ABSORPTION, RELAXATION, AND IMAGERY INSTRUCTION: 
EFFECTS ON THERMAL IMAGERY EXPERIENCE 
AND FINGER TEMPERATURE 

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A skill instruction technique based on cognitive-behavioral principles was applied to thermal imagery to determine if it could enhance either subjective or physiological responsiveness. The effects of imagery instruction were compared with the effects of muscle relaxation on imagery vividness, thermal imagery involvement, and the finger temperature response. The subjects were 39 male and 29 female volunteers from a minimum security federal prison. The personality characteristic of absorption was used as a classification variable to control for individual differences. It was hypothesized that high absorption individuals would reveal higher levels of imagery vividness, involvement, and finger temperature change; that imagery skill instruction and muscle relaxation would be more effective than a control condition; and that the low absorption group would derive the greatest benefit from the imagery task instruction condition. None of the hypotheses was supported. Finger temperature increased over time during the experimental procedure but remained stable during thermal imagery. The results suggest that nonspecific relaxation
effects may best account for finger temperature increases during thermal imagery. Results were discussed in relation to cognitive-behavioral theory and the characteristic of absorption.
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CHAPTER I

ABSORPTION, RELAXATION, AND IMAGERY INSTRUCTION: EFFECTS ON THERMAL IMAGERY EXPERIENCE AND FINGER TEMPERATURE

In recent years, there has been much interest in cognitive and behavioral treatment methods which teach individuals to exert control over their own thoughts and actions. Considerable attention has been focused on the usefulness of such techniques to control various aspects of autonomic physiological functioning. Relaxation (Boudewyns, 1976), hypnotic suggestion (Kroger & Fezler, 1976), and biofeedback (Brown, 1977) have all been reported useful in altering finger temperature. The ability to control finger temperature could have important therapeutic applications in the treatment of disorders which involve dysfunctional patterns of blood flow (e.g., Reynaud's disease, migraine). Techniques which avoid the complications and risks inherent in pharmacological approaches to treatment are needed. The ease with which thermal suggestion can be used makes it an attractive treatment approach. However, much of the research regarding the use of thermal suggestion and imagery to control finger temperature or treat related disorders contains methodological flaws which limit our ability to draw firm
conclusions. More research is needed to determine the usefulness of suggestion and imagery for controlling finger temperature.

Responsiveness to suggestion has traditionally been perceived as a stable personality trait maximized by the use of a hypnotic induction (Hilgard, 1965). Traditional hypnotic inductions often indirectly imply that the subject will experience perceptual alterations and increase suggestibility (Weitzenhoffer & Hilgard, 1962). The cognitive-behavioral viewpoint is that these induction procedures induce a cognitive set to respond positively. This cognitive set includes factors such as attitudes, beliefs, and motivation which favorably influence responsiveness to suggestions (Barber, Spanos, & Chaves, 1974). Recent evidence indicates that cognitive-behavioral techniques may enhance responsiveness to suggestion by providing explicit instruction in the desired responses and strategies to increase involvement in suggestion-related imagery (Council, Kirsch, Vicker, & Carlson, 1983; Katz, 1979). If direct instruction in such techniques could be used to increase involvement in thermal imagery, such a procedure might also increase the physiological response to suggestions for hand warming and cooling embedded in thermal imagery.

In the following sections, theories of suggestion and research on the use of thermal suggestion and imagery are
reviewed. The issue of individual difference variables which may affect responsiveness to suggestion is also addressed. Finally, research regarding the cognitive-behavioral skill training approach for enhancing responsiveness to suggestion is reported.

Theories of Suggestion

According to Kroger and Fezler (1976), healing methods utilizing suggestion have been in use throughout recorded history. The Persian Magi and Greek oracles used "temple sleep" rituals and while the methods utilized in cultures and eras have differed, many have involved using a combination of relaxation, suggestion, and narrowly focused attention. Numerous techniques have evolved and continue to be used to enhance responsiveness to suggestion.

According to Udolf (1981), Braid coined the terms "hypnosis" and "hypnotic" from the Greek "hypnos" which refers to sleep. His work resulted in the acceptance of hypnotic suggestion as a valid phenomenon suitable for scientific study and use within the field of medicine. Charcot extended the parallel between hypnotic states and sleep by proposing a neurologically based theory. His "sleep" theory of hypnosis was expanded by the Pavlovian school of thought. Hypnotic responses were believed to result from a state of cortical inhibition penetrated by "sentinal points" which allowed communication. Theories of hypnosis as a state resembling sleep have not been supported by modern physiological evidence
regarding discrete stages of sleep (Chertok, 1980). Charcot eventually came to regard hypnosis as a pathological state comparable to artificial hysteria. Since many of the symptoms characteristic of hysteria (e.g., somnambulism, convulsive attacks, paralysis, and sensory loss) could be induced or modified using hypnotis, Charcot argued that only persons prone to hysteria were susceptible to hypnosis (Udolf, 1981).

In contrast, Janet construed hysteria as a mental, rather than neurological disease in which lack of personality integration led to exaggerated suggestibility. Hypnosis was viewed as a process allowing deeper and deeper levels of dissociation. To Janet, normal personalities consisted of well integrated ideas and tendencies, but hysterical personalities lacked unity and integration. Due to their lack of integration, hysterics could engage in their symptoms without conscious awareness. Liebeault and Bernheim disputed Charcot's view of hypnosis as a pathological state. They taught that hypnosis is a passive-receptive state produced by suggestion and marked by heightened acceptance of new attitudes and beliefs. Later behavior changes resulted from the acceptance of new ideas. They also argued that a vivid imagination was needed to experience a hypnosis (cited in Frankel, 1976).

Sarbin (1950) explained hypnosis and as a forme of role-playing. He emphasized that socio-cultural influences and specific suggestions are transmitted during inductions
which define the role to be assumed and shape the behavior of the hypnotic subject. Shor (1959) described a generalized reality orientation which characterizes normal self-awareness and provides an individual framework for thoughts about the self, the world, and others. From this viewpoint, Shor agreed that hypnosis is a state achieved by motivated role-taking. However, he noted that hypnosis is characterized by both an alteration in conscious awareness and a narrow attentional focus.

E. Hilgard (1974) borrowed from Janet to formulate his "neo-dissociation" theory of hypnosis. He viewed hypnosis as a dissociated state of consciousness possible because the normal conscious control apparatus is neither highly unified nor well integrated. The ability to monitor more than one simultaneous channel of information input or to perform habitual acts without consciously attending were cited as evidence for the normality of dissociation. It was viewed as a natural process which can lead to increased absorption in normal activities and which is not limited to hysterical symptoms. Activities such as dreaming and fantasizing reflect normal dissociations from consciousness.

Barber (1969) proposed that a hypnotic state is a fictitious construct. He claims that hypnotic behavior can be adequately accounted for in terms of the social psychological variables operating in the situation. The subject's ability to go along with and vividly imagine the suggestions using goal-directed images are the critical factors, according to
Barber, which account for the subject's responsiveness to suggestion. Spanos and Barber (1974) argued that hypnotic inductions function to increase the subject's involvement in vivid, suggestion-related imaginings. This cognitive-behavioral viewpoint maintains that responsiveness to suggestion can be induced by appropriate task instructions.

J. Hilgard (1970) examined the personality correlates of individuals high in hypnotic susceptibility. She found that hypnotic susceptibility is often paralleled by intense absorption and involvement in a wide variety of activities (e.g., reading, watching movies, listening to music). This finding has been supported by other research. Tellegen and Atkinson (1974) devised an instrument to measuring the extent to which an individual experiences absorbed, imaginative involvement in a variety of activities. This self-report inventory is positively correlated with traditional measures of hypnotic susceptibility (Spanos & McPeake, 1975; Yanchar & Johnson, 1981) and relatively independent of a wide range of other personality measures (O'Grady, 1980). Since hypnotic susceptibility peaks prior to adolescence and then declines into adulthood, Hilgard (1970) speculated that continued involvement in imaginative activities during the adult years may be necessary to maintain a high level of hypnotic susceptibility.

Modern theorists have successfully integrated hypnotic responsiveness to suggestion into a cognitive-behavioral
framework of psychological functioning. Current conceptions or responsivity to suggestion have clearly changed from those which equated hypnotic susceptibility with psychopathology. Researchers of different perspectives appear to agree that imaginative involvement is important to an understanding of hypnotic susceptibility. Many theorists also agree that induction techniques function to induce subtle alterations in subjective awareness that affect responsiveness to suggestions. Due to the negative implication of the term "susceptibility," the use of this term in the following text will be limited to refer to traditional measures of hypnotic responsiveness. Responsiveness to suggestion will be the phrase substituted where it is appropriate.

Thermal Suggestion and Imagery

Thermal suggestion and imagery have been utilized for medical purposes with the assumption that an alteration in physiological functioning could be obtained to alleviate the disorder. In research, the effects of thermal suggestion on finger temperature have not been clearly determined. Part of the difficulty in drawing firm conclusions derives from variability in the use of type of induction procedures and from the failure to control for the effects of relaxation or individuals differences in responsiveness to suggestion.

Clinical Applications

If thermal suggestion and imagery to experience or imagine warmth or coolness in a specific body part altered
blood flow in the corresponding direction, this could be a useful technique for treating some disorders. For example, thermal suggestion has been reported effective in the treatment of warts and migraine headache (Kroger, 1976). Imagery which suggests past experiences of feeling warmth would, presumably, correspond to increased blood flow, while feelings of coolness would correspond to decreased blood flow. Although the mechanism by which increased blood flow would promote healing has not been delineated, several reports have indicated that such suggestions are effective in treatment of warts. Ewin (1974) reported successful treatment of warts in four patients using hypnotic suggestions of warmth and vasodilation to increase blood flow. However, since blood flow was not assessed, it is not possible to determine whether increased blood supply was the critical factor in treatment. Paradoxically, Clawson and Swade (1975) reported successful treatment of warts with exactly the opposite strategy; suggestions to decrease blood flow. Thus, although hypnotic thermal suggestions have effectively treated warts, the mechanism responsible for the improvement is unclear.

Medical research has clearly established that migraine headache involves a prior vasoconstriction phase followed by a cerebral vasodilation phase that is concurrent with pain onset (Bakal, 1975). Various behavioral treatment methods to control vascular responsivity to stress, including relaxation training and biofeedback are currently used in
the treatment of migraines (Beech, Burns, & Sheffield, 1982). Finger skin temperature is positively correlated with the amount of blood flow in the peripheral vasculature, which is innervated by the sympathetic nervous system (Hasset, 1978). Thus, finger temperature increases in the hands are a common clinical goal.

Thermal suggestion and imagery have also been reported effective in migraine treatment. Baker (1970) reported that visualization of the scalp blood vessels during migraine attacks led to significant improvement. Sargent, Green, and Walters (1973) combined thermal suggestions for increased hand temperature with biofeedback and reported clear improvement in 12 of 20 migraine patients. Anderson, Basker, and Dalton (1975) compared the effectiveness of hypnotic suggestions to decrease the size of the cranial arteries with drug treatment of migraine. They found that hypnotic suggestions resulted in a significantly greater decrease in the monthly mean number of headaches. Of those who received suggestion, 43.5 percent reported complete remission of attacks, as opposed to only 12.5 percent of those who received the drug treatment. These studies indicate that suggestion may be an effective migraine treatment and that the mechanism might well be due to change in blood flow. Kroger and Fezler (1976) have reported that images which suggest increased blood flow in the hands can be employed to
divert blood flow from the cranial arteries and thus avoid
or alleviate migraine headache.

However, research which has focused on the relationship
between changes in blood flow and changes in migraine symptoms
indicates that blood flow change may not be the crucial
variable producing improvement. For example, Andreychuk and
Skriver (1975) compared hypnosis training, alpha biofeedback,
and finger temperature biofeedback. All three forms of
treatment produced a significant decrease in headache
symptoms and no significant difference in effectiveness was
found among the treatment groups. High susceptible patients
did improve more than patients low in susceptibility to
hypnosis. They concluded that the improvement resulted from
a nonspecific factor best accounted for by either suggesti-
bility or generalized relaxation. Kewman and Roberts (1980)
further examined the specificity of the effect of altering
blood flow. They trained migraine patients to either raise
or lower finger temperature using biofeedback. A control
group simply monitored headache activity. They found no
significant difference in effectiveness between these three
treatment groups, and thus concluded that alteration of blood
flow is not the essential element of treatment. Finally,
Friedman and Taub (1982) utilized hand warming imagery with
migraine patients and found no relationship between finger
temperature alteration and decreases in headache frequency,
headache intensity, or level of medication usage. However,
none of the patients using only hand warming imagery demonstrated a significant change in finger temperature. Thus, these findings do not conclusively demonstrate whether alteration in blood flow is an effective treatment.

In summary, the results of these studies bring up an important question. To what extent does the use of suggestion and imagery allow control of finger temperature? This issue should be resolved before addressing the potential applications of such a technique. For this reason, it is perhaps premature to ask whether the use of suggestion to control blood flow is an effective treatment for clinical disorders, such as warts and migraines. Research should first focus on the usefulness of suggestion to produce or enhance control of finger temperature.

**Finger Temperature Control**

Several studies have investigated the use of thermal suggestion and/or imagery to control skin temperature. Biofeedback is the performance criterion against which other methods of controlling physiological functioning are often evaluated. Much of the research involves comparisons in which thermal suggestion and imagery have been used to supplement biofeedback training to control skin temperature.

Keefe (1978) trained 60 female subjects to raise finger temperature under three types of instructions (resting control, response-specific, or thermal suggestion) and with or without the aid of biofeedback. Subject receiving response-specific
instruction were told to raise finger temperature. All subjects received five training sessions on consecutive days. The results indicated that with suggestions for hand warmth, significant increases were observed after three sessions, regardless of the presence or absence of biofeedback. Response-specific instructions also produced significant increases in temperature, but only when combined with biofeedback. The ability to raise finger temperature was maintained at one-week and two-week follow-ups. From these results, it was concluded that thermal suggestions is a powerful technique for altering finger temperature even in the absence of biofeedback.

Gillespie and Peck (1980) compared two groups of six subjects who had undergone five training sessions. Visual finger temperature biofeedback was present to one group. The other group saw thermal slides and were given suggestions to raise finger temperature. Only changes greater than those which occurred during the baseline period were registered as increases. They found that subjects who received biofeedback were able to produce reliable increases in all sessions after the first. The subjects who received imagery produced a mean decrease. They concluded that imagery is ineffective in raising finger temperature, but that biofeedback allows control of the finger temperature response. Several comments can be made regarding the conclusions to be drawn from this study. First, visual images of warm scenes were presented as
slides and accompanied by relevant verbal descriptions. This protocol does not necessarily lead to the subject's involvement in vivid mental imagery. It may be that attending to visual stimulus presentations leads to decreases in skin temperature. This does not establish that mental imagery, with the eyes closed, cannot lead to skin temperature increases. It is also possible that individual differences in responsiveness to suggestion were masked. Finally, no induction procedure was used to enhance responsivity. These criticisms limit the generalizability of this study and prevent the conclusion that thermal imagery is ineffective.

Herzfeld and Taub (1977) reported that slide projections and verbal suggestions related to thermal experiences can significantly augment biofeedback in attaining finger temperature increases. However, this study used a within-subjects design which allowed subjects to make convert use of mental imagery that was provided earlier in training. Later, employing a between-subjects design, they (1980) compared the effectiveness of a procedure using visual biofeedback plus verbal thermal suggestions and slide projections to a procedure using visual biofeedback plus neutral suggestions and slides (electronic terminology and geometric patterns). They concluded that suggestion and guided imagery can be an important aid in learning temperature self-regulation.

Grabert, Bregman, and McAllister (1980) employed a factorial design to compare the effects of biofeedback
(visual versus none) and suggestion (thermal versus neutral) on finger temperature response. They found a significant interaction between the biofeedback and suggestion conditions on the third training session. This interaction indicated that the group with visual feedback and thermal suggestion increased their finger temperature significantly more than the visual feedback, neutral suggestion group.

Bregman and McAllister (1981) conducted a follow-up study to control for the potentially disruptive effects of using electronic terminology as neutral suggestions. A factorial design examined the effects of suggestion (thermal imagery phrases, electronic terminology, or response-specific instruction) and direction of temperature change (increase versus decrease) on finger temperature biofeedback training. They reported a significant main effect for temperature direction (larger decreases than increases) and a significant interaction between between temperature direction and type of suggestion. The interaction indicated that thermal imagery suggestion were most effective for increases, but that response-specific instructions were most effective for decreases. They concluded that temperature increase is a more difficult task than temperature decrease, and that thermal imagery suggestions enhance the ability to produce temperature increases.

Of the studies reviewed above, only one (Keefe, 1978) supports the use of thermally relevant suggestions and/or
imagery as an independent technique to control finger temperature. However, other research indicates that thermal suggestions and imagery may interact to enhance biofeedback in learned control of finger skin temperature (Bregman & McAllister, 1981; Grabert, Bregman, & McAllister, 1980; Herzfeld & Taub, 1977). These studies all indicate that use of thermal suggestions and/or imagery appears most efficacious when the goal is producing temperature increase. There is less support when the goal requires temperature decrease (Bregman & McAllister, 1981; Gillespie & Peck, 1980). These findings raise the question of whether the effect of suggestion is specific to the thermal content (warm versus cool). Another question concerns the effects of induction procedures on the response to thermal suggestion. Also, individual differences in responsiveness to suggestion need to be considered more fully. The above studies did not consider individual difference variables, such as measures of susceptibility or the personality characteristic of absorption. Responsiveness to thermal imagery may be enhanced by the use of appropriate induction procedures and highly responsive subjects.

**Suggestion with induction.** Since hypnotic inductions may function to enhance responsiveness to suggestion, such procedures may produce the conditions under which thermal suggestion and imagery are more effective in producing temperature change. Research has also examined the
usefulness of combining hypnotic inductions with thermal suggestions to alter finger temperature.

Blizard, Cowings, and Miller (1975) monitored nine subjects for six daily sessions. Each session began with an induction that included relaxation and instructions to focus attention on a particular limb. Suggestions for heaviness and warmth were contrasted with suggestions for lightness and coolness. The warming task was described as requiring passive concentration while the cooling task was described as requiring active concentration. Finger temperature tended to decrease during cool suggestions, but no consistent pattern was observed during warm suggestions. Neither type of suggestion produced a significant change in finger temperature, nor was the difference between the types of suggestion significant. However, heart rate and respiration rate revealed significant increases in response to cool suggestions and nonsignificant decreases in response to the warm suggestions. From this, the authors concluded that imagery training may help gain control over automatic responses, and that the evocation of images may mediate changes produced by other means, such as biofeedback. These results do not support the use of suggestion to control finger temperature. However, the thermal suggestions were confounded with the attentional instructions and also alternated at one minute intervals from warm to cool and
from one hand to the other. This alternation may have interfered with the establishment of control. In addition, since differences in responsiveness were not assessed, effects on highly responsive subjects may have been masked.

Barabasz and McGeorge (1978) compared the effectiveness of four treatment procedures to elevate finger temperature: (a) auditory biofeedback, (b) false biofeedback, (c) relaxation induction, and (d) relaxation induction combined with hand warming imagery and verbal reinforcement for desired change. Only the fourth group showed a significant increase in finger temperature. The mean change in that group was significantly greater than among the other three groups. These results support the use of relaxation suggestion and warming imagery to elevate finger temperature. However, since the fourth group also received contingent verbal reinforcement, all that can actually be concluded is that this combination method was effective whereas the singular methods were not. No susceptibility measured was reported. Thus, it is impossible to determine to what extent differences in responsiveness may have related to temperature change.

Crosson (1980) compared the effectiveness of biofeedback, false biofeedback, suggestion/imagery, and biofeedback plus suggestion/imagery in producing an increase in finger temperature relative to forehead temperature. His subjects were 36 female volunteer undergraduate students with no previous experience in either biofeedback or hypnosis. Each of four
training sessions began with a five minute distraction task (number recognition). A ten minute relaxation induction preceded each twenty minute treatment period. An analysis of covariance of temperature change scores revealed a significant increase in differential temperature during the induction period, and significant group and session effects during the treatment period. Pair-wise comparisons indicated that only the biofeedback group reliability surpassed the false feedback control group during the treatment period. Susceptibility scores were not found to be correlated with temperature control within each treatment group. From these results, Crosson concluded that "biofeedback was an effective means for creating temperature change while suggestion and imagery were not" (p. 84). However, several methodological aspects of Crosson's study prevent drawing such a conclusion. First, equal numbers of high, medium, and low susceptibility subjects were assigned to each group. This method may have masked differences which may occur using suggestion/imagery with more responsive subjects. Although he did not find a significant correlation between susceptibility and temperature change, this relationship was based on only nine subjects. Also, the results indicated that the induction procedure alone produced a significant increase in differential temperature. Crosson's results indicate that biofeedback exceeded false biofeedback, not that suggestion was ineffective. Although only the biofeedback group
exhibited significantly more control than the false biofeedback group, there were no significant differences between the biofeedback group and either of the groups which included suggestion/imagery. Finally, the author noted that suggestion and imagery was combined with biofeedback at a "slower pace in order to allow subjects to integrate exercises in suggestion and imagination with the ongoing feedback" (p. 79). This procedural difference prevents drawing the conclusion that biofeedback was the critical component. Perhaps slower pacing in the administration of suggestion/imagery is critical to its success.

The research reviewed in this section does not substantiate that induction procedures enhance the effectiveness of thermal suggestion or imagery. Some support was again indicated for the use of thermal suggestion or imagery to increase finger temperature (Barabasz & McGeorge, 1978), but poor support was found for its use to decrease finger temperature (Blizard, Cowings, & Miller, 1975). There is some indication that induction procedures alone may produce a temperature increase (Crosson, 1980). This again raises the issue of specificity of effect, since relaxation suggestions in inductions may be responsible for temperature increases. Crosson's experiment also included a control for individual differences in responsiveness to suggestion and did not find any relationship. However, the finding was
based on a very small sample size, which prevents drawing firm conclusions.

**Relaxation induction.** Relaxation suggestions are commonly included in traditional hypnotic induction procedures (Edmonston, 1977). Barber (1969) asserted that relaxation suggestions function only to define the situation as hypnosis. Bandura (1971) emphasized that relaxation may facilitate learning in some situations. Katz (1978) has noted that relaxation could enhance suggestibility by reducing anxiety, focusing attention, and facilitating ideomotor responsivity. In considering the effects of thermal suggestion on the finger temperature response, the nonspecific effects of thermally neutral relaxation suggestions must also be considered.

Boudewyns (1976) conducted a series of experiments to determine the result of stress-inducing (threat of electric shock) versus relaxing suggestions on the finger temperature response. He found that finger temperature increased during relaxing suggestions and decreased during stressful suggestions. Additionally, he reported a significant negative correlation between finger temperature and a self-report fear index. These results indicate that finger temperature changes may be elicited by alterations in general arousal level.

Peters and Stern (1973) monitored 20 high susceptible students to compare the effects of neutral (no specific suggestion) hypnotic induction with simple instructions to relax on finger temperature. Two sessions were conducted on
consecutive days and order of condition was counterbalanced. They reported significant increases during each session with no reliable differences between sessions. They interpreted these increases in each session as due to the nonspecific effects of increased relaxation. However, since only high susceptible subjects were included, it is incorrect to infer that such inductions would have the same effects on finger temperature for low susceptible subjects. Further, temperature baseline was only defined as the time that hypnotic induction or instructions to relax began. It is possible that the increases observed were simply due to acclimatization. Also, it is possible that differences may have occurred had the sessions lasted for a period longer than 10 minutes.

Piedmont (1981) attempted to show that temperature increases during hypnosis were not just due to increased relaxation. He compared a group of subjects who experienced a hypnotic induction with a control group who heard an article about hypnosis. Both groups received visual thermal feedback to decrease temperature. The control group exhibited an increase in finger temperature, but the hypnosis group remained stable. He concluded that hypnosis enhanced control and prevented the rise in temperature associated with the control group. He speculated that hypnosis produced a state of cognitive arousal which enhanced concentration and
attention and thus, allowed greater control over the temperature response. Post-experimental questioning revealed that most of the 20 subjects in the hypnosis group found the visual feedback disturbing. It appears more plausible that this disturbance simply interfered with the relaxation response.

Benson, Arns, and Hoffman (1981) viewed relaxation induction as a specific technique for eliciting the relaxation response. They argued that the physiological response to increased relaxation or hypnotic induction consists of decreases in heart rate, blood pressure, and respiration rate. From the research reviewed in this section, it appears that finger temperature increases may also be part of this pattern. Typical hypnotic inductions may produce a relaxation response that is not different from that achieved by other methods.

Induction comparisons. Barber, Spanos, and Chaves (1974) argued that hypnotic induction procedures increase suggestibility by inducing appropriate motivational and cognitive processes. Only a few investigations have compared the effects of different induction procedures on responsivity to thermal suggestions designed to influence finger temperature. Such comparisons need to be made to establish the contribution of hypnotic inductions or other techniques.

Peters, Lundy, and Stern (1973) selected 10 male, high susceptible subjects and monitored finger temperature
following hypnotic induction in one session and method acting instructions in another session. These conditions were counterbalanced. In each session, suggestions for hand warming were followed by suggestions for hand cooling. An intervening no-suggestion, relaxation period was included to allow temperature stabilization and the establishment of a new baseline between suggestion periods. Suggestions were repeated at one-minute intervals throughout each 10-minute suggestion period. A significant time effect indicated that skin temperature increased during the suggestion period. They also found a significant interaction between time interval and procedural conditions (induction versus method acting). This interaction indicated that temperature increased regardless of the direction of the suggestion following the method acting instructions. In contrast, temperature remained stable following the hypnotic induction. These results argue against a specific, directional temperature effect related to the thermal content of the suggestion itself. Their other research (Peters & Lundy, 1973) indicated that both instructions to relax and hypnotic induction without specific suggestions resulted in finger temperature increase. Peter, Lundy, and Stern (1973) go on to conclude that hypnotic suggestions may have the counterproductive effect of increasing effortful striving which interferes with relaxation and prevents temperature increase.
Their research could also be interpreted to indicate that direct instructions for "method acting" led to higher level of involvement and thus, more temperature increase. However, this would not explain the failure to obtain comparable decreases during cool suggestions. In addition, the use of only high susceptible subjects prevents generalization of these results to less susceptible persons.

Tebecis and Provins (1976) monitored skin temperature and other physiological parameters in 14 high susceptible and 14 randomly selected control subjects. High susceptible subjects were exposed to suggestions of extreme heat and extreme cold following hypnotic induction and following imagination instructions. The randomly selected subjects were monitored following instructions to imagine the heat and cold suggestions as vividly as possible. No significant differences were detected between the beginning and end of each suggestion period for any group or condition. Neither was a significant difference in mean change found between the hypnosis and imagination conditions within the high susceptible group nor between the high susceptible and control group. It was concluded that hypnosis was not a crucial variable, but that the skin site, length of suggestion, or amount of training might be relevant variables. There are methodological problems in this study. The suggestions administered were short (less than one minute) and related to
highly stressful circumstances (e.g., lying in the desert, incredibly hot, no shade in sight, no way of escaping). Stressful, discrete suggestions may not be conducive to imaginative involvement. The authors noted that following hypnotic induction, some subjects displayed behavioral (shivering, grimacing, etc.) and physiological (electromyogram, electroencephalogram, galvanic skin response, eye movements, and electrocardiogram) signs of disturbance. No such pattern appeared with the imagination instructions. Skin temperature differences also may have been detected had a peripheral site, such as the finger, been chosen rather than the forehead.

**Individual differences.** Much of the research examining the effect of thermal suggestion on finger temperature has failed to control for individual difference variables, which may mediate responsiveness to suggestion. The failure to control for such differences results in increased variability and difficulty detecting stable differences. Standard hypnotic susceptibility measures, such as the Stanford Hypnotic Susceptibility Scales (Weitzenhoffer & Hilgard, 1962) are directly derived by either observation or self-report of the response to specific behavioral (e.g., arm rising) or perceptual suggestions (e.g., warmth). As previously indicated, Tellegen (1974) reported that the personality characteristic of absorption is significantly correlated with traditional susceptibility measures.
Individuals high in absorption are described as having the capacity for high levels of attentional involvement in a wide range imaginative activities. The following section will review research which has examined the relationship between such variables and the ability to gain control of physiological functions.

Roberts, Kewman, and MacDonald (1973) trained six experienced hypnotic subjects to produce a temperature difference between their hands. Each subject underwent a ten minute hypnotic induction followed by a five minute period prior to receiving auditory feedback. Differences as large as 5.6 degrees Celsius were reported. Their best subject showed an average difference of 2.96 degrees Celsius across the nine training trials. Self-report of hypnotic depth was related to degree of control. The authors concluded that peripheral skin temperature control is possible and that "the ability to alter one's state of consciousness, together with associated motivational and training variables" (p. 168) are likely to predict success at physiological control.

Roberts, Schiler, Bacon, Zimmerman, and Patterson (1975) compared seven subjects high in hypnotic susceptibility and absorption with seven subjects low in these characteristics on their ability to learn skin temperature control. Each subject received 16 individual training sessions with audio feedback contingent on producing a temperature differential
between fingers of the left and right hands. All subjects were instructed to use mental control rather than muscles or movement. The direction of temperature change was reversed twice during each session. The combined group results showed a significant learning effect, but no significant differences between the groups. The authors concluded that hypnotic susceptibility, the characteristic of absorption, and hypnosis were not necessary components for learning finger temperature control. However, there are several problems with this study. No induction procedure was utilized. The extent to which subjects perceived the experimental situation as absorbing and involving was not checked. Also, the direct suggestions were simple (e.g., your left hand and finger are cold and right hand and finger are warm) and repeated only a few times at the beginning of an 8-minute training period. The extent to which this procedure promotes the individual to become absorbed and involved must be questioned. In fact, the instruction to use mental control may suggest an active, effortful process that interferes with attaining control.

Frischholz and Tyron (1980) also reported the absence of any relationship between hypnotic susceptibility measures and the ability to learn thermal biofeedback. During three different sessions, subjects were given five minutes to attempt finger temperature elevation without the aid of biofeedback and then given a 10 minute training period with
biofeedback. Significant increases of as large as nine degrees Fahrenheit were obtained. Susceptibility scores were not correlated with the slope of the learning curve for either sessions or training periods. However, they did not utilize a hypnotic induction and presented only the direct instruction to raise finger temperature. Consequently, their results do not preclude the possibility that highly responsive subjects could respond to training using thermal imagery.

Qualls and Sheehan (1979) reported that the capacity for absorbed involvement did discriminate finger temperature response. They compared groups high and low in absorption. Both groups received counterbalanced relaxation instructions and biofeedback. There was no order effect for the low absorption subjects, but the high absorption subjects did best when instructions to relax preceded the biofeedback training. They concluded that the biofeedback signal interfered with the attention of high absorption individuals. Responsiveness to suggestion may be relevant to learning finger temperature control, at least for high absorption individuals.

Qualls and Sheehan (1980a; 1980b) conducted additional studies which indicate that biofeedback interferes with the ability of individuals high in absorption to control muscle tension, but aids those low in absorption. They have interpreted their results to indicate that high absorption
individuals prefer to deploy their attentional capacity toward internal, imaginative cognitive activities. Qualls and Sheehan believe that the biofeedback signal places an external attentional demand which interferes with relaxation in high absorption individuals. In contrast, low absorption individuals are characterized by a preference for an external attentional focus. Thus, the biofeedback signal facilitates their attention to the task of relaxing and reduces interference from other external stimuli.

These studies do not clearly delineate the relationship between responsiveness to suggestion and the ability to learn skin temperature control. The characteristic of absorption offers some promise as an individual difference variable which may relate to involvement in procedures such as biofeedback. However, differences in factors such as the use of induction procedures and the characteristics of suggestions employed make it difficult to draw firm conclusions. Individual differences in absorption may affect involvement in more imaginative forms of thermal suggestion and imagery. Such differences in absorption may also affect the corresponding finger temperature response.

**Cognitive-Behavioral Skill Training**

The cognitive-behavioral perspective explains hypnotic behavior in terms of the operational and situation variables which influence suggestibility. Research has indicated that direct induction procedures which provide explicit instruction and modeling of the responses to be performed can
enhance responsiveness beyond that attained with traditional hypnotic inductions (Comins, Fullam, & Barber, 1975). Skill inductions enlist the cooperation and motivation of the subject to respond by emphasizing self-control and teaching the strategy of "goal-directed imagining" (Barber, Spanos, & Chaves, 1974). This strategy is to formulate an imaginary process that would result in a positive response if it were really happening. For example, the suggestion that one's arm is light and lifting up higher and higher might be aided by imagining a helium balloon tied to the hand.

In contrast, traditional hypnotic induction procedures use indirect means to elicit responsiveness to suggestions. Such procedures typically present a monotonous verbal monologue and focus on sensations of relaxation, drowsiness, and/or sleep. These procedures often include implicit suggestions of loss of control or an altered state of awareness (Erickson, Rossi, & Rossi, 1976) that will enhance responsiveness. Low susceptible individuals are, by definition, those who do not respond positively to the suggestions offered. A significant percentage of the general population responds poorly to such traditional induction procedures. Different techniques are needed which can enhance responsiveness to suggestion for such individuals.

Katz (1979) compared the effects of a cognitive-behavioral skill training procedure with a traditional hypnotic induction on responsiveness to suggestions. Only subjects of low to
moderate susceptibility were assessed. The skill training procedure explained hypnotic responsiveness as a beneficial, self-initiated process aided by the cognitive process of goal-directed imagining. The experimenter then modeled several positive responses and coached subjects in devising their own cognitive strategies and imagery to aid their responsiveness. The hypnotic induction emphasized feelings of drowsiness, sleep, and a state of hypnosis, but included no direct instruction. Subjects were measured before and after training on their behavioral response to suggestions and on the subjective intensity of their experience. The results indicated that the skill training procedure produced significantly greater increases in objective and subjective responsiveness than did the traditional induction procedure. Interestingly, Katz also found that adding a relaxation component to the skill training procedure did not increase behavioral responsiveness over that obtained with skill training alone. Relaxation may have even attenuated the subjective response, since this combination procedure was not significantly different from the hypnotic procedure. From these results, Katz concluded that direct training in cognitive strategies is the most effective way to elicit positive responses to suggestions in low and moderately susceptible subjects.

More recently, Council, Kirsch, Vicker, and Carlson (1983) examined the influence of absorption and expectancy
on the effectiveness of various induction techniques. They theorized that skill inductions, like traditional hypnotic inductions, are effective because they increase the subject's expectancy that she or he will perform successfully. To control for the possibility that expectancy is mediated by the credibility of the induction technique, they included a placebo condition. This condition was false biofeedback placebo ostensibly to enhance theta rhythms and thus, produce a hypnotic state. They compared five induction procedures: (1) placebo, (2) control (sitting quietly), (3) hypnotic induction, (4) skill training procedure, and (5) no-modeling skill training procedure. Using a multivariate analysis of variance conducted on a combination of research measures, their results indicated that the control procedure enhanced responsiveness less than the other four procedures. They also found that the placebo procedure was as effective as the remaining treatment procedures. Council et al. (1983) found no difference on the combined measures between the trance and the two skill procedures. Nor was there a significant difference between the two skill procedures. Significant correlations were found between the personality characteristic of absorption, a self-report expectancy measure, and responsiveness to suggestion. Absorption contributed no predictive power that was independent of its relationship to expectancy. Council et al. concluded that inductions enhance responsiveness by increasing the expectancy of a successful response.
Research has demonstrated the usefulness of direct inductions in enhancing responsiveness to suggestions. Factors such as procedural credibility, expectancy, and absorption appear strongly related to responsiveness to some suggestions. Exploration of the usefulness of the skill training approach to affect responsivity to other types of suggestion is needed. Such techniques might be used to directly enhance the subjective experience of guided imagery. If vividness or involvement in thermal imagery were increased, larger alterations in finger temperature should result.

In summary, the hypothesis that finger temperature can be controlled using only thermal suggestion and/or imagery has received only tentative support. Stronger support is indicated for the use of thermal suggestion and imagery to enhance biofeedback effects. However, much of the research contains serious methodological flaws. For example, individual difference variables related to responsiveness to suggestion have often been ignored. This failure may have resulted in differences going undetected. Since the variable of absorption has revealed some relationship to the ability to control physiological responses, this factor should be considered. Another problem in the research is that induction procedures are often not used or not clearly specified. This problem makes it difficult to compare results across the studies. Since typical hypnotic inductions often include relaxation suggestions, research should
also include controls for the effect of relaxation suggestions. Traditional hypnotic inductions have not proven to greatly enhance the effect of thermal suggestion on the finger temperature response. Only a few studies have directly compared the effects of hypnotic inductions with other techniques on responsiveness to thermal suggestion and imagery. Research is needed to determine whether cognitive-behavioral skill training inductions may enhance responsiveness to thermal suggestion. Finally, there is considerable disparity between the types of suggestions and imagery utilized to influence skin temperature. In the research reviewed here, the suggestions were generally short, repetitive, and direct. The effects of pleasant thermal imagery of longer duration which may offer the opportunity for more imaginative involvement should also be investigated.

**Statement of the Problem**

A variety of techniques have been formulated to treat individuals with stress related symptoms. One facet of the physiological response to stressful situations is a shift in blood flow away from peripheral body areas and toward major organs. Since finger skin temperature is related to peripheral circulation, such a shift produces a corresponding decrease in finger temperature (Hasset, 1978). Behavioral treatment techniques designed to control finger temperature are currently being used to treat disorders related to blood circulation (e.g., migraine headache). Thermal suggestion
and imagery are a technique currently used to treat such disorders. However, as already indicated, methodological problems have made it difficult to draw firm conclusions regarding the usefulness of thermal suggestion and imagery for temperature control. While the use of thermal suggestion and imagery offers some promise as a treatment alternative to pharmacological approaches, more research is needed to establish its efficacy.

One critique of past research is the failure to control for individual differences in responsiveness to suggestion. The personality characteristics of "absorption" refers to the tendency to become highly involved in a wide range of imaginative activities (Tellegen & Atkinson, 1974). This characteristic has been found to be positively correlated with traditional measures of hypnotic susceptibility (Spanos & McPeake, 1975) and related to the ability to control finger temperature (Qualls & Sheehan, 1979).

From the cognitive-behavioral viewpoint, traditional hypnotic inductions provide the subject with the rationale and motivation they need to experience vivid, suggestion-related imagery (Barber, et al., 1974). Recent research has indicated that skill training techniques which emphasize individual self-control and provide training in the use of suggestion-related imagery may enhance subjective and behavioral responsiveness beyond the level obtained with traditional hypnotic inductions (Council et al., 1983;
Katz, 1979). This effect was demonstrated with subjects of low to moderate susceptibility. Research has not yet attempted to extend the usefulness of skill training techniques to thermal suggestions and imagery. Thus, an experiment was designed to examine the effects of an imagery skill instruction technique on the subject experience of thermal imagery as well as the finger temperature response.

Research examining the effects of thermal suggestion and imagery on the finger temperature response has largely failed to control for the nonspecific effects of relaxation suggestions. Temperature increases thought to be produced by specific thermal suggestions or imagery may have resulted from increased levels of relaxation. Thus, it was decided to compare the skill training instructions with two different relaxation conditions. One was an active progressive muscle relaxation exercise requiring tensing and relaxing while the other was a control condition providing only instructions to relax. Another step taken to control for relaxation was to test for effects using pleasant warm and cool imagery scenes. If the effect of suggestion is specific to the thermal content of imagery, temperature should increase during warm imagery and decrease during cool imagery. If only increases are observed, the alternative hypothesis of relaxation effects become more plausible.

Imagery vividness and involvement are the subjective elements of experience which theoretically determine
responsiveness to suggestion. One goal of the imagery task instruction technique designed for the experiment was to enhance the subjective experience of thermal related imagery. Therefore, it was decided to directly measure the effects of the different conditions on measures of imagery vividness and involvement. An ongoing narrative form of thermal imagery was used to help maximize the subject's involvement. The effects of the imagery skill instruction technique should be most prominent on those who normally have difficulty with this type of task.

A 2(absorption) X 3 (group) factorial design was used in this experiment. The effects of two levels of absorption (low versus high) and three different instruction techniques were examined. A control group, progressive muscle relaxation instruction group (PMR), and imagery task instruction group (TASK) were compared. The dependent measures were imagery vividness ratings, involvement ratings during thermal imagery, and finger temperature. Based on the research reviewed, the following hypotheses were formulated.

Hypothesis 1

a) Individuals high in absorption will reveal higher levels of imagery vividness; b) the experimental groups (PMR and TASK) will result in higher levels of imagery vividness; and c) an interaction between absorption and group is predicted such that low absorption individuals in the TASK group will reveal higher levels of imagery vividness.
Hypothesis 2

a) Individuals high in absorption will reveal higher levels of thermal imagery involvement; b) the experimental groups (PMR and TASK) will result in higher levels of thermal imagery involvement; and c) an interaction between absorption and group is predicted such that low absorption individuals in the TASK group will reveal higher levels of thermal imagery involvement.

Hypothesis 3

a) Individuals high in absorption will reveal higher levels of finger temperature change; b) the experimental groups (PMR and TASK) will result in higher levels of finger temperature change; and c) an interaction between absorption and group is predicted such that low absorption individuals in the TASK group will reveal higher levels of finger temperature change.
CHAPTER II

METHOD

Subjects

Subjects were recruited from minimum security level prisoners at the Federal Correctional Institute in Fort Worth, Texas. Prisoners were chosen as a relevant sample. They may be more likely than students to show stress-related symptoms for which techniques to control physiological functions are often used. The experimenter was a psychology staff member at the prison. The only incentive was the information they could learn about the use of imagery to cope with stress. A letter was written to each subject's central file to recognize and document his or her voluntary participation (see Appendix A).

Of the 83 volunteers recruited for participation, four subjects were unavailable due to transfer, three were screened out due to psychological instability, and one dropped out for personal reasons. Due to equipment malfunction, seven more were eliminated. This left a total sample of 68 subjects who ranged from 23 to 55 years of age (M = 36.97). The sample included 29 females and 39 males.

Equipment

An Orion Model 8600 biofeedback system made by Self Regulation Systems was used to measure finger temperature.
This system features programmable, automated data collection and integration. During the baseline phase, temperature data were collected and averaged across ten second intervals. During the experimental procedures, temperature data were automatically collected and averaged across two minute intervals. An equipment malfunction during the study produced large temperature deviations marked by sudden, rapid increases of more than five degrees Fahrenheit. The instances in which this occurred were easily identifiable and data from those subjects were eliminated from the analysis. This malfunction resulted in the replacement of the temperature modality board as well as the temperature sensitive thermistor. A Panasonic Model RX-F22 dual-cassette player was used to administer the procedures, vividness measure, and thermal imagery.

**Instrumentation**

The Absorption Scale of the Multidimensional Personality Questionnaire (Tellegen, 1982) was used to classify participants into the high or low absorption groups. This instrument measures the tendency toward high levels of involvement in a wide range of imaginative activities (see Appendix B). The scale includes 34 items referring to specific experiences, attitudes, opinions, or interests. Subjects determine whether each statement reflects a self-characteristic. One point is obtained for each true response.

Reliability estimates of the absorption scale are acceptable. Tellegen (1982) reported thirty day test-retest
reliability of 0.91 using a sample of 500 college females and 300 college males. Interitem consistency was 0.88 for males and females using the alpha coefficient. The normative sample of college males (N = 300) obtained a mean of 19.6 with a standard deviation of 7.3. The normative sample of females (N = 500) obtained a mean of 21.4 with a standard deviation of 6.9.

Numerous reports indicate that the absorption scale is a valid measure of a personality characteristic related to hypnotic responsiveness to suggestion. Tellegen and Atkinson (1974) reported a correlation of .27 between the original absorption scale and the Group Scale of Hypnotic Susceptibility (Roberts & Tellegen, 1973), with a cross-validation correlation of .43. He also reported a correlation of .42 between the absorption scale and the Field (1965) Hypnotic Depth Scale. Roberts, Schuler, Bacon, Zimmerman, and Patterson (1975) reported a correlation of .40 between the absorption scale and a measure of hypnotizability. Spanos and McPeake (1975) reported that absorption predicted hypnotizability in males and females. O'Grady (1980) concluded that support for the discriminant validity of the absorption scale was provided by results which indicated that it measured a dimension distinct from a variety of other personality measures. In addition, Davison, Schwartz, and Rothman (1976) concluded on the basis of electroencephalogram measures that
high absorption individuals may possess a more flexible attentional style than low absorption persons.

Scores on the Absorption Scale ranged from 5 to 33, with a median of 21, a mean of 20.03, and a standard deviation of 7.4. This sample distribution appears similar to that reported by Tellegen (1982) for his normative sample of college students. A median split was used to classify the subjects into low or high absorption level. Subjects who scored 21 were assigned to the high absorption group. Within each level, subjects were randomly assigned to either the control condition, progressive muscle relaxation condition (PMR), or imagery task instruction (TASK) condition.

An imagery vividness measure (Appendix C) was adapted from the Marks (1973) Vividness and Control of Imagery Scale. The questionnaire was modified by the deletion of items dealing with imagery control and by altering one of the four scenes that subjects were asked to visualize. The altered scene was changed from "a window display of a store you often go to" to a "building" since the subjects had no access to store displays. The instructions were altered to accommodate a 7-point scale labeled from "no image at all" to a high of "as vivid as if you had really seen it with your normal vision." In addition, the visualization period prior to rating was reduced from 30 to 15 seconds.

A post-experimental questionnaire (Appendix D) was designed to collect information regarding the subject's age;
medication, caffeine, and nicotine intake; and previous level of experience with guided imagery, muscle relaxation exercises, meditation, or hypnosis. Two self-report ratings were included to assess the subject's perception of the credibility of the instructions. To provide a measure of average imagery quality, subjects rated how pleasant, enjoyable, interesting, easy to follow and relaxing each imagery scene was on a 7-point scale. A final rating was included to assess the effort employed to imagine as vividly as possible.

Procedure

The investigator or one of his associated attended group meetings which included all prisoners. The experiment was briefly described and volunteers were requested to sign up for participation. Those who volunteered were gathered in groups of 8 to 12. Subjects read and signed a Statement of Informed Consent (see Appendix E). The experimenter then administered the Absorption Scale. Subjects were told that an individual appointment would be arranged at a later time to conduct the experiment. An associate scored the Absorption Scale and randomly assigned the subjects to one of the three instructional conditions. The experimenter was blind to subjects' absorption classification during the procedures.

Each subject was seated in a stuffed chair in the experimenter's office. The room temperature was maintained between 74 and 78 degrees Fahrenheit for all subjects. The experimenter then stated:
I will now tape this device, called a thermistor, to the middle finger of your dominant hand. This will not hurt you in any way, but will simply measure the temperature of your finger and record the information for me. After taping this to your finger, I will briefly explain the procedures for the study and then answer any questions you may have. Do you write with your right or your left hand?

The thermistor was taped in place using porous surgical tape wrapped at an angle to prevent restriction of blood flow which could produce a measurement artifact (Gaarder & Montgomery, 1981). After connecting the thermistor to the dominant hand, the experimenter gave the following instructions:

Now that the thermistor is in place, I would like you to place your hands on the arms of the chair. You may hold your hand in any comfortable position. Minor movements are allowed but avoid excess movement since that may interfere with recording. Please make yourself as comfortable as possible in the chair without reclining or removing your feet from the floor. For a few moments, I will ask you to simply sit quietly in the chair while I record your temperature. Once I obtain a stable temperature, I will print off that information and place earphones in position. At that point, we will begin the procedure. You will be listening to a cassette tape during the entire procedure. You will first be given some instructions to help you
in the task to follow. You will then be asked to imagine some things and to report how you experience those things in your imagination. You will report your experience by saying a number between 1 and 7. Say the number out loud and I will record your response. The tape will give you instructions about what the numbers mean. After imagining those things, you will hear some additional instructions. You will then listen to some longer, more descriptive imagery scenes. At several points, while listening to these imagery scenes, you will again be asked to report your experience by saying a number between 1 and 7. The entire procedure will take 42 minutes once the tape begins. I will inform you when you have finished. You will be asked to count to 5 before opening your eyes and then to sit quietly for an additional moment with your eyes open. Do you have any questions?

After ensuring that the subject understood the experimental procedure, the biofeedback monitor was turned on and a beginning baseline temperature was established. Beginning baseline criterion was defined as no variation of more than 0.5 degrees Fahrenheit during a two minute period. The average of the final minute of this two-minute period was used in data analysis.

All three induction procedures were standardized at 12 minutes in length to provide constancy. Subjects in the
CONTROL group heard a tape telling them to relax so that they would be better able to vividly imagine the imagery scenes. Brief phrases encouraging them to continue relaxing were interspersed at one minute intervals for the duration of the condition (see Appendix F). In the PMR group, subjects listened to a taped version of a standard progressive muscle relaxation exercise adapted from Schiraldi (1982) (see Appendix G). The imagery TASK instruction group listened to a taped transcript which explained imagery as a skill that can be developed with practice. This procedure provided specific cognitive strategies (e.g., saying "No" to distractions, pretending like an actor). Subjects were also encouraged to actively concentrate while attempting to "think-along-with" and imagine "as vividly as possible" the subsequent imagery scenes (see Appendix H).

The next phase involved completion of the vividness measure. Instructions defined the 7-point scale before subjects were asked to imagine four brief scenes. Each scene consisted of a brief description and a 15-second imagining period followed by questions to rate how vividly they imagined various aspects of each scene. A script of this portion of the tape is included in Appendix C. Following collection of the vividness data, each subject listened to instructions defining the involvement rating scale (see Appendix I). Subjects then heard a set of brief instructions which paralleled the instructions they had been given during
the original instruction condition manipulation (CONTROL, PMR, TASK). Just prior to introducing the thermal imagery, the subjects were told that they were now beginning the next phase of the study and heard a brief review of the involvement rating scale.

The next phase involved the introduction of thermal imagery. At this point, all three groups listened to eight minutes of warming and eight minutes of cooling imagery. The two imagery scenes were separated by a two minute no imagery intermission period. Each subject heard one of the two warming imagery scenes. Scripts of the beach and the farm scenes used as warm imagery are located in Appendix J. Each subject also heard one of the two cooling imagery scenes. Appendix K provides scripts of the lake and mountain scenes used as cool imagery. To provide constancy across conditions, these scenes were standardized in length and in frequency of references to cooling or warming, color, taste, hearing, and smelling. The different scenes as well as the order of warm and cool imagery were counterbalanced within each condition. While listening to a scene, the subject's temperature was monitored and averaged across each two minute interval. Subjects reported their level of subjective involvement in the ongoing thermal imagery at two, four, six, and eight minutes during each imagery scene.

Following the second thermal imagery visualization period, subjects were instructed to count silently to five before opening their eyes and to sit quietly for a moment.
to adjust themselves to their environment. The post-
experimental questionnaire was then administered. Finally, 
subjects were debriefed and thanked for their participation. 

In summary, the experimental procedure occurred in five 
separate phases. First, a baseline finger temperature was 
established. In the second phase, each subject experienced 
one of the three instructional conditions. Phase two lasted 
12 minutes. In phase three, the imagery vividness scale was 
administered. This phase lasted seven minutes. Phase four 
lasted five minutes, during which subjects were re-exposed 
to a brief version of their instructional condition. In the 
final phase, each subject listened to two different eight-
minute imagery scenes separated by a two-minute intermission 
period. Half of the subjects listened to one of the two 
warm scenes (Beach or Farm) followed by one of the two 
different cool scenes (Lake or Mountain). The other half 
of the subjects listened to a cool scene followed by a warm 
scene.
CHAPTER III

RESULTS

The results were analyzed in three stages. The first, preliminary stage, focused on individual and methodological variables to determine whether they were systematically related to the classification variable of absorption or the instructional condition. The second stage of analysis addressed the experimental hypotheses. Finally, several issues pertaining to the use of imagery and suggestion to control finger temperature were explored.

Preliminary Analyses

In the first stage of analysis, a 2 (absorption) X 3 (group) ANOVA was first conducted to detect age differences between the groups. The results indicated no significant differences for absorption level, $F(2, 62) = 0.08$, n.s., group, $F(1, 62) = 2.54$, n.s., or their interaction, $F(2, 62) = 2.54$, n.s. An independent measures $t$ test indicated that the genders did not differ in age, $t(66) = 0.61$, n.s. Males and females were evenly distributed among the instruction groups, Chi-square(2) = 0.40, n.s., and absorption groups, Chi-square(1) = 0.00, n.s.

Since medication, caffeine, and nicotine may affect the finger temperature response, analyses were conducted to detect systematic differences in these variables. Intake of
prescription medication and caffeine were evenly distributed across the group, \( \text{Chi-square}(2) = 1.75, \ n.s. \), and absorption groups, \( \text{Chi-square}(1) = 1.25, \ n.s. \). Smokers were evenly split between the absorption levels, \( \text{Chi-square}(1) = 0.00, \ n.s. \), but significantly different among the PMR (35%), TASK (59%), and CONTROL (87%) groups, \( \text{Chi-square}(2) = 13.10, \ p < .002 \).

Separate 2 (absorption level) X 3 (group) ANOVAs were conducted to determine whether there were any differences related to previous experiences that might affect reactions to the conditions. No significant differences were found between the absorption level groups in guided imagery, \( F(1, 62) = 1.83, \ n.s. \), progressive muscle relaxation, \( F(1, 62) = 2.69, \ n.s. \), or hypnosis \( F(1, 62) = 0.14, \ n.s. \). However, the high absorption groups (\( M = 3.69 \)) did report a significantly higher level of previous experience with meditation than the low absorption group (\( M = 2.58 \)), \( F(1, 62) = 4.30, \ p < .05 \).

No significant differences were revealed among the instruction groups in previous experience with guided imagery, \( F(2, 62) = 0.63, \ n.s. \), progressive muscle relaxation, \( F(2, 62) = 0.89, \ n.s. \), meditation, \( F(2, 62) = 0.57, \ n.s. \), or hypnosis, \( F(2, 62) = 0.46, \ n.s. \).

Each subject heard one of the two different warm and cool thermal imagery scenes. Consequently, analyses were conducted to detect the presence of any systematic differences between each set of scenes. The warm Beach and Farm scenes were evenly distributed across the absorption level,
(Chi-square(1) = 0.00, n.s.) and instruction (Chi-square(2) = 0.03, n.s.) groups as well as by sex (Chi-square(1) = 0.28, n.s.). The cool Lake and Mountain scenes were also evenly distributed across the absorption level (Chi-square(1) = 0.35, n.s.) and instruction (Chi-square(2) = 0.21, n.s.) groups as well as by sex (Chi-square(1) = 0.89, n.s.).

Further analyses were conducted to determine whether any significant differences between the Beach and Farm or Lake and Mountain scenes affected the dependent variables. Independent measures t tests indicated no significant differences between the two warm scenes in involvement, t(66) = -0.13, n.s., or finger temperature, t(66) = -0.18, n.s. Nor were any differences revealed between the cool scenes in involvement, t(66) = 1.33, n.s., or finger temperature, t(66) = 0.56, n.s. Due to the lack of significant difference on these measures, subsequent analyses combined the two warm imagery scenes for involvement and finger temperature measures. The cool imagery scenes were also combined.

The next series of analyses were conducted to determine the effects of order of imagery presentation (warm-cool versus cool-warm). A repeated measures t test indicated no significant difference from the first to the second imagery sequence in the subject's average level of involvement, t(67) = -0.19, n.s., or average finger temperature, t(67) = -1.01, n.s.
Since these involvement and finger temperature measures were averaged across warm and cool imagery, an interaction between type (warm versus cool) of imagery and order of presentation might mask possible differences. Thus, further analyses were conducted to determine the effect of order on each type of thermal imagery. An independent measures t test indicated no significant difference in average involvement between the first and the second order for the warm imagery scenes, $t(66) = 1.87$, n.s. The same pattern of mean differences between first ($M = 5.18$) and second order ($M = 4.49$) did reach significance for the cool imagery scenes, $t(66) = 2.07$, $p < .05$. This indicates that the cool imagery scenes were reported as more involving when they followed a warm imagery scene.

An analysis was also conducted of the difference between the warm and cool scenes for each thermal imagery presentation. During the first imagery presentation, there was a significant difference in average involvement between the warm ($M = 5.33$) and cool ($M = 4.49$) imagery scenes, $t(66) = 2.45$, $p < .02$. Thus, warm imagery scenes were reported as more involving than cool scenes during the first imagery presentation. A reverse pattern was observed during the second imagery presentation, but this difference did not reach significance, $t(66) = 1.48$, n.s. Differences in involvement level were found to depend on order of imagery presentation. Therefore, the decision was made to analyze the effects of the independent
variables on involvement separately for each order and each type (warm versus cool) of thermal imagery.

Several analyses were conducted to detect possible order effects on finger temperature. The average finger temperature was not significantly different between the first and second imagery sequence for the warm, \( t(66) = 1.07, \text{n.s.} \) or the cool, \( t(66) = 1.16, \text{n.s.} \) thermal imagery. Thus, further analyses of finger temperature changes during warm and cool imagery scenes were conducted irrespective of the sequence in which they occurred.

In summary, few systematic differences were found to be related to either the classification variable of absorption or the different procedural conditions. No differences were detected in age, sex, or intake of medication and caffeine. The control group did contain significantly more individuals who smoked. No differences were observed in regard to previous experience with guided imagery, muscle relaxation exercises, or hypnosis. However, individuals in the high absorption group did report a significantly higher level of previous experience with meditation. The different warm and different cool scenes were found to be evenly distributed across the absorption and instruction groups as well as by sex. Differences were not observed between the different warm or cool scenes in imagery involvement level or finger temperature. Order of imagery presentation interacted with type of thermal imagery on subjective level of involvement. Warm imagery was perceived as more involving than cool imagery.
when each was presented first. Cool imagery scenes were perceived as more involving when they followed a warm scene. Due to this order effect, analyses focused on the variable of involvement were conducted separately for each order of presentation did not affect finger temperature response to warm or cool imagery scenes.

**Hypotheses Testing**

Before testing the hypotheses, a t-test was conducted to determine whether the high and low absorption groups were significantly different in absorption score. The difference between the low (M = 13.42) and high (M = 26.26) absorption groups was significant, t(67) = 12.91, p < .001.

The first set of hypotheses (la, b, and c) addressed the effects of absorption and instructions on imagery vividness. To test the main effects and interactions on average vividness ratings, a 2 (absorption level) X 3 (group) ANOVA was conducted. The absorption level main effect was not significant, F(1, 62) = 1.56, n.s. Thus, hypothesis la stating that high absorption individuals would report higher levels of imagery vividness was not supported. The group main effect was also not significant, F(2, 62) = 0.13, n.s. Therefore, hypothesis lb that the PMR and TASK groups would result in higher vividness ratings than the CONTROL group was not supported. The lack of an interaction between absorption and group indicates that hypothesis lc was not supported, F(2, 62) = 1.38, n.s. Low absorption subjects did not report higher levels of vividness in the TASK condition.
The second set of hypotheses concerned the effects of absorption and instruction on imagery involvement. To test hypotheses 2a, b, and c, 2 (absorption level) X 3 (group) ANOVA was conducted on average involvement. Due to the order effect, separate analyses were conducted for each type of thermal imagery during each imagery presentation.

During the first imagery presentation, 33 subjects heard a warm scene first and 35 subjects heard a cool scene first. No support was found for hypothesis 2a that high absorption subjects would report higher average levels of involvement. Main effects of absorption were not significant for the warm involvement rating, $F(1, 27) = 0.14$, n.s., or the cool imagery involvement rating, $F(1, 29) = 1.44$, n.s. Nor was support indicated for hypothesis 2b that the PMR and TASK groups would report higher levels of involvement. The main effects of group were not significant for either the warm involvement rating, $F(2, 27) = 2.52$, n.s., or the cool involvement rating, $F(2, 29) = 2.28$, n.s. Hypothesis 2c that the low absorption group would report higher involvement in the TASK condition was also not supported. The interaction effects between absorption and group were not significant for the warm, $F(2, 27) = 0.16$, n.s., or cool involvement ratings, $F(2, 29) = 1.70$, n.s.

Two ANOVAs were conducted on the warm and cool involvement ratings for the second imagery sequence. The same pattern was observed indicating no support for hypotheses 2a, b, or c. For the warm involvement rating, neither the
main effect for absorption, $F(1, 29) = 3.14$, n.s., the main effect for group, $F(2, 29) = 0.42$, n.s., nor the interaction, $F(2, 29) = 0.49$, n.s.) was significant. For the cool imagery ratings, no significant differences were found for absorption, $F(1, 27) = 0.62$, n.s., group, $F(2, 27) = 0.09$, n.s., or the interaction, $F(2, 27) = 0.33$, n.s.

The final set of hypotheses concerned the effects of absorption and instruction on the finger temperature response to thermal imagery. To analyze hypotheses 3a, b, and c, a 2 (absorption) X 3 (group) X 4 (trials) mixed design ANCOVA was conducted. Repeated temperature measures was the last factor and pre-instruction baseline finger temperature was used as the covariate. The repeated measures (trials) were the temperature averages during each two minute time interval of thermal imagery. Since order of imagery presentation did not affect the average finger temperature during the cool or warm scenes, this analysis examined variation from baseline for each type of thermal imagery irrespective of order of presentation. Thus, two analyses were conducted. Temperature values of subjects who listened to a warm imagery scene first were combined with values of those who listened to the warm imagery scene after the cool imagery scene. The same method was used to form the combined group for the analysis of temperature change during cool imagery.

For temperature during the warm imagery, the trials main effect indicated no significant temperature variation between
trials, $F(3, 186) = 0.84$, n.s. Hypothesis 3a that the high absorption groups would show more temperature increase in response to warm imagery was not supported due to the lack of a significant main effect for absorption, $F(1, 61) = 0.01$, n.s., or interaction between absorption and trials, $F(3, 186) = 1.54$, n.s. Hypothesis 3b that the PMR and TASK groups would show more temperature change than the control group was not supported. Neither the main effect for group, $F(2, 61) = 0.78$, n.s., nor the group by trials interaction, $F(6, 186) = 0.51$, n.s., was significant. Hypothesis 3c that individuals in the low absorption group would show more change in the TASK than in the control or PMR condition was not supported. This was indicated by the lack of a significant interaction between absorption and group, $F(2, 61) = 0.43$, n.s., or interaction of absorption, group and trials, $F(6, 186) = 0.93$, n.s. Although the results indicated a violation of the assumption of homogeneity of variance-covariance matrices, Box’s $M = 74.73$, $p < .001$, the result of this failure would be an inflation of the alpha level. Since no differences were detected, the results were accepted.

The same hypotheses were tested in regard to finger temperature during cool imagery. The trials main effect indicated no significant temperature variation between trials, $F(3, 186) = 1.00$, n.s. Hypothesis 3a was not supported due the lack of a significant main effect for absorption, $F(1, 61) = 0.02$, n.s., or interaction between absorption
and trials, $F(3, 186) = 1.87, \text{n.s.}$ Hypothesis 3b was not supported because neither a significant main effect for group $F(2, 61) = 0.42, \text{n.s.},$ nor interaction between group and trials, $F(6, 186) = 0.36, \text{n.s.},$ was found. Hypothesis 3c was not supported due to the lack of a significant absorption by group interaction, $F(2, 61) = 0.27, \text{n.s.}$ A significant interaction did occur between absorption, group, and trials, $F(6, 186) = 2.20, p < .05.$ However, this analysis also violated the assumption of homogeneity of variance-covariance matrices. Box's $M$ Test could not be performed since all cells of the variance-covariance matrix were singular. This result would provide support for the hypothesis if it were established that low absorption individuals revealed more temperature change following the task instruction. However, the failure to meet the homogeneity assumption requires that these results be viewed with considerable caution.

To determine whether this difference provided tentative support for hypothesis 3c, several additional analyses were conducted. Finger temperature change scores from the pre-instruction baseline were computed to eliminate the baseline as a covariate. This 2 (absorption) $\times$ 3 (group) $\times$ 4 (trials) ANOVA with the last factor repeated also failed to meet homogeneity assumptions, Box's $M = 152.41, p < .001.$ Therefore, this analysis was conducted for each order of presentation. The analysis of finger temperature change
during the cool imagery when presented first also failed to meet homogeneity assumptions, Box's $M = 164.11$, $p < .001$. This analysis indicated no significant effect for absorption, $F(1, 29) = 0.19$, n.s., group, $F(2, 29) = 0.32$, n.s., or the absorption by group interaction, $F(2, 29) = 1.07$, n.s. However, the previously reported absorption, group, and trials interaction effect was again significant, $F(6, 87) = 2.79$, $p < .02$. Therefore, an additional 3 (group) X 4 (trials) ANOVA limited to the low absorption group was conducted. This analysis did not support hypothesis 3c. Neither the group main effect, $F(2, 14) = 0.03$, n.s., the trials main effect, $F(3, 42) = 0.80$, n.s., nor the group by trials interaction, $F(6, 42) = 2.30$, n.s., reached an acceptable level of significance. Thus, it was concluded that low absorption individuals did not show more temperature change during the first presentation of cool imagery.

A 2 (absorption) X 3 (group) X 4 (trials) ANOVA of temperature change scores associated with the cool imagery presented second did meet homogeneity assumptions, Box's $M = 89.81$, n.s. The results of this analysis was not significant for absorption, $F(1, 27) = 0.05$, n.s., group, $F(2, 27) = 0.56$, n.s., or the absorption by group interaction, $F(2, 27) = 2.24$, n.s. The results indicated no significant effect for trials, $F(3, 81) = 2.32$, n.s., absorption by trials, $F(3, 81) = 2.31$, n.s., group by trials, $F(6, 81) = 0.59$, n.s., or interaction of absorption, group and trials, $F(6, 81) = 1.00$, n.s. Thus, it was concluded that low
absorption individuals in the TASK group did not reveal greater temperature change during cool imagery when it was presented after warm imagery.

Additional Analyses

Several analyses were conducted to gather additional information from this experiment. The first analysis was conducted to determine whether temperature increased during the experimental procedure. A repeated measures t test indicated a significant increase in finger temperature from the pre-instruction baseline ($M = 92.31$) to the two minute interval immediately prior to the presentation to the thermal imagery ($M = 92.97$), $t(67) = -3.46$, $p \leq .001$. This difference was maintained during the warm, $t(67) = -3.29$, $p \leq .002$, and during the cool imagery, $t(67) = -3.29$, $p \leq .002$. However, there was no significant difference between the average temperature immediately prior to the thermal imagery and the average temperature during either the warm, $t(67) = -0.53$, n.s., or the cool imagery scenes, $t(67) = -1.13$, n.s. The results indicate that finger temperature increased during the instruction and vividness stages of the experiment, but remained relatively stable during thermal imagery.

The next analysis directly tested whether finger temperature differed between the warm and the cool imagery scenes. A repeated measures t test indicated no significant within individuals temperature difference between the warm and cool imagery presentations, $t(67) = 1.03$, n.s. No difference
was observed when the warm scene was presented first, \( t(32) = 0.02, \text{n.s.} \), or when the cool scene was presented first, \( t(34) = 1.35, \text{n.s.} \). The results indicate that average temperature was not affected by the shift from warm to cool imagery or by the change from cool to warm imagery.

To assess temperature differences during imagery from a different angle, two independent measures \( t \) tests were conducted. The between groups comparisons of temperatures during warm versus cool imagery indicated no significant difference either during the first imagery presentation, \( t(66) = 1.17, \text{n.s.} \), or during the second imagery presentation, \( t(66) = 1.06, \text{n.s.} \). The results indicate that temperature was not affected by the type of imagery experienced.

Another question of interest concerned the relationship between imagery vividness and imagery involvement. To assess this relationship, Pearson correlations were computed between the average vividness score, the average involvement score, and the average involvement score during each type of thermal imagery. The results indicated significant positive correlations between vividness and involvement, \( r = 0.54, p < .001 \), involvement during warm imagery, \( r = 0.49, p < .001 \), and involvement during cool imagery, \( r = 0.41, p < .001 \).

The relationship between involvement ratings and finger temperatures was also of interest. Pearson correlations revealed no significant relationship between involvement and finger temperature during either the warm imagery, \( r = -0.12, \text{n.s.} \), or during the cool imagery, \( r = -0.12, \text{n.s.} \).
Two analyses focused on credibility measures obtained from the post-experimental questionnaire. The first measure was a self-report rating of the degree to which the procedure instructions helped the subject to "vividly imagine." The overall mean was 5.25 on the 7-point scale. A 2 (absorption) x 3 (procedure) ANOVA indicated no significant main effect for absorption, $F(1, 62) = 0.13$, n.s., for procedure, $F(2, 62) = 0.18$, n.s., or for the absorption by procedure interaction, $F(2, 62) = 1.29$, n.s. The second measure was a self-report rating of the likelihood that the instructions could "help you or others to use pleasant imagery to combat boredom and reduce stress." Again, there was no significant main effect for absorption, $F(1, 67) = 1.88$, n.s., for procedure, $F(2, 67) = 0.29$, n.s., or the absorption by procedure interaction, $F(2, 67) = 0.27$, n.s. The ratings indicate that subjects in all groups perceived their instructions as helpful (overall $M = 5.9$).

The next analysis concerned a self-report measure of the degree of effort the subject put into trying to imagine as vividly as possible. A 2 (absorption) x 3 (procedure) ANOVA indicated a significant difference between the low ($M = 4.94$) and high ($M = 5.97$) absorption groups, $F(1, 62) = 10.26$, $p < .002$. The main effect for procedure, $F(2, 62) = 0.33$, n.s., and the absorption by procedure interaction, $F(2, 62) = 0.34$, n.s., were not significant.

A final set of analyses was conducted to determine whether differences in involvement ratings were related to
the subjects' perceptions of imagery quality. An independent measures t test indicated no significant differences between the perceived quality of the warm and cool imagery during the first imagery presentation, t(66) = 1.91, n.s. An independent measures t test also indicated that there was no significant difference in perceived imagery quality of the cool imagery between the first and second order of presentation, t(66) = 1.56, n.s. Thus, the involvement differences between the warm and cool imagery scenes presented first as well as between the first and second cool scene presentation were not paralleled by similar differences in perceived imagery quality.
CHAPTER IV

DISCUSSION

An experiment was conducted to examine the effects of absorption, imagery skill instruction, and progressive muscle relaxation on thermal imagery experience and the finger temperature response. The results did not support the hypothesis that high absorption subjects would report higher levels of imagery vividness and involvement or more finger temperature change in response to thermal imagery. The results also failed to support the hypothesis that the imagery task instruction and the progressive muscle relaxation exercise would enhance imagery vividness and involvement or finger temperature change in comparison to a resting control. Finally, the results did not uphold the hypothesis that low absorption subjects would respond to the imagery task training instructions with more imagery vividness and involvement or finger temperature change than in the control or progressive muscle relaxation conditions. The results indicated that temperature increased during prior to the thermal imagery, but remained stable during the presentations of warm and cool imagery scenes.

In this section, the results are examined in relation to methodological issues which limit generalizability.
Theoretical implications for the use of thermal suggestion and imagery to control finger temperature are addressed. The cognitive-behavioral viewpoint of suggestion and the use of skill training techniques to enhance responsiveness are discussed. Finally, the influence of absorption on responsiveness to suggestion is considered.

Methodological Issues

Aspects of the subjects, setting, absorption classification, imagery measures and scenes, instructional conditions, as well as the season may have been problematic factors affecting the outcome of the experiment. The use of a prison population will be considered first.

A majority of the inmates are first time offenders with no previous criminal record. Adjustment to incarceration can be perceived as an inherently stressful process. Psychological and somatic symptoms frequently occur (e.g., anxiety, depression, sleep difficulty, headache). It is possible that a restricted setting with a limited variety of activities available may induce even low absorption individuals to more readily involve themselves in imaginative types of activities. Consequently the effects of absorption may have been different among a prison population as opposed to, for example, a college population.

In addition, inmates are often sent to this institution due to the availability of a variety of treatment programs. Many of these individuals have a history of chronic drug
abuse. Although the subjects were recruited as volunteers for an experiment, debriefing interviews indicated that many perceived it as a treatment program. Conducting the research in the experimenter's office where he typically provides treatment probably increased the likelihood of this perception. Such a perception may have enhanced the credibility of the various instructional conditions.

During recruitment, inmates were told that the experiment would involve imagining. Consequently, inmates with favorable attitudes toward the use of imagery may have selectively volunteered. Favorable attitudes and beliefs regarding the use of imagery techniques may have contributed to a high expectancy of success. Council et al. (1983) reported the expectancy of responding successfully accounted for actual responsiveness to suggestion. A positive expectation may have contributed to the lack of differences observed on the dependent measures. Most of the previous research in this area has utilized college students as volunteers. This experiment suggests that future research should consider other individual and environmental characteristics which may mediate the effects of absorption on imagery involvement and responsiveness to suggestion.

The experiment was conducted in an office located in a residential unit and routine activities were in progress in the area. The experimenter also remained in the office during the experiment procedure. Distractions were minimized
by orienting the subject toward a blank wall and by presenting instructions and imagery scenes through headphones. In the clinical application of imagery techniques, environmental variables such as these cannot always be adequately controlled. Imagery techniques designed to aid the individual in gaining self-control should be robust enough to overcome minor environmental distractions. However, it is possible that such factors may have interfered with the detection of differences which have been observed in more isolated laboratory settings.

Two further aspects of the setting may have affected the results. The lives of prisoners are more routine and, perhaps, more boring than what is experienced by other groups. Consequently, any deviation from this routine could have been perceived as very involving. More importantly, prisoners' lives are under external control. During the experiment, subjects were guided by an external stimulus. This need for prisoners to be under external control coupled with subjects' being told how to relax or imagine and to be involved may have contributed to a uniformly high degree of involvement that may not be present in other samples.

The classification procedure produced a significant mean difference between the low and high absorption groups. The means and standard deviations indicated that this sample probably was not very different from normative samples. However, most of the previous research involving this
individual difference variable has selected from the extremes of the distribution. The median split used here allowed individuals in the moderate range of absorption to be included in both groups. This may have obscured the detection of differences due to this variable.

In addition, the absorption scale utilizes a dichotomous scoring format (True-False) and does not attempt to assess the degree or intensity of experience. A broad range of experience items are included which may not sample a unitary dimension of cognitive experience. These aspects of the scale may have contributed to the lack of qualitative differences in imagery vividness or involvement.

The circumstances of prison life which require adjustment to external demands in combination with the external provision of imagery may have particularly enhanced the subjective imagery experience of low absorption individuals. This could also contribute to the failure to detect differences in subjective imagery experience between low and high absorption groups as well as between the different instructional conditions.

Seven-point scales were used to assess the subjective measures of imagery vividness and involvement. Subjects having even vague images and slight involvement scored at or just below the midpoint. Effectively, these scales ranged from four to seven, creating a skewed distribution and attenuated scale. These restricted scales would reduce possibility of detecting differences on these measures.
Several aspects of the instruction conditions utilized to affect responsivity may have confounded these conditions to some degree. For example, the control and relaxation groups were both given the instruction to imagine as "vividly as possible." Thus, these groups received a mild version of the imagery task instruction condition. In addition, while the task instruction group received no instruction to relax, the procedure allowed those subjects to relax and sit quietly for a 24 minute time span before listening to thermal imagery scenes. Further, none of the instructional conditions contained the direct instruction to increase and/or decrease finger temperature. Response specific instructions have been found to aid finger temperature control in some research (Bregman & McAllister, 1981; Keefe, 1978). Such similarities between the conditions may have contributed to the high and uniform credibility ratings assigned to the different instruction approaches and interfered with the detection of differences on the dependent measures.

The imagery scenes used in this experiment were designed to enhance the likelihood of imaginative involvement. In comparison to most of the previous research, the thermal imagery was of relatively long duration, maintained an ongoing narrative format, and included only benign or pleasant associations. References to temperature were usually indirect although each scene included one direct reference to hand temperature. While the high involvement ratings reflect a
generally positive reaction, these scenes may be criticized for their lack of intense, direct suggestions to elicit temperature changes. In addition, the highly structured and descriptive format may have interfered with imaginative involvement for some individuals. Although most subjects reported a favorable response, debriefing indicated that some subjects found it difficult to focus attention on the imagery as presented when it did not agree with their experience.

The effect of the independent variables on the finger temperature response may have been further obscured by a seasonal effect. Data collection began in late July and continued through late September. The weather was generally dry and hot throughout this time period. Increased finger temperatures and reduced variability may have resulted, producing a ceiling effect beyond which further variability was not observed.

Theoretical Issues

Previous research has indicated that thermal suggestion and imagery offers some promise as a technique for gaining finger temperature control (Barabasz & McGeorge, 1978; Bregman & McAllister, 1981; Grabert et al., 1980; Herzfeld & Taub, 1977; Keefe, 1978). Other research has been less supportive of the use of thermal imagery for this purpose (Blizard et al., 1975; Gillespie & Peck, 1980; Piedmont, 1981; Peters & Stern, 1973). A review of the literature revealed several recurring methodological problems. These
problems included a failure to control for individual differences in susceptibility, variability in induction procedures, nonspecific relaxation effects, and differences in the types of suggestion employed.

This experiment controlled for methodological problems often found in the literature while assessing the effect of thermal imagery on the finger temperature response. The results indicated that thermal imagery did not affect finger temperature. Neither individual differences in responsiveness to suggestion nor the instructional condition employed affected the finger temperature response to thermal imagery. The results suggest that finger temperature changes which have been reported to occur during thermal suggestion or imagery could best be interpreted as due to increased relaxation. However, these findings are limited in generalizability. First, the effects of using a prison population are unknown and several methodological problems occurred. Also, since the present experiment only involved a brief instructional exposure, it may be possible that temperature change could be achieved with additional practice. Finally, other types of induction techniques or imagery might more effectively alter the finger temperature response.

Benson et al. (1981) argued that reports of temperature changes during thermal suggestion reflect only the nonspecific effects of the general relaxation suggestions included in traditional hypnotic inductions. A relaxation interpretation
is supported in this experiment for several reasons. Post hoc analyses indicated that temperatures during both warm and cool imagery were significantly higher than the pre-instruction baseline, but were not higher than a pre-imagery baseline. Thus, as others have also reported (Crosson, 1980), finger temperature increased during the induction procedure prior to introduction of thermal imagery. However, this temperature change was neither enhanced nor impaired by the subsequent introduction of warm or cool thermal imagery. Previous reports of either decreases in temperature or attenuation of increases (Blizard et al., 1975; Gillespie & Peck, 1980) may be interpreted most parsimoniously as increases in general arousal level. The imagery scenes used in the present study were designed to be equivalent in relaxation and pleasantness. The lack of any finger temperature difference between warm and cool imagery exposures suggests that arousal levels were equivalent.

It may be inferred from the results that thermal imagery does not directly affect finger temperature. This interpretation does not preclude the use of thermal imagery to obtain finger temperature changes. Thermal or any other type of imagery with pleasant, relaxing associations may mediate finger temperature changes. That is, imagery may provide a cue to focus attention and facilitate relaxation which could result in finger temperature increase. In the present study, finger temperature was maintained at a relatively high level during the thermal imagery exposures.
This could indicate that imagery assisted in maintaining a low arousal level during the thermal imagery exposure.

**Cognitive-Behavioral Viewpoint**

The cognitive-behavioral viewpoint contends that responsiveness to suggestion is facilitated by a high level of involvement in vivid suggestion-related imaginings (Spanos & Barber, 1974; Spanos & McPeake, 1974; Barber & Wilson, 1977). Direct skill training approaches devised to encourage the strategy of goal-directed imagining have been shown to increase responsiveness as well or better than traditional hypnotic inductions (Katz, 1978; Council et al., 1983). This approach has successfully enhanced both subjective and behavioral responsiveness to suggestion. This experiment applied a cognitive-behavioral skill training type of technique to thermal imagery in an attempt to enhance subjective involvement in thermal imagery and increase control of finger temperature.

The present study compared the effects of a brief set of imagery skill training instructions with progressive muscle relaxation instructions and a relaxation control procedure. The effects of these conditions on subjective and physiological responses to thermal imagery were compared. Cognitive-behavioral imagery skill training instructions did not enhance either the subjective or the physiological response to thermal imagery beyond what was achieved by relaxation or control.
One possible explanation for the failure to obtain the anticipated results is suggested by an analysis of the situation. In traditional measures of responsiveness, suggestions are often offered and subjects are left on their own to either experience or not experience the suggestion. Theory predicts that those who employ appropriate imagery then exhibit the desired response. The rationale for training subjects to use imagery would be that some subjects do not engage in such imagery and thus, do not respond appropriately. The purpose of skill training would be to encourage subjects to devise and employ appropriately relevant images to obtain the desired effect. It could be argued that such techniques do not influence the subjective experience of mental imagery, only the tendency to employ such imagery. In this research, all subjects were directly instructed to imagine "as vividly as possible." It may be that all subjects actually did employ imagery as requested and that differences on all dependent measures were normally distributed across the different procedures. This interpretation would suggest that involvement in imagery is mediated primarily by the subject's natural capacity to experience imagery when it is employed.

The results of the present study do provide some support for such an interpretation. Despite the lack of differences between the procedures, independent measures of vividness and involvement were highly positively correlated, even
across different imagers. This finding is in agreement with previous research (Spanos & McPeake, 1974) and supports the interrelated nature of these two subjective aspects of mental imagery. The degree to which one may vividly experience mental imagery may be a factor limiting involvement in mental imagery. Future research needs to develop more precise measures of these variables and determine what factors affect them.

Alternatively, even given inherent limitations on imagery vividness, it may still be possible to enhance subjective involvement in mental imagery. Involvement may be limited by other factors, such as distractions or attention to thoughts that are incompatible with the suggestion (Barber & DeMoor, 1972). If involvement is a crucial factor affecting responsiveness to suggestion, training to counteract such thoughts might allow individuals to respond with increased involvement despite an invariant level of vividness. The brief set of instructions used in the present study incorporated several techniques to aid the individual in remaining highly focused on the thermal imagery. The results indicate that the techniques were not powerful enough to elicit increased involvement. Research including different cognitive techniques to aid the individual in imagining and allowing training over time is needed to provide a more adequate test of learning effects.
A final point concerns the relationship between involvement and finger temperature response. Subjective involvement was affected by the type of thermal imagery and the order of imagery presentation. Involvement was significantly higher during the warm imagery when it was presented first. This subjective difference was not paralleled by a corresponding between groups difference in finger temperature. Although the present data must be viewed with caution, the results imply that imagery involvement may not mediate the finger temperature response.

Absorption

Imaginative activities have been recognized by investigators with different viewpoints as important to an understanding of hypnotic responsiveness (Bowers, 1982; Hilgard, 1979; Singer & Pope, 1981; Spanos & Barber, 1974). Tellegen and Atkinson (1974) introduced the personality characteristic of absorption to refer to the tendency to display a high level of attentional involvement in a wide range of imaginative activities. Previous research has consistently reported a relationship between absorption and hypnotic susceptibility (Spanos & McPeake, 1975; Yanchar & Johnson, 1981).

In the present study, no differences due to absorption were observed in either subjective imagery experience or physiological response. It was anticipated that high absorption individuals would not benefit as much from the
imagery skill training instructions since they are characterized as highly skilled at imaginative activities. However, it was hypothesized that low absorption individuals, who normally show less capacity for imaginative activities, would benefit from direct imagery skill training. The training instructions were designed to provide low absorption subjects with the rationale and motivation to engage in imagery and some specific strategies to help them imagine more vividly and remain more involved. Unexpectedly, the results indicated that low and high absorption subjects responded equivalently to the guided thermal imagery. As Council et al. (1983) have previously indicated, expectancy may mediate the effects of absorption to some degree. Although no measure of expectancy was taken to verify this possibility in the present study, such an influence is easily conceivable given the environmental setting. Also, as suggested above, it is possible that a prison environment might stimulate individuals normally low in absorption to engage in more imaginative activities.

Qualls & Sheehan (1981a, 1981b) have suggested an attentional hypothesis which also deserves some consideration. They have suggested that tasks (e.g., biofeedback) which exert demands for attention to external stimuli may interfere with imaginative involvement for high absorption subjects. The provision of imagery on an ongoing basis may have placed an attentional demand on high absorption subjects which
interfered with their subjective level of involvement. In contrast, guided imagery may provide low absorption subjects with an external focus which aids them in sustaining their involvement. The finding that high absorption subjects employed more effort in the present study may support this view. Remaining attentive to the externally initiated imagery may have been perceived as more effortful for these individuals and interfered with involvement. Evidence of this possibility was discovered during debriefing. Some subjects reported finding it difficult to stay with the imagery and distracted when it did not agree with their own experience or imaginings.

Directions for Future Research

The present study suggests several directions for future research. First, the results do not support the use of thermal imagery to produce specific finger temperature alterations. However, relaxing imagery may be used to mediate changes in general arousal level. Further research should focus on the use of cognitive strategies, such as imagery, to mediate changes in conjunction with biofeedback. This combination approach provides information regarding the usefulness of individually meaningful imagery scenes. More attention should also be given to the characteristics of imagery used to elicit changes. While the usefulness of the imagery skill instructions used in this experiment was not supported, this approach deserves further investigation. Research should also delineate the relationship between imagery vividness and involvement and
responsiveness to suggestion. Finally, the relationships between absorption, expectancy, attentional style, and the effortfulness of experience need further clarification.
Appendix A

Letter of Appreciation to Central File

Date:

From: Robert E. Durrenberger, M.A.

To: Central File

This letter is to express my appreciation for the voluntary participation of (subject's name) in a psychological research project. This research investigated the effects of relaxation and imagery training instructions on thermal imagery experience and finger temperature response. Only through such cooperation is psychological research able to develop and improve treatment techniques.
Appendix B
Absorption Scale Questionnaire

Below is a series of statements a person might use to describe his/her attitudes, reactions, or experiences. Each statement is followed by "True False." Read each statement and decide if it is generally True or False as it applies to you. Then circle the appropriate response. Please answer every statement, even if you are not completely sure of the best answer. If undecided, it is best to answer False.

1. Sometimes I feel and experience things as I did when I was a young child. True False
2. I can be greatly moved by eloquent or poetic language. True False
3. While watching a movie, a T.V. show, or a play, I may become so involved that I forget about myself and my surroundings and experience the story as if it were real and as if I were taking part in it. True False
4. If I stare at a picture and then look away from it, I can sometimes "see" an image of the picture, almost as if I were still looking at it. True False
5. Sometimes I feel as if my mind could envelop the whole world. True False
6. I like to watch cloud shapes change in the sky. True False
7. If I wish I can imagine (or daydream) some things so vividly that they hold my attention as a good movie or story does. True False
8. I think I really know what some people mean when they talk about mystical experiences. True False
9. I sometimes "step outside" my usual self and experience an entirely different state of being. True False
10. Textures—such as wool, sand, wood—sometimes remind me of colors or music. True False
11. Sometimes I experience things as if they were doubly real. True False
12. When I listen to music I can get so caught up in it that I don't notice anything else. True False
13. If I wish I can imagine that my body is so heavy that I could not move it if I wanted to. True False
14. I can often somehow sense the presence of another person before I actually see him/her. True False
15. The crackle and flames of a wood fire stimulate my imagination. True False
16. It is sometimes possible for me to be completely immersed in nature or in art and to feel as if my whose state of consciousness has somehow been temporarily altered. True False
17. Different colors have distinctive and special meanings for me. True False
18. I am able to wander off into my own thoughts while doing a routine task and actually forget that I am doing the task, and then find a few minutes later that I have completed it. True False

19. I can sometimes recollect certain past experiences in my life with such clarity and vividness that it is like living them again or almost so. True False

20. Things that might seem meaningless to others often make sense to me. True False

21. While acting in a play I think I could really feel the emotions of the character and "become" her/him for the time being, forgetting both myself and the audience. True False

22. My thoughts often don't occur as words but as visual images. True False

23. I often take delight in small things (like the five-pointed star shape that appears when you cut an apple across the core or the colors in soap bubbles). True False

24. When listening to organ music or other powerful music, I sometimes feel as if I am being lifted into the air. True False

25. Sometimes I can change noise into music by the way I listen to it. True False
26. Some of my most vivid memories are called up by scents and smells.  
   True  False
27. Some music reminds me of pictures or changing color patterns.  
   True  False
28. I often know what someone is going to say before he or she says it.  
   True  False
29. I often have "physical memories"; for example, after I've been swimming I may feel as if I'm in the water.  
   True  False
30. The sound of a voice can be so fascinating to me that I can just go on listening to it.  True  False
31. At times I somehow feel the presence of someone who is not physically there.  
   True  False
32. Sometimes thoughts and images come to me without the slightest effort on my part.  
   True  False
33. I find that different odors have different colors.  
   True  False
34. I can be deeply moved by a sunset.  
   True  False
Appendix C

Imagery Vividness Scale

Instructions: In a moment, you will be asked to imagine some things and then to report how vividly you see those things in your imagination. Vividness may refer to the clarity or distinctness of an object as well as the brightness or intensity of its color. You will report how vivid your images are by saying a number between 1 and 7. If you say 1, it means that you were not able to form an image at all, that it was really no different from just thinking about it. A 2 means you see an image so low in vividness that it is barely recognizable. A 3 means your image is more recognizable but still vague and dim. A 4 means it is still unclear but easily recognizable. A 5 means it is clearly recognizable and moderately vivid. A 6 means very clear and almost as vivid as your actual vision. If you say 7, it means that your image was very vivid, perfectly clear, and just as vivid as if you had seen it with your normal vision. Remember, when asked how vivid your image is, say a number between 1 and 7, with 1 meaning no image present at all and 7 meaning a very vivid, perfectly clear image. Numbers 2, 3, 4, 5, and 6 fall in between, with each higher number meaning your image was noticeably a little more vivid. Be completely honest and answer each question as quickly as possible.
Appendix C—Continued

Image 1: Now, imagine a relative or friend whom you see frequently. Carefully imagine the person in your mind's eye. (Allow 15 seconds.)

1. How vividly do you see the contour, or outline of the face, head, shoulders, and body? ___

2. How vividly do you see the characteristic pose or posture of the head and body? ___

3. How vividly do you see the stance of the body and length of the step when walking? ___

4. How vividly do you see the colors of the clothes? ___

Image 2: Now, imagine the sun rising into a stormy sky with a rainbow to one side. Carefully consider the scene that comes before your mind's eye. (Allow 15 seconds.)

5. How vividly do you see the sun rising above the horizon? ___

6. How vividly do you see the clouds? ___

7. How vividly do you see the flashes of lightning? ___

8. How vividly do you see the rainbow? ___

Image 3: Now, imagine you are standing in front of a building you go to often. Consider carefully the image that comes before your mind's eye. (Allow 15 seconds.)

9. How vividly do you see the overall appearance of the building from where you are standing? ___

10. How vividly do you see the shapes and details of the windows? ___
11. How vividly do you see the colors of the building? ____________

*Image 4: Now imagine a scene which includes trees, mountains, and a lake. Carefully consider the image that comes before your mind's eye. (Allow 15 seconds.)*

12. How vividly do you see the contours of the landscape? ____________

13. How vividly do you see the shapes of the trees? ____________

14. How vividly do you see the colors of the trees? ____________

15. How vividly do you see the color and shape of the lake? ____________

**TOTAL ____________**
Appendix D
Post-Experimental Questionnaire

1. Thinking about the INSTRUCTIONS you received:

How much did they help you to vividly imagine the scenes you heard?

Not at all  Somewhat  Very Much
1 2 3 4 5 6 7

How likely is it that THOSE INSTRUCTIONS could help you or others to use pleasant imagery to combat boredom and reduce stress?

Very Unlikely  Somewhat Likely
1 2 3 4 5 6 7

2. Please circle the word which BEST describes the FIRST LONG IMAGERY scene that you heard. BEACH  MOUNTAIN  LAKE  FARM

Now, rate that imagery scene using the scales below:

Very Unpleasant  Neutral  Pleasant
1 2 3 4 5 6 7

Very Enjoyable  Neutral  Not Enjoyable
1 2 3 4 5 6 7

Not at all Interesting  Neutral  Very Interesting
1 2 3 4 5 6 7

Very Easy to Follow  Neutral  Very Hard to Follow
1 2 3 4 5 6 7

Relaxing  Neutral  Stressful
1 2 3 4 5 6 7
3. Please circle the word which BEST describes the SECOND LONG IMAGERY scene to which you listened: BEACH MOUNTAIN LAKE FARM. Now rate that imagery scene using the scales below:

```
Very Unpleasant                Neutral                Pleasant
+................+................+................+................+  
1 2 3 4 5 6 7

Very Enjoyable                Not Enjoyable
+................+................+................+................+  
1 2 3 4 5 6 7

Not at all Interesting        Neutral              Very Interesting
+................+................+................+................+  
1 2 3 4 5 6 7

Very Easy to Follow            Not Hard to Follow
+................+................+................+................+  
1 2 3 4 5 6 7

Relaxing                       Neutral              Stressful
+................+................+................+................+  
1 2 3 4 5 6 7
```

4. How much EFFORT did you put into the task of IMAGINING AS VIVIDLY AS POSSIBLE the scenes to which you listened:

```
None at all                    Moderate               Very Much
+................+................+................+................+  
1 2 3 4 5 6 7
```

5. List any medication you are currently taking and the last time you took it.______________________________________________________________________________________________

6. When was the last time you drank containing caffeine?

7. Do you smoke cigarettes? YES NO

8. Indicate your level of previous experience with each of the techniques listed below:

```
Guided Imagery
None          Once        Several          Daily
+................+................+................+................+  
```
### Muscle Relaxation Exercises

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### Hypnosis

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Appendix E

Statement of Informed Consent

This research project is being conducted by Robert Durrenberger, M.A. in fulfillment of dissertation requirements for the Ph.D. degree at North Texas State University. The study is concerned with the relationship between imagery experiences and finger temperature. You will be asked to fill out a questionnaire concerning your typical reactions to various types of activities. Later, during an individual session of 1 to 1 1/2 hours, you will be asked to listen to and imagine several different scenes while your finger temperature is measured. You will also be asked to answer some questions about the mental imagery and procedures you experience. I expect that you will have a pleasant, enjoyable experience while listening to the imagery scenes. The instruction you receive may help you learn how to use pleasant imagery to combat boredom and cope with stressful situations.

In order to monitor your finger temperature, your finger will be hooked up to a biofeedback monitor. This instrument simply gathers information from your body. At no time will you be in any danger of electrical shock.

I will write a memorandum to your central file to document your voluntary participation in this research project. You are free to withdraw from the research at any time for any reason without any penalty. No one will be informed if you fail to complete the project.
Appendix E—Continued

I, ________________________________, certify that I understand the purpose of the study as explained above, and I consent to participate. My participation is fully voluntary. I understand that all research information will be handled in the strictest confidence and that my participation will not be individually identifiable in any reports. I further understand that there is no penalty or prejudice of any kind for not participating in the study.

(Signature)  (Register No.)  (Unit)  (Date)

(Witness)  (Date)
Appendix F

Control Condition Instructions

In a few moments, you will be asked to listen to and imagine several different scenes. As you listen, your goal is to pay close attention and imagine these scenes to the best of your ability. To begin, I would like you to get very comfortable in your chair, but keep both feet on the floor and your hands on the arms of the chair. Next, I would like you to close your eyes to help you relax. I am going to give you a few moments to remain quiet and relax as much as possible. By becoming very deeply relaxed, you will find it easier to concentrate on and vividly imagine the imagery scenes you will hear later. Please remain seated in your chair with your eyes closed until the next part of the study begins. The following instructions were interspersed at one minute intervals: Just continue to relax, enjoying the relaxation, deeply relaxed.

The following instructions were heard after the vividness measure: Please remain seated in your chair with your eyes closed until the next part of the study begins. Just continue to relax as much as possible so that you will be able to concentrate on and vividly imagine the imagery scene which you will hear shortly.

The following instructions were heard during the intermission period between the thermal imagery scenes: Please remain seated in your chair with your eyes closed until the next imagery scene begins. Just continue to relax so that you
will be able to concentrate on and vividly imagine the next imagery scene.
Appendix G

Progressive Muscle Relaxation Condition Instructions

In a few moments, you will be asked to listen to and imagine several different scenes. As you listen, your goal is to pay close attention and imagine these scenes to the best of your ability. To begin, I would like you to get very comfortable in your chair, but keep both feet on the floor and your hands on the arms of the chair. Next, I would like you to close your eyes to help you concentrate. Now, listen carefully. I will give you some information and instructions to help you in the task to follow.

The following instructions will help you become very deeply relaxed. By becoming deeply relaxed, you will find it easier to concentrate on and vividly imagine the imagery scenes you will hear later. In this exercise, you will first tense and then relax most of the muscles in your body. This is an effective way to achieve very deep relaxation. I'll first explain the exercise for each area, and then ask you to tense by saying, "Ready? Tense!" When I say "Relax," exhale and completely let go of the tension all at once.

First, I'd like you to concentrate on your breathing. Notice the air flowing in and out. Notice the tension with each inhalation and the feeling of relaxation with each exhalation. Focusing on your breathing is a natural relaxer that calms you as you tune in to it. Notice your stomach
Appendix G—Continued

rising as you breathe in deeply, and falling as you breathe out. With each breath, search your body for any tense areas. Let the tension go as you breathe out. Notice particularly your exhalation—let your body relax and sink into the chair as you breathe out. Let your breathing gradually slow and become regular. Throughout this exercise, continue to breathe naturally.

When I say tense, I'd like you to point both of your feet and toes at the same time. Tense as hard as you can without discomfort. When I say "Relax," exhale as you let go of the tension. Ready? Tense! Notice the pulling sensation of tension in your calves. Feel the tension in the bottom of your feet. Notice if both feet are equally tensed. Now relax. As you exhale, feel the relaxation in the calves and feet. Just enjoy letting them relax. Let your feet sink into the floor feeling relaxed and comfortable. Next, you will point your toes upward toward your head. Ready? Tense! Feel the tension in the muscles below the knee. Now, relax. Completely release all tension. Let those muscles relax more and more.

Next, I'd like you to tense the powerful muscles on the front part of the leg above the knee. You'll do this by straightening your legs and locking your knees. Ready? Tense! Concentrate on the pulling in your legs. Feel the tension. Now, relax and breathe out as you feel the tension drain from your legs. Enjoy feeling the relaxation. Next, I'll ask you to push down with your heels on the floor. Ready? Tense!
Press down hard. Feel the tension in the back of your legs. Now relax. Let your legs relax entirely. Search your entire legs and feet for the relaxed feeling. Notice how different relaxation is from tension. Let the relaxed feeling spread evenly throughout the legs.

This time, I want you to pull in the muscles of your stomach. You will draw the stomach in as though it will touch the spine. Ready? Tense! Very tight and hard. Notice that this tension interferes with your breathing. Now relax. Notice the difference as your stomach relaxes and lets go of tension. Feel the relaxation spread.

Next, you'll tense the muscles of the back. First, you'll gently and gradually press your shoulders and elbows against the back of the chair while arching your back away. At the same time, you'll raise your chest up toward your chin. Ready? Tense! Push your shoulders against the chair. Extend your chest toward your chin. Notice where you feel the tension in your back. Now relax. Let go of the tension. Enjoy the pleasant feeling as the back muscles relax.

Next, you'll squeeze your arms downward and against the sides of your body. Ready? Tense! Push hard. Feel the tension across your chest, shoulders and upper arms. Now relax. Notice the contrast as these muscles relax. Notice that when you inhale, there is a slight tension in the muscles around the ribs and chest. As you exhale, let your chest relax more and more deeply. Next, you'll shrug your shoulders.
Ready? **Tense!** Raise your shoulders toward your ears and feel the tension. Now **relax**. Let your shoulders sag down. Relax deeper and deeper.

You will now relax the neck area. Use care and move slowly as you do this, and don't strain. Right now, gently and slowly **turn your head to the right** until you feel tension below your right ear. Notice where that tension is and what it feels like. **Now slowly return** to the normal position, and let the muscles on the right side of the neck totally relax (pause 5 seconds). **Now, slowly and gently turn your head to the left,** this time noticing the tension below your left ear. **Now return** and relax (pause 5 seconds). **Now, slowly push your chin down toward your chest.** Feel the tension at the sides and front of the neck. **Now relax and return to normal** (pause 5 seconds). **Now, slowly point your chin up in the air.** Notice the tension along the back of the neck. **Relax now** and let your head rest naturally and comfortably. Feel the difference all around your neck.

Next, you'll make a wide smile. Ready? **Tense!** Open your mouth wide. Feel the skin and muscle tighten around the cheekbone. Feel the tension around your temples. Now, **relax.** Notice the difference. Next, clench your teeth and push your tongue against the roof of your mouth. Ready? **Tense!** Notice the tension from the jaw up to the temples. **Now, relax.** Let your teeth part slightly.

Next, you will draw your eyebrows together and shut your eyes tightly. Ready? **Tense!** Feel the tension under the
Appendix G—Continued

eyebrows and in the muscles of the eyelid. Now, relax and let that tension melt away. Finally, you will raise your eyebrows high, as if someone were pulling back on your scalp. Ready? Tense! Feel the tension under your wrinkled brow. Now, relax and smooth out your forehead. Let your entire fact and head relax completely. Your body has now become very relaxed. Remain alert and study how the relaxation feels. Notice your breathing. Search your body to discover any remaining areas of tension. Let any tension you may find drain out each time you exhale.

Please remain seated in your chair with your eyes closed until the next part of the study begins. Remain as relaxed as possible and you will find it easier to concentrate on and vividly imagine the imagery scenes you will soon hear.

The following instructions were heard after the vividness measure: Please remain seated in your chair with your eyes closed until the next part of the study begins. You should continue to relax as much as possible so that you will be able to concentrate on and vividly imagine the next imagery scene which you will listen to shortly. Remember to concentrate on your breathing. As you inhale, search your body for any remaining tension. As you exhale, let all tension flow out. Breathe slowly, regularly, and naturally.

The following instructions were heard during the intermission period between the thermal imagery scenes: Please remain seated in your chair with your eyes closed until the
next part of the study begins. You should continue to relax as much as possible so that you will be able to concentrate on and vividly imagine the next imagery scene.
Appendix H

Imagery Skill Task Training Instructions

In a few moments, you will be asked to imagine several different scenes. As you listen to the imagery scenes, your goal is to pay close attention and think-along-with these scenes. Try to the best of your ability to imagine these scenes as vividly as possible. But first, I want to give you a few hints about ways you can improve your imagination skill. Imagination is a skill that we all possess to varying degrees. Like any skill, it can be developed with practice. With practice, we can use this skill to combat boredom and reduce stress. By imagining pleasant and relaxing scenes, we can decrease tension and reduce the risks of developing illness. Using imagery in this manner can allow us to gain more control over our lives. Listen carefully to the following instructions on how to imagine as vividly as possible. By imagining vividly, you may find yourself becoming caught up in the scenes you hear, and experiencing the events suggested almost as if you were actually there.

It is actually quite easy to image vividly. People who do well report that instead of just listening and passively waiting for something to happen, they actively concentrate on the imagery suggested and they try to think and imagine along with it. The first step is to listen carefully and let yourself go along with the suggestions. If you do this, you
will find yourself experiencing clearer, more vivid images and feelings as close as possible to really being there to experience those sensations. Going along with the imagery means that you first have to take a noncritical attitude. Take out of your mind all negative thoughts, like "This is foolish" or "This is not clear." Just focus your imagination and do your very best. If you do find yourself getting distracted by some other thought, simply reject that distraction by mentally saying "No" to it. Then, simply return your attention to the imagery scenes. Remember, it takes practice to focus our attention narrowly and avoid distractions.

Do not begin catastrophizing. Catastrophizing is the habit of magnifying minor problems into major ones. We all experience setbacks, in everything we do. Avoid becoming irritated at yourself for letting a distraction enter. Continued effort and practice will pay off in the end. Think positively. Tell yourself "I can do it. Take this one step at a time." Remind yourself. Your goal is to actively imagine the suggested imagery and resist giving in to distraction. Congratulate yourself if you recognize distraction. Then return your attention to the imagery scenes. These steps will help you keep your attention directed toward the goal.

Many people who have active imaginations have developed particular strategies or approaches to help them imagine. A strategy some people use to increase their imagery skill is
to approach the task as if they are watching a movie. Many people have sat in a dark theater and watched the brightly lit screen and forgotten about everything else but what was happening in the movie. You may need to begin with a blank screen and fill in the details, layer by layer. Or, you might start with a still frame and then gradually envision a moving picture. Another strategy some people use is to simply think like a young child playing a game. You can probably remember getting very involved while playing "make-believe" games as a youngster. Perhaps you had a favorite fantasy as a child. Remember how easy it was to suspend reality and get carried away by your childhood fantasies. You can allow yourself the freedom of a young child if you just let your imagination go along with the imagery you hear. A different strategy might be to pretend you are an actor in a play or filming a movie. Or, you might imagine that you are asleep and having a vivid, pleasant dream. You can select any of these strategies or make up one of your own. Regardless of what strategy you use, the important thing is that you do everything you possibly can to go-along-with and imagine as vividly as possible. By following these instructions, you will become as actively involved in these scenes as possible.

You will later be tested to determine your ability to imagine as vividly as possible. You will also be asked to report how involved you feel while listening to some other imagery scenes. Now, I will give you several chances to
practice using mental imagery. To begin, I would like you to get comfortable in your chair while keeping both feet on the floor. Next, I'd like you to close your eyes and listen carefully.

We will start out with a familiar object of your choice. Visualize a familiar object in your room. Picture its size. Imagine its shape and dimensions. See its color. Feel its texture—notice if it is rough or smooth. Concentrate on it. Play with that image in your mind (pause 15 seconds). O.K., stop. See how well you can do. You can get better and better with practice.

Next, visualize a red, round ball. Notice the shape and size. See its color. Imagine yourself as you pick it up and squeeze it. Feel its resilience in your hand. Concentrate on picturing that image in your mind (pause 15 seconds). Good. Now, stop. Do you see how practice help can help?

This time, allow yourself to imagine a brightly colored bird. Notice its shape and size. See its color and observe its movement as it spreads open its wings. Listen to the chirping sounds it makes. Concentrate on your image of a bird (pause 15 seconds). Stop. You are doing fine and developing your skill as you practice.

Finally, let yourself imagine a fresh lemon that is cut in half and lying on a plate. See the shape and color. Pick up one of the halves. Squeeze it and feel its texture in your hand. Smell its tangy odor. Concentrate on your image
of a lemon (pause 15 seconds). Now, imagine biting into it. Great! Notice the sour taste. Your imagery skill is improving more and more.

Remain seated in your chair with your eyes closed. The next part will begin in a few moments. Remember your instructions to help you go-along-with and imagine as vividly as possible. Choose the strategy that works best for you and remember to think positively. You will find yourself able to do very well.

The following instructions were heard after the vividness measure: Please remain seated in your chair with your eyes closed until the next part of the study begins. Review the instructions you heard earlier. Remember, instead of just listening passively, you should actively concentrate and try to imagine the next imagery scene as vividly as possible. Do this by trying to think and imagine along with the scene as you listen to it. Take a noncritical attitude, think positively, reject distractions, and avoid irritation or discouragement. These steps will help you to imagine as vividly as possible.

The following instructions were heard during the intermission period between the thermal imagery scenes: Please remain seated in your chair with your eyes closed until the next imagery scene begins.
Appendix I

Involvement Rating Scale Instructions

The following instructions were given after the vividness measure: In a few moments, we will begin the next part of the study. You will again be asked to listen to and imagine a scene. While imagining the scene you hear described, you will be asked several times to report your level of involvement. Involvement is related to the vividness that you reported on earlier. However, involvement is a broader concept than just vividness. You see something very vividly and yet still feel detached and distant. Involvement refers to the degree to which you FEEL emotionally caught up in or absorbed by a realistic imagery experience. You will report your level of involvement again by saying a number between 1 and 7. If you say 1, it means that your imagery experience feels totally artificial, unrealistic, and uninvolving. A 2 means your imagery feels very unrealistic and uninvolving. A 3 means moderately uninvolving. A 4 means you feel slightly involved. A 5 means more realistic and moderately involving. A 6 means very realistic and highly involving. If you say 7, it means your imagery experience feels totally genuine and as realistic as possible, as if you were actually living the scene and experiencing the images with your normal senses. Remember, when asked "How involved are you feeling at this time?" you are to report a number between 1 and 7, with 1 meaning not at all involving and 7 meaning completely involving. Numbers
between 1 and 7 mean that your experience falls between those extremes with each higher number meaning an increase in your level of involvement. Say the number out loud and speak clearly so that your response may be recorded.

The following instructions were heard immediately prior to the beginning of the thermal imagery: We will now begin the next imagery scene. Remember, when asked "How involved are you feeling at this time," you are to report a number between 1 and 7, with 1 meaning not at all involving and 7 meaning completely involving. Numbers between 1 and 7 mean that your experience falls between those extremes, with each higher number meaning an increase in your level of involvement. Say the number out loud and speak clearly so that your response may be recorded.
Beach Scene

Just relax and you may allow yourself to enjoy a trip to a pleasant beach. It is a warm summer afternoon and the sun is shining brightly. You are standing on a deserted beach. The beach sand is white and clean, but the sand is rippled by the tides and scattered with colorful sea-shells and sea-weed. Small pools of trapped water reflect the sun shining from a bright blue sky. The sea is a dark blue and white-capped waves break onto the beach. The beach sand shimmers like waves. Take in a deep breath of the fresh air (pause). Smell the salty and fishy odor of the air and water. You walk barefoot along the edge of the water and feel the warm, wet, firm sand beneath your feet. You hear the harsh cry of sea-gulls and watch them gliding lazily overhead on the invisible currents of warm, sea air. You watch the waves washing in and feel the rhythmic swaying of the surf rushing in to lap against the shore before slowly ebbing back into the ocean. You can feel the warm ocean breeze coming from across the foamy water. It feels so pleasant to just relax and watch the beauty of the waves and enjoy the comfortable warmth of the sun and breeze. (1'50") How involved are you feeling at this time? (2'10") You feel so wonderfully carefree and calm as you observe the majestic beauty of the beach. You turn away from the water and walk toward a vast
expanse of sand dunes. You feel the warmth of the sun shining
down on your head and back and the coarse sand beneath your
feet. You walk through a small pool of warm water. Looking
down, you notice brightly colored seashells glistening in the
sunlight. You reach down and pick up a beautiful pink shell.
Feel its warmth and weight in your hand and notice the feel
of its smooth ribbed sides between your fingers. You continue
to walk, listening to the sound of the surf fade. You arrive
at a large sand dune sprinkled with flowers. You sit down in
the soft sand and feel it shift under your weight. Breathing
in the fresh air, you smell the delightful fragrance of the
flowers. You reach down and feel the texture of the sand in
your hands. The tiny, coarse grains of the warm sand gently
and silently sift through your fingers. You bury your hands
into the soft, warm sand. Feel the warmth of the sand and
allow the relaxing warmth to spread through your hands.
(3'50") How involved are you feeling at this time? (4'10")
Feel the heat of the sand surrounding your hands and allow
the comfortable warmth of the sun on your shoulders and down
your back. Sitting in the warm sand, you reach out on each
side and scoop sand up over your legs and close to your body.
You lay back in the sand and feel the warmth radiating
throughout your body. A gentle breeze blows over you as
the hot sun shines down on you. You suddenly decide to go
for a swim. You get up and walk back. Entering the water,
you feel the warm water surrounding your feet—creating small
whirlpools. You wade out deeper and deeper. The water is warm and soothing and feels so comfortable and inviting. You lay in the water and float on your back, letting the warm water surround you and support you. Breathe in the salty air (pause). You gaze up toward the sky, hear only the sounds of the ocean swells. Enjoy the peaceful quiet of the water. Feel the gentle rocking motion of the warm waves sliding smoothly beneath you. It feels so pleasant to soak in the warmth of the sun and water throughout your entire body.

(5'50) **How involved are you feeling at this time?** (6'10")

You swim effortlessly back toward the beach, then stand up in the shallow water. Feel the warm sun and wind drying your wet skin. Your warm skin glistens as it reflects and absorbs the rays of the sun. You walk back onto the beach and lay down on the soft carpet of sand. You take a deep breath (pause). The ocean air is so clean and pure. The warmth from the sand and wind gives you a pleasant sense of heaviness. You feel so warm and lazy and enjoy just lying there soaking in the sun, not a care in the world. The gentle, relaxing rhythm of the wind and waves washes over you and the sand feels warm and comfortable beneath you. (Interspersed suggestions will be continued until time period is completed.)

Warm and heavy. Enjoying the warmth. Warm and comfortable. Pleasantly warm. (7' 50") **How involved are you feeling at this time?**
Farm Scene

(0' 00") Just relax and you may allow yourself to enjoy a trip to a pleasant farm. It is a warm summer morning and the sun is shining in a bright blue sky. You are sitting in a rocker on the wooden front porch of an old-fashioned farmhouse looking out over the hilly countryside. You can see birds and squirrels scurrying about several huge, tall oak trees. The tree limbs are swaying in a warm breeze. A faded yellow tractor stands near a red barn with a tin roof that reflects the bright sun. In the distance is a green meadow with horses and cows grazing peacefully together. Nearby a hill of golden wheat ripples in waves as the wind washes over it. Take in a deep breath of the fresh air (pause). You notice the delicious aroma of freshly baked bread coming from the kitchen. You rock gently and hear the boards creaking under the weight of the rocker as you shift your weight. Notice the smoothness and warmth of the worn boards under your bare feet. You watch a large windmill as it revolves around and around so slowly and gracefully on invisible currents of warm air. It feels so pleasant to just relax and rock back and forth and enjoy the comfortable warmth of the sun and breeze. (1' 50") How involved are you feeling at this time? (2' 10") You feel so wonderfully carefree and calm. You can hear birds singing cheerfully in the background as you observe the natural beauty of the peaceful surroundings. You enjoy the warmth of the sun shining down on your head and
the feel of the smooth boards beneath your feet. To your right sits a small garden bursting with colorful fruits and vegetables. You can see bright red, moist strawberries glistening in the sunlight. Tempted by the succulent strawberries, you get up and walk toward them. You pass under an old oak tree and touch its bumpy, scaly bark. You reach the strawberry patch and pluck the largest one you see. Feel its warmth and weight in your hand. Smell its fragrant scent. Bite into it. Taste its sweet juice in your mouth. Filling your hands with strawberries, you walk back toward the farmhouse. You enter the warm kitchen and smell the delicious aroma of baking bread. A loaf of hot bread sits on the table. Next to the bread is a steaming mug of hot chocolate. You place the strawberries in the sink. Using both hands, you pick up the mug of rich chocolate. Feel the warmth of the mug and allow the relaxing warmth to spread through your hands. (3' 50") How involved are you feeling at this time? (4' 10") Feel the heat of the mug in your hands and allow the comfortable warmth to spread up your arms. Drink the creamy chocolate and feel its warmth in your mouth and stomach. Now you sit at the table and slice a piece of hot bread. Feel the light, fluffy texture of the bread in your mouth. A radiating wave of warmth spreads throughout your body. You get up from the table and walk back outside into the warm sunshine and fresh air. You walk across the grassy yard onto a dusty dirt road. Feel the warmth of the sun on your head and shoulders and back. Even the dirt feels warm beneath
your bare feet. You arrive at the wheat field. Walk up the rolling hill into the tall, soft wheat. Feel its softness brush against your body. Inhale a deep breath of clean, fresh air (pause). At the top, you sit down in wheat to just relax and enjoy the view of the peaceful countryside. Feel the soil under you and the pleasant warmth spreading from the ground under you into your feet and legs. The sound of the warm wind rustling through the tall wheat is so relaxing. You lie back in the soil under you and the pleasant warmth spreading from the ground under you into your feet and legs. The sound of the warm wind rustling through the tall wheat is so relaxing. You lie back in the wheat and enjoy the delightful warmth of the sun and wind spreading throughout your entire body. (5' 50") How involved are you feeling at this time? (6' 10") You can enjoy just lying there in the wheat, listening to the gentle, relaxing sound of the warm wind swishing through the wheat. You take a deep breath (pause). The farm air is so clean and pure. The warmth from the sun and wind gives you a pleasant sense of heaviness. The bright sun brings warmth from above and the soft carpet of wheat beneath you feels so comfortable. You feel so warm and lazy, enjoying the restful quietness. You soak in the summer sun, not a care in the world, like soaking in a tub of soothing, warm water. The gentle warm breeze caresses and washes over you. The earth feels warm and comfortable beneath you. (Interspersed suggestions will be continued until time period is completed.) Warm and heavy. Enjoying the warmth.
Warm and comfortable. Pleasantly warm. (7' 50") How involved are you feeling at this time?
Appendix K

Scripts of Cool Thermal Imagery Scenes

Lake

(0' 00") Just relax and allow yourself to enjoy a trip to a refreshing lake. It has rained recently, and the air feels cool and fresh. But, it is now a beautiful day. The sky is a pale blue. Big, fluffy, white clouds hang in the sky. Looking around, you see a blue cottage with a white picket fence surrounding a small well-tended garden. On your left is a beautiful green meadow with daisies and wildflowers growing in it. Brightly colored butterflies float and bounce weightlessly from one flower to the next, taking in the sweetness and nectar. Take in a deep breath of the cool, fresh, pure air. (Pause) Small the fragrance of the flowers and garden. You walk barefoot down a wet gravel road and feel the damp coolness and pebbles beneath your feet. You hear birds singing and notice how cheerful they sound as they tell each other of the beautiful day that awaits. At the end of the road, you come to a long flight of stone steps that lead down a steep bank to the shoreline of a lake. A current of cool air blows from across the clean, blue water. It's so easy to just relax and let yourself go and enjoy the pleasant coolness of the lake breeze. (1' 50")

How involved are you feeling at this time? (2' 10") You descend the stone steps. You feel the cool, moist, smooth
stone under your feet. Grasp the cool metal railing in your hand as you descend. With each step, the air gets cooler and cooler. The smell of wildflowers remains in the air and brightly colored flowers decorate the lake's edge. You reach the base of the steps and walk out onto a wooden dock where a white sailboat is tied. You get into the boat. Feel it rock back and forth beneath the pressure of your weight. Push off from the dock. Hear the water splashing against the boat. You let out the sail which billows in the breeze. The graceful boat lunges forward, and you pick up speed, going faster and faster. The cool wind blows through your hair, and you can feel a cool, light spray of water against your face. Hear the sail popping in the wind. You reach the middle of the lake, take in the sail, and let the boat drift. Notice the gentle rocking of the boat. You have a wonderful sense of security and peace. An ice-chest is sitting in the rear of the boat. Suddenly thirsty, you open it up and look inside. You reach both hands into the ice. Feel the cold ice surround your hands. (3' 50") How involved are you feeling at this time? (4' 10") The cold ice surrounds your hands. The cold penetrates your hands, which begin to feel pleasantly numb. Feel the pleasant coolness spreading up your arms. You grasp a can and withdraw your hands from the ice. You smile because the can contains your favorite soda. You open the can and drink. Taste the delicious liquid in your mouth. The soda feels cool in your throat and stomach. Feel the coolness
spreading through you. Your thirst quenched, you stand up on the bow of the boat. You take a deep breath (pause). Now, dive into the cold, clear, blue water. The air whistles past your ears as you plunge toward the water. It takes your breath away when you make contact with the water. Cold and invigorating! Your whole body feels tingling and alive. You take a deep breath (pause) and dive down, deeper and deeper into the water. As you descend, you notice the cold becoming more and more intense and penetrating. You slowly surface and enjoy feeling the delightful coolness spread throughout your body as you let the water support and surround you. It feels so calm and peaceful to relax and enjoy the pleasant feeling of floating, so cool and light. (5' 50")

How involved are you feeling at this time? (6' 10") Refreshed and invigorated from your swim, you climb out of the water and back into the boat. The breeze blowing across the water feels cold on your wet skin. You feel cool and light, as if you could be lifted up into the air with the breeze. Take a deep breath of air (pause). The lake air is pure and clean and has the sweet scent of wildflowers. You lay back in the boat, feeling cool and comfortable. You feel a sense of floating on air like the huge, white clouds which hang suspended and weightless in the pale blue sky. Hear the water sloshing as the boat slowly rocks back and forth with a gentle, relaxing rhythm. (Interspersed suggestions continue for the remainder of the time period.) Feeling pleasantly
cool. Cool and light. Enjoying the coolness. Cool and comfortable. (7' 50") How involved are you feeling at this time?

Mountain Scene

(0' 00") Just relax and you may allow yourself to enjoy a trip to the refreshing mountains. It has rained recently, and the air feels cool and fresh. But, it is now a beautiful day. The sky is a pale blue. Big, fluffy white clouds hang in the sky. Looking around, you see a grassy, green meadow sprinkled with white daisies and with red and yellow wildflowers. Brightly colored butterflies float by, bouncing weightlessly from one flower to the next, taking in the sweetness and nectar. A short distance ahead, you can see beautiful green pine and fir trees. Take in a deep breath of the cool, fresh, pure air. (Pause). Smell the fragrance of the flowers and mountain pine. You walk barefoot through the meadow and enjoy feeling the cool, damp grass beneath your feet. You hear birds singing and notice how light and cheerful they sound as they tell each other of the beautiful day ahead. At the end of the meadow, you come to a trail that winds up the mountain between the pine and cedar trees. A cool mountain breeze from above is swirling between the trees. It's so easy to relax and let yourself go and enjoy the pleasant coolness of the mountain breeze (1' 50") How involved are you feeling at this time? (2' 10") You continue to walk along the winding mountain path, feeling relaxed but curious.
to find where the path leads. In the distance, you can
faintly hear the sound of water running and splashing. Tree
branches overhang the path and the light fades, but you have
a wonderful sense of security and peace. The fragrant, thin
mountain air feels so clean and cool and pure. You suddenly
come to a large, open clearing in the midst of the trees. A
beautiful waterfall, shimmering in the light comes into view.
You can see the water bubbling and hear it gurgling as it
falls rapidly down a sheer cliff into a deep pool containing
huge grey-brown boulders. The sound of the waterfall seems
to flow through you. You can feel the power radiating from
this waterfall, an energy matched by its tranquil beauty.
You suddenly feel very thirsty and yearn for a cold drink
from the crystal clear mountain waterfall. You walk care-
fully to the edge and feel the smooth, cool rock under your
bare feet. Water splashes over the rocks and feels nice
and cool on your feet. You cup your hands and reach into the
cold water to get a refreshing drink. Feel the icy cold
water surround your hands. (3' 50"") How involved are you
feeling at this time? (4' 10"") The cold water surrounds your
hands. The cold penetrates your hands, which begin to feel
pleasantly numb. Feel the pleasant coolness spreading up
your arms. You cup your hands in the water to get your
drink. You smile as you raise your hands and drink the cold,
icy water. Taste the delicious liquid in your mouth. The
water feels cool in your throat and stomach. Feel the coolness
spreading through you. Your thirst quenched, you climb upon one of the rocks which surround the deep pool. You take a deep breath (pause). Now dive into the cold, clear, blue water. The air whistles past your ears as you plunge toward the water. It takes your breath away when you make contact with the water. Cold and invigorating! Your whole body feels tingling and alive. You take a deep breath (pause) and dive down, deeper and deeper into the water. As you descend, you notice the cold becoming more and more intense and penetrating. You slowly surface and enjoy feeling the delightful coolness spread throughout your body as you let the water support and surround you. It feels so calm and peaceful to just relax and enjoy the pleasant feeling of floating, so cool and light. (5' 50") How involved are you feeling at this time? (6' 10") Refreshed and invigorated from your swim, you climb up out of the water and back up onto a rock. The breeze blowing from above feels cold on your wet skin. You feel cool and light, as if you could be lifted into the air with the breeze. Take a deep breath (pause). The mountain air is so pure and clean and has a tangy cedar and pine scent. You sit down on a rock, feeling cool and comfortable. You feel a sense of floating on air like the huge, white clouds which hang suspended and weightless in the pale blue sky. You just relax and listen to the peaceful, relaxing rhythm of the water falling into the mountain pool. (Interspersed suggestions will be continued until time period is completed.)
Feeling pleasantly cool. Cool and light. Enjoying the coolness. Cool and comfortable. (7' 50") How involved are you feeling at this time?
References


