, spite, and dogmatism; and as uncontrolled and impulsive in behavior.

Serious, honest, industrious, modest, obliging, sincere and steady; as being conscientious and responsible; and as being self-denying and conforming.

So (socialization) To indicate the degree of social maturity, integrity, and rectitude which the individual has attained.

Defensive, demanding, opinionated, resentful, stubborn, headstrong, rebellious, and undependable; as being guileful and deceitful in dealing with others; and as given to excess, exhibition, and ostentation in their behavior.

Calm, patient, practical, slow, self-denying, inhibited, thoughtful, and deliberate; as being strict and thorough in their own work and in their expectations for others; and as being honest and conscientious.

Sc (self-control) To assess the degree and adequacy of self-regulation and self-control and freedom from impulsivity and self-centeredness.

Impulsive, shrewd, excitable, irritable, self-centered, and uninhibited; as being aggressive and assertive; and as over-emphasizing personal pleasure and self-gain.

**High Scorers****Scale and Purpose****Low Scorers**

Enterprising, informal, quick, tolerant, clear-thinking, and resourceful; as being intellectually able and verbally fluent; and as having broad and varied interests.

To (tolerance) To identify persons with permissive, accepting, and non-judgmental social beliefs and attitude.

Suspicious, narrow, aloof, wary, and retiring; as being passive and overly judgmental in attitude; and as disbelieving and distrustful in personal and social outlook.

Co-operative, enterprising, outgoing, sociable, warm, and helpful; as being concerned with making a good impression; and as being diligent and persistent.

Gi (good impression) To identify persons capable of creating a favorable impression, and who are concerned about how others react to them.

Inhibited, cautious, shrewd, wary, aloof, and resentful; as being cool and distant in their relationships with others; and as being self-centered and too little concerned with the needs and wants of others.

Dependable, moderate, tactful, reliable, sincere, patient, steady, and realistic; as being honest and conscientious; and as having common sense and good judgment.

Cm (communality) To indicate the degree to which an individual's reactions and responses correspond to the modal ("common") pattern established for the inventory.

Impatient, changeable, complicated, imaginative, disorderly, nervous, restless, and confused; as being guileful and deceitful; inattentive and forgetful; and as having internal conflicts and problems.

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**Class III. Measures of Achievement Potential and Intellectual Efficiency**

Capable, cooperative, efficient, organized, responsible, stable, and sincere; as being persistent and industrious; and as valuing intellectual activity and intellectual achievement.

Ac (achievement via conformance)  
To identify those factors of interest and motivation which facilitate achievement in any setting where conformance is a positive behavior.

Coarse, stubborn, aloof, awkward, insecure, and opinionated; as easily disorganized under stress or pressures to conform; and as pessimistic about their occupational futures.

Mature, forceful, strong, dominant, demanding, and foresighted; as being independent and self-reliant; and as having superior intellectual ability and judgment.

Ai (achievement via independence)  
To identify those factors of interest and motivation which facilitate achievement in any setting where autonomy and independence are positive behaviors.

Inhibited, anxious, cautious, dissatisfied, dull and wary; as being submissive and compliant before authority; and as lacking in self-insight and self-understanding.

High Scorers	Scale and Purpose	Low Scorers
Efficient, clear-thinking, capable, intelligent, progressive, planful, thorough, and resourceful; as being alert and well-informed; and as placing a high value on cognitive and intellectual matters.	<u>Ie (intellectual efficiency)</u> To indicate the degree of personal and intellectual efficiency which the individual has attained.	Cautious, confused, easygoing, defensive, shallow, and unambitious; as being conventional and stereotyped in thinking; and as lacking in self-direction and self-discipline.

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Class IV. Measures of Intellectual and Interest Modes

Observant, spontaneous, quick, perceptive, talkative, resourceful, and changeable; as being verbally fluent and socially ascendant; and as being rebellious toward rules, restrictions, and constraints.	<u>Py (psychological-mindedness)</u> To measure the degree to which the individual is interested in, and responsive to, the inner needs, motives and experiences of others.	Apathetic, peaceable, serious, cautious, and unassuming; as being slow and deliberate in tempo; and as being overly conforming and conventional.
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Insightful, informal, adventurous, confident, humorous, rebellious, idealistic, assertive, and egoistic; as being sarcastic and cynical; and as highly concerned with personal pleasure and diversion.	<u>Fx (flexibility)</u> To indicate the degree of flexibility and adaptability of a person's thinking and social behavior.	Deliberate, cautious, worrying, industrious, guarded, mannerly, methodical, and rigid; as being formal and pedantic in thought; and as being overly deferential to authority, custom, and tradition.
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Appreciative, patient, helpful, gentle, moderate, persevering, and sincere; as being respectful and accepting of others; and as behaving in a conscientious and sympathetic way.	<u>Fe (femininity)</u> To assess the masculinity or femininity of interests. (High scores indicate more feminine interests, low scores more masculine.)	Outgoing, hard-headed, ambitious, masculine, active, robust, and restless; as being manipulative and opportunistic in dealing with others; blunt and direct in thinking and action; and impatient with delay, indecision, and reflection.
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This inventory appears to be generally well accepted by those involved in the field of psychological assessment. E. Rowell Kelly (1971), psychologist, evaluated the CPI to be "all in all. . .one of the best, if not the best, available instrument of its kind."

Walsh (1969) relates that the CPI scales correlates quite substantially with scales from other inventories and recommends the CPI for empirical purposes.

### Results

Table I shows the differences between mean scores (mean deviation) and standard deviation obtained on the California Psychological Inventory subtest pre- and post test measures for the experimental and control samples.

Greatest mean deviations for the experimental group resulted respectively for the subtests; Sense of well being (Wb), Capacity for status (Cs), Social presence (Sp), Tolerance (To), Communality (Cm), Self acceptance (Sa) and Responsibility (Re). The differences in these subtests indicates a higher mean score, to the measured degree, for the post measure than for the pre-measure. The standard deviations obtained for these specific subtests fall between 2.58 (Sa) and 3.90 (Cs). These are within average limits when compared to standard deviations obtained for the remaining subtests.

Negative mean deviations were obtained in Flexibility (Fx), Femininity (Fe) and Socialization (So). Negative mean differences would indicate that lower scores in this group were obtained on the post measure than the pre-measure. Lower standard deviations than for previous measures were computed for Fe and So.

TABLE I

Mean Deviations and Standard Deviations Calculated for  
Pre- and Post Test Measures for All CPI Subtests for  
Experimental (n=24) and Control (n=24) Samples

Subtest	Experimental Sample		Control Sample	
	Mean Deviation	SD	Mean Deviation	SD
Do	0.20	2.60	0.23	1.97
Cs	5.00	3.90	0.16	2.73
Sy	0.79	1.38	0.61	1.26
Sp	4.50	2.70	1.21	3.57
Sa	2.29	2.58	0.30	1.33
Wb	6.20	2.92	1.20	3.96
Re	1.70	3.33	0.28	2.67
So	-0.20	1.98	0.17	1.36
Sc	0.20	1.59	0.69	1.04
To	4.16	3.02	0.98	1.57
G1	0.04	3.01	0.54	2.76
Cm	3.41	3.50	1.03	2.38
Ac	0.00	1.35	-0.23	1.46
AI	0.70	1.60	0.47	1.61
Ie	0.54	3.28	0.01	2.56
Py	0.29	3.34	0.19	1.86
Fx	-1.20	3.51	0.65	2.03
Fe	-0.85	1.79	-1.01	2.60

Largest mean deviations for the control group resulted in Social presence (Sp), Sense of well being (Wb) and Communnality (Cy). The standard deviations obtained for these subtests were from 2.38 (Cm) to 3.96 (Wb).

Negative mean deviations were obtained on Femininity (Fe) and Achievement via conformance (Ac). Standard deviations for these two measures showed little variability as compared to those on other subtests.

Table II shows the results of a t-test of significance for pre- and post test subtest differences on the California Personality Inventory for the experimental and control group.

Results indicate significant ( $p < .05$ ) mean differences were obtained between pre- and post test measures for the experimental group on the subtest scales Cs, Sp, Sa, Wb, Re, To and Cm.

Those subtests obtaining significant t-test scores all fell within two of the four CPI class grouping. Subtests within the .05 significance level belonging to Class I (measures of poise, ascendancy and self-assurance) were Cs, Sp, Sa and Wb. Those in Class II (measures of socialization, maturity and responsibility) were To and Cm. Numerically .66 of the Class I subtests, .50 of Class II subtests and none of Classes III (achievement potential and intellectual efficiency) and IV (intellectual and interest nodes) were significant at the .05 level on t-test results.

T-test score of pre- and post test subtest differences for the control group yielded no significant ( $p < .05$ ) results.

TABLE II

T-Test Results Computed for Pre- and Post Subtest Measures on CPI for Experimental (n=24) and Control (n=24) Samples

Subtest	CPI Class	Exp. T	Control T
Do	I	0.39	0.46
Cs	I	6.27*	0.30
Sy	I	0.80	0.51
Sp	I	8.15*	1.78
Sa	I	4.35*	0.49
Wb	I	10.42*	1.76
Re	II	2.51*	0.48
So	II	-0.51	0.42
Sc	II	0.64	0.79
To	II	6.76*	0.90
G1	II	0.06	0.67
Cm	II	4.78*	1.04
Ac	III	0.00	-0.48
A1	III	0.49	0.57
Ie	III	0.80	0.09
Py	IV	0.42	0.43
Fx	IV	-1.68	0.75
Fe	IV	-1.25	-1.02

$$*p < .05$$

$$T = \frac{\bar{X}_1 - \bar{X}_2}{SD_{\bar{x}}}$$

### Discussion

Test data on the California Psychological Inventory (Gough, 1969) for the control group yielded no significant ( $p < .05$ ) subtest results. Such results would suggest that no measurable psychological changes occurred in that sample that did not participate in the wilderness recreational program.

Significant results ( $p < .05$ ) for the experimental sample were obtained on those CPI measures evaluating Classes I and II "inter and intrapersonal adequacy" (Gough, 1969). No significant change ( $p < .05$ ) were obtained in Classes III and IV which assess "intellectual and academic efficiency" (Gough, 1969).

According to the CPI manual (Gough, 1969) high scores in Classes I and II suggest individuals who are "well adjusted, outgoing, ascendant, socially active, verbally fluent" and who "move up to positions of leadership."

More specific behavioral changes which resulted from this research experiment can be listed within each subtest description:

Capacity for Status (Cx): This test measures those personal qualities which tend to underlie or lead to status positions. A positive change in this subtest scale would suggest that the subject has become, to the measured degree, more ambitious, effective in communication, forceful, active, insightful, resourceful, and versatile.

Social Presence (Sp): Social Presence measures poise, spontaneity, and self confidence. Higher scores in this scale would indicate a tendency toward becoming more clever, enthusiastic, imaginative, spontaneous and vigorous.

Self-acceptance (Sa): This scale assesses such factors as sense of personal worth and capacity for independent thinking and action. In this subtest a higher post test measure indicates the subject has become more aggressive, persuasive, and self-assured.

Well being (Wb): Well being measures the tendency for subtests to be relatively free from self doubt and minimize their worries and complaints. An increased score on this test would suggest that a subject is more ambitious, versatile, and enterprising.

Responsibility (Re): This measurement identifies persons of a conscientious and dependable disposition. Relatively higher scores in responsibility suggest a movement toward being more independent, conscientious, responsible, and progressive.

Tolerance (To): The extent to which an individual is accepting and non-judgmental regarding others is measured by this scale. Increased scores indicate a personality that is clear thinking, having broad and varied interests, tolerant, and enterprising.

Communality (Cm): Communality measures the degree to which an individual's reactions and responses correspond to a "common" pattern which was established during the construction of the CPI. An elevation in this subtest score would indicate an increase in dependability, common sense, reliability, and sincerity.

Only three subtest scales for the experimental group obtained negative mean deviations and t-test results. Negative scores indicate a higher mean pre-test score than mean post test score. These three include So, Fx, and Fe. While none of these scales were significant at the .05 level, and therefore lower scores may be due to chance responses,

they are perhaps notable. Two of these measures, those obtaining the largest mean deviations, were Fx and Fe, both members of Class IV which evaluates intellectual and interest modes. A summary of potential changes in these subtests include the following:

Flexibility (Fx): This test measures the degree of flexibility or adaptability of a person's thinking and social behavior. Lower post test scores might appear to indicate a more mannerly, methodical, and deliberate personality change.

Femininity (Fe): Femininity measures the "masculinity" or "femininity" of interests. A depressed score on this test suggests a more ambitious, manipulative, and active behavioral transition.

Again, it should be remembered that these test-retest results were not significant and any such measured changes may be due, to a great extent, by chance differences.

In summary, test results indicate specific measured psychological change did occur for the sample that took part in a wilderness recreation program which did not occur for the sample that did not participate in this activity.

## CHAPTER IV

### SUMMARY AND CONCLUSIONS

This research indicated that specific measurable psychological changes occurred as a result of a programmed wilderness experience. Consistently significant t-test results were obtained on two subtest groupings.

The first grouping measures poise, ascendancy, and self-assurance. Test results indicated an increase of these characteristics. This correlates well with the results of Copp, Pierson and Sargent (1972) who found that students participating in an Alternative Semester Wilderness Experience Program acquired a more positive, self-confident image of themselves as a result of that program.

The second high subtest grouping assesses socialization, maturity, and responsibility. Post test scores indicated that the subjects participating in this experiment obtained significantly higher scores in these areas, suggesting a higher level of personal maturity and social awareness as a result of this experience. Similarly, Lovett (1971) relates that students participating in a Project Adventure program gained a more positive self-concept, became more confident in decision making and enjoyed better interaction with their peers.

Generally, the measured results of this project suggest similar findings as other studies (Clifford and Clifford, 1967; Strutt, 1966; Schultz, 1970). Such consistent results would indicate that an intensive wilderness recreational program can facilitate psychological change.

Further research incorporating 1) a more heterogeneous sample, 2) larger sample size might be designed in an attempt to provide a more reliable assessment of psychological changes resulting from a wilderness experience, and 3) a measure of the persistence of recorded changes should also be considered. Fletcher (1971) felt that the effects of a single wilderness program experience was very persistent but that no attempt was made to measure this persistence. Kelly and Baer (1971) have an implied measure of persistence in that delinquent youths showed a significantly reduced rate of recidivism over a two-year period.

The author of this research feels that the information gathered in this study has a number of potential uses. Practical application can be made of these results in assisting an individual to evaluate recreational alternatives more effectively. Recreation programs for delinquents, the mentally disturbed and individuals with other handicaps could be more precisely designed and evaluated. This information could also be useful in recreation planning as a more effective means of determining the value of alternative programs.

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