

THE EFFECTS OF A BRIEF ADJUNCTIVE PHYSICAL  
CHALLENGE WILDERNESS PROGRAM ON LOCUS  
OF CONTROL IN ADOLESCENT  
SUBSTANCE ABUSERS

By

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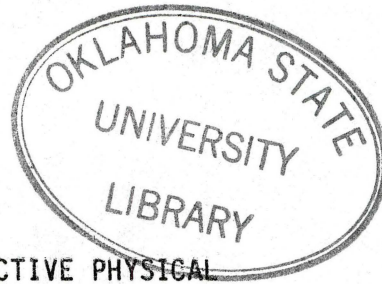
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## PREFACE

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## CHAPTER I

### INTRODUCTION

This study involves the use of physically challenging wilderness experiences with adolescents referred for either the prevention or treatment of substance abuse. The primary objective of the study is to investigate changes in the Locus of Control orientation of the subjects in the program compared to controls receiving no treatment. The results of this comparison will be used as part of a complete program evaluation.

#### History and Background

In 1975, the Oklahoma State Department of Health gave approval for the beginning of a Therapeutic Camping Program. The program was under the direction of the Guidance Service and initially only the center in southwest Oklahoma City was allowed to provide camping services.

The program emphasized psychological batteries to determine entrance into the program, the groups met once a week for four to six weeks, and campouts were regarded as lures or reinforcements for "good" behaviors in school, at home, or while in sessions. Individual and family sessions were included to insure progress and each member's continued group participation.

Because of early successes with this venture, the Guidance Service expanded Therapeutic Camping Services to four centers. The new programs



continued with the original format, but expanded into other populations. For instance, the Center in Cherokee County began working with mentally retarded and multiple handicapped children. The LeFlore County Guidance Center Therapeutic Camping Program, which had primarily served eight-to-ten-year-old children with school related problems, began working with disadvantaged children and also delinquent adolescents.

As the population of the children served changed, so did the revenue sources, and with these changes in funding came alterations in the breadth of services offered as therapeutic camping. Concomitantly, and not necessarily as a result of funding changes, came some philosophical changes in the format of the Therapeutic Camping Programs. Trips and experiences were modified to become more cost efficient, and from some quarters of administration came an emphasis on proving therapeutic camping to be a verifiable treatment modality and to be as cost efficient as the remainder of the guidance services.

In May, 1983, in a report submitted to the Commissioner of Health by Dixon (1983), the cost accountability question was answered. Included in the report was an impact study on a Therapeutic Recreation Program supporting a conclusion of positive behavioral changes as a result of exposure to a recreation program. The study was very limited in scope, pre-experimental in design, and dealt with therapeutic recreation services and not specifically therapeutic camping. As a result, there still remained a question concerning the effectiveness of therapeutic camping as a treatment modality for populations of children served by the Guidance Service.

In August of 1983, there remained only three functioning Therapeutic Camping Programs in the Guidance Service; one full-time

program in LeFlore County and two part-time programs, one in Cherokee County, the other in Oklahoma County. The expected growth in programs never materialized within the Guidance Service. While the reasons are varied, interdepartmental funding cannot be overlooked as a major difficulty. With the question of therapeutic camping's therapeutic value still unanswered, a research proposal to investigate its efficacy as a modality was submitted and permission was granted to do psychological research on the one remaining full-time Therapeutic Camping Program in LeFlore County, Oklahoma.

However, prior to beginning the research, the LeFlore County Guidance Service was the recipient of a Department of Mental Health grant to perform therapeutic camping services with adolescents in residential settings. The grant meant better equipment, more challenging experiences, and no financial restrictions on clients entering the program but, it also meant a complete revision of the program. Participants would come to the center only once for a three-day camping experience, and they would not be part of a continuing group counseling program. Because the new participants would come from residential treatment centers throughout the state, adequate follow-up would be virtually impossible. And, there would be little control over the constitution of the groups by camping personnel.

Since a continuation of therapeutic camping was felt to be a viable part of Guidance Services in LeFlore County and that continuation could be enhanced by accepting the grant, the center embarked on completely changing its therapeutic camping services to accommodate participants with different needs. Furthermore, documentation of services was now to become a priority along with the necessity of providing psychological

research investigating this treatment as having the potential to modify behavior.

The program changes were dramatic. Camping personnel were to receive no psychological histories, evaluations, etc., on participants, with only verbal narratives from the counselors accompanying the groups. There were to be no meetings prior to leaving on the camping experience, and the only correspondence would be the mailing and returning of custodial permission forms and medical releases for authorizing participation. And, the participants would be coming from various types of domestic situations, including residential treatment centers. Some participants would come from centers for alcoholic detoxification, some from psychiatric settings, and some possibly from institutions housing physically and mentally impaired. So, in order to narrow the range of participants, an agreement was made to provide services to adolescents 12 to 17 years of age who are at least recreational substance abusers but without lengthy chemical histories, and who can physically qualify for wilderness physical activities.

Other changes involved condensing a three-to-four month Therapeutic camping program in three days. Activities, experiences, strategies, and techniques were needed which could help modify an adolescent's behavior in this brief period of time. Furthermore, a psychological variable or construct would need to be identified which would be related to problems in this population and could act as the most important focus of the research.

#### Summary

The combinations of these historical programmatic events and the

above questions led to the development of a therapeutic camping program which is brief, three to four full days, adjunctive (supporting the on-going outpatient or inpatient treatment), and a physical challenging therapy utilizing the wilderness experience. The participants would experience and learn the basic skills involved in canoeing, rock rappelling, backpacking, and orienteering. There would be one group session per day devoted to verbalizing the re-creation of the experience of the day, the feelings associated with this new challenge and what its successful completion could mean to the participant.

#### Statement of Hypothesis

This investigator has chosen to use Locus of Control (LOC) orientation as the dependent variable in this study and forwards the research hypothesis:

There will be a significant change in experimentals' LOC orientation when compared with controls due to a three day physical challenge wilderness trip.

Locus of Control (Lefcourt, 1976), as a psychological construct, has been studied extensively and been shown to be highly correlated with psychological health. It is simply the individual's recognition of the association between an experience and a consequence. Internal Locus of Control (I-LOC) is the attribution of personal causality or responsibility for the association, where External Locus of Control (E-LOC) is denial of responsibility of the association. Nowicki and Barnes (1973) demonstrated that LOC orientation can be manipulated and their research was accomplished during a physical challenge camping program.

### Purpose and Value of Study

The study has two general purposes partially explained during the introduction. First is to evaluate the program itself. Even though it does not pertain to the research question directly, the overall efficacy of this treatment and whether it merits program status in the Guidance Service is one question this study purports to resolve.

Secondly, counseling and therapy techniques for adolescents have become broad and diverse in the last 10 to 15 years. References will be discussed which will illustrate not only the complexity of dealing with an adolescent population but one whose life style incorporates chemicals for diversion. Treatment of this population with verbal-office psychotherapies has been less successful than expected, and even though this program is not the first of its kind, it has qualities of uniqueness. It is extremely brief, uses no directive psychotherapy and hypothesizes change in a psychological dimension based almost entirely on the experience of physical challenge.

To this investigator, experimental research of this nature, even though limited, may be of value to others in designing new and different techniques utilizing physical challenge, the wilderness, or a combination of both. Also, it may provide some insights into other forms of communication that may enhance personal growth, specifically the inherent, nonverbal communication between the person and the experience.

### Assumptions

This study will investigate a relationship between the treatment of adolescent substance abusers and their own (LOC) orientation. Assuming past research is correct and (LOC) orientation is related to psychological

health, can it also be said that (LOC) orientation is related to a person's specific everyday choices, for instance, his/her drug taking behavior? This investigator is forwarding an assumption that if a person or program participant becomes more Internal (LOC) and tends to accept responsibility for his/her actions and their consequences, then he/she will become more authentic, more confident, with an improved self-esteem, and ultimately less vulnerable to the whims and wishes of his social milieu, i.e., less peer dependent.

#### Limitations

Several aspects of this study will be limited in their scope. Generalizability of results will be affected by the characteristics of the sample participants and their respective populations. The participants used in the samples will share one primary attribute, substance abuse; consequently, generalizing results to a population not sharing this characteristic would be unwarranted.

Secondly, the participants voluntarily choose to become participants. Generalizing the results to uncooperative, disinterested, or declining adolescents would again be unwarranted.

This is an outdoor program. To accomplish the four experiences, which the investigator believes to be the catalyst for change, requires nature's cooperation. Therefore, only two seasons, Spring and Fall, were used. This places time constraints on the study and, secondly, limits the amount of participants in the sample; again, restricting the generalizability of the results.

A final limitation is seen in the difficulty of removing variables such as counselors' personality traits and behaviors from program

experiences when analyzing the results. This may cloud the results by leaving the question of whether it was the interaction with the counselors or the experiences that affected the results.

### Definition of Terms

Existential Group Psychotherapy--emphasizes the here and now. Alienation, loneliness, and responsibility are feelings explored in depth, while accepting responsibility for one's choices is seen as therapeutic. Genuine relationships between patients and therapist take precedent over insight. It has no preconceived purpose but has as its goal authenticity and affirmation. Process is emphasized over content and immediate behavior over casual probings.

Experiential Therapy--a treatment involving activities using ones' physical environment to acquire skills and understanding about themselves through focusing on their relationship to their environment (author's definition).

Locus of Control--(LOC) the generalized expectancy of Internal Locus of control to be the perception of events whether positive or negative as being a consequence of one's own actions and thereby potentially under personal control. The generalized expectancy of external control, on the other hand, refers to the perception of positive or negative events as being unrelated to one's own behavior and thereby beyond personal control (Lefcourt, 1976). For the purposes of this study, LOC orientation will be operationally defined as raw scores on Crandall's Intellectual Achievement Responsibility Questionnaire (IAR). The higher the score, the more the subject is expressing internality.

Physical Challenge Therapy--a therapeutic modality which has as its

cornerstone the belief that a person's behavior can be changed through the use of kinetic physical activity. Essential components are (1) unfamiliar environment, (2) challenging physical activity, (3) controlled amounts of stress, (4) collaborative small group context, and (5) the use of newly acquired skills.

Substance Abusers is operationally defined as adolescents referred by others for the prevention and/or treatment of substance abuse.

Substance (in "substance abusers")--any psychotropic compound capable of rendering euphoria, i.e., alcohol, barbituate, hallucinogens,



## CHAPTER II

### REVIEW OF RELATED RESEARCH

#### Introduction

A proper research review related to this study must encompass several disciplines. Research in camping as a psychological treatment model should be explored because it sets the stage for the treatment being investigated. Prior studies in related Environmental Therapies would also need exploration with specific interest in Recreation Therapies using what is a relatively new sub-division referred to as "Physical Challenge." And, due to Recreational Therapy's historical antecedents, research from the fields of physical therapy, sociology, and after-care nursing should also be explored for relevance. Finally, the fields of psychology, rehabilitation, and education should be reviewed for relevance and worth pertaining to the stated research problem and, secondly, to attempt to provide a foundation as to the legitimacy and intent of this study.

#### Research in Therapeutic Camping

Traditional psychotherapies, i.e., client visits the office of professional counselor or therapist, have been shown to have a limited impact with adolescent populations (Aptor, 1977; Caravan & Zax, 1967; Lowry, 1974). As of 1979, research on psychotherapy with adolescents has been described as narrow in its scope, with a proponderance of data

being dedicated to delinquency and drug usage (Tramontana, 1980). In a 10-year study, one researcher investigated over 30 independent projects dealing with adolescents and found that adolescents receiving treatment had a 75% mean positive outcome rate compared to 39% mean outcome rate for adolescents not receiving treatment. The investigator argued that therapies used with adolescents were merely strategies and techniques borrowed from the treatment of adults (Tramontana, 1980). And, research had been accomplished on characteristic problems of adolescents, i.e., delinquency, high drug usage, acting-out; but there was nothing resembling Adolescent Psychology (Tramontana, 1980). Probably the genesis of organized therapeutic camping in the 1800's was due in some part to the lack of adequate and appropriate therapeutic experiences for adolescents.

MacNeil (1957) traced camping for 100 years in American history. However, it can be said to have antecedents before the birth of Christ. There are evolutionary glimpses of wilderness camping in Plato's era, through the Renaissance, and into this century when camping became revitalized in the early 1930's (Bailey, 1978). This revitalized interest in camping as a treatment can be attributed to urbanization, alienation from our natural world, and the frustration with adolescent therapy outcomes previously mentioned. However, attempts at certifying camping as an efficacious treatment for problem adolescents fared no better than conventional approaches. It should be remembered that camping's rebirth originated in the field of recreation in the 1930's and experimental methodology was for the most part non-existent. Early investigations were poorly designed, lacking adequate controls and inadequate instrumentation; consequently, results were of little use (Shniderman, 1974). A final contaminant to camping research during its

rebirth involved the dilemma of using psychoanalytic principles requiring months and years for success in a two-to-four-week summer camp (Shniderman, 1974).

Camping programs specifically designed to produce therapeutic results with emotionally disturbed youth has a history of 30 years. Over the last three decades there have been Therapeutic Camping programs (T.C.) on a single day basis (Shniderman, 1974), T.C. programs lasting a week or longer (Kaplan & Reneau, 1974; Neff, 1974), T.C. programs lasting throughout the summer months (Clark, 1978; Mand and Green, 1973), and T.C. programs encompassing a full year (Flood, 1979; Loughmiller, 1965).

There have also been T.C. programs designed to supplement conventional psychotherapy with adolescent offenders and T.C. programs designed as adjunctive treatment for adolescents in residential psychiatric settings (Shea, 1977). For example, Hobbs and Shelton (1972) reported on the utility of a T.C. program to "enhance and consolidate" ongoing therapy with a variety of populations suffering from a variety of disabling conditions.

Outcome evaluations of T.C. programs in recent decades have become numerous and their results indicate T.C. programs to be a promising field of inquiry in the treatment of special populations. However, defining T.C. as a method of treatment, isolating program variables in common with other programs, and reaching a consensus on T.C. program philosophy are remaining problems. One overriding conclusion could be that investigators of T.C. programs do not necessarily agree on the variables worthy of inclusion when studying a T.C. program. In a review by Byers (1979), it was noted that investigators have used outcome measures

such as orderliness, problem solving, academic skills, and silence by a signal. While 10 T.C. programs used behavior modification techniques, only two programs measured outcome results related to referral behaviors (Byers, 1979).

There are many examples of research on T.C. programs which agree on methodology and use variables for outcomes measures which are associated with normalizing personal adjustment. Rawson (1973) investigated a two-week T.C. program where client improvement was measured by response to authority, perceived likeability, attitude toward school and scores on instruments indicating acquiescence. Jung (1973), studying client outcome in an Outward Bound program and Rosen (1959) studying client outcome in a T.C. program for emotionally disturbed adolescents, found increases in self-esteem, changes to Internal Locus of Control, and improvements in social competence.

There are other examples of research in T.C. programs utilizing conventional psychological constructs as variables and their results support conclusions of participant growth. Jensen (1963), using a situation response attitude scale, found that of six different aspects of a month long wilderness training program for children and adolescents, "real camping" experiences were rated significantly higher as contributors to learning and personal growth. Personal growth factors in the study were variables relating to adjustment upon returning to home and to school. Of particular importance in the Jensen study was the separation of program components into two basic areas; (1) camping and (2) interpersonal. Contrary to conventional wisdom, the participants rated the experiences in the wilderness more significant contributors to adjustment than the interpersonal dynamics of "groupness" while in the program.

In a similar study investigating the various components of T.C. programs and their relationship to success, Kelly and Baer (1971) found a positive relationship between the physical demands of the program on participants and later recidivism rates. This study compared recidivism rates in three separate Outward Bound programs where participants had been adjudicated delinquent and part of their probation required participation in one of the three programs. The participants had no prior knowledge of any of the differences between the programs. On a one-year posttreatment assessment, the participants from the program requiring more strenuous physical activities in the wilderness had significantly lower recidivism rates than the other two less strenuous programs and control groups receiving conventional probation rehabilitative strategies (Kelly & Baer, 1971).

There are further claims to successful outcomes using T.C. in some form or another (Albridge & MacDonald, 1952; Liftshitz & Sahada, 1952; Ricker & Walker, 1976; Winters & Winters, 1968). It still must be said that empirical, experimentally sound research is a novelty in examining T.C. programs. The majority of the literature on the therapeutic camping field is subjective, using personal testimonials from program administrators and/or observers. A sizable percentage of the studies are generated to satisfy grant requirements.

In a critical review of the literature on therapeutic camping, Byers (1979) states;

. . . therapeutic camping has not been adequately demonstrated to produce changes in camper referral behavior either on a short term (during the camp experience itself) or on a long term (after the camper has completed the camp program) basis. . . . the few studies that have been conducted do not appear either to have addressed any or all the questions relevant to an evaluation of therapeutic camping or to have provided adequate controls to allow strong statements to be made about the efficacy of the procedures involved (p. 632).

In a conclusion of a study done by Bursdal and Buel (1980), it was suggested that a consensus on program components that legitimately constitute a T.C. program would be helpful in answering outcome questions. Summarizing the author's contentions, it is difficult to compare outcomes of T.C. programs so vastly different in design, philosophy, instrumentation, and strategies. It is suggested that T.C. programs may well suffer from the same difficulties in measuring "what it does" and "how it succeeds" as other more conventional psychotherapies.

### Physical Challenge Therapy

In 1940, the English military began a program designed to train soldiers to sail in the shortest time possible. It was a rigorous and demanding program but an enormous success in a variety of ways. The military psychologists studying the program's effects on the participants discovered that successful participants not only learned the skills of sailing but became physically fit and much more personally "adjusted" due to the program. The program was named "Outward Bound" (Winn, 1982).

Currently, as it was in the beginning, the Outward Bound experience included five core criteria. They are (1) an unfamiliar environment, (2) strenuous physical activity, (3) controlled amounts of stress, (4) collaborative small group context, and (5) the use of newly acquired skills (Kesselheim, 1974). Because of the adaptability of these core elements, literally thousands of programs worldwide were developed, many for all-together different intentions. Some have become so diverse, any resemblances to the original program vanished. Oddly enough, the five core elements remain in varying degrees and amounts (Winn, 1982).

Not only did Outward Bound spawn programs, it created an investigation into some of the subsumed artifacts and fundamental nature of psychological treatment. This investigation culminated in the birth of a sub-discipline called Physical Challenge Therapy (Winn, 1982). The new field's proponents are psychologists, psychiatrists, educators, recreational therapists, and physical therapists. It involves a plethora of approaches including weight training, nutritional therapy, body awareness therapy, and an endless range of outdoor educational therapies and programs.

The various approaches ascribing to physical challenge therapy have a similar rationale. They subscribe to the belief that motor behavior is un verbalized thought and affect (Mahl, 1968). Reich and later Lowen, kinetic psychologists, suggest that an individual's social adjustment, self-esteem, and self-reliance are, firstly, highly important in the psycho-therapeutic treatment process and, secondly, are directly effected by any physical efforts designed to enhance self-image (Lowen, 1967).

The relationship between physical action and psychological health is not a recent discovery. Piaget and later Sullivan agreed that "therapeutic efforts designed to improve or repair one's self-image or increase interpersonal trust are very accessible to a strictly physical intervention" (Winn, 1982, p. 164). Schacter (1974) contends that communication through cooperative physical activity is a primary medium for children offering a natural uncomplicated means for mastery, integration, and reality testing.

It can be assumed that physical activity intent on improving an individual's self-image may positively contribute to that improvement

and may be contributory to altering psychological variables other than self-image. However, physical challenge denotes more than conventional kinetic physical activity. It denotes risk to the individual in both physical and emotional ways. Physical and emotional vulnerability are essentials in physical challenge therapies. Emotional risking, in that the individual has made a commitment to participate and becomes part of a small group. Concomitantly, the rigors of the experience/environment leave the individual with a sense of vulnerability and the sense he/she has risked personal health and well-being. Research done by Richer and Walker (1976), as well as studies by Baer and Stephens (1978) and Kelly and Baer (1971), found positive changes on a variety of psychological measures with adjudicated adolescents resulting from physical challenges in the wilderness. Matthai (1982) found significant improvement in adolescents with school related problems due to a high adventure program utilizing six demanding wilderness experiences. And, in a separate study Deery (1976) discovered an increase in risk-taking behavior of sixth-grade males and females at home and at school following a physical challenge program. Deery also noted that not all the risk-taking behaviors had positive consequences.

There is research evidence that physical challenge experiences not intent on effecting a psychological change in participants may have an inherent quality that effects those changes regardless. Winn (1982) cites a study using untrained counselors where there were no attempts to verbalize, encourage, or enhance domains such as interpersonal skills, trust, and/or self-reliance. Group leaders merely performed as skill instructors, later participating in discussions concerning attitudinal variables valuable to the successful accomplishment of difficult tasks.



Other than aiding a participant in interpreting the task or the experience or giving examples of ways the participants could generalize what they had learned, no direct psycho-therapeutic intervention was performed. On outcome measures, the participants reported increased sensitivity in three fundamental areas solely as a result of experiences of a life threatening nature. The areas were (1) trusting, (2) sensitivity to feeling of self and others, and (3) independence.

The core of the physical challenge experience is either the presence or illusion of risk and vulnerability to an individual's physical well-being, as well as his/her emotional well-being. Jung (1973) concludes that experiences offering high risk in those two domains appear to offer simultaneously a confrontation with fundamental human issues and sets the context for resolution of those issues which is essential to personal growth.

#### Therapies for Adolescent Substance Abusers

The history of substance abuse treatment with adolescents is beyond the scope of this review. For brevity, it can be stated that treatment of this very difficult problem within a difficult population is multi-dimensional and sub-specialties dealing with these problems are numerous. There are treatment models and formats which are considered specific for each classification of drug involved in an abusive lifestyle. For example, no one questions the need for residential treatment for a long term opiate or alcohol abusing adult. But the specific requirements of appropriate treatment within the confines of "residential treatment" will vary with the population served (Fairborg & Salasnek, 1975).

Research indicates that a productive therapeutic environment for treating adolescent substance abusers should be composed of a context allowing for group leadership, decision making by consensus, and the opportunity to learn socially-accepted practices through a social learning model as opposed to didactic instruction. Studying treatment variables in a residential treatment facility for alcohol abusing adolescents, Fairborg and Salasnek (1975) concluded that the context previously stated to be more significant contributors to outcome success than therapist philosophy, therapist personality characteristics, or program structure.

In a related study, outpatient treatment and inpatient treatment of both high risk for drug involvement youths and youth substance abusers were investigated to determine program components aiding in successful out-comes. Posttreatment ratings suggest that therapeutic efforts designed to aid participants to become less vulnerable to peer pressure, to insulate from a "bad" environment, and to develop faith in their own choices to be the most significant contributors to normalizing adjustments upon release (Scarpitti, 1967). And, reluctantly, Schwitzgebel and Kolb (1963) while attempting to prove the efficacy of behavior modification techniques with a similar population, reported that success outcome appeared to be related more significantly to attitudes shared during the treatment. The attitudes found to be related were sympathy, firmness, open sharing, the open lines of communication, and equal status for both staff and clients, an atmosphere encouraging the expression of honest opinions, and permission to express new ways of feeling and living (Schwitzgebel & Kolb, 1963).

It can be seen that major contributors to successful outcome in

treatment of adolescent substance abusers are attitudinal or related to program components possibly assumed to be superfluous. However, helping an individual become less vulnerable to the whims of peers and developing faith in his/her choices could be fundamental in maximizing growth in any population. The importance of the realization of goals and purposes for everyday living are essentials for instilling hope of recovery and/or rehabilitation. The placebo effect, itself, is probably related to the instillation or resurgence of a sense of hope (Yalom, 1980).

While there is no evidence of a statistical relationship between purpose in life (hope contrasted with anomie) and an individual's ability to be responsible for his/her choices (Walters & Klein, 1981), there is a wealth of research suggesting those human properties to be highly related (Burnes, Brown, & Keating, 1971; Platt & Eisenman, 1968; White, 1965). While studying adolescents in treatment, Platt and Eisenman (1968) discovered that negative affect states were related to non-successful treatment profiles. Furthermore, negative affect states such as dysphoria, depression, and aimlessness occur more often in the participants exemplifying a more External Locus of Control orientation. This finding is contrary to the common sense notion that individuals who are more responsible for their actions or choices (Internal LOC) are more susceptible to negative affect states (Platt & Eisenman, 1968).

Affect states, "therapeutic environment," Locus of Control, and insulation from negative milieu seem to converge in the literature relevant to the treatment of adolescents regardless of their referral behavior. Common to success outcomes are (1) program provisions to provide and to effect a wide range of affect arousal (Lubin & Smith, 1979), (2) contexts producing events or experiences where the participant must

act on his own choices and gain a sense of responsibility for those actions (Sahakian, 1974), and (3) therapeutic experiences designed to escape the dysphoria accompanying the abusers' presenting problems with avenues for positive reinforcement for more appropriate euphoric diversions (Greaves, 1974).

#### The Value of LOC and Its Relationship to Other Pertinent Psychological Variables

One of the first pertinent questions concerning Locus of Control orientation (LOC) is whether an individual's LOC orientation is a static pattern trait or is an individual's LOC orientation docile, manipulatable, and/or adaptable. There exists in the literature some evidence suggesting the orientations are vulnerable to therapeutic interventions.

Gillis and Jessor (1970), in a study involving hospitalized adult patients, noted changes in LOC orientation in treatment groups exposed to "highly sensitive" staff personnel contrasted with controls showing no LOC orientation shifts. Treatment groups orientation became more internal in their orientation as a result of firm but compassionate staff treatment.

In an unrelated study, a sample of adolescents classified as delinquents showed significant positive (toward internal) LOC orientation change as a result of a 60-to-90-day behavioral therapy program primarily aimed at providing participants with opportunities to experience appropriate behavioral options through group sociodrama exercises rather than milieu-induced behaviors (Dua, 1970).

There exists in the literature numerous studies illustrating LOC orientation change due to treatment. Some of the studies credit

interpersonal variables such as group composition, staff LOC orientation, or the nature of shared group experiences with altering the participants' LOC orientation. There is also evidence that program or treatment variables contribute to LOC orientation change.

In a study by Moser (1975), therapeutic techniques were separated into specific categories. Over 20 categories were constructed and involved both the counselors' responses in group settings and the nature of the group experience. Significant positive (toward internal) changes in LOC orientation were noted in treatment groups contrasted with control groups not experiencing the treatment. The therapeutic responses and experiences found to be contributory to the positive LOC orientation changes were (1) confrontation, (2) modeling, (3) rehearsal, and (4) different reinforcement. The author's summary suggests that these therapeutic elements were significantly related to LOC orientation change, in that they create the context necessary for the participant to re-think his/her responsibility in an event or experience which allowed for movement towards a more internal LOC orientation.

In a similar study (Nowicki & Barnes, 1973), investigating the relationship between the elements of a treatment program and LOC orientation, inner city youth ranging in age from six to seventeen were exposed to a 21-day summer camp. The groups tested after completion of the program displayed statistically significant shifts in their LOC orientation compared to their pre-program scores. The program elements found to be most beneficial in producing the significant changes (toward internal) in LOC orientation were (1) group experiences allowing for the natural development of social competence skills and (2) experiences involving rigorous high-risk physical tasks done in groups. The

investigator's summary suggests that the physically challenging experiences provided accomplishment of tasks which, they contend, are necessary in providing a sense of fulfillment.

There are numerous other research references illustrating changes in participants' LOC orientation as a result of therapeutic interventions, many of the references are correlational studies involving encounter groups or one-shot case studies. A high percentage of these studies were not rigorously designed, use no control groups and, consequently, their results are, at best, suspect (Yalom, 1980).

One study investigating the long-term effects of LOC orientation change which should be interpreted with caution due to small sample size involved one group of preadolescent boys classified as delinquents. After an unspecified length of treatment using a social-learning model, posttreatment measures indicated significant positive (toward internal) LOC changes in the participants. On a posttreatment nine-month follow-up, the participants were retested and found to have retained a significantly higher level of "internality" than a matched control group. Furthermore, the LOC orientation change was the only measure evidencing stability over the nine-month period between the termination of treatment and the follow-up. Other measures where marked changes occurred were social attitudes and educational aspirations (Ostram, Steele, Rosenblood, & Mirels, 1971).

There have been demonstrations of the abilities of certain therapeutic techniques in altering individuals' LOC orientation. Yet it remains an assumption that LOC, as merely one of hundreds of psychological constructs or variables, is a valid focus for intervention. In a proper study of a treatment model, the dependent variable must be shown

to be related to psychological health or improved social functioning.

To investigate the relationship between LOC orientation and psychological health, Yalom (1980) cites a study asking 20 college age patients, whose group therapy experience was judged a success, to rank "mechanisms of change." The mechanisms were ranked from those aspects of therapy most beneficial to least beneficial. The aspects of therapy were classified into 12 curative factor categories and included such items as catharsis, self-understanding, identification, and group cohesiveness. Of the 60 items, "assuming responsibility for actions" ranked fifth (Yalom, 1975). In a replication study involving youth substance abusers, "assuming responsibility" ranked first out of the 60 items by one group and ranked second of the 60 items by a second group (Yalom, 1980; York & Eisman, 1980).

In a comprehensive review of a treatment population spanning over 10 years, Yalom (1980) suggests that when individuals scoring as externals are contrasted with individuals scoring as internals in their LOC orientation, externals display more profound feelings of inadequacy, tend to be more hostile, anxious, and more suggestible. The quality of suggestibility allows externals to be more vulnerable to peer pressure than their more internal counterparts. Anomie, confusion, lack of purpose, and a blunting of imagination were additional qualities noted in externals.

In discussing this comprehensive treatment review, the author concluded that it is healthier to be "blessed" with the perception of control of "one's own destiny." Secondly, individuals not realizing or accepting responsibility for the association which exists between their actions and the consequences will be more prone to "purposeless

floundering (learned helplessness), increased vulnerability to sub-group pressures, and, as a group, have a higher incidence of psychopathology" (Yalom, 1980, p. 263).

Having laid a foundation associating LOC orientation with individual adjustment, particular therapeutic techniques and demonstrating that LOC orientation is vulnerable to intervention the exploration of LOC's association with other treatment components and other psychological variables will complete this review.

A treatment component addressed earlier, which is an intergral part of the proposed study, is therapist or counselor LOC orientation. It was demonstrated that therapist attitudinal characteristics were less significant contributors to success outcomes in treating alcohol abusing adolescents (see Fairborg & Salasnek, 1975), but Gillis and Jessor (1970) evidenced therapist "sensitivity" as a contributor to significant LOC orientation changes in hospitalized patients.

Helwig (1976) investigated the relationship between therapist LOC orientation and participant LOC orientation and found that college age participants scoring as externals on LOC orientation instruments were more comfortable with highly directive therapists. Externals also preferred a high measure of program structure and evidenced a marked increase in anxiety and frustration when introduced to ambivalent and/or unstructured therapist expectations (Jacobson, 1976). The crucial variables in both studies appear to have been the therapist position on issues of "control and "level of participation" as perceived from the participants perspective. Wilson (1976, p. 170) concluded; "the more active and forceful the therapist (even if ostensibly in the service of helping the patient assume responsibility), the more the patient is infantilized."



In a separate investigation studying therapist attributes, Lieberman, Yalom, and Miles (1973) found that clients perceived highly directive therapists in highly structured exercises as more competent immediately following the exercises. Measures of client growth in terms of LOC orientation change was negligible. The investigators concluded;

. . . if you want patients to think you know what you are doing be active, vigorous, structuring . . . , however, be prepared to accept the fact that such a strategy impedes growth of the patient and probably impedes their assuming responsibility for their actions (Yalom, 1980, p. 268).

Recent investigations regarding LOC orientation and other psychological variables have found that internal LOC orientation to be positively correlated with positive self-esteem (Fitch, 1969), and positively correlated with measures of self-reliance and responsibility assumption (Yalom, 1980). LOC orientation has been shown to have a zero correlation with general intelligence (Reid, 1980), socioeconomic class, and racial background (Weiner & Potepan, 1970). However, youth adjudicated as delinquents tend to come from lower socioeconomic conditions and also tend to be more external in their LOC orientation. These tendencies are suggested reasons for the effectiveness of physical challenge programs in altering LOC orientations with this population, (Ostram, Steele, Rosenblood, & Mirels, 1971). These investigators further suggest that hopelessness, a sense of stagnation, and the inability for the disadvantaged youth to find a means to escape those conditions to be contributors to their external LOC orientation.

LOC orientation can be said to be a quality of an individual's psychological constitution beginning around the third to fourth year (Mischel, Zeiss, & Zeiss, 1974). It appears to have its origins in family myths, family defenses, and the family's perspective regarding

causality (Lefcourt, 1976), while sociocultural factors such as socioeconomic conditions, community size, and type of school have little bearing on the origins of LOC orientation (Lloyd & Chang, 1979).

Research demonstrates its manipulability, its value in psychological health, and its association with other psychological variables. There are also common properties of both treatment programs and therapist attributes which tend to aid in the manipulation of LOC orientation in treatment populations.

#### Summary of Related Research

The culmination of related research pertaining to the proposed study spans several disciplines; the majority having a rich and diverse history of research exploration. Solid evidence of the merits of supporting physical challenge therapy as an autonomous discipline was not forthcoming.

Therapeutic camping much like physical challenge therapy is not adequately defined. It holds promise as a supplemental treatment for many referral behaviors in adolescent populations. However, unanimous research support of its overall efficacy was not indicated. Ironically, this lack of consensus on the merits of therapeutic camping was not due to a dearth of investigations, but was due to less than acceptable investigative techniques, poor research designs, and lack of experimental methodology.

Research was cited exposing the core dimensions of successful programs dealing with adolescent substance abusers. Common to successful approaches were strategies and techniques originating in social learning theory, reality therapy, and existential philosophy. The value and

utility of manipulating LOC orientation with this population was adequately demonstrated.

The most convincing facet of the review was the stability and the inherent importance of LOC orientation as it is associated with other significant psychological constructs and its contribution to maturation, personal growth, and authenticity. The literature provides a perception of the intertwining relationship between external LOC orientation in psychopathology, socio-pathology, and a host of other debilitating human conditions, but also portrays LOC orientation as a docile process dimension of an individual's psychological constitution vulnerable to appropriate therapeutic interventions.

## CHAPTER III

### METHOD

#### Introduction

This chapter will discuss the sample and the population of subjects used in the study as well as the instrument, the experimental design, and the analysis, chosen to answer the research question. Also, fundamental chronological procedures will be presented in order to further explain the program components. Finally, there will be a brief discussion concerning methodological assumptions and limitations.

#### Subjects

The subjects used in this study were selected from a computerized referral sheet compiled by LeFlore County Youth Services and LeFlore County Guidance Service. Initially, the total number of subjects on the list was 314. The list was examined for duplicate entries, age, and referral criteria and this procedure reduced the total number to 260. Program criteria set a minimum age for inclusion in the study at 12 years and the maximum age allowed at 17 years. Secondly, only those subjects referred for either prevention or treatment of substance abuse were eligible for participation, however, subjects were not excluded if they denied substance involvement. Table I, p. 30, presents a breakdown of sample by residence type and admitted level of substance abuse. This data was obtained from the subjects not referral sources

TABLE I  
RESIDENCE TYPE BY ADMITTED LEVEL OF SUBSTANCE INVOLVEMENT  
BREAKDOWN OF TREATMENT POPULATION  
(Number of Subjects + % of Treatment Population)

Resident Type	Level of Substance Involvement					Totals
	(0) None	(1) Exper- mental	(2) Occa- sional	(3) Regular	(4) Chronic	
(1) Resident Treatment				1 (2%)		1 (2%)
(2) Temperature Shelter		6 (10%)	7 (12%)	1 (2%)		14 (23%)
(3.1) Nuclear Family	9 (15%)	3 (5%)				12 (20%)
(3.2) Non-Nuclear Family	4 (7%)	15 (25%)	2 (3%)			21 (35%)
(4) Foster Care		7 (12%)	5 (8%)			12 (20%)
<b>Totals</b>	<b>13 (22%)</b>	<b>31 (52%)</b>	<b>14 (23%)</b>	<b>2 (3%)</b>		<b>N = 60 (100%)</b>

**Definitions:**

**Residence Type**

- 1 Residential Treatment - Voluntary or involuntary extended treatment facility.
- 2 Temporary Shelter - Youth Services Shelter-under 30 days.
- 3.1 Nuclear Family - Own home with two parents, (natural or step)
- 3.2 Non Nuclear Family - Own home with one parent, or living with extended family.
- 4.0 Foster Care - Department of Human Services Custody-residing in foster home.

**Substance Involvement**

- 0 - No use
- 1 - Experimental - situational, not planned, impulsive.
- 2 - Occasional - No more than twice a month.
- 3 - Regular - Once a week.
- 4 - Chronic - Once a day.

and illustrates that not all of the sample subjects admitted to substance abuse.

The majority of the population resided in LeFlore County, Oklahoma, and attended schools in Poteau, Panama, Heavenor, and Howe, Oklahoma. Their academic classification ranged from the eighth to the twelfth grades. Subjects in this population exhibited a range of residential placements including residential treatment centers, foster care, and nuclear family settings. They were tri-cultural, with representatives from black Americans and Native American Indians, but the vast majority were caucasians. Socioeconomic information was not available. Females outnumbered the males but only slightly (see Table II below).

TABLE II  
RACE BY SEX BREAKDOWN OF TREATMENT POPULATION

Race	Sex				Total	
	Male		Female			
	Number	Percent	Number	Percent		
White	27	(45%)	21	(35%)	48	(80%)
Black	2	( 3%)	1	( 1%)	3	( 5%)
Am. Indian	5	( 8%)	2	( 3%)	7	(12%)
Hispanic	1	( 1%)			1	( 1%)
Oriental			1	( 1%)	1	( 1%)
Totals	35	(58%)	25	(42%)	60	(100%)

The size of the sample used was determined by the number of experimental conditions possible and the nature of the treatment. A maximum number of eight subjects could receive the treatment due to the regime of activities. Also, seasonal considerations limited the range of activities that could be obtained during treatment. Therefore, it was decided to sample the population of 260 with four repetitions of the treatment condition; each condition being comprised of both an experimental group (receiving a three-day physical challenge trip) and a control group, both having eight subjects each.

To further ensure the sample to be representative and to control for pretreatment-between-group differences, the population referral list was scanned and checked for subjects currently receiving some form of treatment with a local service provider. None of the sample of 260 were currently receiving any form of psychotherapy during the time this study was performed.

#### Instrumentation

The instrument used to obtain data was Crandall's Intellectual Achievement Responsibility Questionnaire (I.A.R.) (Crandall, Katkovsky, & Crandall, 1965). The I.A.R. is composed of 34 forced-choice items (see Appendix B). Each item describes either a positive or negative event which regularly occurs in a student's daily life. The items state that an event was caused by the student's attitude, behavior, etc., or the opposite circumstance, i.e., the event was caused by the attitudes, behavior, etc., of a "significant other". The "significant other" is either a parent, peer, or instructor.

The I.A.R. by its use of "significant others" as possible causal

agents avoids such other possible agents as luck, fate, and impersonal social forces. Secondly, this instrument's design avoids a number of motivational and behavioral reinforcement areas of possible confusion such as affiliation, dominance, and dependency. The rationale is that by limiting the causal agents on the questionnaire, however restrictive they may be, it limits some associated "excuses" for the occurrence of an action; subsequently, the total I.A.R. score achieved is a more accurate representation of the student's Locus of Control Orientation (Crandall, Katkovsky, & Crandall, 1965).

Unlike all currently available LOC instruments except the Stanford Preschool Internal/External Scale, the I.A.R. affords two Internal Scores. I+ indicates Internal LOC orientation or assuming responsibility for positive event and I-, Internal LOC for assuming responsibility for a negative event (blame). Research indicates that the same dynamics may not be operating where someone assumes credit for a positive event than when assuming blame for a negative event (Crandall, Katkovsky, & Crandall, 1965).

The I.A.R. was normed on a sample of 923 elementary through high school students drawn from five different schools. The sample was composed of a heterogeneous mix of students from a variety of socioeconomic racial, and socio-cultural backgrounds. Chance distributions would result in a mean total I score of 17 and mean I+ and I- scores of 8.5 each (see Appendix D for norm group means and standard deviations). Test retest correlations over a two-month interval were .69 for total I scores, .66 for I+ scores, and .74 for I- scores. These correlation coefficients were significant at the .001 level of probability. There were no significant sex differences and variance was not related to



social desirability, intelligence, or social class (Crandall, Katkovsky, & Crandall, 1965).

Internal consistency correlation coefficients for the I.A.R. were .54 for I+ items and .57 for I- items. In older children, correlation coefficients were .60 for both I+ and I- scores. These coefficients are low and the interscale items do tend to be heterogeneous. Brevity of the scales and the nature of the items were contributors to low internal consistency (Crandall, Katkovsky, & Crandall, 1965; Hersch & Scheibe, 1967).

Weiner and Kukla (1970) employed the I.A.R. in a correlational study using elementary through high school students. Measuring achievement motivation with both the I.A.R. and the Mehrabian Achievement Risk-Preference Scale (M.A.R.P.S.) scales over seven age and sex groups resulted in one significant correlational coefficient,  $p < .05$ ; high school aged males. However, analysis of variance of ascription data, (i.e., ascribed causality, Internal vs. External), revealed that subjects high in resultant achievement motivation had higher I+ scores than subjects low in achievement motivation ( $F_{1,384} = 3.97, p < .05$ ). There was not a significant difference between groups when attributing failure internally (Weiner & Kukla, 1970).

Mixed and contradictory results using the I.A.R. have been reported in Lefcourt (1976). In an unspecified sample, the I.A.R. was shown to have little predictive validity when correlated with intelligence and achievement in girls ( $r = .00, r = .03, r = -.13$ ) but a significant coefficient was obtained with boys on the same variables, ( $r = .52, p < .05$ , intelligence). Other Locus of Control instruments have also been shown to have difficulty with predictive validity on these same variables

(Katz, 1976; Nowicki & Roundtree, 1971). Inferences using the I.A.R. or any other LOC instrument should be restricted to "valences of responsibility" without assuming that these "valences" are predictors of success or failure in any given situation.

The I.A.R. was chosen as the instrument to obtain data on LOC orientation for subjects in this study primarily because it affords the distinction between I+ and I- scores. It has been demonstrated that I+ scores have been affected by successful accomplishments of tasks (Diamond & Shapiro, 1973); the dynamics of assuming responsibility for positive events are shown to be different from those dynamics of assuming responsibility for negative events; and I+ scores are significantly more stable over time (Crandall, Katkovsky, & Crandall, 1965).

Secondly, by specifying "significant others" as possible causal agents, luck and fate are excluded. In this study, counselor activities of teaching wilderness skills to experimental groups are seen as being associated with a significant other, i.e., teacher, teaching educational activities more so than unrelated item events in other LOC questionnaires.

### Design

The design used to measure the effects of the independent variable (wilderness trip) is referred to as the Posttest-Only Control Group Design (Campbell & Stanley, 1966). Schematically it would appear as;

R. X O<sub>1</sub>

R. O<sub>2</sub>

R indicates randomization, followed by X, for Experimental Group

treatment and ( $O_1$ ,  $O_2$ ), the measures of the dependent variable for both experimentals and controls. The dependent variable was measured by administration of the I.A.R. to all subjects. Analysis of that data was accomplished using a one way analysis of variance. An ( $\alpha$ ) Alpha Level of .05 was used to determine a significant F-ratio.

The posttest-only control group design was chosen for its simplicity and because it controls for all sources of internal invalidity except mortality when subjects are randomly assigned (Gay, 1981). Experimental group mortality was not seen as a threat, since subjects were not free to leave and the experiment-per-group was only three days. The use of a pretest measuring I.A.R. would have been an unnatural intrusion for experimental groups and there also would have been the possibility of a pretest-treatment interaction due to the attitudinal characteristics of the dependent variable and the brevity of exposure to the treatment.

#### Procedure

The selection of the samples was made on two occasions. During the spring the initial four groups (2 experimental, 2 control) were randomly selected from the referral list ( $N = 260$ ) using a table of random numbers. Each subject on the referral list was assigned a number from 1-260. Blindly, an arbitrary number in the table was located, and, using the last three digits in each set from the table, subjects were selected when their number corresponded to the tabled number. After selection, a coin toss for each of the selected subjects determined whether they were exposed to either the control or experimental conditions. This exact procedure was duplicated to obtain four fall groups,

two experimental and two controls. Of the total N of 64 expected, 60 completed the study. There were a total of eight subjects who declined to participate after notification of their selection. Those slots were filled using the same selection process without disruption.

Participation in the study either as a control or experimental was voluntary. Each subject was notified of what participation as a control or experimental entailed, and release forms were obtained on all subjects classified as experimentals. Participation as a control meant arriving at the offices of Youth Services to take the I.A.R. posttest. After one subject from control group I failed to arrive, procedures insuring compliance were explored. It was decided to notify parents the evening prior to testing that testing was to be performed and encouraging their support, to offer transportation for subjects to testing, and to give a presentation on photography as a motivation for participation. Three members from control group III failed to attend and were later tested together. One member of control group IV withdrew. Posttesting of controls was performed in the same facilities as experimentals and under group conditions. Controls were posttested the first or second working day after experimentals. All posttesting of controls was done by Youth Services personnel, while all grading was done by the recreational therapist aide employed by the Guidance Service.

The experimental groups, like their controls, were divided into four treatment groups. Two groups received a three-day physical challenge wilderness trip in the Spring of 1983, one in March and one in April. The other two treatment programs received the same treatment, one in October, 1983, and the other in November, 1983. The reason the groups were divided into Spring and Fall was to equate the groups on the

experiences involved during treatment.

Seasonal differences have been shown to effect wilderness groups in affiliation, camaraderie, and inclusion. Summer wilderness groups tend to spend more time in "cooling" activities such as swimming and are less motivated for backpacking and rappelling. Winter groups, on the other hand, tend to coalesce and display much more interest and voluntary behaviors concerning survival skills, cooking, tent preparation, and firebuilding. Spring and Fall groups are equivalent in their motivation for not only survival behaviors, but pleasant atmospheric conditions and mild water temperatures allow groups to experience a broad range of wilderness activities not enjoyed during the heat of summer or the harsh cold of winter. Therefore, only Spring and Fall groups were used in the study.

Each experimental subject was exposed to the same regime of activities. After arrival at the center, the Recreational Therapist aide handled the introductions and gave a brief explanation of the upcoming activities. The subjects then took a brief wilderness test (see Appendix A) and were then given a brief lecture by the Recreational Therapist (R.T.) on proper use of the equipment. The group and equipment were loaded into vehicles and driven to western Arkansas for a one day whitewater adventure.

Upon arrival at the river, subjects were introduced to their canoes and given a brief whitewater safety course along with safety instructions. The rivers used for this experience were capable of class III and class IV whitewater which by definition display destructive capabilities to crafts and equipment and can be lethal.

Upon completion of the river trip, subjects were instructed in camp

preparation, firebuilding, camp safety, and group cooking. After dinner, an evening group session focusing on the events of the day ended the day.

The second day was devoted to teaching the basic skills of rock climbing and rappelling. Subjects learned proper use of ropes, safety techniques, and then experienced rappelling 140+ feet cliffs. After dinner that evening, orienteering skills were taught. Before bed another group session was accomplished, again, focusing on the experiences of the day.

The morning of the third day was spent learning proper backpacking techniques. Each subject experienced packing survival basics, proper packing procedures, and some trail use skills. Camp was cleaned and the afternoon was spent backpacking a 10-mile trail. Upon completion of the backpacking, subjects were transported back to the center, tested using the I.A.R., and wilderness posttests administered by the R.T. aide, and excused to return home.

There were only three staff persons accompanying each of the four experimental groups. A Recreational Therapist in charge of skill instruction and safety procedures, a Recreational Therapist Aide in charge of testing and assisting in skill instruction, and this researcher acting as a counselor/observer. The same staff accompanied each experimental group. Prior to beginning the study each staff member received a two-day training program on the philosophy of physical challenge therapy and were instructed on staff behaviors beneficial in producing internality LOC in others (see Appendix C). Specific methods of utilizing wilderness experiences were discussed and individual staff member roles were delineated in order to be consistent from group to group.

Group sessions focused on the experiences of the day. No didactic presentations were performed. Usually subjects explored highlights of the experiences without prompting from staff. The whitewater experiences tended to evoke feelings of helplessness, frustration, exhilaration, and cooperation while rappelling evoked feelings associated with personal conquest. Backpacking was revered as an arduous necessity of getting from one place to the other. Staff contributions to the group sessions were limited to promoting within the individual an understanding of his/her contribution into meeting the demands of the challenge and offering statements focusing on the individuals' ownership or responsibility for successful completion of tasks.

Deviations from this format were minimal. Inclement weather shortened the length of backpacking for experimental group III and low water conditions reduced the impact of whitewater experience for group IV. Group I experienced no evening session after whitewater due to fatigue. Aberrant acting out behaviors were minimal. It is believed that fatigue from a grueling day, sharing of sometimes life-threatening experiences, and being in an unfamiliar and often hostile environment diminished the ability to exhibit those behaviors.

#### Assumptions

One of the inherent difficulties in using the posttest-only-control-group design is that it does not control for subject mortality. Rather than being a limitation, the author believes that since each experimental condition lasts only three days, it was unlikely that subject attrition or mortality would present an unmanageable problem. Therefore, concern for subject mortality was assumed to be unwarranted for this study using this design.

Experimenter bias and differential treatment of subjects will be addressed in Chapter V, but should be mentioned here as they relate to the procedure just discussed. Since the investigator as well as other professional staff were involved in the treatment, experimenter bias could possibly have been a factor. The variables of Physical Challenge Therapy and interaction with staff are not to be construed as separate elements of the treatment. The interaction of the two variables is the treatment. This is an inescapable assumption which will effect the generalizability of the results.

A final assumption also to be elaborated in Chapter V concerned the differential treatment of subjects. Besides exposure to differing levels of the independent variable, the two groups, experimentals vs. controls, differed in school attendance on the Friday of the experimentals trip. Controls attended school as usual, unaware they were participating in an experiment. Experimentals, on the other hand, were excused from school on Friday, participating in the treatment. Since testing for the controls did not occur for three more consecutive days, it was assumed that differing school attendance would not affect the results.

#### Limitations

The study is limited initially by the size of the sample, and the characteristics of the sample will limit the generalizability of the results to a distinct population. The population is best described as youth referred for an unspecified level of involvement with mood altering substances, residing in southeastern Oklahoma who voluntarily participate in a program of this nature. The aspect of volunteerism,



itself, will reduce dramatically the variability in a substance using adolescent population which is, on the whole, resistant to most forms of intervention. Secondly, even though the subjects participate voluntarily, they are referred for treatment by others, i.e., parents, educators, counselors, etc. This, too, will further restrict the range of a population the results can be generalized.

## CHAPTER IV

### RESULTS

#### Introduction

The study involved 60 adolescent subjects randomly selected from a population of 260 referred for treatment. The sample subjects were randomly assigned to either a three-day experimental condition consisting of a physical challenge wilderness trip or to a no-treatment control condition. The subjects' participation in either condition was voluntary.

After satisfying participation requirements of the treatment conditions, the subjects were administered Crandall's Intellectual Achievement Responsibility Questionnaire (IAR). After finding the means and standard deviations for each group, the IAR data for the four separate treatment conditions, i.e., two treatments in the Spring 1983 and two treatment conditions in the Fall 1983, were collapsed into either data for experimentals or controls without regard for which particular treatment condition or specific group involved.

Upon data compilation the investigator performed a simple one-way analysis of variance on the data and utilized two strength of association tests. The directionality of between group differences can be obtained by a visual analysis of group mean differences located in Table IV.

Means and Standard Deviations  
of the I.A.R. Scores

Table III illustrates how the eight sample groups scored on the IAR. The means and standard deviations presented are for total IAR scores, i.e., Internal+ and Internal-. Table IV presents means and standard deviations for different levels of treatment. Figure 1 is a frequency polygon of the range of scores of the experimental group compared to the control group.

TABLE III  
GROUP MEANS AND STANDARD DEVIATIONS OF TOTAL I.A.R. SCORES  
(N = 60)

	Group I		Group II		Group III		Group IV	
	Experi- mental	Control	Experi- mental	Control	Experi- mental	Control	Experi- mental	Control
No. in Group	7	7	8	8	8	8	7	7
Mean Score	27.57	26.57	28.75	27	29.25	27.25	28.57	26.43
Stan. Dev.	4.11	2.23	4.53	2.07	1.90	2.25	3.69	1.62

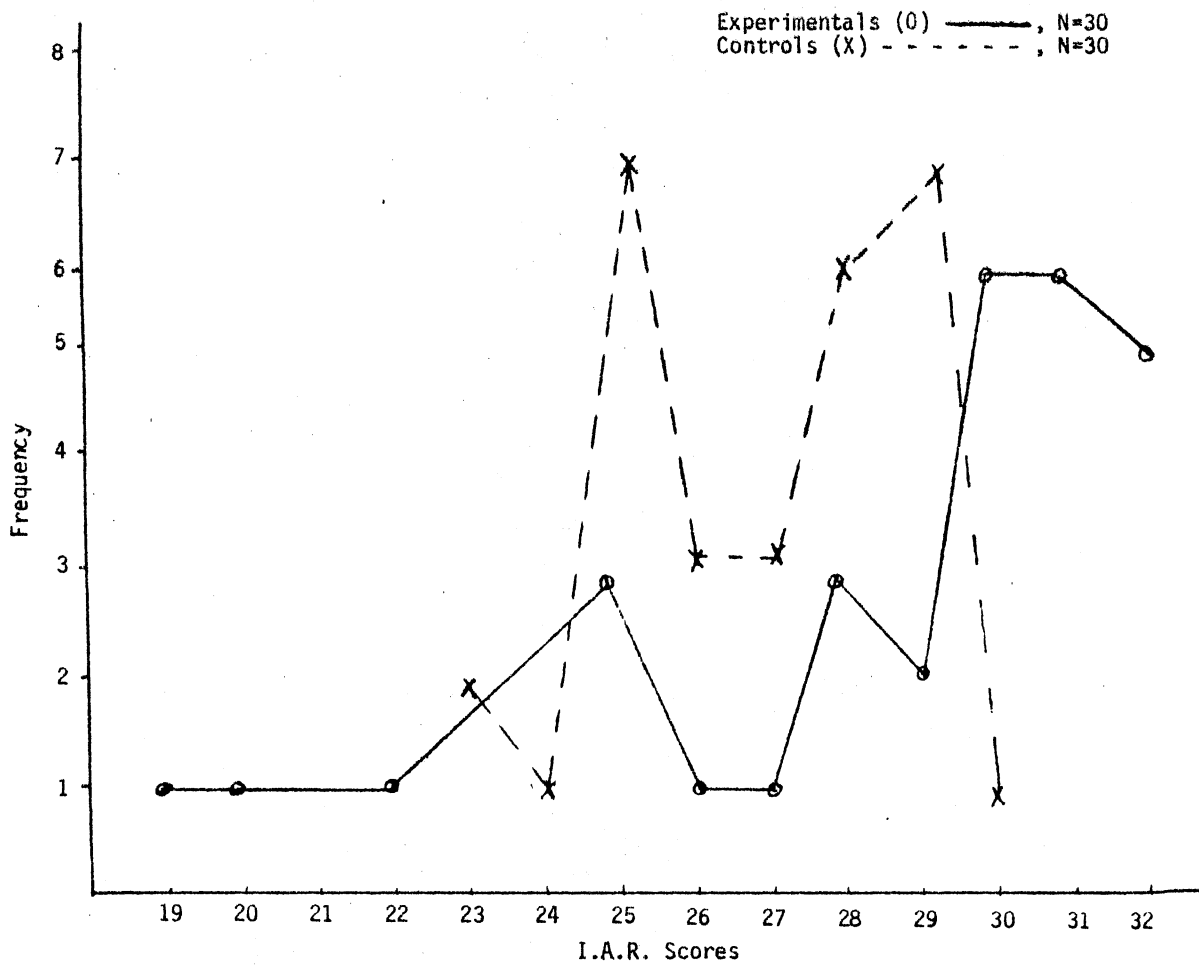


Figure 1. Frequency Polygon of I.A.R. Scores for Experimental and Control Groups

TABLE IV  
I.A.R. MEANS AND STANDARD DEVIATIONS FOR TOTAL  
EXPERIMENTALS VS. CONTROLS

	All Experimentals	All Controls
Total Number	30	30
Mean Score	28.57	26.83
Standard Deviation	3.54	1.98

#### ANOVA Results

A one way analysis of variance was applied to the total I.A.R. scores of the experimental and controls groups. The analysis tested the statistical hypothesis  $H_0: \mu_1 = \mu_2$ ; that the two groups (experimentals vs. controls) are from the same population having the same mean score. Specifically, the null hypothesis states that there are no differences between the two groups on the measurement of the dependent variable. The alternate hypothesis,  $H_1$ , states that a difference between the two groups exists and is statistically significant. The analysis was performed with the apriori assumption that if the calculated F-ratio was greater than the tabled F-ratio at the .05 level of probability, then the null hypothesis,  $H_0$ , would be rejected.

Table V presents the analysis of variance summary table. Raw scores and analysis may be found in Appendix E.

TABLE V  
ONE WAY BETWEEN SUBJECTS ANOVA FOR  
THE TREATMENT POPULATION

Source	df	S.S.	M.S.	F
Treatment	1	45.06	45.06	5.47*
Error	58	477.54	8.23	
Total	59	522.60		

\* $F_e(1,58) = 5.47, p < .05$

#### Strength of Association Results

Two strength of association tests were performed.  $\text{Eta}^2$  estimates the proportion of the variance in the dependent variable that can be accounted for by the independent variable in the sample.  $\text{Omega}(\omega^2)$  estimates the same proportion in the population. Calculations of these tests are included in Appendix E.

As a result of the analysis of variance performed on the data ( $F(1,58) = 5.47, p < .05$ ), the null hypothesis was rejected and it was determined that a difference between the two groups measured on the dependent variable existed. Both ( $\text{Eta}^2$ ) and ( $\text{Omega}^2$ ), strength of association tests indicated that only a small proportion (9%, 7%) of variance of the dependent variable could be attributed to the independent variable.

## CHAPTER V

### CONCLUSIONS

#### Comparison of Sample With Referral Population

The sample had a mean age of 15.53 years. Eighty percent of the sample were caucasian, while 58% were male and 42% were female. Fifty-five percent of the subjects were residing in their own family unit; 35% of that 55% lived in single parent homes or with extended family members. Interestingly, only subjects residing with their natural families reported no involvement with mood altering substances (22%). Of the total sample, 52% classified their substance use as experimental and only 4% reported regular usage.

Mean I.A.R. scores for both experimentals and controls ( $\bar{X} = 28.57$  exp.,  $\bar{X} = 26.83$  con.)(Table III) fell within one standard deviation of the scores obtained in norming the I.A.R. (10th grade,  $X = 25.90$ , S.D. = 4.33, see Appendix D). Mean scores for experimental group males was the highest, ( $\bar{X} = 28.95$ ) while control group males had the lowest mean score ( $\bar{X} = 26.44$ ) in a sex-by-group breakdown.

#### Discussion of Results

Results from the analysis of variance suggest that a difference exists between the mean I.A.R. scores of the two groups (experimentals vs. controls) at the .05 level of probability,  $F(1,58) = 5.47$ ,  $p < .05$ .

Stated differently, this means that the odds of a (mean) score difference between the groups occurring by chance are less than 5 in 100.

Table III and Table IV provide a visual measure of the directionality of mean score differences between experimentals and controls. Every experimental mean score exceeds any control mean score and the mean score of experimentals is greater than the mean score of controls (Table IV). It should be recalled that a total I.A.R. score is a combination of Internal (+) and Internal (-) scores. Consequently, the higher the score the more the subject is expressing an internal LOC orientation.

#### Results Related to the Research Question

From viewing these mean differences in the presence of a significant F-ratio, it would appear that the treatment had a positive (toward internal) effect on the experimental group's LOC orientation. For the purpose of answering the Research Question, this can be restated: For this sample, exposure to a three-day physical challenge wilderness trip effected a positive change, i.e., more internal, in the LOC orientation of participants when compared to controls receiving no treatment.

#### Generalizability

Eta<sup>2</sup> and Omega<sup>2</sup> analysis indicate the influence of the treatment on the two group's I.A.R. scores to be very small; 9% in the sample, 7% in the population. Generalizations based on such small proportions would necessarily be restricted.

The design chosen for this study precluded the investigation of the stability of an LOC orientation change. It is impossible to answer



whether group's differences would exist five days, two weeks, or a month after treatment. And, it is possible that fatigue or excitement during testing of experimentals substantially effected group scores. Controls were neither fatigued, excited, nor did control group members necessarily share in any common experiences during the three-day period prior to testing.

Taking into account design differences and possible rival hypotheses, it was evident to staff that participants were positively effected by the experiences of this treatment. Participants, overall, appeared to have better social relationship skills upon completion of the trip than at inception. They appeared to have had an enhanced sense of self-worth and self-confidence as well as self-sufficiency or Internal LOC orientation. Collaboration was necessary for camp maintenance, for survival on dangerous rapids, or for support to the climber during rappelling. The only competition seemed to be self versus the challenge. There was rarely time or energy for aberrance.

There were no formal measures of perceived change and, consequently, no comparisons of perceived vs. computed change either by the subject or between groups. But repeatedly, informal staff sessions held late in the evening during the trips focused on perceived changes in participants. It was a staff concensus that, for the majority of participants, the experiences either by their arduous, demanding, or sometimes frightening nature, seemed to "force" collaboration, inclusion, cohesiveness, and a sense of responsibility upon participants.

Due to the limited size of the sample and the special characteristics of the referral population, generalization of these results even to similar populations is unwarranted. These results will be useful as

part of an overall program evaluation to verify compliance with the stated goals of the program and, in a small way, evidence the merit of this application of the techniques of physical challenge therapy.

### Recommendations

#### Proposed Program Study Modification

Further research on this program is necessary and will continue. To improve the utility of future results, it was decided to revise the design to include a pretest and a delayed posttest using instruments measuring at least two psychological dimensions. More biographical and historical data will be obtained on each subject and provisions will be made to assess, through a questionnaire, both staff and participant attitudes about the program and themselves. Information will also be obtained from parents and teachers during the experimentation.

#### Suggestions for Future Research

It is recommended that future studies, whether they be accomplished on programs of this type or other physical challenge interventions, provide comparisons of differing forms of treatment, i.e., physical challenge therapy to group psychotherapy, individual psychotherapy, etc. The use of repeated measures with the same subjects or a times-series design may prove beneficial if program constraints on (per) group size is a factor. Also, comparisons of specific forms of physical challenge therapies may prove beneficial to the growth and appropriate specialization of this new and promising field. In this author's opinion, Physical Challenge Therapy holds the promise of expanding knowledge concerning the nature and treatment of many psychological as well as physical problems.

This particular program, as well as other forms of physical challenge therapy, is highly adaptable to a variety of populations. This author believes that it is unique and has special status with client populations typically considered "resistant to treatment." It has the promise of treating problems without the appearance of doing so. Studies should be undertaken to test this hypothesis. Alcohol abuse, chronic drug abuse, and other less devastating, but still debilitating, conditions such as the emotionally disturbed or school behavior problems should be considered as possible targets of interventions.

The range of physical abilities necessary to participate in a wilderness physical challenge experience is easily reduced, thereby allowing individuals with even partial paralysis to participate. The goals in the treatment of persons with physical disabilities could include an increase in motor functioning, increase in self-esteem or self-worth, or simply the exploration and enjoyment of challenging experiences in the company of others so afflicted.

#### Summary

The primary goal of this study was the evaluation of a physical challenge wilderness program. The study sample consisted of 60 adolescents referred for substance abuse who were randomly selected from a referral population of 260 adolescents. The subjects were randomly assigned to two treatment conditions; experimentals, who received a three-day physical challenge wilderness trip, and controls who received no treatment. In a posttest-only control group design, a one-way between-subjects analysis of variance was performed on the scores of both groups on the Intellectual Academic Responsibility Questionnaire (I.A.R.).

The analysis determined that there was a significant difference between the two groups and mean analysis determined that experimentals were improved (more internal).

Due to the limited size of the sample and design restrictions, generalizations of the results to other forms of the treatment with different populations were regarded as unwarranted.

Recommendations for design elaboration and an increase in sample size were advanced. Recommendations also were futhered for continuing research in the field of physical challenge therapy in a variety of formations, with broader and more heterogeneous populations.

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APPENDICES

APPENDIX A

WILDERNESS TESTS FORMS

BACK PACKING

1. Where should the major amount of weight be placed in a back pack?
  - a. In the bottom
  - b. on right bottom of right handed
  - c. at the top
  - d. depends on persons weight
2. If one person is 6 feet tall and one person is 5 feet tall who should carry the most weight in their back pack?
  - a. the 6 feet tall person
  - b. it should be determined by a percentage of body weight
  - c. the smaller person has a lower center of gravity and should have most weight
  - d. don't know
3. What is the last thing you put in a back pack?
  - a. next days clothes
  - b. extra underwear
  - c. your rain coat
  - d. extra batteries
4. When walking on flat ground with a full back pack you should?
  - a. walk perpendicular to the ground
  - b. walk with shoulders and head back
  - c. bend 15 degrees to the front
  - d. bend 30 degrees to your left
5. To help relieve back pack weight on your lower back
  - a. tighten straps raising pack
  - b. take stuff out
  - c. give stuff to biggest person
  - d. carry stuff in arms
6. Why is "down filled" sleeping bags so warm?
  - a. because geese are warm blooded
  - b. it retains your body heat
  - c. it is water repellent
  - d. it is bio degradable
7. Where do you store your pack overnight?
  - a. outside the tent
  - b. under your sleeping bag
  - c. in the tent
  - d. on a high tree limb

RIVER AND CANOE

1. A river has a
  - a. end and a middle
  - b. high and low water
  - c. a mouth and a source
  - d. is named for its beginning
2. White water is
  - a. water that is along the edges
  - b. water disturbed with obstacles
  - c. the color of a smooth lake
  - d. snow run off
3. Usually the faster current is
  - a. in the middle of the river
  - b. along the left side
  - c. is in the deepest part
  - d. where the most rock are
4. An eddy is
  - a. the name of an expert canoe person
  - b. the shaft on an oar and paddle
  - c. still water after rapids or behind obstacles
  - d. the shallowest part of a lake or stream
5. The bow of a canoe is
  - a. along the left rail
  - b. the very bottom of the canoe
  - c. the front of the canoe
  - d. a canoe doesn't have a bow
6. While canoeing, which member is in charge of steering?
  - a. the bowman
  - b. the most experienced
  - c. the stern man
  - d. its a democratic process
7. What is the first thing to do if you see someone capsize a canoe?
  - a. jump in and save the boat-- it's expensive
  - b. panic and scream so someone may come and help
  - c. advise victim to stay with the boat on up stream side
  - d. throw them your life vest, you don't need it.

SAFETY

1. What area of the body is responsible for the most heat loss in cold weather?
  - a. feet
  - b. head
  - c. hands
  - d. thoratic region
2. Who is the person ultimately responsible for your safety on a camp out?
  - a. you are
  - b. Mr. McKenzie
  - c. your best friend
  - d. the leader
3. When someone is injured what else may happen that also needs to be treated?
  - a. frost bite
  - b. convulsions
  - c. shock
  - d. don't know
4. Many experts believe that when bitten by a snake you should
  - a. use tourniquet, cut wound and extract venom by sucking
  - b. relax victim, use restricting band and go to hospital
  - c. don't do either
  - d. do (b) but be able to identify snake
5. When leaving camp for a walk
  - a. be sure you have your flashlight
  - b. it's always a good idea to take someone along or let someone know where your're going
  - c. no one should ever leave a campsite
  - d. only adults can go on walks away from camp
6. The most important part of camping is
  - a. fun
  - b. orienteering
  - c. safety
  - d. Mr. McKenzie's mood
7. When is the coldest time of night
  - a. When you're alone
  - b. midnight
  - c. right before day break
  - d. 8:35 on this continent

MOUNTAINEERING AND RAPPELLING

1. What term best describes "stretching a rope to its breaking point"?
  - a. atlatness
  - b. elasticity
  - c. tensile strength
  - d. yank
2. Which of the following is a piece of equipment used in rock climbing?
  - a. nailing
  - b. pinning
  - c. piton
  - d. leighigh
3. What type of knot is used to tie a swiss seat?
  - a. crossed knot
  - b. slip knot
  - c. both a & b
  - d. neither a or b
4. The term "on belay" means
  - a. get out of the way
  - b. food is ready
  - c. rope is torn
  - d. none of the above
5. What is the term for "descending using a rope"?
  - a. rappelling
  - b. condoning
  - c. scaling
  - d. hanging
6. The safest way to climb a hill or mountain side is called?
  - a. 3 point stance
  - b. with shoes off
  - c. with one shoulder away from the mountain
  - d. none of the above
7. Gloves are always used in rappelling, why?
  - a. air temperature is cold
  - b. skin is oily and will affect the rope
  - c. so fingers won't get caught in rope
  - d. so hands won't get friction burns

JUDGMENT

1. What does "responsibility for yourself" really mean?
  - a. going it alone
  - b. being a deviate
  - c. playing a fool
  - d. ultimate freedom
2. When someone else is talking during a circle, what should you do?
  - a. good time to get a drink
  - b. ask a question
  - c. carefully listen and play like you are them
  - d. do what others do when you are talking
3. Responsibility does not mean blame, it really means
  - a. being responsible for your choices
  - b. finding out who's at fault
  - c. acting on impulse
  - d. being overly kind
4. If something or someone makes you angry, you
  - a. must first examine carefully your role in what happened
  - b. get mad back and pout
  - c. go tell your mommy
  - d. go tell your best friend
5. Which will give you the biggest high?
  - a. amphetamines
  - b. hallucinogens
  - c. narcotics
  - d. close friends
6. How does someone get and keep good close personal friends?
  - a. by being a clown
  - b. by being real kind and shy
  - c. by being loud and know everything
  - d. by saying, acting, and behaving like they truly are inside
7. Group circles on campouts can. . . .
  - a. allow a person to feel better about him/her self
  - b. bring people closer together
  - c. by talking, give meaning to camping experiences
  - d. be very difficult sometimes
  - e. all of the above



APPENDIX B

I.A.R. QUESTIONNAIRE

## Form I-H (cont'd)

FOR QUESTIONS 1 THROUGH 34, THERE ARE TWO ANSWERS TO CHOOSE FROM.  
CIRCLE THE NUMBER OF THE ANSWER YOU THINK IS BEST. DON'T SPEND A LOT OF  
TIME ON ANY ONE QUESTION.

1. If a teacher passes you to the next grade, would it probably be: (18)
  - 1) because he or she liked you, or
  - 2) because of the work you did?
2. When you do well on a test at school, is it more likely to be: (19)
  - 1) because you studied for it, or
  - 2) because the test was especially easy?
3. When you have trouble understanding something in school, is it usually: (20)
  - 1) because the teacher didn't explain it clearly, or
  - 2) because you didn't listen carefully?
4. When you read a story and can't remember much of it, is it usually (21)
  - 1) because the story wasn't well written, or
  - 2) because you weren't interested in the story?
5. Suppose your parents say you are doing well in school. Is it likely to happen (22)
  - 1) because your school work is good, or
  - 2) because they are in a good mood?
6. Suppose you did better than usual in a subject at school. Is it likely to happen (23)
  - 1) because you tried harder, or
  - 2) because someone helped you?
7. When you lose at a game of cards or checkers, does it usually happen (24)
  - 1) because the other player is good at the game, or
  - 2) because you don't play well?

## Form I-H (cont'd)

8. Suppose a person doesn't think you are very bright or clever (25)
- 1) Can you make him or her change his/her mind if you try to, or
  - 2) Are there some people who will think you're not very bright no matter what you do?
9. If you solve a puzzle quickly, is it (26)
- 1) because it wasn't a very hard puzzle, or
  - 2) because you worked on it carefully?
10. If a boy or a girl tells you that you are dumb, is it more likely that they say that (27)
- 1) because they are mad at you, or
  - 2) because what you did really wasn't very bright?
11. Suppose you study to become a teacher, scientist, or doctor, and you fail. Do you think this would happen (28)
- 1) because you didn't work hard enough, or
  - 2) because you needed some help and other people didn't give it to you?
12. When you learn something quickly in school, is it usually (29)
- 1) because you paid close attention, or
  - 2) because the teacher explained it clearly?
13. If a teacher says to you, "Your work is fine", is it (30)
- 1) something teachers usually say to encourage pupils, or
  - 2) because you did a good job?
14. When you find it hard to work arithmetic or math problems at school, is it (31)
- 1) because you didn't study well enough before you tried them, or
  - 2) because the teacher gave problems that were too hard?

## Form I-H (cont'd)

15. When you forget something you heard in class, is it (32)  
1) because the teacher didn't explain it very well, or  
2) because you didn't try very hard to remember?
16. Suppose you weren't sure about the answer to a question (33)  
your teacher asked you, but your answer turned out to  
be right. Is it likely to happen  
1) because she wasn't as particular as usual, or  
2) because you gave the best answer you could think of?
17. When you read a story and remember most of it, is it (34)  
usually  
1) because you were interested in the story, or  
2) because the story was well written?
18. If your parents tell you you're acting silly and not (35)  
thinking clearly, is it more likely to be  
1) because of something you did, or  
2) because they happen to be feeling cranky?
19. When you don't do well on a test at school, is it (36)  
1) because the test was especially hard, or  
2) because you didn't study for it?
20. When you win at a game of cards or checkers, does it happen (37)  
1) because you play real well, or  
2) because the other person doesn't play well?
21. If people think you're bright or clever, is it (38)  
1) because they happen to like you, or  
2) because you usually act that way?
22. If a teacher didn't pass you to the next grade, would it (39)  
probably be  
1) because she or he "had it in for you", or  
2) because your school work wasn't good enough?

## Form I-H (cont'd)

23. Suppose you don't do as well as usual in a subject at school. Would this probably happen (40)
- 1) because you weren't as careful as usual, or
  - 2) because somebody bothered you and kept you from working?
24. If a boy or a girl tells you that you are bright, is it usually (41)
- 1) because you thought up a good idea, or
  - 2) because they like you?
25. Suppose you became a famous teacher, scientist, or doctor. Do you think this would happen (42)
- 1) because other people helped you when you needed it, or
  - 2) because you worked hard?
26. Suppose your parents say you aren't doing well in your school work. Is this likely to happen more (43)
- 1) because your work isn't very good; or
  - 2) because they are feeling cranky?
27. Suppose you are showing a friend how to play a game and he or she has trouble with it. Would that happen (44)
- 1) because he or she wasn't able to understand how to play, or
  - 2) because you couldn't explain it well?
28. When you find it easy to work arithmetic or math problems at school, is it usually (45)
- 1) because the teacher gave you especially easy problems, or
  - 2) because you studied your book well before you tried them?
29. When you remember something you heard in class, is it usually (46)
- 1) because you tried hard to remember, or
  - 2) because the teacher explained it well?

## Form I-H (cont'd)

30. If you can't work a puzzle, is it more likely to happen (47)
- 1) because you are not especially good at working puzzles, or
  - 2) because the instructions weren't written clearly enough?
31. If your parents tell you that you are bright or clever, is it more likely (48)
- 1) because they are feeling good, or
  - 2) because of something you did?
32. Suppose you are explaining how to play a game to a friend and he or she learns quickly. Would that happen more often (49)
- 1) because you explained it well, or
  - 2) because he was able to understand it?
33. Suppose you're not sure about the answer to a question your teacher asks you, and the answer you gave turns out to be wrong. Is it likely to happen (50)
- 1) because she or he was more particular than usual, or
  - 2) because you answered too quickly?
34. If a teacher says to you, "Try to do better", would it be (51)
- 1) because this is something she or he might say to get pupils to try harder, or
  - 2) because your work wasn't as good as usual?

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These consist of pages:

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APPENDIX C

COUNSELOR BEHAVIORS AND PROGRAM  
COMPONENTS/PROGRAM CLIMATE



## COUNSELOR BEHAVIORS

- 1) Reflective listening--the retention, recall, and reverbalization of clients spoken message given with additional associational feeling responses.
- 2) Sensitivity and Empathy--honestly caring for them in their predicament, understanding without criticism for their chosen behaviors.
- 3) Trusting--do what you say you will do when and how you say you will do it. Perform wilderness skill instruction for complete understanding and let the experiences do the confrontation.
- 4) Modeling--live and be your choices--no excuses. Be genuine. Allow clients to practice being you.
- 5) Openness--allow clients free expression of thoughts and feelings at their disposal not yours. At the same time if you have personal preferences for the times of particular discussions make them known- i.e. don't set others up to fail.

Wilderness experiences themselves have been shown to alter participants' LOC orientation--allow the experiences to work. Think before you speak!

## PROGRAM COMPONENTS/PROGRAM CLIMATE

## Successful Physical Challenge Programs:

provide for:

- I. An Unfamiliar Environment
- II. Strenuous Physical Activity
- III. Controlled Amounts of Stress
- IV. Collaboration in a small group context
- V. Use of newly acquired skills

allow for:

- I. the context of allowing for a wide range of affect arousal; fear vs. confidence, anger vs. joy, hope vs. despair, etc.
- II. experiences where the individual must act on his own choices and gain a sense of responsibility for his/her choices.
- III. therapeutic experiences to escape the dysphoria associated with the persons dilemma and to find avenues for positive reinforcement for appropriate euphoric diversions.
- IV. the creation of a total experience of successful completion of tasks/challenges.

## L.O.C. Orientation

<u>Ingredients</u>	<u>Source</u>
1) Confrontation	experiences
2) Modeling	staff and participants
3) Rehearsal	experiences, training
4) Differential Reinforcement	experiences

APPENDIX D

MEANS, STANDARD DEVIATIONS, AND  
RANGES OF I.A.R. SCORES

TABLE VI  
 MEANS, STANDARD DEVIATIONS, AND RANGES OF I.A.R. SCORES  
 IN NORMATIVE SAMPLE

Both Sexes by Grade	N	Total I			I+			I-		
		Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
3	102	23.20	3.92	13-31	12.64	2.08	8-16	10.56	3.05	2-16
4	103	24.80	3.37	15-30	12.51	2.13	7-17	12.26	2.35	5-17
5	99	24.19	3.83	15-32	12.42	2.53	6-17	11.75	2.69	1-16
6	166	25.70	4.35	12-33	13.38	2.44	5-17	12.32	2.72	5-17
8	161	26.11	3.77	13-34	13.19	2.20	7-17	12.92	2.31	5-17
10	183	25.90	4.33	6-33	13.21	2.41	2-17	12.68	2.68	4-17
12	109	25.93	3.66	14-32	12.66	2.62	5-17	13.27	2.07	8-17

Source: (Crandall, Katkovsky, & Crandall, 1965, p. 100)

APPENDIX E  
ANOVA WORKSHEET

## ANOVA WORKSHEET

Experimentals N = 30

Controls N = 30

$X_1$	$X_1^2$	$X_1$	$X_1^2$	$X_2$	$X_2^2$	$X_2$	$X_2^2$
20	400	32	1024	28	784	26	676
30	900	28	784	28	784	27	729
27	729	31	961	23	529	28	784
32	1024	30	900	25	625	29	841
28	784	26	676	25	625	26	676
31	961	30	900	29	841	30	900
25	625	29	841	28	784	29	841
30	900	28	784	28	784	23	529
25	625	31	961	29	841	29	841
32	1024	30	900	24	576	28	784
19	361	31	961	29	841	25	625
30	900	32	1024	25	625	26	676
32	1024	29	841	29	841	27	729
31	961	25	625	27	729	25	625
31	961	22	484	25	625	25	625
N = 30		$TX_1 = 857$		N = 30		$TX_2 = 805$	
$\bar{X} = 28.57$		$TX_1^2 = 24,845$		$\bar{X} = 26.83$		$TX_2^2 = 21,715$	
SD = 3.54				SD = 1.98			

$$TX_1 + TX_2 = 857 + 805 =$$

$$G = 1,662, N = 60$$

$$G^2/N = 1662^2/60 =$$

$$G^2/N = 46,037.4$$

$$\Sigma X_{1,2}^2 = 24,845 + 21,715 =$$

$$\Sigma X_{1,2}^2 = 46,560$$

$$SS_T = 46,560 - 46,037.4$$

$$SS_T = 522.60$$

$$\Sigma TX_a/n_a = 857^2/30 + 805^2/30 =$$

$$\Sigma TX_a/n_a = 46,082.46$$

$$SS_a = 46,082.46 - 46,037.4$$

$$SS_a = 45.06$$

$$SS_E = SS_T - SS_a = 522.6 - 45.06$$

$$SS_E = 477.54$$

Source	df	SS	MS	f
Treatment	(a-1), 1	45.06	45.06	5.47, p < .05
Error	(N-a), 58	477.54	8.23	p > .01
Total	(N-1), 59	522.60		

$$\text{Eta}^2 = \frac{SS_X}{SS_T} = \frac{45.06}{522.60} = .086 = [9\%]$$

$$(\omega^2) = \frac{SS_a - (df_a)(MS_E)}{(MS_E) + (SS_T)} = \frac{45.06 - (1)(8.23)}{8.23 + 522.6} = \frac{36.83}{530.83} = .069 = [7\%]$$

✓  
VITA

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