COPING WITH STRESS: THE EFFECT OF PREPARATORY INFORMATION AND PERSONAL STYLE

By

CANDACE CONLEY

Bachelor of Arts

University of Tulsa

Tulsa, Oklahoma

1979

Submitted to the Faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the Degree of
MASTER OF SCIENCE
July, 1982

COPING WITH STRESS: THE EFFECT OF PREPARATORY INFORMATION AND PERSONAL STYLE

Thesis Approved:

Donald K. Tramme
Thesis Adviser

James M. Price

Clyde J. Kruper

Norman N. Durham
Dean of the Graduate College

ACKNOWLEDGMENTS

To my major adviser, Dr. Donald Fromme, I wish to express my appreciation for his support and guidance in this project and throughout the first two years of my graduate work. Thanks also to Dr. Phil Murphy whose knowledge of physiological measurement made that part of my thesis possible. Special thanks to Dr. Jim Price for the endless amount of time, effort, and patience spent with me and my statistical analysis.

Thanks to Rick Cervantes whose initial work and development of the Oklahoma Personal Style Inventory made this project possible.

I would also like to thank Steve Carver and Reed Mankin for generously sharing their laboratory space and to Steve, in particular, for his helpful advice in the use of the Grass polygraph.

Thanks to Karen Lewis for her willingness to be the guinea pig in the initial stages of this study, and for being an excellent friend.

Finally, this appreciation would not be complete without expressing my deepest thanks to my parents, Marjorie and Donald Angove, for their constant support and love throughout my life and especially during my graduate career.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Stress is a universal and frequently disabling human phenomenon (Hamilton, 1979). It becomes disabling mainly because of the inadequacy of an individual's method of coping with the stress. Humans develop coping styles based on their past experiences with stressful encounters and their interpretations of those encounters. Humans tend to label events as challenges or threats. This labeling will affect his/her choice of a coping method. A choice becomes inadequate when it hinders the individual's ability to deal effectively with the external demand.

Individuals are constantly confronted with demands from the environment. The environment impinges on the person and creates an imbalance in his/her system. The coping individual attempts to compensate for the unbalanced state. This can be done in a variety of ways; for example, the external stimuli can be changed in some manner to better fit the individual's system. If the coping strategy is effective (equilibrium is restored), it is likely it will be used again in a similarly stressful situation. If, however, the strategy is not effective, the individual can choose to develop a different, more effective method or he/she can resist any coping efforts. It is in the latter case where stress can become disabling and pathology can develop at the physiological and/or psychological level. When an individual resists adaptation to or coping with stress, he/she is, perhaps, resisting a natural occurrence. Adapting to environmental

demands has long been considered a natural process, at least, at the physiological level. One cannot accept the notion of evolution and natural selection (Darwin, 1859) without also accepting adaptation to the environment.

The human body has the ability to adapt to influences from the environment and still maintain its internal balance. Over 100 years ago, Claude Bernard (1878) proposed the concept of the milieu interieur. First applied to the natural balancing system of the blood in the human body, Bernard came to view the entire body as functioning within a system of equilibrium. When any external force would disrupt the milieu interieur immediate compensations would be made within the body which would return it to balance. Bernard (1878, p. 189) wrote: "All of the vital mechanisms, however varied they may be, have always but one goal, to maintain the uniformity of the conditions of life in the internal environment."

Years later in the United States, Cannon (1932) further enumerated the efficacy of the human body to adapt itself to states which varied from its normal equilibrium. Cannon proposed that various methods of preserving balance were tested down through the ages with the most successful methods remaining. As the system became more and more complex, it became necessary for a more efficient stabilizing mechanism to develop. Homeostasis (Cannon, 1932) was the term which seemed most appropriate, as it implies a condition of the organism which is relatively constant but may vary. Under conditions of stress, the body's homeostatic functions respond to the imbalance and operate to protect the organism.

More recently, Selye (1946) proposed the general adaptation syndrome (GAS). The GAS is the sum of all non-specific systemic reactions of the body which ensue upon continued exposure to stress. The body reacts in

an attempt to maintain its balance and adapt to the stimulation. Selye noted that one of the most important physiologic reactions in life was adaptation to our surroundings. In reacting to stress, the body uses information available within its system to make the proper compensations to return to a physiological equilibrium. It has been suggested that the physiological and psychological components of the stress reaction cannot be separated (Mason, 1971; Teichner, 1968). If this is so, then a case could be made for a psychological or cognitive equilibrium maintained by proper compensations made from available information.

If equilibrium is to be the goal at the cognitive level, a person attempting to adapt or cope should utilize available information that is helpful to him/her in dealing with the stressful demand. The information that is most helpful should be that which is consistent with the individual's already developed view of the world. That view of the world is what is instrumental in determining that person's interpretation of an event as a threat or a challenge, and can, therefore, be seen as a part of his/her personality known as his/her style of coping.

It has been found that there are two general classes of coping, one which functions primarily on avoidance of stress, the other on vigilance for stress (Goldstein, 1973). The avoiding individual copes with stress by denying, ignoring, or repressing it and seeks out material which will allow him/her to avoid most effectively. A vigilant person copes by attending to the stress and uses information which facilitates this process. It is unimportant to evaluate which method of coping is better or worse; it is only pertinent to determine whether it works for the individual. In other words, does it allow the individual to adapt and function effectively in the situation?

In the present study, individuals with differing coping styles will be provided with information which is either consistent or inconsistent with their present coping strategies. Each person will then be exposed to a physical stressor. It is proposed that individuals who receive consistent information will deal more effectively with the stress than those who receive inconsistent information. Consistent information should facilitate the person's attempt to adapt to and cope with the stress and maintain the balance within his/her system.

Statement of the Problem

It is the purpose of the present study to further explore an individual's coping style and the role that cognitive strategies play within those coping styles.

The interaction between the person and his/her environment is expected in the present study. For that reason, a measure predicated on a systems or interactional approach to personality was chosen as a means for determining a person's coping style.

The Oklahoma Personal Style Inventory (OPSI) was designed specifically to measure three basic coping strategies which are purported to underlie the psychological processes used by an individual in an attempt to adapt to his/her environment (Cervantes, unpublished thesis, 1982). The styles, conservatism, accommodation, and assimilation, are based, in part, on the concept of avoidance and vigilance. Assimilators and accommodators use vigilance as their modes of adaptation. Each uses it in a different manner, however.

Assimilators are vigilant in an effort to control their situations; they alter the situation to suit their needs. Accommodators use vigilant

behavior to discover how they must change themselves in order to adapt to the event; they mold themselves to fit the situation. Conservators, on the other hand, tend to ignore or deny a situation; they avoid the disruption that adaptation would cause in their systems.

Of particular interest is the effect preparatory information will have on an individual's stress reaction as a function of his/her personal coping style (based on the OPSI). Information which is consistent with the individual's present manner of coping should have the most significant impact on that person's response to stress.

Conservators who tend to deny experiences should find information which helps them avoid the stimulation to be the most beneficial. For this reason, attentional diversion information was matched to the conservative coping style. With this type of instruction set, the conservator would be actively diverting his attention from the stressor by reading and evaluating a children's story.

Assimulators prefer to recognize a stimulus and then attempt to control the impact it has on them. One way to control the stimulation created by the cold pressor would be to change it. This could be done by interpreting the cold water as refreshing, as it would be on a hot day in the desert. A reversal of affect instruction set is not denying the existence of the coldness and the pain produced by it, but rather it is changing it so the assimilator can deal with it more effectively.

A person with an accommodative strategy will recognize the external demand and will try to accommodate themselves to it. They do not attempt to control or deny it so an objective sensory information set concerning the cold pressor sensations would likely be most helpful to them. In any event, once an accommodator recognizes that he/she is in pain, he/she will

probably accommodate him/herself by taking his/her extremity out of the water.

It is postulated that, in general, when an individual is provided with preparatory information for dealing with a stressor, that information will be most beneficial if it is congruent with that individual's coping style. The present study specifically hypothesizes that:

1. Individuals with a conservative coping style will be physiologically aroused by the cold pressor but will deny that arousal.

2. Individuals with a conservative coping style provided with attentional diversion information:

   a. will be less physiologically aroused than when provided with other types of information.

   b. will exhibit higher pain thresholds and tolerances than when provided with other types of information.

3. Individuals with an assimilative coping style will be physiologically aroused by the cold pressor and will recognize and report that arousal.

4. Individuals with an assimilative coping style when provided with reversal of affect information:

   a. will be less physiologically aroused than when provided with other types of information.

   b. will report less arousal than when provided with other types of information.

   c. will exhibit higher pain thresholds and tolerances than when provided with other types of information.

5. Individuals with an accommodative coping style will be physiologically aroused by the cold pressor and will recognize and report that arousal.

6. Individuals with an accommodative coping style when provided with sensory information:

   a. will be less physiologically aroused than when provided with other types of information.

   b. will report less arousal than when provided with other types of information.

7. Individuals with an accommodative coping style when provided with sensory information or any other type of information will have lower pain thresholds and tolerances than any of the other coping styles under any condition.

8. Males, in general, will be more physiologically aroused, have higher subjective pain ratings and lower pain thresholds and tolerances than females.

CHAPTER II

LITERATURE REVIEW

The general adaptation syndrome (Selye, 1946) is the sum of all non-specific systemic reactions of the body which occur upon long continued exposure to stress. Selye described the stress as the sum of all non-specific changes caused by use or damage; and the stressor was described as the wide variety of stimuli capable of producing the non-specific changes. The theory, though not conclusively confirmed or refuted, is useful to the present study in that it recognizes the body's attempt to adapt itself to external stimulation.

The body has to respond to a physical stressor because the balance maintained within the body is upset. When the body reacts to a physical stressor, there are measurable physiological changes. The hormonal levels change (Selye, 1950), heart rate changes (Harrell, 1980; Cornelius & Averill, 1980; Molinari & Khanna, 1980; Leventhal et al., 1979; Bloom et al., 1977; Monat, 1976), muscle tension changes (Jaremko, 1978), and skin conductance changes (Cornelius & Averill, 1980; McCaul, 1980; Miller, 1979; Bloom et al., 1977; Monat, 1976).

Physiological reactions have also been demonstrated in response to psychological stressors (Lawler, 1980; Molinari & Khanna, 1980; Weinberger et al., 1979; Goldstein, 1973; Epstein & Roupenian, 1970; Weinstein et al, 1968; Goldstein et al., 1965).

Since the body is not being stressed directly by a physical force, how can there be a change in the physical being? Lazarus et al. (1966) have analyzed stress in terms of cognitive appraisal and coping. They propose there is a set of psychological processes that mediate encounters between the person and the environment. These processes lead to emotional and adaptational outcomes which determine the person's psychological stress reactions, the various emotions experienced, and that person's adaptational outcomes. It is the human tendency to label events as acceptable or aversive, which leads to his/her ultimate selection of a means for adapting to that event. The effects of a physical or a psychological stressor cannot be isolated as either a physiological or behavioral reaction. It has to be viewed as an interaction; stressors have both psychological and physiological components which cannot be separated. This interaction cannot be ignored; rather, it should be expected (Teichner, 1968).

The coping styles measured by the Oklahoma Personal Style Inventory (OPSI) assume that the relationship between humans and their environment is interactional and ongoing (Fromme, unpublished manuscript, 1979). Cohen and Lazarus (1966) have criticized trait measures of stress responses which ignore this interaction. Traits assume that, in large part, behavior is static; prediction from trait measures as to how the person actually copes with a variety of specific situations has been very poor. Cohen and Lazarus emphasize a need for assessing a person's coping process.

A systems approach such as that taken by the OPSI allows for the consideration of variability in coping responses associated with a coping process. The OPSI coping measures are based on the concept that there is

a "boundary" which separates the individual and his/her environment. Through this boundary system, the person allows "inputs" and "outputs" to flow and, thereby, interacts with the environment. By using the coping styles available to him/her, the individual is able to control and predict outcomes across various situations.

An individual with an assimilative coping style will change the inputs or external demands before incorporating them into his/her system. It is important for the assimilator to be "in control" of his/her environment; he/she controls it by altering it to suit his/her values, beliefs, etc.

An accommodative person will alter him/herself internally in order to meet the external demands placed on him/her. The accommodator's boundaries are more porous than the assimilator's; the environment virtually acts directly on the accommodator.

The conservator, on the other hand, has fairly distinct and rigid boundaries; he/she attempts to keep his/her system balanced by shutting off outside interference. A conservative person will simply ignore the demand.

Influential in the theoretical background and terminology used in the OPSI was Piaget's concept of adaptation (1971). Piaget has theorized that life is essentially autoregulation. By this, he means that all regulatory mechanisms within the human body attempt to adapt to the environment by keeping an equilibrium in the organization. Ideally, the body could maintain its balance and continuity by closing itself off to external demands, a <u>conservation</u> of the equilibrium. Piaget (1971, p. 149) asserts "it is the essential reaction of every organized being to conserve its essential overall shape and thus go on living as an organized whole."

This equilibrium can exist as long as there are no outside influences but Piaget has recognized that the human is an open system which must have exchanges with the external world. The human must adapt to the environment if he is to survive. Just as humans evolved to walk upright, so they evolved to think. Piaget has suggested that cognitive adaptation is an extension of biological adaptation. Because of the ability of the human to think and reason, he concluded that cognitions serve higher functions of adaptation not feasible at the organic level.

Two of these cognitive functions are assimilation and accommodation. These are not two separate functions but exist at opposite ends of the adaptation polarity to maintain the organization's balance. Assimilation involves the integration of new information with already existing "action schemata." Action schemata apply to whatever there is in common between various repetitions of the same action. Accommodation refers to any modification that must occur within an action schemata because of external influences. In the first instance, the individual is altering the incoming information to fit his/her action schemata; in the second, the individual alters his/her action schemata (him/herself) to fit the incoming information.

The OPSI, then, measures these coping styles of conservatism, assimilation, and accommodation. When confronted with a stressful situation, a person with a conservative coping strategy will attempt to deny it; a person with an assimilative coping style will try to alter it in some manner; and a person with an accommodative coping style will endeavor to change him/herself to fit the demands of the stressor.

The particular coping style that a person develops through experiences with stressors will have an effect on that person's stress response.

As was stated before, the stress reaction is not a pure one. The interaction between the physiological and psychological components of the situation is, in part, determined by the individual's personality. The individual interprets the environmental demand. What may be seen as a challenge to one person may be interpreted as a threat to another. Personality variables, then, can serve as mediators in an individual's eventual reaction to the stressor.

Personality Variables as Coping Mediators

Locus of control (Rotter, 1966) has been shown to have differential effects on a person's stress reactions. An individual who sees a relationship between his/her own behaviors and whatever happens in his/her life is considered to have an internal locus of control. Persons with an external locus of control believe, to a greater or lesser extent, that the outcomes in their lives are determined by such things as luck, chance, fate, or powerful others.

Harrell (1980) examined the relationship among locus of control, heart rate, and subjective response to stressful tones before and after a strategy for controlling those responses (relaxation techniques) was introduced to the subjects. Internal locus of control was related to more rapid heart rate in subjects who listened to signaled stressful tones. Reductions in heart rate, after relaxation training, was not associated with locus of control. However, in those trained subjects, larger reductions in the subjective ratings of the aversiveness of the tone was related to internal locus of control. The effects of stressful versus non-stressful skill and chance conditions on internal and external locus of

control subjects (Molinari & Khanna, 1980) showed internals performed significantly better than externals in the non-stressful skill condition.

In a longitudinal study (Anderson, 1977), locus of control was found to be a stable personality trait which apparently influenced the subjects' choice of either task-oriented or emotion-centered coping behaviors. The study was conducted in a Pennsylvania community during a three-and-a-half year period following the flooding of Hurricane Agnes (June, 1972). The business district received extensive damage. Anderson assumed this would contribute to abnormal stress levels in the subjects. One hundred and two owner-managers were selected at random to participate in the study. They were classified as either internally or externally controlled (based on Rotter's I-E Scale) and as using either task- or emotion-centered coping mechanisms (based on the Kahn, Wolfe, Quinn, Snoek, & Rosenthal categorization). Task-centered coping behavior was defined as problem-solving, such as seeking resources to make up for the initial loss. Emotion-centered coping behavior was categorized as either withdrawal, group affiliation, hostility, or aggression, or any combination of those. Internals perceived less stress and employed more task-centered coping behaviors than externals. Additionally, internals who were successful in dealing with stress became more internal while externals who were unsuccessful became more external.

Lefcourt (1972) found locus of control to be related to the prediction of assertiveness, experiencing of oneself as a distinct source of causation and the tendency to be self-reliant rather than acquiescent and conforming.

Archer (1979) reported additional support for the existence of a

meaningful relationship between greater externality and high levels of general trait anxiety and test anxiety.

Byrne (1964) has defined a personality dimension known as repression-sensitization which can be used to distinguish between people based on their typical styles of coping with stress. Research has shown that sensitizers readily report the subjective stressful experience and exhibit stress reactions; repressors are much less likely to report the subjective experience of stress.

Schregardus (unpublished dissertation, 1976) found patterns of defensive style related to the perception and experience of stress and to subsequent patterns of coping and adjustment. His study focused on repression-sensitization (R-S) theory and its application to the abortion experience (two weeks before, one day before, and two weeks after a first trimester abortion). The results showed that repression and sensitization coping styles remain stable over stress and time conditions. Behavioral components associated with high and low scores on the R-S Scale (Byrne, 1964) are consistent with descriptions of repressors/sensitizers found in the literature. Repressors exhibit less anxiety, higher self-esteem, and fewer shifts in mood than sensitizers. Sensitizers perceive significantly more stress than repressors (higher state and trait anxiety scores), lower self-esteem, and a greater variety and frequency of reported physical, thought, and mood disturbance symptoms.

These results do not mean, however, that repressors are actually experiencing less stress than sensitizers. Repressors may be reporting and perceiving less anxiety and stress than the sensitizers but may be just as aroused, physiologically, as the sensitizers.

Weinberger et al. (1979) compared physiological measures with behavioral measures in persons with low anxious, high anxious, and repressive coping styles. The investigators were interested in the distinction between truly low anxious subjects (low trait anxiety on the Taylor Manifest Anxiety Scale and low defensiveness on the Marlowe-Crowne Scale) and repressors (reported low anxiety but high defensiveness). These groups were compared to a group with moderately high anxiety. During the psychologically stressful task of phrase association, repressors claimed to have less trait anxiety than the low anxious group. This report was uniformly contradicted by the three behavioral measures and three physiological measures. The repressors had high content avoidance scores and increasingly poor reaction times. Additionally, they showed increased heart rate, sweat gland activity, and forehead muscle tension. In another study focusing solely on the R-S dimension, Weinstein et al. (1968) also found discrepancies between the repressors' self-reports and physiological indices of stress. In a reanalysis of six experiments, repressors were shown to have relatively higher scores on physiological measures than on self-report measures while the reverse was true for sensitizers. Across the six studies, differences between repressors and sensitizers were stable. The investigators suggested that it is the self-report and not the physiological reaction which is related to personality. They further concluded that discrepancies between a physiological response to a stressor and the self-report should be used as sources of inference about underlying processes.

Subjects faced with the threat of shock could choose between distracting themselves (listening to Muzak) or monitoring cues predicting the shock (Miller, 1979). There were differences found between individuals

who chose to monitor and those who chose to distract. Situation-specific anxiety was significantly related to monitoring and there was a tendency, though not a significant one, for monitors to have higher extraversion scores. Monitors also showed greater electrodermal responses and subjective arousal than distractors.

Witkin (1978) has suggested that cognitive styles represent techniques for moving toward a goal; people have a tendency to adopt the cognitive style which is most adaptive to their life situations. The styles develop in accordance with the requirements of the situations. The characteristics of the particular style tend to be stable but are not unchangeable. Witkin has postulated, through use of perceptual orientation, that individuals adopt either a field-independent or field-dependent cognitive style. Field-independent people tend to rely primarily on internal reference points in a self-consistent way. These individuals are better at restructuring (organizing an ambiguous field so that it can be interpreted) than field-dependent individuals. Field-dependent people need external referents in order to interpret a situation.

Stansell et al. (1975) investigated field-dependence and field-independence in psychiatric inpatients. Males and females were classified based on their performance on the rod-and-frame test as either extremely field-dependent or field-independent. The two groups' MMPI scores were then compared. It was found that field-independent subjects tend to be more unconventional, aggressive, antisocial, and, perhaps, defensive than field-dependent. However, more similarities than differences were found between the two groups. They suggested that the perception personality relationship may be more complex than expected:

> The meaning of field-dependency may vary from subject to subject representing a complex constellation of attributes that are each present to a greater or lesser degree across subjects but none of which are necessary or sufficient (Stansell et al., p. 543).

Another study has suggested that Witkin's theory may operate more accurately under conditions of stress (Sarris et al., 1976). A reliable influence of stress on field-dependency was found when subjects were exposed to repetitions of the rod-and-frame test. The stressor, in this instance, was a low flicker frequency light with two variations. Field-dependent subjects in the experimental condition were asked to make judgments with the flicker. Field-dependent control subjects were not exposed to the flicker. Results showed that perceptual errors increased during the experimental session but not in the control session. Error rate, in general, was greater in the experimental condition than in the control. This trend held up both intra- and inter-individually.

It can be assumed, based on the previously cited literature, that personality variables can exert their influence on an individual's response(s) to a stressful situation. An individual develops a pattern of responding to external demands after repeated encounters. Personality variables are instrumental in the evolution of this pattern, or style. In coping with stressors, it allows for the labeling of those stimuli by the individual in a manner which is consistent with his/her view of the world. Those events can be interpreted as either acceptable or aversive, and in that same respect, as painful or non-painful.

Pain is an especially important factor in encounters with physical stress. It has been argued that it is nearly impossible to separate the psychological aspects from physical stress because of the pain and/or emotional arousal caused by it (Mason, 1971). A person's subjective

appraisal of pain as a function of his/her coping style is of particular interest in the present study. It has been demonstrated that coping style and the personality variables inherent in that style will have an effect on an individual's interpretation of pain.

Personality Variables and Pain

Differences in tolerance for pain has been found to parallel differences in perception (Petrie et al., 1959). The researchers investigated some of the perceptual characteristics (in this case, perceptual satiation) of the subjects that are associated with the personality type that tolerates pain. Perceptual satiation is the tendency identified by Kohler and Wallach (1944) for the intensity of a perception to be reduced in some persons after they have been stimulated for some time. The results showed reducers had a greater tolerance for pain than non-reducers. They explained this phenomenon, in part, with the subjects' tendency to reduce the effectiveness of the stimulation. The investigators found these results apply not only in the laboratory (experimental pain induced by applying heat to the skin) but also in real-life situations (surgical pain).

McCaul (1980) found fear level to be associated with an individual's subjective response to pain. Those subjects evaluated as high fear individuals (based on scores from the Fear Survey Schedule, Geer, 1965) experienced greater levels of distress from the cold pressor than low fear subjects.

Locus of control has also been found to be related to subjective ratings of stressor aversiveness (Harrell, 1980). Internals were found to rate stressful tones less aversively than externals after relaxation

training even though their physiological response (heart rate) remained virtually the same as that before relaxation training.

Personality variables, then, can have an increasing or decreasing effect on an individual's tolerance for or appraisal of pain. Not only can there be changes in a person's subjective appraisal of the distress associated with a stressor but there can also be measurable physiological changes. As a person attempts to adjust cognitively to a stressor, his/her body is also responding in an effort to adapt to the environment. The human organism reacts to external influences in some compensatory way; it is a complex self-regulating system that responds interactively to both the physical and psychological aspects of its environment (Teichner, 1968).

Physiological Adaptation to Stress

Physical stressors involve the anticipation of, or confrontation with, a situation that is characterized by physical harm, danger, pain, or discomfort (Lamb, 1979). In reacting to a stressor, there may be a change in an individual's heart rate, skin conductance, blood pressure, etc., singly or together. In the instance of a single response to a stressor, there is the possibility of response stereotypy. Sternbach (1968), in a discussion of response stereotypy, noted that one person may always respond maximally to external stimuli with heart rate changes, another with blood pressure changes, and still another with changes in skin conductance. In a study of heart rate reactive and non-reactive individuals under psychological stress, Lawler (1980) found significant differences in physiological responses and some support for response stereotypy. Based on the change in heart rate from baseline to the first minute of mental arithmetic, results indicated that heart rate reactive subjects

had higher systolic blood pressure and heart rate than non-reactives. Conversely, skin conductance responses were greater for heart rate non-reactives than reactives.

Additional studies have shown significant differences in one physiological response while the other measures remain relatively unchanged under conditions of stress (Cornelius & Averill, 1980; Weinberger et al., 1979; Weinstein et al., 1968; Goldstein et al., 1965). To be certain there has been a physiological response to a stressor, investigators have chosen multiple measure to avoid mistaking response stereotypic patterns for little or no physiological response. Typically, heart rate and skin conductance have been chosen as measures (Cornelius & Averill, 1980; Monat, 1976; Epstein & Roupenian, 1970; Weinstein et al., 1968; Goldstein et al., 1965).

Engel (1959) found physiological correlates for pain produced by the cold pressor. He had subjects immerse a foot in a container of iced water (maintained between 3°-4°C). Immersion times varied, either zero (control), two, three, or four minutes. Engel found no evidence for graded pain but concluded there was little doubt that the exposure to the iced water does produce the sensation of pain. All subjects agreed that the immersion periods were painful. The main effects of the cold pressor were cardiovascular changes. Both systolic and diastolic pressures increased about equally, leaving pulse pressure unaffected. There were increases in heart rate. Engel did find that different durations of cold pressor stimulation resulted in different patterns of autonomic activity even though subjects did not distinguish clear differences in pain among the three immersion periods. Engel suggested that some adaptation to the stimulation could be occurring.

Building on the theory that personality variables influence, at least in part, the experience of a stressful event, investigators have attempted to manipulate an individual's stress response with preparatory information. By providing subjects with a cognitive or emotional "set" in anticipation of a stressor, researchers have found that reactions can be affected.

Preparatory Information Effects on Response to Shock

Shock has often been used as a means of physically stressing an individual. It not only involves an immediate physiological reaction to the electrical current but the anticipation of shock can be manipulated in a variety of ways. Since it is a threatening experience, as well as a painful one, the psychological implications are many.

Cornelius and Averill (1980), in attempting to describe a model of mechanisms which underlie stress reactions, suggested that the type of personal control an individual perceives him/herself as having over a stressor will affect his/her response to that stressor. They proposed three types of control, one of which was described as cognitive control and referred to the way an event is interpreted, appraised, or incorporated into a cognitive "set." Cognitive control was manipulated by giving half the subjects written information about the shock they were to receive, the effect it might have on them, and the kinds of bodily feelings they might experience while waiting for the shock; the rest of the subjects were simply told they would experience a moderately painful shock and were given a history of signal detection. Additionally, behavioral control (the opportunity to respond in a manner which would have an

effect on the shock, e.g., its intensity or time of onset) and volitional control (the option to choose the course of action one wants to take, or to be in agreement with the course of action that must be taken anyway) were varied across subjects.

The results once more suggested an interactive model of stress reactions. Subjects provided with either behavioral or cognitive control alone had an increased skin conductance response to the shock. Subjects provided with both behavioral and cognitive control showed a decreased skin conductance response. Those provided with both also thought more about the shock and had higher heart rates in anticipation of the shock than subjects provided with either alone.

Coping processes have been found to mediate stress reactions under conditions of threat (Monat, 1976). Subjects were provided with vigilant, avoidant, or no means of coping in preparation for a temporally uncertain shock. In the vigilant condition, individuals were told to think about the upcoming shock as much as possible, how harmful it might be, what it would feel like, etc. Subjects given the avoidant orientation were asked to think about anything unrelated to the shock. Those without an orientation were asked to sit and wait for the shock. Heart rate, galvanic skin response, and skin conductance were the physiological responses measured.

Results suggested that temporal uncertainty and anticipation time interacted to affect stress reactivity. Subjects who knew when the shock would occur showed increasing stress levels and reported spending more time thinking about the shock as the time approached. However, subjects who did not know when shock would occur showed decreasing stress levels across anticipatory segments of trials and reported spending less time thinking about the shock. Monat concluded that although temporal

uncertainty may seem threatening, it encourages a pattern of cognitive coping which was associated with lowered stress reactions.

Some coping strategies are more effective than others in reducing stress levels. Bloom et al. (1977) factorially crossed threat and non-threat conditions with coping conditions. After receiving an initial shock, subjects in the threat condition were told they would receive additional shocks while those in the non-threat condition were told they would not. Subjects were then assigned to one of three coping conditions. The attentional diversion condition required the subject to read a children's story and evaluate it for entertainment value to first graders. In situation redefinition, subjects were asked to write down reasons why he/she should not be nervous or upset about receiving shocks. (Subjects in the non-threat condition were asked to write down reasons as if the shocks were expected.) A subject assigned to a control condition was asked to sit quietly. Physiological responses of pulse rate, finger pulse volume, and skin resistance were measured. Attentional diversion time was an effective strategy for reducing physiological stress to impending shock. It was more effective than sitting quietly or redefining the situation. Subjects who used attentional diversion showed less physiological stress than those who used situation redefinition or sat quietly.

Preparatory Information Effects on Response to Cold Pressor

In the present study, the stressor with which the individual was confronted was the cold pressor. The subject is seated and instructed to immerse a part of his/her body (typically, the hand) in a basin of non-circulating iced water (1° C, 33° F). Lovallo (1975) found the initial

cold pressor response to be "cutaneous vasoconstriction, increased heart rate, and increased arterial pressure." Subjects have shown changes in blood volume, pulse rate, and skin conductance in response to cold pressor stress, as well (Lovallo & Zeiner, 1974). Finally, the cold pressor has been shown to be a good choice for stressing an individual because it provides a variety of sensations, has a fairly slow onset of pain which allows time for the impact of cognitive processes, and it can be affected by psychological manipulations (Leventhal et al., 1979).

Hackett and Horan (1980) looked at different coping skills in dealing with pain produced by the cold pressor. The investigators trained subjects in various coping strategies based on Melzack's (1973) gate control theory of pain, either sensory discriminative (SD), motivational affective (MA), or cognitive evaluative (CE).

The SD dimension implies that muscle tension increases pain; in this condition, subjects were trained in relaxation techniques. The MA dimension suggests that negative or positive feelings will either increase or decrease pain, respectively. In this instance, subjects were trained in simple distraction methods. The CE component involves expectancies about the pain; these subjects were given self-instructional training in coping with pain. It was found that the relaxation training (SD) produced increased pain tolerance and the distraction procedure (MA) resulted in higher pain thresholds. The coping statements (CE) were largely ignored.

Jaremko (1978) also demonstrated the usefulness of various coping strategies in tolerating pain from a cold pressor. Subjects were exposed to the cold pressor on two occasions; a pretest was used to determine pain thresholds and a second session was used for the cognitive strategy manipulation. Each of three groups of subjects was given a coping

strategy for enduring the pain. In the reversal of affect condition, subjects were to imagine themselves in a desert and that the cold water was refreshing. Under the rationalization condition, subjects were told to think of the course credit they would receive for participating in the experiment. The irrelevant distraction condition involved subjects imagining a particular lecture by a professor.

Results showed that the reversal of affect strategy was most effective in dealing with pain. The rationalization group rated the water as more painful than the reversal of affect group but they tolerated the pain longer than the other groups. The control group which received no information about the second session with the cold pressor detected the pain earlier than the other groups. Jaremko suggested that a person without any cognitive strategy will detect pain sooner in the second experience with the stimulus.

In a series of three experiments using the cold pressor, Leventhal et al. (1979) found that emotional distress can be greatly reduced by the individual monitoring the impact of the unpleasant stimulation. In the first experiment, subjects were differentially informed about the cold pressor experience. Some were provided with sensory information emphasizing the tactile, thermal, and visual changes each would experience. Others were given arousal information which detailed emotional behaviors, the objective and subjective signs of arousal. Finally, the control group was given procedural information about the cold pressor. Additionally, pain warnings were varied with the conditions. The researchers monitored heart rate and skin temperature for each subject. Subjective distress (based on "the amount of upset of distress the sensations cause") was rated by each subject ten times during the immersion period. Results

showed the sensation-informed group reported less distress and somewhat weaker sensations than the arousal-informed or control groups. The sensory information distress reducing effect was greatest in the absence of a pain warning.

In experiment 2, subjects were told to either attend to sensations in their hands or in their bodies; less distress was reported by subjects attending only to hand sensations.

In the third experiment, subjects attended to hand sensations or distracted themselves (viewing landscape and art slides). Subjects would either attend to hand sensations throughout, attend for the first half and distract the second half, distract the first half and attend the second half, or would distract throughout. Subjects who attended to hand sensations throughout or attended early and distracted later both showed low levels of distress. All other subjects showed no distress reduction.

The investigators concluded that coping is an important factor in distress reduction. They suggested that coping strategies could be substitutes for instrumental responding which (Leventhal et al., 1979, p. 711) "sustain attention to the objective features of repeated, noxious stimulus inputs, facilitate placing benign interpretations on these inputs, and permit habituation."

Building on the theory that sensory information is generally beneficial in reducing distress, McCaul (1980) set out to discover under what circumstances sensory information would be helpful. He suggested that it would depend on the individual's fear level as to how much the sensory information could assist in the reduction of distress. Subjects were divided into high fear and low fear groups. (Fear level was determined by scores on the Fear Survey Schedule, Geer, 1965.) A procedure similar to

that used by Leventhal et al. (1979) provided high and low fear subjects with either sensory information about sensations produced by the cold pressor or with a control statement concerning the cold pressor procedure.

Dependent measures were reports of distress and general anxiety and skin conductance. Distress judgments showed that sensory information was effective in reducing distress in low fear subjects but increased distress in high fear subjects. It was also found that the pattern of skin conductance for the low fear subjects closely resembled the self-reported distress pattern. McCaul concluded that it cannot be assumed that preparatory information will have uniform effects for all subject populations and that interaction of personality with the situational determinants of coping must be examined.

When information is provided about an impending event, the information is most helpful when its form and content is congruent with the person's coping style (Goldstein, 1973). Three coping-style groups (copers, avoiders, and non-specific defenders [NDS]) were compared on their psychophysiological and behavioral responses to laboratory-induced and real-life stress. (Groupings were determined by perceptual defense characteristics and sentence completion methods.) Goldstein found that persons classified on the basis of coping style measure vary markedly in their reactions to a stressful film. Sharpest differences, however, were found between individuals with a consistent coping style (copers and avoiders) and those who appear variable (NSD).

In field studies under the real-life stress of surgery, Goldstein found that patterns of arousal and adaptation to real-life stress in persons classified by coping style were similar to those produced in the laboratory. It was also discovered that specific information about the

impending stress was most helpful to copers and that general information was most useful to avoiders. This conclusion was based on speed of recovery from surgery. Goldstein's studies strongly suggest that individual differences in response to stress are predictable from measures of coping style.

CHAPTER III

METHODOLOGY

Subjects

An initial sample of 281 male and 308 female undergraduates (589, total) from introductory psychology classes at a large southwestern university were given the Oklahoma Personal Style Inventory (OPSI) two weeks before the experiment (Appendix B).

The OPSI is a 93-item inventory composed of declarative statements. It was designed to discriminate among people with different coping styles, namely, accommodation, assimilation, and conservatism. The OPSI has four scales, one for each of the styles and a lie/repression scale. Theoretically, a person who scores high on one of the coping style scales and low on the other three should demonstrate the characteristics of that high scale. Persons taking the OPSI decide how they feel about each item and respond using a 0-4 point scale. Responses vary from Disagree Strongly at "0" to Agree Strongly at "4".

From this sample, subjects were then chosen based on high scores on one of the OPSI's three coping styles (accommodation, assimilation, and conservatism) and low scores on the other two coping style scales. High and low scores were determined by median splits. In addition to meeting these criteria, subjects had to meet physical health standards to be among those selected for the study. A list of eleven physical conditions

was included on a cover sheet which accompanied the answer form (Appendix C). Subjects filled out the sheet as to their having any of the illnesses and the recency of their last physical examination. This screening device served as a means of excluding those people who might have an adverse reaction to the iced water bath.

Equal numbers of males and females scoring high on accommodation, assimilation, or conservatism were chosen for the final sample, a total of 108. They were re-contacted in a random order and asked to participate in the experiment. Equal numbers of male and female accommodators, assimilators, and conservators were randomly assigned to each information condition. Each subject was also assigned a number so that coping style would not be known during experimentation.

Apparatus

A non-circulating bath of iced water kept at a temperature of 1° C (32° F) was held in a plastic basin in the experimental room. Heart rate and skin resistance were monitored by a Grass polygraph in a room adjacent to the experimental room.

A chair was placed to one side of the water basin, so arranged that the subject's non-dominant hand could be placed in the bath. A table containing the electrodes from the polygraph and a timing signal button was placed next to the chair.

Two silver silver chloride electrodes, two finger-tip electrodes, and a ground electrode were used to facilitate monitoring of heart rate and skin resistance. Hewlett-Packard Redux Creme was used as the contact medium. Additionally, the experimental room was equipped with a tape recorder for presentation of instructions.

Procedure

Each subject who met the experimental criteria was contacted by telephone and informed of his/her selection for the study. Each was informed that the purpose of the study was to investigate psychological and physiological reactions to cold temperatures and that each would be asked to place his/her non-dominant hand in an iced water bath. Each subject was told that the experiment could involve the experience of pain but there was no danger of being harmed and that he/she could quit the experiment at any time without risk of losing the extra credit in his/her psychology course.

Subjects were given the opportunity to refuse to participate in the study. Of those who did not participate, 12 males and 8 females refused, while 1 male and 4 females failed to appear for the experiment (a total of 25). A further breakdown of those not participating showed an even distribution for type (nine conservators, eight assimilators, and eight accommodators). The majority of conservators who refused were male (seven). The majority of assimilators who refused were female (six). Accommodators were evenly split between the sexes.

If the subject agreed to participate, an experimental session was scheduled. Each subject signed an informed consent form before any involvement in the experiment. The form included the information received from the experimenter before agreeing to participate and outlined those eleven physical conditions which excluded those subjects from the study whose health would likely be harmed by extremely cold temperatures (Appendix D).

The experimental room was prepared before each subject's session. The temperature of the iced water was checked; the basin and electrodes were placed to the side of the chair appropriate for the non-dominant hand and the timing signal button for the dominant hand. The taped information was inserted into the tape recorder.

After the consent form was signed, the experimenter took the subject to the experimental room and instructed him/her to be seated. Each subject was then informed that one electrode would be affixed to the undersides of both of his/her forearms, that two finger-tip electrodes would be attached to the first and second fingers of his/her dominant hand, and that a ground electrode would be positioned on the inside of his/her ankle on the dominant side. Each was assured that the electrodes were used only as a means of monitoring his/her physiological response.

Before applying the electrodes, that area of the subject's skin was rubbed vigorously with alcohol-soaked cotton to remove surface oil and the uppermost layer of skin in order to improve contact between the electrode and the skin. Hewlett-Packard Redux Creme was applied in the same manner to further improve skin/electrode contact.

The silver silver chloride electrodes were filled with the Redux Creme and applied to the subject's forearms. Electrode collars were used to reduce slippage on the arm and the resulting movement artifacts. Following application of the electrodes to the forearms, the ground electrode was affixed to the subject's ankle. Lastly, the finger-tip electrodes were attached to the first two fingers of the subject's dominant hand.

The timing signal button was placed in the subject's dominant hand so that it could be easily pressed with the thumb. The subject was instructed in the use of the button, that it was to be pressed upon

immersion into and withdrawal from the iced water bath and when he/she first noticed what he/she would describe as "pain". When the button was pressed, a slash to mark the time was made on the polygraph readout.

The experimenter briefly described the sequence of the tape recording to the subject; he/she would hear some information, followed by three minutes of silence, followed by a signal to immerse his/her hand in the water, and finally, information similar to that heard before the silence would be repeated.

The subject was informed that after the experiment, he/she would be asked to rate the experience of the iced water using a subjective scale of discomfort.

Based on the subjective unit distress scale (SUDS) (Wolpe, 1973), subjects assigned experiences to each gradation of discomfort/pain on a numbered scale. The subject first anchored the scale at "1", the point of "just felt discomfort," and then at "9", the point of "the most extreme pain you can imagine" (Obrist, 1965). After experiences were matched to these two points, the subject then assigned experiences to a midpoint of "5" on the scale, then to points in between of "3" and "7".

The experimenter placed a towel in the subject's lap where he/she could rest his/her hand before immersion into the iced water and after removal from it. The subject was instructed to sit as quietly as possible at all times and that after he/she withdrew his/her hand from the water, the experimenter would return in approximately three minutes. The experimenter started the tape recording, left the room and entered the adjacent room which contained the Grass polygraph. The subject was monitored from that room by means of a one-way mirror.

A split-half timing device was used to record elapsed time between responses. Timing began with the submersion of the hand, stopped with the signal of pain, and stopped when the hand was removed from the iced water bath.

Each subject heard the following taped statement:

> When you are given the signal, place your hand in the iced water bath and report when you first experience what you would call 'pain' by pressing the button that the experimenter showed you in your other hand. Continue to leave your hand in the water as long as you possibly can. When you do take your hand out of the water, please sit quietly for a few more minutes until the experimenter returns to ask you some questions. Some people who have participated in this type of experiment have expressed concern about injury to their hand. We want to assure you that under these conditions even iced water cannot and will not cause any damage during the period of time you will be exposed to it. There is absolutely no danger of any damage to your hand.

The subject then heard the information appropriate to his/her condition.

Informational Conditions

The instructions for each condition were as follows:

Sensory Information. The cold temperature treatment that we mentioned will involve submerging your hand in an iced water bath. When you put your hand in the water, the first sensation will be one of extreme coldness. The feeling of coldness will last for a short period of time (20-30 seconds) and then you will begin to feel a number of different sensations. Along with this, you will begin to get a feeling of strong pressure on your hand. You may notice that the feeling of discomfort is not spread evenly around your hand but rather is concentrated in certain areas. Your whole hand may throb after some additional time, and the joints of your fingers will begin to feel somewhat stiff. After a while, the strong sensations will begin to fade. At this time, you will feel a pinpricking

sensation or a feeling that your skin is being pulled tightly across the back of your hand. This sensation will fade in your fingers. This sensation will fade until you can only feel numbness. The prickly feeling will remain only in a ring at the point where your hand enters the water.

Reversal of Affect Information. Imagine that you are in the desert. It is midday and the sun is directly overhead so that your figure throws no shadow. The air is still and dry. There is no breeze and the thickness of the air weighs you down. There are no sounds. The sand is burning your feet through the soles of your shoes. The sun is beating down on you. There is no shade in sight. You are feeling uncomfortably hot and tired. Concentrate on the cooling aspects of the water. Interpret this as pleasant and refreshing as it would be in the desert.

Attentional Diversion Information. To occupy your time during the experimental period, we would like you to read the story near you. After you are given the signal to place your hand in the water, you will begin to hear a tape recording of that same story. You may also choose to read the copy of the story along with the tape. In any case, we would like you to become as involved in the story as possible. Later, we will ask you to evaluate how entertaining this story would be for first grade children. (The story was an excerpt from "The Velveteen Rabbit" by Margery Williams, 1971, Appendix E).

There will now be approximately three minutes of silence where we would like you to sit quietly and relax. At the end of the three minutes, you will be given the signal to place your hand in the iced water. Following that, the information given to you earlier will be repeated for your convenience.

Dependent Variables

Pain threshold was measured as the time to the nearest .01 second from immersion in the iced water to the point at which the subject signaled pain. Time was measured by the split-half timer.

Pain tolerance was measured as the total immersion time to the nearest .01 second from immersion to removal. Time was measured by the split-half timer.

Both pain threshold and tolerance were marked on the polygraph readout when the subject pressed the signal timing button.

The 1-9 SUDS rating taken after removal from the cold pressor constituted the subjective pain rating. Subjects were asked to rate the threshold (pain) point and the tolerance point using the SUDS scale.

Physiological measures, heart rate and skin resistance, were measured by the Grass polygraph. Readings were taken ten seconds before and after each time mark on the polygraph readout, immersion, "pain" (threshold), withdrawal (tolerance).

CHAPTER IV

RESULTS

A 2(Sex)*3(Accommodation, Assimilation, Conservatism Type)*3(Attentional Diversion, Reversal of Affect, Sensory Information) analysis of variance using repeated measures on all dependent variables was performed. In the overall analysis, several significant effects seemed to be apparent. Upon further examination using simple effects tests and pairwise comparisons with Dunn's multiple comparison procedure, these initial results were qualified.

Physiological Measures (Heart Rate and Skin Conductance)

The number of subjects varies across trials for the analysis of both the skin conductance and the heart rate measures. Scores for several subjects were not included due to either movement artifacts in the heart rate response or extreme skin conductance reactions. There were 18 individuals excluded from the skin conductance analysis. Of those 11 were female (1 accommodator, 4 assimilators, 6 conservators) and 7 were male (4 accomodators, 1 assimilator, 2 conservators). Seven subjects were not included in the heart rate analysis, four females (1 accommodator, 1 assimilator, 2 conservators) and three males (1 accommodator, 2 assimilators).

Physiological arousal was operationally defined as the increase in heart rate and/or the decrease in skin conductance. Baseline (pre-immersion)

heart rate was subtracted from each subsequent measure and the difference scores were analyzed. An Information*Trial interaction, F (6, 157) = 2.14, $p < .05$, was found (Table VI, Appendix A). As shown in Table I, a pairwise comparison showed that at post threshold the difference was between those subjects who received attentional diversion information and those who received sensory information. Those subjects who listened to attentional diversion information at post threshold were significantly more aroused than those who heard sensory information.

TABLE I

MEAN HEART RATE DIFFERENCES AT POST THRESHOLD FOR INFORMATION (IN BEATS PER MINUTE)

Information	N	Mean
Attentional Diversion	22	4.45
Reversal of Affect	24	2.67
Sensory	24	-2.75

Skin resistance was converted to conductance before any analysis was performed. Baseline (pre-immersion) skin conductance was substracted from each subsequent measure and difference scores were analyzed. A main effect for Type was found, F (2, 43) = 3.23, $p < .05$ (Table VII, Appendix A) as well as a Type*Sex interaction, F (2, 43) = 3.23, $p < .05$. A pairwise comparison showed significant differences at tolerance between accommodators and assimilators, and accommodators and conservators, $t'D$ (3, 165) = 2.39, $p < .05$. As shown in Table II, accommodators were significantly

less aroused than assimilators or conservators at tolerance where the subjects removed their hands from the cold pressor.

TABLE II

MEAN SKIN CONDUCTANCE DIFFERENCES AT TOLERANCE FOR TYPE (IN MICROMHOS)

Type	N	Mean
Accommodative	20	26.64
Assimilative	19	-13.33
Conservative	19	-6.42

Subjective Ratings

An Information*Type*Sex*Trial interaction, F (4, 58) = 2.53, $p < .05$, was revealed in the overall analysis (Table VIII, Appendix A). A simple effects test of Information*Type at each level of Sex and Trial produced no significant differences (Tables XIV, XV, Appendix A).

Hypothesis 4b, that assimilators receiving reversal of affect information would report less arousal than other assimilators, was not supported. However, in performing the pairwise comparisons, a significant difference was found between those assimilators receiving attentional diversion information and those receiving sensory information. As shown in Table III, the assimilators who listened to attentional diversion information rated the pain lower at tolerance than assimilators who heard sensory information, $t'D$ (4, 120) = 2.54, $p < .05$.

TABLE III

MEAN SUBJECTIVE TOLERANCE RATINGS
FOR ASSIMILATORS

Information	N	Mean
Attentional Diversion	6	2.50
Reversal of Affect	9	3.83
Sensory	9	5.20

TABLE IV

MEAN PAIN TOLERANCE FOR SEX
(IN MINUTES AND SECONDS)

Sex	N	Mean
Female	40	3.54.48
Male	42	7.06.23

Pain Threshold and Tolerance

A main effect for Sex was found, F (1, 64) = 4.00, $p < .05$ (Table IX, Appendix A). As shown in Table IV and by pairwise comparison, there was a significant difference between males and females in the total amount of time (pain tolerance) they left their hands in the iced water bath, $t'D$ (2, 124) = 2.27, $p < .05$. This does not support Hypothesis 8, that females would have higher pain thresholds and tolerances than males.

Additionally, a Sex*Trial interaction, F (1, 60) = 4.00, $p < .05$, and a Type*Sex*Trial interaction, F (2, 60) = 3.15, $p < .05$, were found. The Type*Sex*Trial interaction was further examined using a simple effects test for Type*Sex at each level of Trial which showed no significant differences at pain threshold. At pain tolerance, there was a main effect for Sex, F (1, 124) = 3.92, $p < .05$ (Table X, Appendix A). This, again, showed that males were significantly different than females.

A simple effects test for Type at each level of Sex and Trial was performed as well. This test also failed to produce any significant results (Table XI, Appendix A).

The series of hypotheses which were stated previously received some support from the analyses which were carried out. Those which have not already been mentioned will be noted below.

Hypothesis 1, that conservators would be aroused by the cold pressor and would deny that arousal, was partially supported by a significant negative correlation between skin conductance for tolerance and the subjective rating at tolerance ($r = -.52$, $n = 18$, $p < .05$). As arousal increased, conservators' ratings decreased. There was no significant correlation at threshold.

Hypothesis 4a, that assimilators receiving reversal of affect information would be less aroused than assimilators receiving other types of information, was partially supported. A pairwise comparison showed a significant difference for heart rate for assimilators receiving reversal of affect information and assimilators receiving sensory information, t'_D (4, 213) = 2.50, $p < .05$. As shown in Table V, assimilators who listened to reversal of affect information were less aroused than those who heard sensory information. There was no significant difference between attentional diversion information and either of the other types of information.

TABLE V

MEAN HEART RATE DIFFERENCES FOR ASSIMILATORS (IN BEATS PER MINUTE)

Information	N	Mean
Attentional Diversion	4	7.75
Reversal of Affect	8	0.25
Sensory	8	11.20

CHAPTER V

DISCUSSION

The present study was an attempt to explore further an individual's coping style with regard to a new theory of coping, and to assess the part that cognitive strategies play within those coping styles.

A priori hypotheses were, in general, not supported. The results will be interpreted in light of a new theory and, in this respect, a few trends can be suggested.

Some differences were found between types which lends support to the general systems theory of the Oklahoma Personal Style Inventory (OPSI). An individual with an accommodative style molds him/herself to the external demands made upon him/her by the environment. Accommodators' boundaries are "porous"; they allow the world to essentially act directly on them. They are likely to attend to various social cues around them without noticing the impact that a stimulus may be having on them. Accommodators essentially allow the world to flow through their boundaries without concern for its effects. In the present study, accommodators were less aroused at pain tolerance than either assimilators or conservators as indicated by skin conductance. The cold pressor is stressful and causes physiological arousal; however, accommodators in the present study were apparently attending to cues in his/her immediate environment other than those from the cold pressor.

Conservators have rigid boundaries between themselves and the environment and attempt to avoid the world's influences. They control threat by psychological denial and behavioral withdrawal. The present results showed that those conservator subjects' subjective ratings of discomfort were lower despite physiological arousal, suggesting that the conservators were denying that arousal. By using denial, they could better handle the threat of the cold pressor stress by avoiding its influence.

Persons with an assimilative coping style tend to evaluate a stimulus, then change it to fit their needs. Being provided with information which would allow them to control the experience of the cold pressor should fit the assimilators' needs at the time. Assimilators were the only group to use any cognitive strategy effectively to reduce the arousal and the discomfort from the cold pressor. With attentional diversion information, their tolerance ratings were lower than with sensory information. When assimilators received reversal of affect information, they were less aroused just after immersion than those who received sensory information. Both attentional diversion and reversal of affect required the subjects to actively divert their attention from the iced water bath, thereby giving them control over the situation. Sensory information provided no such control and was not effective for assimilators.

However, sensory information, in general, seemed to be the most helpful of the three information conditions in reducing arousal. Those subjects who received sensory information, regardless of type, were less aroused than those who listened to attentional diversion and those who heard reversal of affect information at the point just after threshold. In other words, once subjects signaled "pain," those who were listening to the sensory information were less aroused by the cold pressor stress.

Sensory information focused the attention of the subjects on the sensations expreienced in the iced water. It is likely that the subjects were expecting the intense feelings described in the sensory information which would be occurring around the time of "just noticeable pain." It is suggested that this match of description with experience affected the subjects in such a way as to reduce physiological arousal.

Additionally, Leventhal et al. (1979) found that subjects receiving sensory information reported less distress and somewhat weaker sensations than subjects supplied with arousal information or no information in coping with cold pressor stress.

There was also a difference detected between males and females. In general, males withstood the cold pressor longer than females. Trends, though not significant, indicated the physical stress of the iced water better differentiated among males. Females, regardless of information or type, seemed to react in the same manner. The female subjects tended to, after recognizing the pain, remove their hands from the iced water bath. Male subjects recognized the pain at essentially the same time as the females yet left their hands in the water significantly longer. This lack of difference among females and difference between the two sexes may indicate that a physical stressor is not appropriate for females. This conclusion suggests that the cultural bias separating men and women is still present. It could be argued that because of this bias, the male subjects involved in the present study have had a lengthier history of managing physical stress than the female subjects and therefore were better able to withstand the iced water bath.

It has always been difficult to assess non-significant results. However, because of the exploratory nature of the study, an attempt at explanation of these results will be proffered.

In approaching a new theory, it is virtually impossible to be correct in the first conceptualization of each variable. If initial ideas were correct, there would be no need for experimentation. But investigation is needed to provide support for a theory or to lead the theorizing in a different direction. Although the general systems theory of coping and adaptation was given some support, it was mainly after the fact. Generally, the predicted hypotheses were not helpful in providing direction. There are several reasons for the problems encountered in the predictions.

The OPSI used for differentiating among people for coping style was not the final form of the instrument. The inventory used in the present study was a 93-item instrument whereas the final form contains considerably fewer items, 46 in all. However, correlations between the two forms for the three scales were quite high (assimilation, $r = .87$; accommodation, $r = .78$; and conservatism, $r = .90$, $p < .01$). It is likely that problems of equivalency of form are not a great source of error.

A more likely source lies in the number of subjects finally recruited for the experiment. Out of the 589 males and females who responded to the OPSI, only 153 met the experimental criteria. To be selected, an individual had to score above the median on one scale and below the median on the other two scales. It is possible that many of those subjects were not "true" examples of each of the coping styles. Conservators would not behave as "true" conservators because they also had characteristics of assimilation and accommodation, for example. Additionally, median splits are not likely to be sensitive to small differences between coping styles

but were used because they yielded the largest number of subjects for the final sample.

Statistically, the present study was initially designed with a 90 percent chance of detecting one standard deviation difference between any two cells for the test of the interaction of information with coping style. To achieve that power, a cell size of eight was needed, a total of 144 subjects. Since only 153 met the criteria for the study and the breakdown of subjects across type was unequal, the sample size was forced down to 108 (a cell size of six). This reduced the likelihood that significant differences would be found. It is not surprising then that most results were not significant.

The theory is an appealing one. Stress researchers are becoming more supportive of an interactive, process approach to the study of coping (Lazarus & Launier, 1978; Mason, 1971; Teichner, 1968; Lazarus, 1966). Further, Lazarus and Launier (1978) have posited the analogy of coping efforts directed toward the environment, the self, or both, and the Piagetian concepts of assimilation and accommodation. It seems likely that the theory is potentially useful, especially in the advent of the changing orientation of stress research. Additional validation for the theory and the final form of the OPSI are needed.

To investigate the role of cognitive strategies, differing types of information were provided to the subjects. Again, this manipulation produced few significant results.

Preparatory information for dealing with a physical stressor has been shown to be effective (Hackett & Horan, 1980; McCaul, 1980; Leventhal et al., 1979; Jaremko, 1978). However, none of these studies combines the informational conditions in the same manner as the present study.

Predicted outcomes were, for the most part, based on these previous experiments. The results which were attained suggest that there is a difference between sensory information and both attentional diversion and reversal of affect information but none between attentional diversion and reversal of affect.

Although each seems to offer differing cognitive strategies for approaching the stressful situation, the distinction is a fine one. Each involved diverting attention from the stressor to something else. In the case of attentional diversion, it is more obvious; subjects listened to a story and attempted to evaluate it. With reversal of affect, subjects also diverted their attention; they attended to the cooling aspects of the iced water rather than the painful ones. Both of these techniques are quite different from that of sensory information where the subject focused on the stimulation. Consequently, the effects of diverting attention could have been masked to a certain extent by the combination of the two similar information types.

The informational conditions were matched to each coping style in order to assess the benefits of information consistent with a person's coping style in reducing stress. The matching was exploratory in that there has been no evidence for the type of information which should be best for the particular coping styles of the OPSI. There is support for information congruent with a person's coping style to be helpful in his/her coping with stress (Goldstein, 1973). McCaul (1980) found that different types of people responded differently to information in withstanding the cold pressor as a function of the type of person they were.

It is likely that since the informational manipulation was faulty, the matching of information to coping style was, as well. Because little

is known about the process of coping for each style across situations, a more powerful technique may have been to hold information constant for each coping style and then assess differences.

The majority of the differences which were produced appeared in the physiological measures. Indeed, the rationale behind their use was to detect changes in arousal that the subjects would not or could not report (i.e., conservators' denial of arousal). An individual's overt behavior, however it may be assessed, by self-reports, behavioral observations, subjective ratings, are likely to be distorted. It is generally assumed that physiological responses are less influenced by factors present in the experimental situation (Averill & Opton, 1968). This is not to say that there are not problems in the interpretation of physiological data.

Physiological data are objective and must be reported in that manner. No psychological labels accompany physiological responses. It is not known if distress was reduced; it is known that heart rate decreased and that lowered heart rate indicates lowered arousal. The present study has been limited to the discussion of increases and decreases in arousal. Further inference is not possible and is one of the disadvantages of using physiological data.

Response stereotypy, the tendency of individuals to respond in a specific physiological way to a specific physiological stress, is often a source of error. In the present study, both heart rate and skin conductance were monitored to avoid some of the potential response specificity. For example, some individuals could have been specifically visceral reactive and would not have been as responsive on heart rate or skin conductance measures.

The results yielded few differences in the subjective ratings. Individuals were allowed to construct their own scales and, using those scales as reference points, rated the discomfort of the cold pressor at threshold and tolerance. The discomfort of the iced water bath based on those ratings seemed to be very consistent. The rationale for the subjective ratings was to allow each subject his/her own frame of reference rather than imposing an outside reference point on him/her. Theoretically, if each person could choose his/her own experience for "1", etc., across subjects the pain ratings could be considered equivalent. Perhaps, in the present study, the ratings were too equivalent to show differences. The subjects' perceptions of the discomfort of the cold pressor fell at essentially the same place on each scale.

Although some support was given to the Oklahoma Personal Style Inventory and the general systems theory of coping and adaptation, the overall results were inconsistent and inconclusive. Had the design been simpler, there could perhaps have been firmer conclusions drawn. To understand coping, the common demands and processes must be extracted and the unique details of the situation ignored (Lazarus & Launier, 1978). Because this is a process theory, the coping styles must be observed over time and across situations in order to extract and evaluate those common elements of the coping styles. The implications of the present study point toward future research considerations with the final form of the OPSI.

A SELECTED BIBLIOGRAPHY

Anderson, C. R. Locus of control, coping behaviors, and performance in a stress setting: A longitudinal study. Journal of Applied Psychology, 1977, 62, 446-451.

Archer, R. P. Relationship between locus of control and anxiety. Journal of Personality Assessment, 1979, 43, 617-625.

Averill, J. R. & Opton, E. M. Psychological assessment: Rationale and problems. In P. McReynolds (Ed.), Advances in psychological assessment (Vol. 1). Palo Alto, Calif.: Science and Behavior Books, Inc., 1968.

Bernard, C. Lecons sur les phenomenes de la vie communs aux animaux et aux vegetaux. In F. Grande & M. B. Visscher (Eds. and trans.), Claude Bernard and experimental medicine. Cambridge: Schenkman Publishing Company, Inc., 1967.

Bloom, L. J., Houston, B. K., Holmes, D. S., & Burish, T. G. The effectiveness of attentional diversion and situation redefinition for reducing stress due to a nonambiguous threat. Journal of Research in Personality, 1977, 11, 83-94.

Byrne, D. Repression-sensitization as a dimension of personality. In B. A. Maher (Ed.), Progress in experimental personality research (Vol. 1). New York: Academic Press, 1964.

Cannon, W. B. The wisdom of the body. New York: W. W. Norton & Company, Inc., 1932.

Cervantes, R. Coping and adaptation: A general system approach. (Master's thesis, Oklahoma State University, 1982.)

Cornelius, R. R., & Averill, J. R. The influence of various types of control on psychophysiological stress reactions. Journal of Research in Personality, 1980, 14, 503-518.

Darwin, C. The origin of species. New York: Heritage Press, 1963.

Edelberg, R. Electrical properties of the skin. In C. Brown (Ed.), Methods in psychophysiology. Baltimore: The Williams and Wilkins Company, 1967.

Engel, B. T. Some physiological correlates of hunger and pain. Journal of Experimental Psychology, 1959, 57, 389-396.

Epstein, S. & Roupenian, A. Heart rate and skin conductance during experimentally induced anxiety. Journal of Personality and Social Psychology, 1970, 16, 20-28.

Fromme, D. A general systems theory. (Unpublished manuscript.)

Geer, J. H. The development of a scale to measure fear. Behavior Research and Therapy, 1965, 3, 45-53. (Journal of Personality, 1980, 48, No. 4.)

Goldstein, M. J. Individual differences in response to stress. American Journal of Community Psychology, 1973, 1, 133-137.

Goldstein, M. J., Jones, R. B., Clemens, T. L., Flagg, G. W., & Alexander, F. G. Coping style as a factor in psychophysiological response to a tension-arousing film. Journal of Personality and Social Psychology, 1965, 1, 290-302.

Hackett, G. & Horan, J. J. Stress inoculation for pain: What's really going on? Journal of Counseling Psychology, 1980, 27, 107-116.

Hamilton, V. & Warburton, D. M. (Eds.) Human stress and cognition: An information processing approach. Great Britain: Pitman Press, 1979.

Harrell, J. P. Relationship among locus of control, heart rate, and ratings of stress. Psychological Reports, 1980, 46, 472-474.

Jaremko, M. E. Cognitive strategies in the control of pain tolerance. Journal of Behavioral Therapy and Experimental Psychiatry, 1978, 9, 239-244.

Kohler, W. & Wallach, H. Figural after-effects. Proceedings of the American Philosophical Society, 1949, 88, 269-357. (American Journal of Psychology, 1960, 73.)

Lamb, D. H. On the distinction between physical and psychological stressors. Motivation and Emotion, 1979, 3, 51-61.

Lawler, K. A. Cardiovascular and electrodermal response patterns in heart rate reactive individuals during psychological stress. Psychophysiology, 1980, 18, 91-100.

Lazarus, R. S. Psychological stress and the coping process. New York: McGraw-Hill Book Co., 1966.

Lazarus, R. S. & Launier, R. Stress-related transactions between person and environment. In L. A. Pervin & M. Lewis (Eds.), Perspectives in interactional psychology. New York and London: Plenum Press, 1978.

Lefcourt, H. M. Recent developments in the study of locus of control. In B. A. Maher (Ed.), Progress in experimental personality research. (Vol. 6.) New York: Academic Press, 1972.

Levenson, R. W. & Ditto, W. B. Individual differences in ability to control heart rate: Personality, strategy, physiological, and other variables. Psychophysiology, 1981, 18, 91-100.

Leventhal, H., Brown, D., Shacham, S., & Engquist, G. Effects of preparatory information about sensations, threat of in, and attention on cold pressor distress. Journal of Personality and Social Psychology, 1979, 37, 688-714.

Lovallo, W. The cold pressor test and autonomic function: A review and integration. Psychophysiology, 1975, 12, 268-281.

Lovallo, W. & Zeiner, A. R. Cutaneous vasomotor responses to cold pressor stimulation. Psychophysiology, 1974, 11, 458-471.

McCaul, K. D. Sensory information, fear level, and reactions to pain. Journal of Personality, 1980, 48, 494-504.

Mason, J. W. The re-evaluation of the concept of 'non-specificity' in stress theory. Journal of Psychiatric Research, 1971, 8, 323-333.

Mason, J. W. A historical view of the stress field, I. Journal of Human Stress, 1975, 1, 6-12.

Mason, J. W. A historical view of the stress field, II. Journal of Human Stress, 1975, 2, 22-35.

Miller, S. M. Coping with impending stress: Psychophysiological and cognitive correlates of choice. Psychophysiology, 1979, 16, 572-581.

Molinari, V. & Khanna, P. Locus of control and the denial of anxiety. Psychological Reports, 1980, 47, 131-140.

Monat, A. Temporal uncertainty, anticipation time, and cognitive coping under threat. Journal of Human Stress, 1976, 2, 32-43.

Obrist, P. A., Wood, D. M., & Perez-Reyes, M. Heart rate during conditioning in humans: Effects of UCS intensity, vagal blockade, and adrenergic block of vasomotor activity. Journal of Experimental Psychology, 1965, 70, 32-42.

Petrie, A., Collins, W., & Solomon, P. The tolerance for pain and for sensory deprivation. American Journal of Psychology, 1960, 73, 80-90.

Piaget, J. Biology and knowledge. Edinburgh: University of Edinburgh Press, 1971.

Rotter, J. B. Generalized expectancies of internal versus external control of reinforcement. Psychological Monographs, 1966, 80 (1, Whole No. 609).

Sarris, V., Heineken, E., & Peters, H. Effect of stress on field dependence. Perceptual and Motor Skills, 1976, 43, 121-122.

Schregardus, D. J. A study of defensive style and its interaction with perception and experience of stress (Doctoral dissertation, University of California, Davis, 1976). Dissertation Abstracts International, 1977, 38, 400B-401B.

Selye, H. The general adaptation syndrome and the diseases of adaptation. Journal of Clinical Endocrinology, 1946, 6, 117-191.

Stansell, V., Bentler, L. E., Neville, C. W., Jr., & Johnson, D. T. MMPI correlates of extreme field indpendence and field dependence in a psychiatric population. Perceptual and Motor Skills, 1975, 40, 539-544.

Sternbach, R. A. Pain: A psychophysiological analysis. New York: Academic Press, 1968.

Teichner, W. H. Interaction of behavioral and physiological stress reactions. Psychological Review, 1968, 75, 271-291.

Weinberger, D. A., Schwartz, G. E., & Davidson, R. J. Low-anxious, high-anxious, and repressive coping styles: Psychometric patterns and behavioral and physiological responses to stress. Journal of Abnormal Psychology, 1979, 88, 369-380.

Weinstein, J., Averill, J. R., Opton, E. M., & Lazarus, R. S. Defensive style and discrepancy between self-report and physiological indexes of stress. Journal of Personality and Social Psychology, 1968, 10, 406-413.

Wild, B. S. & Hanes, C. A dynamic conceptual framework of generalized adaptation to stressful stimuli. Psychological Reports, 1976, 38, 319-334.

Wolpe, J. The practice of behavior therapy. New York: Pergamon Press, 1973.

APPENDIX A

SUMMARY TABLES

TABLE VI

ANALYSIS OF VARIANCE FOR HEART RATE

Source	df	MS	F
Between Subjects			
Information	2	143.69	0.63
Type	2	522.93	2.29
Sex	1	122.78	0.54
Information*Type	4	510.21	2.23
Information*Sex	2	74.90	0.33
Type*Sex	2	266.72	1.17
Information*Type*Sex	4	209.16	0.91
Subno (Information*Type*Sex)	56	228.83	
Within Subjects			
Trial	3	640.43	10.85*
Information*Trial	6	150.79	2.55*
Type*Trial	6	47.93	0.81
Sex*Trial	3	79.16	1.34
Information*Type*Trial	12	68.02	1.15
Information*Sex*Trial	6	35.01	0.59
Type*Sex*Trial	6	38.66	0.65
Information*Type*Sex*Trial	12	100.60	1.70
Trial*Subno (Information*Sex*Type)	157	59.03	
Total	284		

F (3, 157) = 2.65.

F (6, 157) = 2.14

*p < .05.

TABLE VII

ANALYSIS OF VARIANCE FOR SKIN CONDUCTANCE

Source	df	MS	F
Between Subjects			
Information	2	11863.91	2.53
Type	2	19713.12	4.20*
Sex	1	1064.93	0.23
Information*Type	4	7082.18	1.51
Information*Sex	2	11786.26	2.51
Type*Sex	2	18471.41	3.93*
Information*Type*Sex	4	2222.71	0.41
Subno (Information*Type*Sex)	43	4696.24	
Within Subjects			
Trial	3	2319.92	2.80*
Information*Trial	6	1709.50	2.06
Type*Trial	6	1018.53	1.23
Sex*Trial	3	785.78	0.95
Information*Type*Trial	12	629.89	0.76
Information*Sex*Trial	6	648.20	0.78
Type*Sex*Trial	6	909.12	1.10
Information*Type*Sex*Trial	12	659.01	0.80
Trial Subno (Information*Type*Sex)	122	828.89	
Total	236		

F (2, 43) = 3.23.

F (3,122) = 2.68.

*p < .05.

TABLE VIII

ANALYSIS OF VARIANCE FOR SUBJECTIVE RATINGS

Source	df	MS	F
Between Subjects			
Information	2	7.78	1.49
Type	2	1.20	0.23
Sex	1	0.40	0.08
Information*Type	4	8.94	1.72
Information*Sex	2	3.35	0.64
Type*Sex	2	6.06	1.16
Information*Type*Sex	4	3.18	0.61
Subno (Information*Type*Sex)	58	5.21	
Within Subjects			
Trial	1	2.97	1.53
Information*Trial	2	0.58	0.30
Type*Trial	2	0.58	0.30
Sex*Trial	1	3.42	1.77
Information*Type*Trial	4	0.80	0.41
Information*Sex*Trial	2	0.45	0.23
Type*Sex*Trial	2	0.74	0.38
Information*Type*Sex*Trial	4	5.08	2.63*
Trial*Subno (Information*Type*Sex)	58	1.93	
Total	151		

F (4, 58) = 2.53.

*p < .05.

TABLE IX

ANALYSIS OF VARIANCE FOR PAIN THRESHOLD AND TOLERANCE

Source	df	MS	F
Between Subjects			
Information	2	71905.60	1.82
Type	2	15183.40	0.38
Sex	1	446372.50	11.30*
Information*Sex	2	43353.61	1.10
Information*Type	4	21160.85	0.54
Type*Sex	2	31604.22	0.80
Information*Type*Sex	4	25404.93	0.64
Subno (Information*Type*Sex)	64	39514.26	
Within Subjects			
Trial	1	1421326.86	84.50*
Information*Trial	2	1751.47	0.10
Type*Trial	2	16173.08	0.96
Sex*Trial	1	260083.61	15.46*
Information*Type*Trial	4	10588.65	0.63
Information*Sex*Trial	2	44688.24	2.66
Type*Sex*Trial	2	55742.99	3.31*
Information*Type*Sex*Trial	4	3410.62	0.20
Trial*Subno (Information*Type*Sex)	60	16821.18	
Total	159		

F (1, 60) = 4.00.

F (1, 64) = 4.00.

F (2, 60) = 3.15.

*p < .05.

TABLE X

SIMPLE EFFECTS TEST FOR TYPE*SEX AT TRIAL
FOR PAIN THRESHOLD AND TOLERANCE

Source	df	MS	F
Pain Threshold			
Type	2	27562.80	0.96
Sex	1	14945.20	0.52
Type*Sex	2	22344.36	0.78
Error	124	28533.74	
Pain Tolerance			
Type	2	19395.78	0.68
Sex	1	733595.26	25.71*
Type*Sex	2	38620.69	1.35
Error	124	28533.74	

F (1, 124) = 3.92

F (2, 124) = 3.07.

*p < .05.

TABLE XI

SIMPLE EFFECTS TEST FOR TYPE AT SEX AND TRIAL
FOR PAIN THRESHOLD AND TOLERANCE

Sex	Source	df	MS	F
Pain Threshold				
Females	Type	2	2245.92	0.08
	Error	124	28533.74	
Males	Type	2	39590.64	1.34
	Error	124	28533.74	
Pain Tolerance				
Females	Type	2	2885.31	0.10
	Error	124	28533.74	
Males	Type	2	69558.48	2.44
	Error	124	28533.74	

F (2, 124) = 3.07.

TABLE XII

MEAN PAIN THRESHOLD AND TOLERANCE FOR TYPE AT SEX AND TRIAL (IN MINUTES AND SECONDS)

Sex	Type	N	Mean
Pain Threshold			
Females	Accommodators	13	1.57.49
	Assimilators	11	2.15.20
	Conservators	15	1.48.75
Males	Accommodators	13	3.20.15
	Assimilators	15	1.40.55
	Conservators	12	1.52.13
Pain Tolerance			
Females	Accommodators	13	3.52.37
	Assimilators	11	3.35.46
	Conservators	15	4.05.61
Males	Accommodators	13	7.19.55
	Assimilators	15	7.48.96
	Conservators	12	5.29.43

TABLE XIII

MEAN PAIN THRESHOLD FOR SEX (IN MINUTES AND SECONDS)

Sex	N	Mean
Females	38	1.47.57
Males	40	2.04.39

TABLE XIV

MEAN SUBJECTIVE THRESHOLD RATINGS FOR INFORMATION AND TYPE COMBINATIONS

		Females		Males	
		N	Mean	N	Mean
Information					
Attentional Diversion		12	2.91	13	3.38
Reversal of Affect		13	3.46	14	2.92
Sensory		14	3.50	11	3.90
Type					
Accommodator		13	3.53	13	2.69
Assimilator		11	3.45	14	3.53
Conservator		15	3.00	11	3.95
Information	Type	N	Mean	N	Mean
Attentional Diversion	Accommodator	4	3.00	4	3.00
Attentional Diversion	Assimilator	2	1.00	5	3.20
Attentional Diversion	Conservator	6	3.50	4	4.00
Reversal of Affect	Accommodator	4	4.00	5	2.60
Reversal of Affect	Assimilator	4	4.25	5	2.70
Reversal of Affect	Conservator	5	2.40	4	3.62
Sensory	Accommodator	5	3.60	4	2.50
Sensory	Assimilator	5	3.80	4	5.00
Sensory	Conservator	4	3.00	3	4.33

TABLE XV

MEAN SUBJECTIVE TOLERANCE RATINGS FOR
INFORMATION AND TYPE COMBINATIONS

		Females		Males	
		N	Mean	N	Mean
Information					
Attentional Diversion		12	3.58	13	3.23
Reversal of Affect		13	3.76	14	2.96
Sensory		14	4.35	11	4.09
Type					
Accommodator		13	4.00	13	2.92
Assimilator		11	4.27	14	3.82
Conservator		15	3.60	11	3.36
Information	Type	N	Mean	N	Mean
Attentional Diversion	Accommodator	4	4.25	4	3.25
Attentional Diversion	Assimilator	2	2.00	5	3.00
Attentional Diversion	Conservator	6	3.66	4	3.50
Reversal of Affect	Accommodator	4	3.50	5	2.40
Reversal of Affect	Assimilator	4	3.50	5	4.10
Reversal of Affect	Conservator	5	4.20	4	2.25
Sensory	Accommodator	5	4.20	4	3.25
Sensory	Assimilator	5	5.80	4	4.50
Sensory	Conservator	4	2.75	3	4.66

APPENDIX B

OKLAHOMA PERSONAL STYLE INVENTORY

1. I am good at organizing things.
2. I am probably a little too manipulative with people.
3. It's important to make a good impression on others.
4. Schools should emphasize moral and religious training.
5. I am a conservative person.
6. I usually try to accomplish what I set out to do, even if it means coming into conflict with other people.
7. I like chances to be creative and inventive.
8. One might as well learn to accept the fact that there will always be conflict among people who want the same things.
9. One should look to the church or the great philosophers for the moral principles which can best guide one's life.
10. I can be hard when the situation requires it.
11. The highest expression of mankind's aspirations is to be found in art.
12. I enjoy the excitement of a crowd.
13. I seldom make demands on other people.
14. I enjoy being a leader.
15. My closest, most intimate friends are people from backgrounds similar to my own.
16. I am easy to get along with.
17. I am a strong person.
18. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things.
19. I am very selective in the things I do.
20. I am confident of my ability to deal with untrustworthy people.
21. I enjoy parties.
22. If I were to participate in a religious pageant, I would be most concerned with how well the audience enjoyed the performance.
23. I blush no more often than others.
24. I value spiritual growth most highly.
25. When I have difficulties, I tend to look to my family for help.
26. I will consider life a success if I have succeeded in my career.
27. My parents and family find more fault in me than they should.
28. I enjoy testing my abilities in competitive situations.
29. I enjoy doing things with other people.
30. In situations where I might be in conflict with other people, I try to find a compromise so everyone can satisfy at least part of their needs.
31. I do not tire quickly.

32. I enjoy opportunities to show my skills and abilities.
33. I am a careful person.
34. I feel comfortable around most people, even if they have backgrounds different from my own.
35. It's important to me to feel I have roots in the community where I live.
36. I usually handle uncomfortable situations by trying to change what is happening.
37. I have long range goals which I hope to achieve.
38. I tend to get quite involved in other people's problems.
39. It is easy for people to get to know me.
40. I work harder than most people.
41. Some of my family have quick tempers.
42. The more challenging the assignment, the more I like it.
43. Life is most satisfying for me when it consists of familiar activities with few surprises.
44. It makes me nervous when I have to wait.
45. I enjoy doing things on my own.
46. People seem to have confidence in my abilities.
47. Life gains it most important meaning through helping one's children grow and develop into worthwhile citizens.
48. I like to flirt.
49. Society is in trouble today because people do not feel they can influence what is happening in their lives.
50. When I'm not careful who I'm around, people are apt to take advantage of me.
51. If I were to participate in a religious pageant, I would be most concerned that all the rituals were observed correctly.
52. My hands and feet are usually warm enough.
53. I will consider my life a success if I have a network of friends who value and love me.
54. I enjoy new experiences.
55. I tend to enjoy those activities which allow me to be with other people.
56. I think I would have enjoyed the challenges of a frontier life.
57. People seek my advice when there are difficult decisions to be made.
58. Society is in trouble today because people do not respect the traditional values which have withstood the test of time.
59. I usually try to cope with day-to-day problems as they occur.

60. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.
61. I usually have lots of energy.
62. I tend to enjoy those activities which allow me to develop my skills.
63. Once in a while I feel hate toward members of my family whom I usually love.
64. When I do something wrong, I am ashamed because of the disgrace it brings upon my family.
65. I am rather traditional.
66. I value achievement most highly.
67. At times I feel like picking a fistfight with someone.
68. When I have difficulties, I try to resolve them without outside help.
69. I have reason for feeling jealous of one or more of my family members.
70. I like to spend most of my money on things I want, even if I have to borrow to meet unexpected expenses.
71. The highest expression of mankind's aspirations is to be found in religion.
72. I enjoy the excitement of a crowd.
73. I value being my own boss.
74. I am a carefree person.
75. I am often inclined to go out of my way to win a point with someone who has opposed me.
76. I try to avoid situations where I might be in conflict with other people, even if it means not doing something I want to do.
77. I tend to prefer novel, exciting activities in my daily life.
78. My mother or father often made me obey even when I thought it was unreasonable.
79. I can be depended upon to carry my share of the load.
80. It's important to me to feel that I can be at home whereever I might be.
81. I take pride in being highly productive.
82. I sometimes work with people I don't like when it's necessary to achieve my goals.
83. At times I feel like smashing things.
84. I enjoy doing things which are routine and familiar.
85. Life is most satisfying for me when it consists of a variety of different activities.
86. For me, the good life is one of stability and continuity.
87. My family does not like the work I have chosen (or the work I intend to choose for my life work).

88. I like setting goals which require my best effort to achieve.

89. In learning to cope with life, I have relied mostly on the experience of older adults such as my parents.

90. I expect a lot of myself.

91. I like to save as much money as I can for unexpected expenses.

92. I will consider life a success if I have children of whom I can be proud.

93. I am more self-reliant than most people.

APPENDIX C

COVER SHEET

Please provide us with the information listed below. It will assist us in expediting the final phases of this study. In all cases, strict confidentiality will be observed of all data collected under the guidelines established by the Department of Psychology, Oklahoma State University.

Your name and phone number are necessary only so that we may recontact you in the event that you are chosen to participate in the final stages of the study. Following that point, complete anonymity (no names will be used) will be preserved and data will be released only to qualified professionals for scientific or training purposes.

If you are not recontacted, all data concerning you will be destroyed.

NAME: _____

SEX: _____

AGE: _____

PHONE NUMBER: _____

RIGHT-HANDED? ___ LEFT-HANDED? ___

DO YOU HAVE NORMAL USE OF BOTH ARMS? _____

IF NOT, PLEASE EXPLAIN _____

DO YOU HAVE A HISTORY OF ANY OF THE FOLLOWING CONDITIONS?

__ High blood pressure

__ Diabetes

__ Asthma

__ Impaired circulation (i.e., Reynaud's disease)

__ Peripheral nerve damage (including numbness in any extremity)

__ Vascular disease (i.e., systemic lupus)

__ Heart disease

__ Arthritis

__ Allergies (severe)

__ Pheochromocytoma

__ Heavy metal poisoning (i.e., lead)

HOW RECENT WAS YOUR LAST PHYSICAL CHECK-UP? _____

MAJOR: _____

RACE: _____

APPENDIX D

CONSENT FORM

OKLAHOMA STATE UNIVERSITY
CLINICAL PSYCHOLOGY DEPARTMENT
STILLWATER, OKLAHOMA

DATE _____

NAME _____

I, hereby, voluntarily authorize CANDACE CONLEY, Oklahoma State
Name of Researcher
University, and such assistants that may be designated to perform the following study: "The Psychological and Physiological Effects of Cold Temperatures".

I understand that if I have a history of any of the following illnesses, I will not be allowed to participate in this study but I will receive the extra credit.

High blood pressure
Heart disease
Diabetes
Arthritis
Asthma
Allergies
Impaired circulation (i.e., Reynaud's disease)
Pheochromocytoma
Peripheral nerve damage (including numbness in any extremity)
Heavy metal poisoning (i.e., lead)
Vascular disease (i.e., systemic lupus)

I further understand that strict confidentiality will be observed of all data collected under the guidelines established by the Department of Psychology, Oklahoma State University. Complete anonymity (no names will be used) will be preserved and data will be released only to qualified professionals for scientific or training purposes.

I further understand and agree that the data and information related to and resulting from the study may be used for publication in scientific journals but that my name shall not be used in association with these publications without my specific written permission.

I, also, fully understand that I could experience pain during the course of the study but that there is no danger of my being harmed.

I understand that if, at any point, I wish to withdraw from the experiment, I may do so without risk of losing the extra credit.

By signing this consent form, I have not waived any of my legal rights or released this institution from liability for negligence. Should any problem arise during this study, I may take them to the Chairman, Research Committee: Dr. Donald Fromme, Fourth Floor, North Murray Hall, O.S.U., Phone: 624-6027.

I have read and understood this form.

SIGNATURE OF PARTICIPANT: _____

APPENDIX E

ATTENTIONAL DIVERSION STORY

There was once a velveteen rabbit, and in the beginning he was really splendid. He was fat and bunchy, as a rabbit should be; his coat was spotted brown and white, he had real thread whiskers, and his ears were lined with pink sateen. On Christmas morning, when he sat wedged in the top of the boy's stocking, with a sprig of holly between his paws, the effect was charming.

For at least two hours the boy loved him, and then aunts and uncles came to dinner, and there was a great rustling of tissue paper and unwrapping of parcels, and in the excitement of looking at all the new presents the velveteen rabbit was forgotten. For a long time he lived in the toy cupboard or on the nursery floor, and no one thought very much about him. He was naturally shy, and being only made of velveteen, some of the more expensive toys quite snubbed him. Between them all the poor little rabbit was made to feel himself very insignificant and commonplace, and the only person who was kind to him at all was the skin horse.

The skin horse had lived longer in the nursery than any of the others. He was so old that his brown coat was bald in patches and showed the seams underneath, and most of the hairs in his tail had been pulled out to string bead necklaces. He was wise, for he had seen a long succession of expensive toys arrive to boast, and by-and-by break and pass away, and he knew that they were only toys, and would never turn into anything else. For nursery magic is very strange and wonderful, and only those playthings that are old and wise and experienced like the skin horse understand all about it.

"What is REAL?" asked the rabbit one day. "Does it mean having things that buzz inside you?"

"Real isn't how you are made," said the skin horse. "It's a thing that happens to you. When a child loves you for a long, long time, not just to play with, but REALLY loves you, then you become Real."

"Does it hurt?" asked the rabbit.

"Sometimes," said the skin horse, for he was always truthful. When you are Real you don't mind being hurt. Generally, by the time you are Real, most of your hair has been loved off and your eyes drop out and you get loose in the joints and very shabby. But these things don't matter at all, because once you are Real you can't be ugly, except to peole who don't understand."

The rabbit sighed. He thought it would be a long time before this magic called Real happened to him.

One evening, when the boy was going to bed, he couldn't find the china dog that always slept with him and quite by chance picked the rabbit off the nursery floor. That night, and for many nights after, the velveteen rabbit slept in the boy's bed. At first he found it rather uncomfortable, for the boy would hug him very tight, and sometimes he pushed him so far under the pillow that the rabbit could scarcely breathe. But very soon he grew to like it, for the boy used to talk to him, and made nice tunnels for him under the bedclothes that he said were like the burrows the real rabbits lived in.

And so time went on, and the little rabbit was very happy--so happy that he never noticed how his beautiful velveteen fur was getting shabbier and shabbier, and his tail coming unsewn, and all the pink rubbed off his nose where the boy had kissed him.

Spring came, and they had long days in the garden for wherever the boy went the rabbit went too. And once, when the boy was called away suddenly to go out to tea, the rabbit was left out on the lawn until long after dusk, and Mommy had to come and look for him with the candle because the boy couldn't sleep unless he was there.

"You must have your old bunny!" she said. "Fancy all that fuss for a toy!"

The boy sat up in bed and stretched out his hands. "Give me my bunny! You mustn't say that. He isn't a toy. He's REAL!"

When the little rabbit heard that he was happy, for he knew that what the skin horse had said was true at last. The nursery magic had happened to him, and he was a toy no longer. He was Real. The boy himself had said it.

That night he was almost too happy to sleep and into his boot-button eyes, that had long ago lost their polish, there came a look of wisdom and beauty, so that even Mommy noticed it next morning, and said, "I declare if that old bunny hasn't quite a knowing expression."

APPENDIX F

TIME SERIES FOR PHYSIOLOGICAL MEASURES

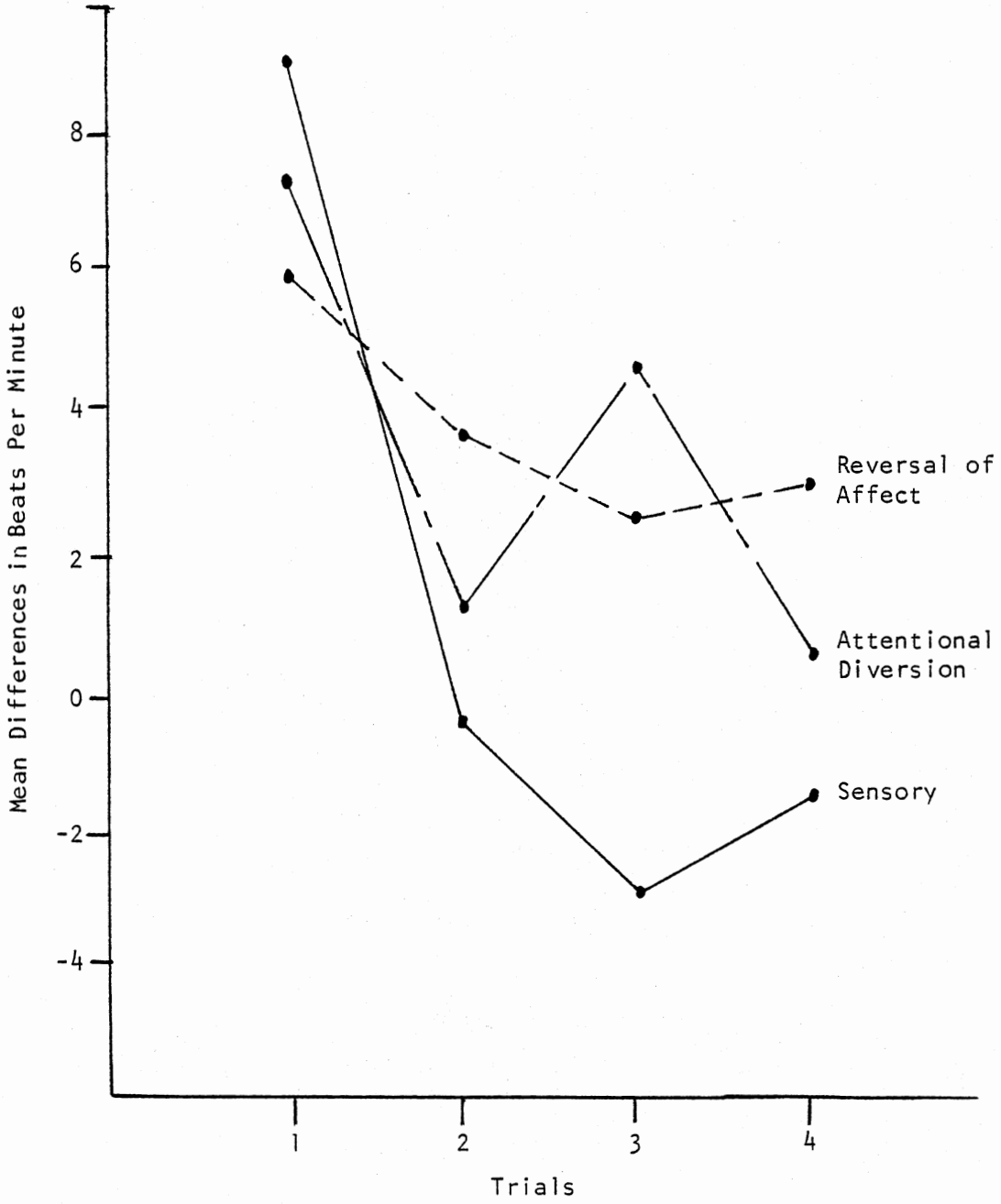

Figure 1. Mean Heart Rate Differences from Immersion to Withdrawal for Information

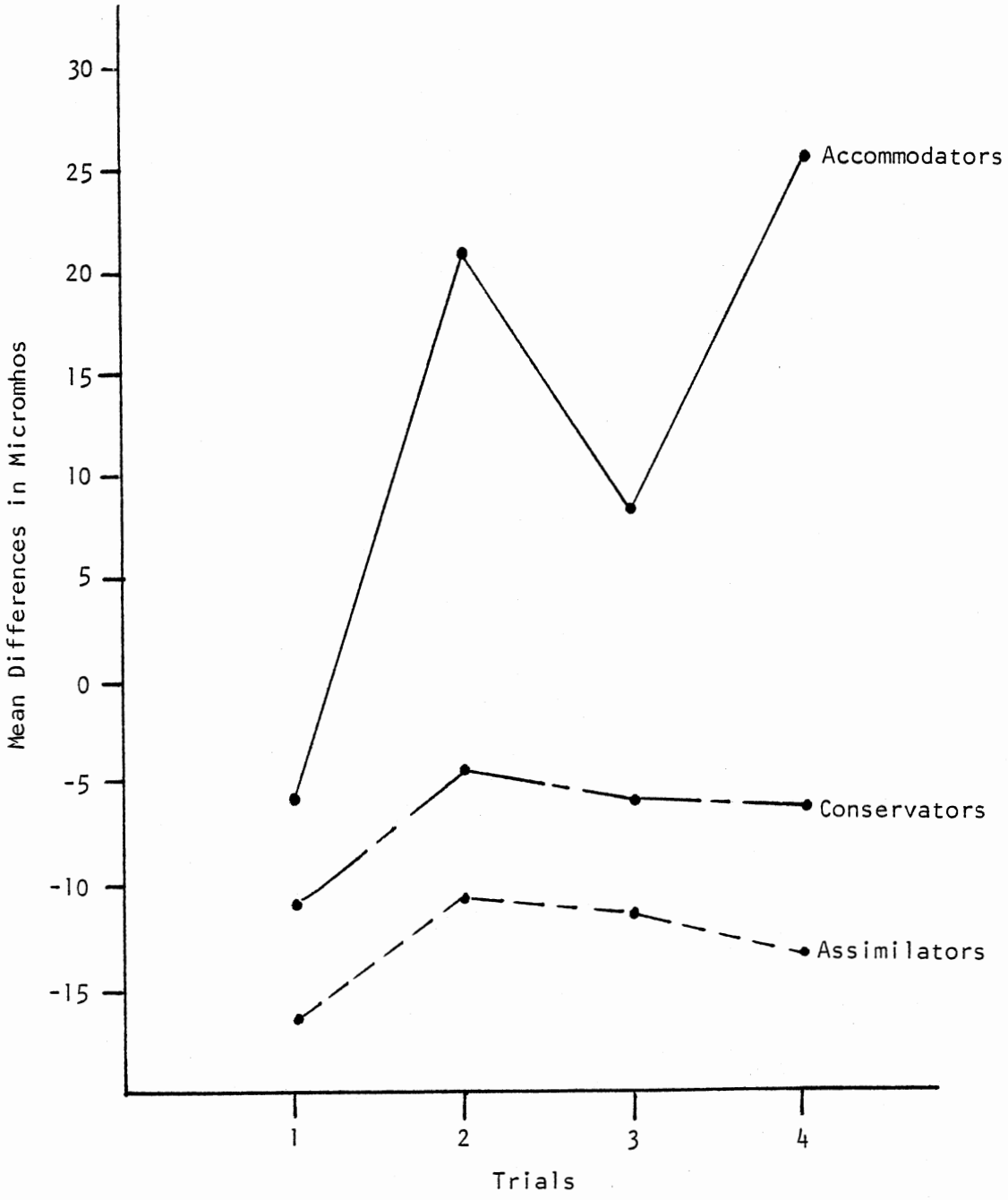

Figure 2. Mean Skin Conductance Differences From Immersion to Withdrawal for Type

VITA

Candace Conley

Candidate for the Degree of

Master of Science

Thesis: COPING WITH STRESS: THE EFFECT OF PREPARATORY INFORMATION AND PERSONAL STYLE

Major Field: Psychology

Biographical:

Personal Data: Born in Tulsa, Oklahoma, November 10, 1956, the daughter of Mr. and Mrs. Robert Ellis Conley.

Education: Graduated from Holland Hall School, Tulsa, Oklahoma, in May, 1974; received the Bachelor of Arts degree in Mass Media News from the University of Tulsa, Tulsa, Oklahoma, in 1979; enrolled in the doctoral program at Oklahoma State University in 1980; completed requirements for the Master of Science degree at Oklahoma State University in July, 1982.

Professional Experience: Undergraduate statistics laboratory assistant, Department of Psychology, University of Tulsa, 1979; graduate teaching assistant, Department of Psychology, Oklahoma State University, 1980-1982.