The Effects of Hostility and Arousal on Facial Affect Perception:

A Test of a Neuropsychological Model of Hostility

by

Matthew L. Herridge

Virginia Polytechnic Institute and State University

Dissertation submitted to the Faculty of the Virginia Polytechnic

Institute and State University

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Psychology

APPROVED:
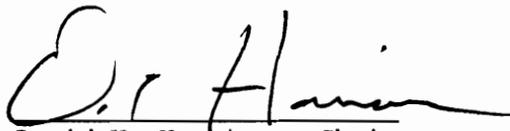
David W. Harrison, Chair
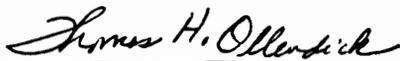
Thomas H. Ollendick

Douglas Southard

Richard Eisler

Ellie Sturgis

April 25, 1996

Blacksburg, Virginia

Keywords: Hostility, Emotion, Affect, Perception, Neuropsychology

The Effects of Hostility and Arousal on Facial Affect

Perception:

A Test of a Neuropsychological Model of Hostility

by

Matthew L. Herridge

David W. Harrison, Chair, Clinical Psychology

ABSTRACT

Within the field of psychology, hostility has historically
been a heavily researched affective construct. The purpose of
this experiment was to test hypotheses derived from a
neuropsychological model of hostility utilizing two common
research paradigms from the extant literatures on hostility's
cognitive and physiological correlates. This was accomplished
by testing an integral component of a previously proposed
neuropsychological model of hostility (Herridge & Harrison,
1994). The purpose of the model was to aid in understanding the
chronicity and pervasiveness of a hostile disposition. The
model describes a system where physiological arousal level is
mediated by systems which also mediate accuracy of an
individual's interpretation of affective cues. It was at this
level (physiological arousal and perception) that the
experimental test was developed.

It was predicted that hostile men would show different
levels of perceptual accuracy than non-hostile men in both a
cold pressor (CP) and no CP condition when tachistoscopically

presented with three categories of affective facial configurations (happy, angry, and neutral) in either their left (LVF) or right visual field (RVF).

In this sample of college men ($\underline{N}$ = 56), a four-factor, repeated measures, analysis of variance (ANOVA) produced a significant three-way interaction which indicated that hostile subjects were less accurate than non-hostile subjects in the assessment of happy, angry, and neutral faces in their LVF. However, they were more accurate than subjects classified as non-hostile in the assessment of happy and angry facial configurations in their RVF. Subjects were classified as hostile and non-hostile using joint criteria; the Cook-Medley hostility scale (Ho) and cardiovascular reactivity levels to the arousing stimulus, a CP task.

Additionally, a non-significant trend was noted where non-hostile subjects in a no CP state showed more accuracy in the assessment of faces presented to them in their LVF than all other group and CP levels. However, they showed less accuracy than all others when faces were presented in their RVF.

These findings are discussed in regard to the proposed model of hostility. Confirmatory and contradictory evidence is discussed relative to current neuropsychological hypotheses on the lateralization of affective function in the cerebral cortex and the role of physiological arousal in affective facial perception. Clinical implications of results are further

discussed in relation to anger management interventions in hostile men. Recommendations for future research on hostility, relative to design and new directions, are made.

me achieve my career goals despite forgoing some of hers. Without her, I would not have reached this milestone.

TABLE OF CONTENTS

x

INTRODUCTION

The hostility construct has been described in numerous
ways by researchers testing its effects and its relationships to
various behaviors. It is generally considered to be a
continuous trait manifested in varying degrees (Carver &
Matthews, 1986). Historically, it has been measured through
self-report questionnaires such as the Cook-Medley hostility
scale (Ho) (Cook & Medley, 1954) and Type-A behavior pattern
(TABP) inventories (see Houston, 1992 for review). However,
this approach has been criticized because of its primary focus
on the cognitive dimension of the construct. This criticism
seems valid since research has shown that hostility also has a
very strong link to physiological and neurological systems
(Butter, Snyder, & McDonald, 1970; Dembroski & Williams, 1989;
Ekman, Levenson, & Friesen, 1983; Harrison & Gorelczenko, 1990;
Harrison, Gorelczenko, & Cook, 1990; Houston, 1986, 1989, 1992;
and Smith & Houston, 1987). These three systems (cognitive,
physiological, neuropsychological) can be considered intimately
related components, all of which are necessary to fully
understand and define the hostility construct.

Purpose

The purpose of this experiment was to attempt to
strengthen the link between the two most commonly researched
dimensions of hostility (cognitive and physiological) with the
neuropsychological dimension. This was proposed to be

1

accomplished by testing an integral component of a neuropsychological model of hostility (see Figure 1). The model's purpose is to help understand the chronicity and pervasiveness of a hostile disposition. It describes a system where autonomic arousal level (a physiological process) mediates the accuracy of an individual's interpretation of neutral affective cues (a cognitive/neuropsychological process). It was at this level (autonomic arousal and perception) that the experiment was based.

If hostile individuals (as defined by cognitive and physiological measures) are more likely to make inaccurate and negatively-biased appraisals of neutral affective stimuli (such as facial configurations) when at extreme arousal levels, then their consequential arousal level is likely to show either an increase or maintenance. This increase or maintenance of arousal would continue to alter perception and the individual would be unable to habituate to what was an initially neutral stimulus.

Definitions

The model briefly described above is based on a certain definition of hostility. For the purpose of this experiment, hostility was defined as a composite of angerability, cynicism (Houston, 1992), and antagonistic behavior toward others (Williams & Williams, 1993), coupled with heightened

2

Figure 1

3
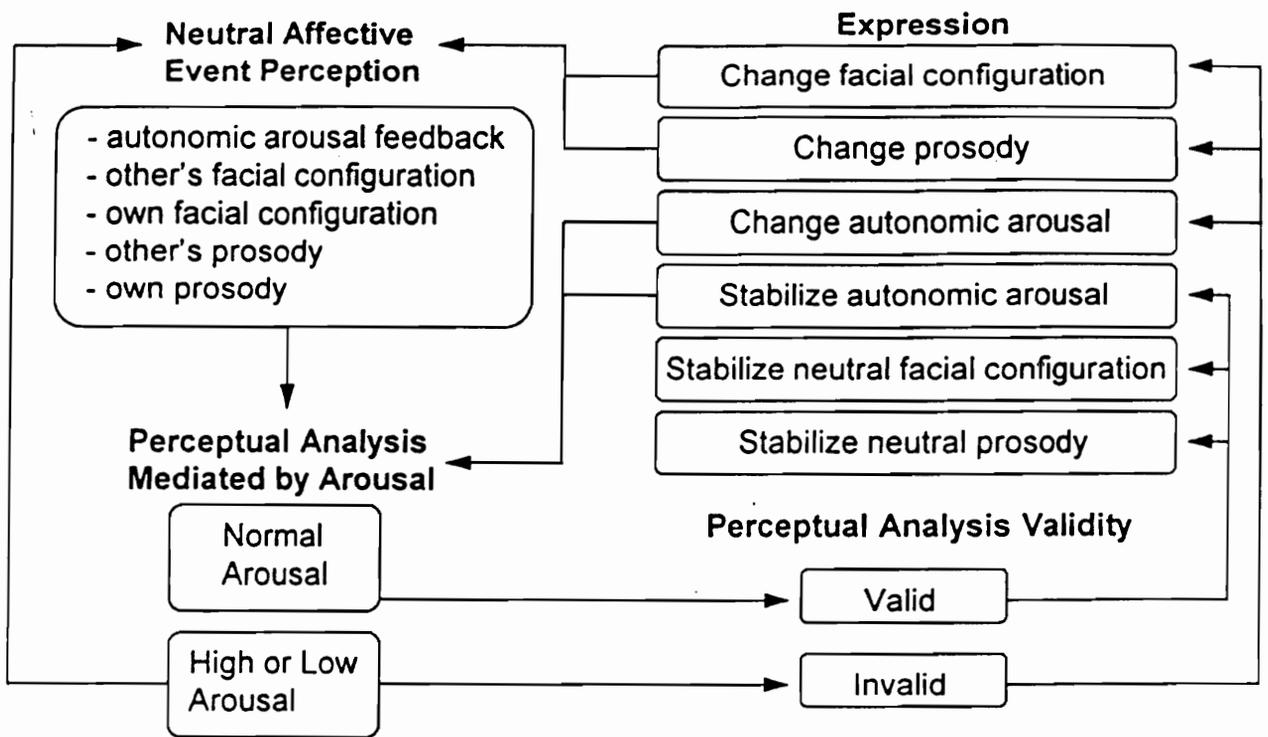
physiological reactivity that can be measured by neuroendrocrine substances(Mills & Dimsdale, 1992; Pope & Smith, 1991), autonomic (Smith & Allred, 1989), and somato-motor responses (Williams, 1986).

The definition is composed of two primary behavior constructs that together produce a complete description of hostility. The first construct (represented by angerability and antagonistic behavior toward others) is based on cognitive and social-interactive types of behavior. Another common definition of hostility, using only this construct, is that of "an enduring attitude of ill will and a negative view of others" (Smith & Allred, 1989).

The second construct (represented by the components of heightened physiological reactivity) is based on the behavior of physiological systems. It is this part of the definition that allows for a more objective look at hostility than strictly social-interactive explanations of the construct.

Attempts to understand hostility or to treat it as a clinical problem have tended to focus on only one of the two primary constructs (Carver & Matthews, 1989; Krantz, Manuck, & Wing, 1986; Williams, 1986). The Ho scale and TABP are probably the best known measures of the cognitive and social-interactive dimension of hostility. For example, Smith and Houston (1987) focused on the social-interactive dimension when they showed

that social support may mediate the expression of hostile feelings.

Though hostility is a two-part construct, it can be differentiated from other negative affective constructs on the basis of physiological behaviors alone. Anger has been shown to be more related to increased secretion of norepenepherine than other emotional valences (Henry & Meehan, 1981). Ax (1953) showed that anger can be differentiated from fear on diastolic blood pressure and heart rate changes. Ekman, Friesen, & Levenson (1983) hypothesized that simply making various affective facial configurations produced differential patterns of autonomic reactions. Herridge and Harrison (1993) further demonstrated this principle by differentiating happy, angry, and neutral facial configurations on skin conductance change from baseline. The angry facial configurations produced more change than either the happy or neutral facial configurations.

Research has demonstrated a link between the two primary constructs involved in hostility such that the social-interactive variables have been found to have a direct relationship to the physiological variables. For example, Krantz et al. (1986) explained that cardiovascular responses are directly related to the perception of the individual. Thus, an affective event can produce a cardiovascular response if it is perceived as being hostile, whether it is or not. This implies

5

that an individual may maintain a high level of arousal as a result of faulty or invalid appraisals of affect.

The link between physiology and affective interactions is also supported by research on cardiovascular disease (CVD). Hostility remains the sole affective construct which has reliably been indicated in the promotion of CVD. Dembroski and Williams (1989) reviewed studies related to coronary-prone behavior and found no relationship between CVD and neuroticism measures. Houston (1986) stated that no relationship has been found between CVD-promoting responses and such affective constructs as anxiety. In particular, cardiovascular responses were not related to anxiety as measured by the trait portion of the State-Trait Anxiety Inventory and the 16 Personality Factor Questionnaire. These findings involved stressors such as the CP task and difficult mathematics or anagram tasks that often produce significant cardiovascular change in high hostiles.

Just as it is important to understand the hostility construct, it is equally important to define habituation and its relevance to the model and to the chronicity of a hostile disposition. Habituation is inferred from a reduction, and eventual cessation, of physiologically measurable responses to repeated stimuli (Walrath & Stern, 1980).

If we were unable to inhibit our attention to the irrelevant stimuli around us, we would maintain a constant state of high arousal. Habituation is the process by which we stop

attending and responding to these redundant stimuli and return
to a more stabile arousal state. Habituation is by our
definition a central nervous system process and is considered by
many (Scott et al., 1967) to be a learning phenomenon related to
specific definable environmental events or to environmental
context (Harrison & Pavlov, 1983). Walrath and Stern (1980)
stated that "the rate of habituation is a measure of cortical
control and responsiveness and of the capacity to manage the
demands of ... adjustment."

To understand the relationship between habituation and
physiological responsivity, one must examine features of the
initial stimulus which are novel in the broader sense but which
are responded to selectively. The selectivity only occurs with
stimuli that present sufficient meaning or potency to the
organism to require an orienting response (OR) or disruption of
stabile ongoing behavior.

When an individual is presented with a novel stimulus, an
OR occurs. The OR is manifested by particular physiological
behaviors. These behaviors include increases in skin conductance
(Herridge & Harrison, 1993), heart rate deceleration (Harrison,
Kelly, Gavin, & Isaac, 1989), peripheral vasoconstriction and
central dilation (Harrison & Kelly, 1989), pupil dilation
(Garrett, Harrison, & Kelly, 1989), muscle activity, and EEG-
event related potentials. The OR is linked to the sympathetic
nervous system (SNS) and the physiological results of its

activation include such events as increased adrenaline (Williams & Williams, 1993) and increased blood flow to the cranial region (Harrison, 1990).

Pribram and McGuinness (1992) summarize this effect by stating that there are two consequences of arousal or orienting: (1) the viscero-autonomic reaction; and (2) with stimulus repetition, familiarization. Moreover, Pribram states that some stimuli produce and maintain physiological changes that can be described as "readiness," vigilance, or the "fight or flight" phenomenon.

Affective stimuli seem to frequently produce this type of response in hostile individuals. This physiological "readiness" may also be viewed as a dishabituation to affective stimuli. The perception of the stimulus' characteristics may vary or the regulation of intent in emotional reactivity and expression may be unstable or impersistent and thus habituation cannot occur.

Dishabituation refers to interference of the habituation process. This can occur with the presentation of another stimulus or as a response to a perceptible change in the habituating stimulus such as an increase in stimulus intensity (Sokolov, 1963). Sokolov goes on to explain that a change in a "neuronal model" of a stimulus must be detected for dishabituation to occur.

Dishabituation can be viewed as a process producing an altered state of arousal that can be mediated by many variables.

The feedback of an altered arousal level to the central nervous system may produce dishabituation as it represents a change in the features or intensity of the original stimulus. This may be especially characteristic of affective variables where underlying arousal level "sets the stage" for affective tone or valence.

William James' theory that the self-perception of physiological changes produces an emotional experience seems to be borne out by the evidence for dishabituation. In essence, the perception of these physiological changes represent a new stimulus that requires attention. This appraisal of change takes place within multiple components of a neuronal affective system including the higher cortical systems. The resulting reaction to this stimulus is then expressed through a change in physiological arousal as mediated through interaction with the limbic system.

The importance of this efferent physiological activity as a derivative of hostility is that one must consider the effect of feedback on its expression. In turn, the subsequent effect of this feedback on further expression, or on the cerebral perception of the feedback itself, must be considered. Heilman et al. (1993) quoted Charles Darwin to describe this process. "He who gives violent gesture increases his rage." He explained how facial configurations produced feedback in a system that operated to produce autonomic change. In a test of this

phenomenon, Herridge and Harrison (1993) showed that simply making facial configurations on command produced differing bilateral skin conductance responses in high and low hostiles. The subjects were not "mood-induced" but rather were simply given instruction in making affective facial configurations.

Model of Hostility

The impact of various stimuli on arousal is one of many factors involved in a hostile's affective response system. These factors include the perception of an affective event, the individual's state of physiological reactivity and arousal, the expression or response relative to the perceived event, and a dishabituation process. The model of hostility tested in this experiment integrates neuropsychological mechanisms of arousal dishabituation with cerebral affect systems using these factors (see Figure 1). This model is relevant to both the neuropsychological and CVD literature and foresees the emergence of more research on the neuropsychology of hostility.

The model is based on four primary concepts. The relationship between the first concept and the model involves the general brain area in which this model of hostility is proposed to operate. The right hemisphere (defined here as both the cortical and limbic areas of the right cerebrum) will be the cerebral "setting" for this mechanism.

The primary reason that the right hemisphere was chosen as the cerebral setting for the model is that it has continually

been shown to be the seat of negative emotion. The fact that affective abilities, such as the interpretation of affective facial configurations and prosody, are severely limited when the right hemisphere is damaged, supports this contention.

In addition, Davidson (1992) concluded in a review on the hemispheric substrates of emotion that the right hemisphere is associated with negative, withdrawal related emotions while the left was related to positive, approach related emotions. Silberman and Weingartner (1986) proposed that the right hemisphere is responsible for various types of negative affect such as hostility.

This lateralization of hostility is not confined to the cerebral cortex, however. Morris, Bradley, Bowers and colleagues (1991) stated that the right amygdala may influence arousal and activation associated with negative emotions while the left amygdala may be important for positive emotions. This finding is very important to this model because of its implications for a dysfunctional arousal system relative to hostility, a negative emotion.

A second concept is also important in clarifying and further validating the right hemisphere as the setting for the model. Autonomic arousal, an integral part of many emotions, has been shown to be affected by changes in the right hemisphere. Heilman, Bowers, and Valenstein (1993) reported that the right hemisphere seems to play an important role in the

mediation of arousal. On the basis of such research, the
mechanism presented in the model, with its heavy emphasis on
autonomic arousal events and levels, necessitates a right
hemisphere setting.

The third concept that the model is based on involves the
relationship and functions of the orbital-frontal cortex and the
limbic system of the right hemisphere. These areas are
important because of their relevance to autonomic arousal
management involving the perception and production of arousal.
Affective event perception is mediated by this cortico-limbic
system. This system seems to be altered in high hostiles as
compared to normals. This alteration manifests itself across
two dimensions: (1) the perception of arousal; and (2) the
inhibition of anger-based arousal. Anger-based arousal is
defined as cortically cued arousal that involves the amygdala as
the primary limbic pathway through which it is manifested.

Research leading to the above conclusion is varied.
Heilman et al. (1993) concluded from a number of studies that
the right hemisphere plays a dominant role in visceral autonomic
activation and in the perception of visceral changes. Though
the specific pathway within the right hemisphere that is
responsible for the perception of these visceral cues is
debated, the orbital-frontal cortex is the primary area thought
to be involved in the inhibition of arousal. Orbital-frontal
disinhibition of the amygdala results in physiological changes

and behaviors associated with anger and aggression (Damasio &
Anderson, 1993). Thus, altered functioning in this hemisphere
would be likely to indirectly affect the cognitive and
physiological aspects of hostility.

The fourth concept which serves to complete the proposed
model involves the relationship between arousal level and the
validity of the affective event perceptual analysis. Hebb
proposed that arousal and performance are related in the form of
an inverted - U function (Anderson, 1990). Accordingly,
performance will suffer at both high and low levels of arousal
while performance is best at a moderate level of arousal.

A conclusion can be drawn here by relating this concept to
the previous one. The third concept describing poor visceral
feedback in hostiles would predict that they would have a
greater degree of arousal level variance. Specifically, they
would have difficulty maintaining a homeostatic level of arousal
simply because they are frequently unaware of it. They would
also be more likely than normals to be in a state of high or low
arousal at any given time. They would become aware of the
emotional significance of their arousal level only at relatively
heightened or lowered levels.

Given these assumptions associated with the third and
fourth concepts, attempts at right hemisphere tasks, such as
facial affect perception, may be blunted when the hostile
individual is at an extreme arousal level. If the arousal level

is heightened, then these mistakes would likely be biased toward an active negative affect such as anger/hostility because of the right hemisphere setting and its role in negative affect expression. This misperception would be most evident when the affective stimulus or event is neutrally valenced and the individual misperceives it as event that calls for a hostile response due to his extreme arousal level.

In summary, the right hemisphere seems to be responsible for the interpretation of affective stimuli in most individuals. These stimuli can arise internally or externally. An example of an internal affective event includes the recognition of one's autonomic arousal level as novel and emotionally significant (see Figure 1).

Autonomic arousal changes are an important part of emotional experience such that the perception of a change in arousal necessitates a response to be chosen by the right hemisphere and then mediated in its expression by the limbic system.

Other types of internally derived affective events include the perception of one's own facial configuration or prosody. The former occurs through skeleto-muscular feedback and the latter through audition. These types of affective events can also be derived externally (the individual's environment) through others' facial configurations and prosody.

Model Component Tested

The second part of the model (Figure 1) is linked concurrently to the initial affective event perception. The perceptual analysis of the initial affective event may be mediated by the current arousal state of the individual. If a normal arousal state is present, the affect perception is more likely to be valid or appropriate. However, according to Hebb's theory, a heightened or lowered state of arousal can impede performance of valid affect perception.

Affect appraisal and expression are types of tasks or actions for which the right hemisphere is responsible. Thus, if either a high or low state of arousal is present, the perceptual analysis of affective stimuli is more likely to be invalid or inferior as compared to that during an optimal state of arousal.

In hostile individuals, the physiological arousal state seems to be more often high than low as a result of a right hemisphere disinhibition mechanism. This bias towards high arousal in hostile individuals may make them vulnerable to making such invalid or inferior perceptions of affective stimuli.

A high arousal state in hostiles is likely to have different consequences than a low arousal state. This is important for explaining the subsequent affective valence of the perception. This is because hostility has often been described as an active type of negative affect. Passive types of negative

15

affect include depression or sadness. If an invalid perception of an affective stimulus is to be made because of a heightened arousal level, the bias would likely be toward anger/hostility because of its more active nature. Physiological arousal is a necessary part of hostility. In fact, it would seem to be its most defining characteristic.

Finally, the individual's consequential hostile behavior (angry facial configuration and prosody, and heightened arousal) now act as new non-neutral affective events that act to further increase hostility and arousal. This "vicious cycle" contributes to the chronic cognitive and physiological behaviors described as hostility.

Rationale

This model can be experimentally examined at various levels. However, this experiment focused on the relationship of arousal and perception in hostiles as described in the model. After differential presentation of a CP stimulus to individuals designated as hostile and non-hostile, comparisons of their perceptions of tachistoscopically presented affective faces in both right and left visual fields were made.

Hypotheses

It was hypothesized that hostile individuals would show different levels of perceptual accuracy than non-hostiles in both a CP and no CP condition when tachistoscopically presented with three categories of affective facial configurations (happy,

angry, and neutral). Hostiles were predicted to be more accurate at assessing angry affect and less accurate at assessing neutral affect than non-hostiles in a no CP condition. This relative pattern was hypothesized to continue in a CP condition but, as compared to their previous performance, the hostiles were hypothesized to show improved accuracy with angry faces while they would show less accuracy with neutral faces. The non-hostiles were predicted to demonstrate more accuracy across all three facial configurations when in the CP condition as compared to the no CP condition.

It was also hypothesized that this effect would be greater with faces presented in the LVF of the subjects. Faces presented here were proposed to be differentially affected by the right hemisphere's dominant role in negative affect perception and expression.

METHODS

Subjects

Screening 1. Screening sessions of 107 male students at Virginia Tech were performed in order to initially select the experimental groups composed of hostile and non-hostile subjects. These sessions occurred approximately three times per week during the screening phase and attendance at each session ranged from one to eight subjects. The following were administered in group format during these initial screening sessions; an informed consent form (see Appendix A), the

laterality or handedness questionnaire (see Appendix B), the neurological screening form (see Appendix C), the Ho scale (see Appendix D), and an answer sheet/data record form (see Appendix E).

The consent form explained the purpose of the experiment and notified the subjects that they may be asked to participate in a later, related phase of the experiment. The screening questionnaire assessed any history of neurological or visual impairment that may have negatively impacted their performance in the experimental phase.

Seven subjects were excluded due to scores of 16-19 on the Ho scale. Seven more subjects were excluded due to exclusionary findings on the laterality or history questionnaire (i.e., not strongly right-handed, diagnosed with a learning disability or mental illness).

Handedness Questionnaire. The handedness or laterality questionnaire is a 13-item, behaviorally validated, lateral preference questionnaire (Coren, Porac, & Duncan, 1979) assessing four types of lateral preference (hand, foot, eye, and ear). The self-report items are scored as +1 for right, -1 for left, and 0 for both left or right lateral preference. The questionnaire was developed from other laterality inventories and tests of hand preference.

Cook-Medley Ho Scale. Many studies involving hostility have used the Ho scale. This MMPI-based scale was devised in

1954. The 50-item agree/disagree questionnaire has been correlated with CVD and the TABP. Individuals who score higher on the Ho scale experience anger at higher intensities and frequencies than low scorers.

Only strongly right-handed subjects (those scoring +6 or above on the laterality measure) were included in the experiment. Those with known neurological or visual impairments were excluded. Corrected-to-normal vision was not a basis for exclusion, however (see Table 1 for task summary).

Subjects from screening 1 who met the above requirements and scored 15 or below on the Ho scale were considered non-hostile. Twenty-eight subjects from screening 1 met these criteria, were considered non-hostile, and were asked to participate in the experimental phase. The experimental phase was then scheduled with the subject for some time during the following week and he was asked to return to the laboratory at that time.

Screening 2. A total of 64 subjects from screening 1 met the above participatory criteria and scored 20 or above on the Ho scale. The score of 20 or above on the Ho scale was the first of two criteria needed to be considered part of the hostile experimental group. These subjects were escorted individually from the screening 1 testing room to a private office for screening 2. Each subject was then administered three consecutive 45-second cold-pressor (CP) tests (see Table

Table 1

Screening 1 Data	Screening 2 Data	Experiment Data
Consent Form	Consent Form	Consent Form
History Questionnaire	Cold Pressor	Cold Pressor for 1/2 of subjects
Handedness Questionnaire	Blood Pressure and Heart Rate	Blood Pressure and Heart Rate
Cook-Medley Ho Scale		Facial Affect Perception Task

1). The subjects were told prior to the baseline measurement and CP tests that their blood pressure and heart-rate (HR) changes were being examined in relation to a stressful stimulus (the CP). Systolic blood pressure (SBP), diastolic blood pressure (DBP), and HR measurements were taken before and after each CP resulting in four concurrent assessments. Comparisons of the first SBP reading during the initial baseline measurement to the highest SBP reading during the three CP trials were made. The left arm of the subjects was used to gather the data. Following these measurements the subject was scheduled to return to the laboratory during the following week for the experimental phase. Only one subject meeting the screening 1 acceptance criteria was excluded during screening 2 after being unable to keep his hand in the CP for the required 45 seconds.

The mean systolic change from baseline during screening 2 was 13.3 mmHg. Subjects participating in screening 2 who showed SBP change above the mean (14 mmHg or more) were included in the subject pool for the experimental hostile group. Twenty-eight subjects were then randomly drawn from this group of 32 subjects to be included in the experimental analysis so as to match the number of non-hostile subjects. These 28 hostile subjects along with the 28 non-hostile subjects comprised the experimental groups.

Tachistoscopic Apparatus and Materials

Sixty slides (20 happy, 20 angry, and 20 neutral) were selected from Ekman and Friesen's (1978) pictures of facial affect. The slides were prepared with the stimulus face appearing in either the RVF or the LVF and were mounted with the inside edge of the picture 3 degrees from center and the outside edge 12 degrees from center (see Sergent, 1982). The sixty slides were divided into five sets of 12 slides. Each set included two LVF happy, angry and neutral faces and two RVF happy, angry and neutral faces in random order. This resulted in a total of 10 slides per affect category and visual field. The order of presentation among the five sets was counterbalanced across all subjects by group. The experimenter recorded all responses to these stimuli on a data form (see Appendix F).

The subjects were seated in a sound-attenuated chamber and the automated programming equipment and experimenter were located in a separate room. The subjects were monitored through a one-way observation window and prompted via an intercom. A constant illumination tachistoscope (Lafayette Instruments 42011) presented the stimuli onto a screen 2.67 m in front of the subject. The center of the screen was marked with a black dot positioned 1.47 m above the floor and at the subject's eye level. Tachistoscopic-trial onset was signaled by a 2000 Hz, 55

dB (A-scale) tone located behind the subject. Each trial consisted of a .02 second presentation of the face.

Experimental Conditions and Materials

The experiment consisted of two CP conditions; (1) a CP presentation condition; and (2) a no CP presentation control condition. The CP condition utilized five presentations of a CP stimulus and six BP/HR measurements throughout the experiment. The control condition did not involve the CP but did include the BP and HR measurements. The CP stimulus utilized for screening 2 and the experimental phase was an insulated container (18" x 12" x 12") filled with crushed ice and water. A constant temperature below 40° F was maintained. Subjects placed their left hand and wrist in the container for a period of 30 seconds when instructed. Following each CP trial, the subject was asked to rest their hand in a position over the open container.

An automated digital blood pressure unit was utilized to measure SBP, DBP, and HR at different points throughout the experiment. A preset pressure setting of 190 mmHg was used for all subjects. The left arm of the subjects was used to gather the data.

Procedures

Fifty-six strongly right-hand dominant, male college students participated. Subjects were free of current or past neurological or psychiatric disease, and had never been diagnosed with a learning disability. Use of these subjects

was motivated by the presumed heightened functional lateralization of the male brain (Harrison & Gorelczenko, 1990).

Procedure A. All subjects were seated and completed an informed consent form (see Appendix G). This was a non-blind experiment. Subjects were categorized by the experimenter as either hostile or non-hostile and in the CP or no CP condition. Cold pressor condition was determined in a sequential fashion. The first hostile and non-hostile subjects were in the CP condition, the second from each group in the no CP condition. This alternating pattern continued throughout the experimental phase. The blood pressure cuff was fitted to the left arm and (if in the CP condition) the CP stimulus container was placed on a chair immediately on the left side of the subject. The experimenter then exited the room and turned off the lights leaving only the stimulus screen illuminated. The following instructions were then presented:

"In this part of the study you will have to make decisions concerning faces which you will see on the screen. The presentation of the faces will be brief and either to the left or right of the black dot. The presentation of the face will be preceded by a tone (the tone is sounded). We ask that , upon hearing the tone, you focus on the black dot because the face will be presented soon afterward. After the presentation of the face, please decide quickly if it appeared to be happy,

angry, or neutral (meaning not happy or angry). You will

have three seconds to respond. When you have made your

decision, please state it clearly. Try to respond as

accurately as possible. There is an intercom located

behind you if you need to contact us. We will remind you

to fixate on the black dot during the testing. Any

questions?"

Procedure B1 (Cold pressor). Subjects in the CP condition

were then presented with these additional instructions:

"In order to test your ability to function under

pressure, you will be asked to submerse your left hand in

ice-water prior to the presentation of the faces. Your

blood pressure will be taken prior to this. This pattern

will be repeated five times. Any questions?"

Following these instructions, a BP and HR measure was

taken. The subject was then asked to submerse his hand in the

ice-water. After a period of 30 seconds the subject was asked

to remove his hand and rest it on the edge of the container. A

stopwatch was used to keep the exact time. Following the first

CP trial the tachistoscopic task was initiated. A repeated

presentation of one slide set (twelve slides) resulting in 24

total slide presentations was completed. The tone was sounded

for a period of 1 second prior to each slide. A period of 5-10

seconds occurred after the subject responded and before the next

tone was sounded. Following the presentation of the first slide

set the experimenter made another BP and HR measurement. The second CP trial was then completed. The second set of slides was then presented. The experimenter reminded the subject to focus on the black dot before each set of slides was presented. The following three CP trials and three slide sets were completed in the same manner. Following the last slide set presentation, BP and HR were measured a final time.

Procedure B2 (No cold pressor). Following Procedure A, subjects in the no CP condition were presented with these additional instructions:

> "Prior to the presentation of each of the five sets of faces, your blood pressure will be taken. Any questions?"

The experimenter then measured the SBP, DBP, and HR of the subject. The presentation of the first slide set was initiated. As in the CP condition, each slide set was presented twice resulting in a total of 24 slide presentations. As in the CP condition, the experimenter reminded the subjects to focus on the black dot in the center of the screen and sounded a 1-second tone prior to the presentation of each slide. The first slide was then presented. Following the subject's response, the next tone was sounded. Following the presentation of the first slide set, another measurement of BP and HR was completed. The experimenter then instructed the subject to prepare for the next slide set by focusing on the black dot. The experimenter then

sounded the tone to signal the presentation of the first slide in the second set. The same procedures described above were followed for the final three BP/HR measurements and three slide set presentations.

Procedure C. All subjects were debriefed following the experimental procedure. Those in the CP condition were given a towel to dry off and warm their hand. The blood pressure cuff was removed from all subjects. Each subject was notified that he could request the findings from this experiment and was reassured of his anonymity regarding results.

RESULTS

Data from two groups (hostile and non-hostile) of 28 subjects ($\underline{N}$ = 56) were analyzed. Within each group, both the CP and no CP conditions were comprised of 14 subjects (see Table 2). The dependent variable for this experiment was the accuracy of the subjects' appraisals of the facial affect category (happy, angry, or neutral). The data were analyzed with a four-factor, repeated measures analysis of variance (ANOVA) with the fixed or between-subjects effects of group (hostile and non-hostile) and CP (CP and no CP presentation), and the repeated or within-subjects factors of visual field (LVF and RVF), and facial affect category (happy, angry, and neutral). This approach produced six scores per subject with a possible range of 0 to 20 correct for each score. Significance levels were computed with conservative degrees of freedom (Greenhouse &

Table 2

Group Sections and Sample Sizes

N = 56

Hostile Group   Non-hostile Group
n = 28 n = 28

Cold pressor   No CP   Cold pressor   No CP
n = 14 n =14 n = 14 n = 14

Geisser, 1959) and found to be equivalent to univariate and
mixed-model approaches. Post-hoc comparisons of main effects
were performed with Tukey's Honestly Significant Difference
Procedure (HSD) (alpha = .05). Post-hoc comparisons of the
contributions of each level of the Group, CP, Affect Category,
and Visual Field variables were performed with individual
ANOVA's. Examination of each variable in the overall analysis
was performed using the Bartlett Box F homogeneity-of-variance
test. All variables were non-significant (alpha = .05, (3,
4867)).

Significant Effects

A significant main effect was found for Affect Category
and for Visual Field. Significant two-way interactions included
Group x Visual Field and Visual Field x Affect Category. Also,
a significant three-way interaction of Group x Visual Field x
Affect Category was noted.

Hypotheses Outcomes

In general, it was hypothesized that hostile individuals
would show different levels of perceptual accuracy as compared
to non-hostile individuals. This hypothesis was confirmed by
the significant interaction effect of Group x Visual Field x
Affect Category. Hostile subjects evidenced different accuracy
levels when asked to judge three categories of facial affect.

More specifically, it was predicted that hostiles would be
more accurate at assessing angry affect and less accurate at

assessing neutral affect than non-hostiles in both CP
conditions. In regard to neutral facial affect perception this
was correct. Hostiles consistently demonstrated poorer
performance with neutral facial configurations within both
visual fields and CP conditions. However, hostiles demonstrated
the hypothesized pattern of superior angry facial affect
recognition only when the facial configurations were presented
in their RVF. They showed poorer performance relative to non-
hostiles when angry faces were presented in their LVF.

A third hypothesis was that the above pattern of superior
angry affect recognition and inferior neutral affect recognition
in the hostile group would become more accentuated for those
subjects completing the CP task. These effects were predicted
to become more significant in the CP group of hostiles. This
did not occur. Hostiles performed similarly in both the CP and
no CP conditions.

The fourth hypothesis stated that non-hostiles completing
the CP task would show increased accuracy across all three
facial affect categories as compared to those in the no CP
condition. This was partially confirmed. Non-hostiles did show
an overall increase in accuracy relative to CP presentation but
this occurred only with facial configurations presented in their
RVF. They showed less accuracy relative to CP presentation when
faces were presented in their LVF.

Description of Significant Effects

There was a significant three-way, Group X Visual Field X Affect Category, interaction, F (2,104) = 4.99 p<.01, see Figure 2 and Table 3. As expected, hostiles showed a different pattern of accuracy than non-hostiles in the assessment of the three categories of facial affect. They consistently performed less accurately than non-hostiles when facial configurations were presented in the LVF. In the RVF they showed less accuracy only in the assessment of neutral faces, however. They proved to be more accurate than non-hostiles in the RVF when assessing angry and happy facial configurations.

Post-hoc analysis of the hostile group yielded a significant effect for Affect Category, F (2,54) = 64.63 p<.0001, and a significant interaction of Visual Field x Affect Category, F (2,54) = 5.20 p<.01. Hostiles did not show a main effect for Visual Field, F (1,27) = 3.31 p=.080. Post-hoc analysis of the non-hostile group yielded a significant main effect for Visual Field, F (1,27) = 23.17 p<.0001, and Affect Category, F (2,54) = 72.69 p<.0001. Non-hostiles did not demonstrate a significant interaction effect for Visual Field x Affect Category, F (2,54) = 1.17 p=.317.

Further post-hoc analysis of this interaction showed that the angry affect was the only affect category to produce a significant Group x Visual Field interaction, F (1,54) = 8.81

Group x VF x Affect Category
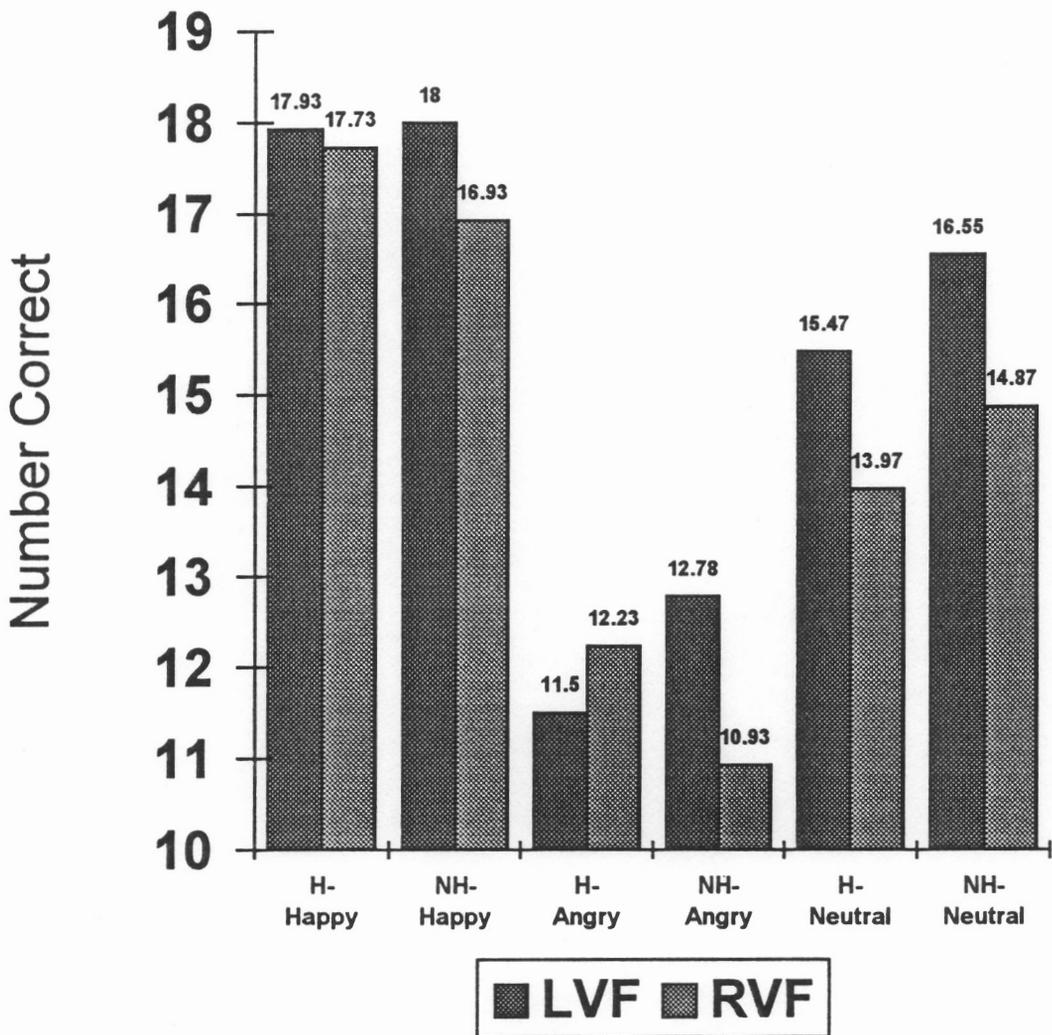
Figure 2

Table 3

Tests involving Visual Field by Affect Category Within-Subject Effect

Averaged Tests of Significance for Affect Category using Unique sums of squares

Source of Variation	SS	DF	MS	F	P - Value
Within+Residual	380.02	104	3.65		
Visual Field by Affect Category	41.15	2	20.57	5.63	.005
CP by Visual Field by Affect Category	3.68	2	1.84	.50	.605
Group by Visual Field by Affect Category	35.61	2	17.81	4.87	.009
CP by Group by Visual Field by Affect Category	7.86	2	3.93	1.03	.345

p<.01. Significant main effects of Visual Field were found for happy affect, F (1,54) = 4.10 p<.05, and neutral affect, F(1,54) = 29.80 p<.0001 but not angry affect.

Furthermore, a significant overall interaction was found for Group X Visual Field, F (1,52) = 6.74 p<.05, see Figure 3 and Table 4. Hostiles showed better overall accuracy than non-hostiles in the RVF. However, non-hostiles showed better overall accuracy than hostiles in the LVF.

The Visual Field X Affect Category interaction was also significant, F (2,104) = 5.63 p<.01, see Figure 4 and Table 3. Neutral facial configurations were recognized as neutral significantly more often in the LVF than the RVF.

The effect of Visual Field was significant also, F (1,52) = 23.01 p<.0001, as expected (see Figure 5 and Table 4). In general, subjects were more accurate with facial configurations presented in the LVF. Post-hoc analysis, however, showed that this effect was primarily due to the non-hostile group.

Finally, the effect of Affect Category was significant, F (2,104) = 140.13 p<.0001, see Figure 6 and Table 5. Each category of affective facial configuration was significantly differentiated from the other two. For all groups, happy faces were recognized at the most accurate level, followed by neutral faces, and then angry faces. Post-hoc comparisons performed with Tukey's HSD (alpha=.05) on the main effects of Visual Field

Group x Visual Field
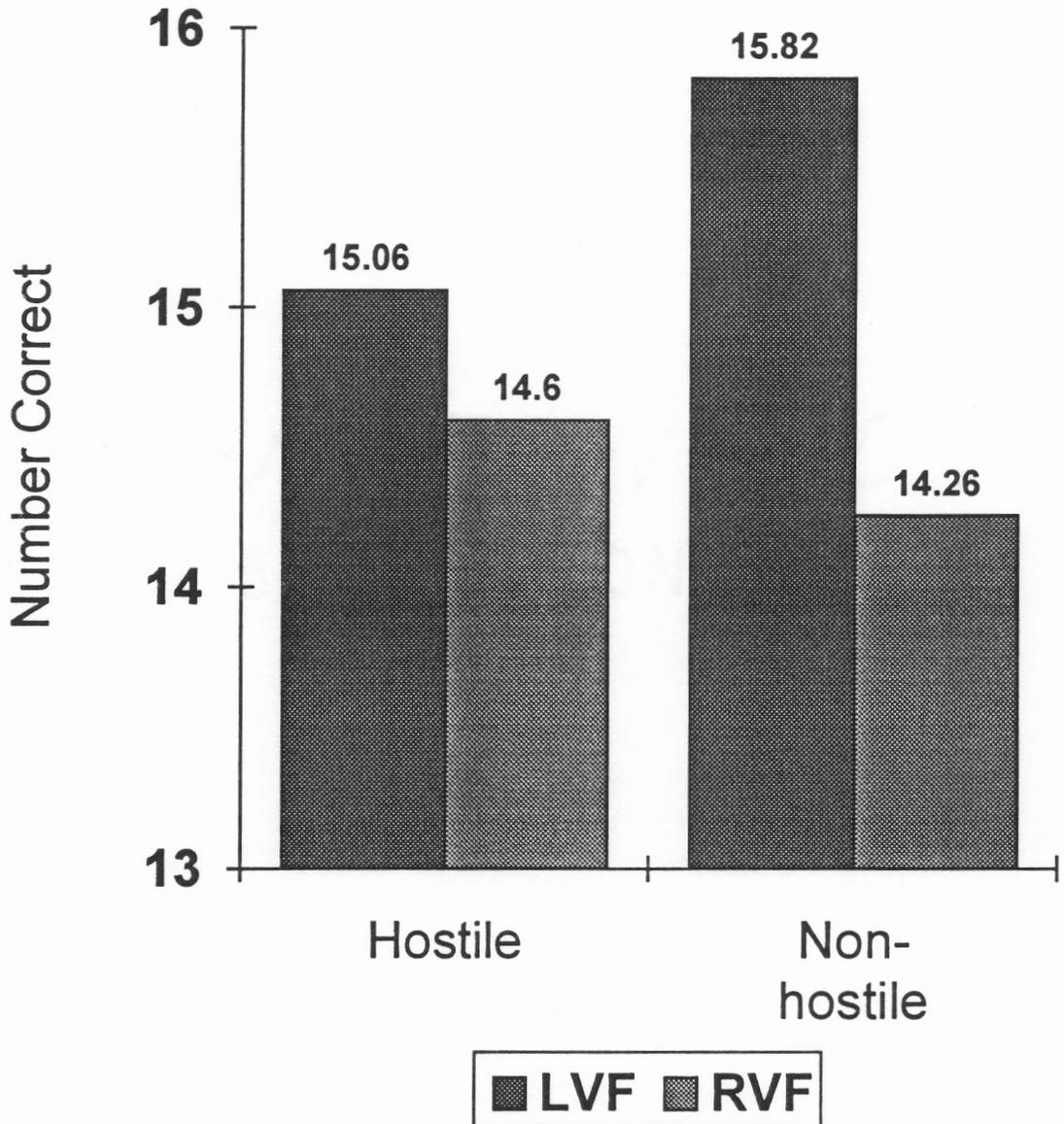
Figure 3

Table 4

Tests involving Visual Field Within-Subject Effect

Tests of Significance for Visual Field using Unique sums of squares

Source of Variation	SS	DF	MS	F	P - Value
Within+Residual	194.40	52	3.74		
Visual Field	86.01	1	86.01	23.01	.000
CP by Visual Field	6.30	1	6.30	1.68	.200
Group by Visual Field	25.19	1	25.19	6.74	.012
CP by Group by Visual Field	13.76	1	13.76	3.68	.061

Visual Field x Affect Category
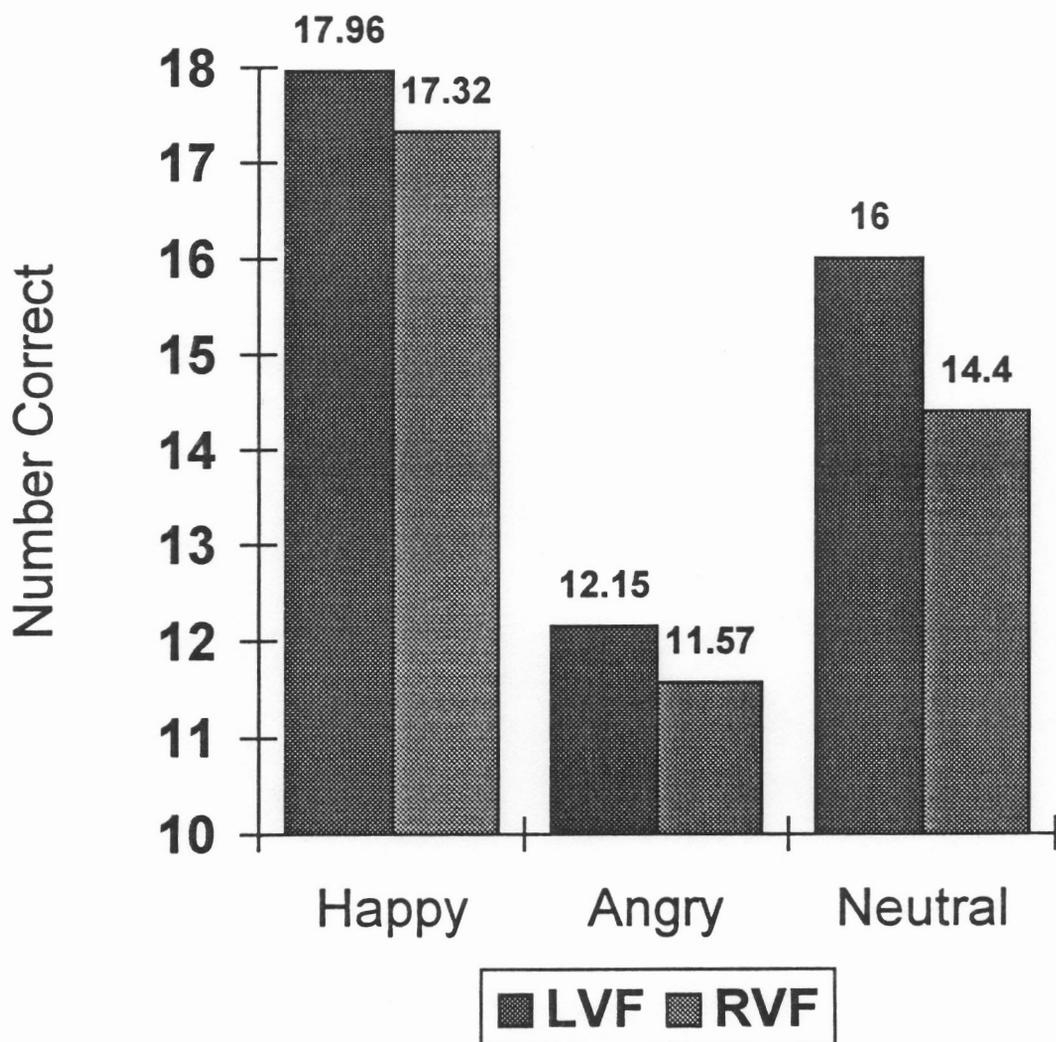
Figure 4

Visual Field
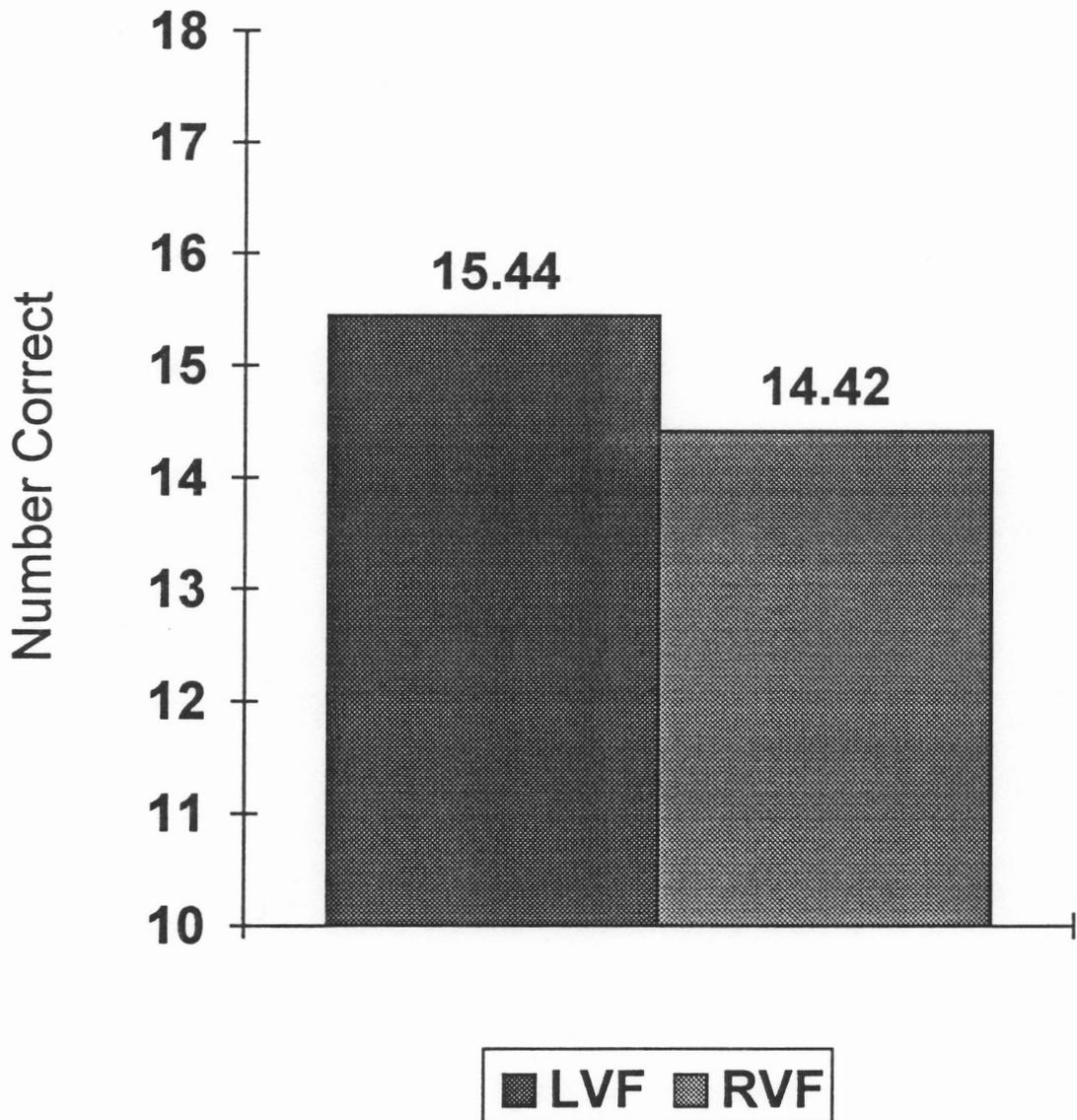
Figure 5

Affect Category
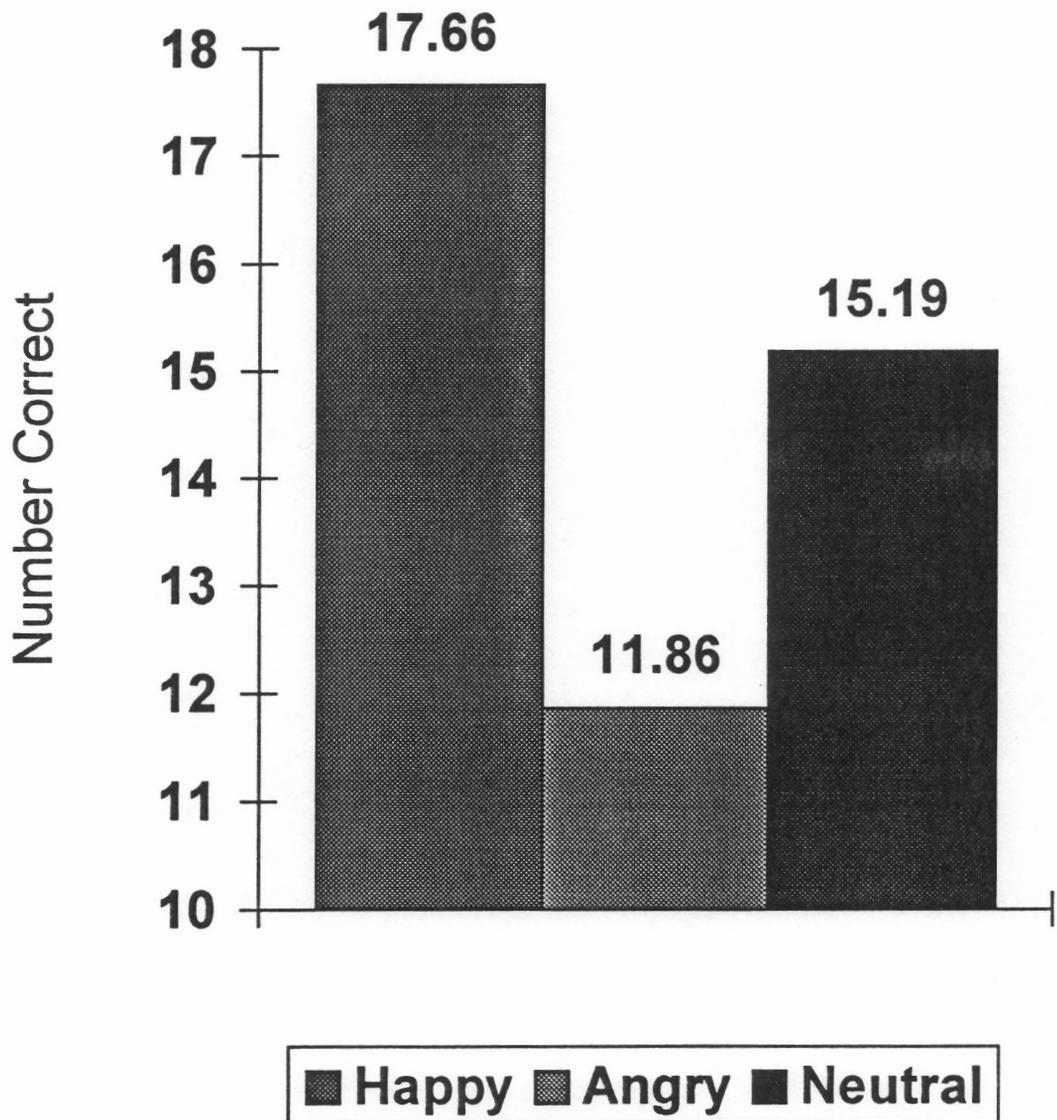
Figure 6

Table 5

<u>Tests involving Affect Category Within-Subject Effect</u>

<u>Averaged Tests of Significance for Affect Category using Unique sums of squares</u>

Source of Variation	SS	DF	MS	F	P – Value
Within+Residual	709.36	104	6.82		
Affect	1911.65	2	955.82	140.13	.000
CP by Affect	27.97	2	13.99	2.05	.134
Group by Affect	25.30	2	12.65	1.85	.162
CP by Group by Affect	2.72	2	1.36	.20	.820

and Affect Category confirmed their significance (see Table 6 for results summary).

A nonsignificant trend was noted in the Group x Visual Field x Cold Pressor interaction, F (1,52) = 3.68 p=.061 (see Figure 7). Post-hoc analysis of the hostile group yielded no significant main effect for CP or Visual Field. The interaction of CP X Visual Field was also non-significant. However, examination of the non-hostile group yielded a significant main effect for Visual Field, F (1,26) = 26.64 p<.0001. Also, a significant interaction effect was found for CP x Visual Field, F (1,26) = 5.05 p<.05 for this group.

Further post-hoc examination of this group showed that within the no CP condition, there was a significant main effect of Visual Field, F (1,26) = 8.65 p<.01, and a significant interaction effect of Group x Visual Field, F (1,26) = 15.77 p<.001. Within the CP condition, only a significant interaction effect of Group x Visual Field, F (1,26) = 9.72 p<.01, was noted.

Confirmatory evidence of the efficacy of the CP as an arousing stimulus was noted. Subjects in the CP condition in both the hostile and non-hostile groups showed increases in average SBP from baseline to treatment phases (see Figure 8). Subjects in the no CP conditions showed less SBP change from baseline to treatment. Increases in DBP were also noted in

41

Table 6

<u>Tukey's Studentized Range (HSD) Test for Arousal Level</u>

Alpha = 0.05
df = 52
MSE = 4.91
Critical Value = 2.838
Minimum Significant Difference = .4852

<u>Category</u>	<u>Mean</u>	<u>N</u>
Cold pressor*	14.82	168
No cold pressor*	15.05	168

* Not significantly different

<u>Tukey's Studentized Range (HSD) Test for Visual Field</u>

Alpha = 0.05
df = 52
MSE = 3.74
Critical Value = 2.838
Minimum Significant Difference = .4233

<u>Category</u>	<u>Mean</u>	<u>N</u>
Left Visual Field**	15.44	168
Right Visual Field**	14.42	168

** Significantly different

<u>Tukey's Studentized Range (HSD) Test for Affect Category</u>

Alpha = 0.05
df = 101
MSE = 7.27
Critical Value = 3.364

Affect Category Comparison	Difference Between Means	Significant at .05 level = ***
Happy – Angry	5.79	***
Happy – Neutral	2.47	***
Angry – Neutral	3.32	***

Group x Visual Field x Cold Pressor
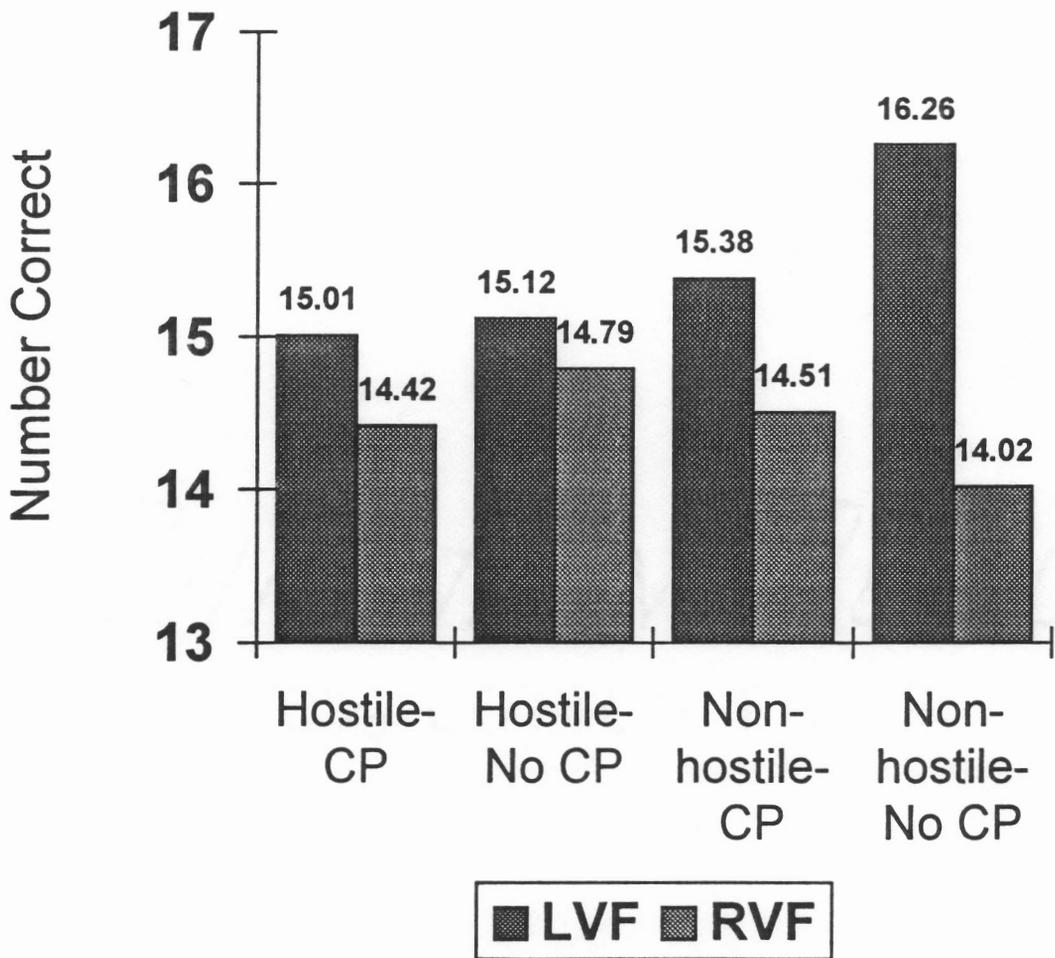
Figure 7

Table 7

Tests of Between-Subjects Effects

Tests of Significance for Group using Unique sums of squares

Source of Variation	SS	DF	MS	F	P - Value
Within+Residual	255.36	52	4.91		
Cold Pressor	4.30	1	4.30	.88	.354
Group	3.86	1	3.86	.79	.380
CP by Group	.05	1	.05	.01	.922

Systolic Blood Pressure Change

Figure 8

45
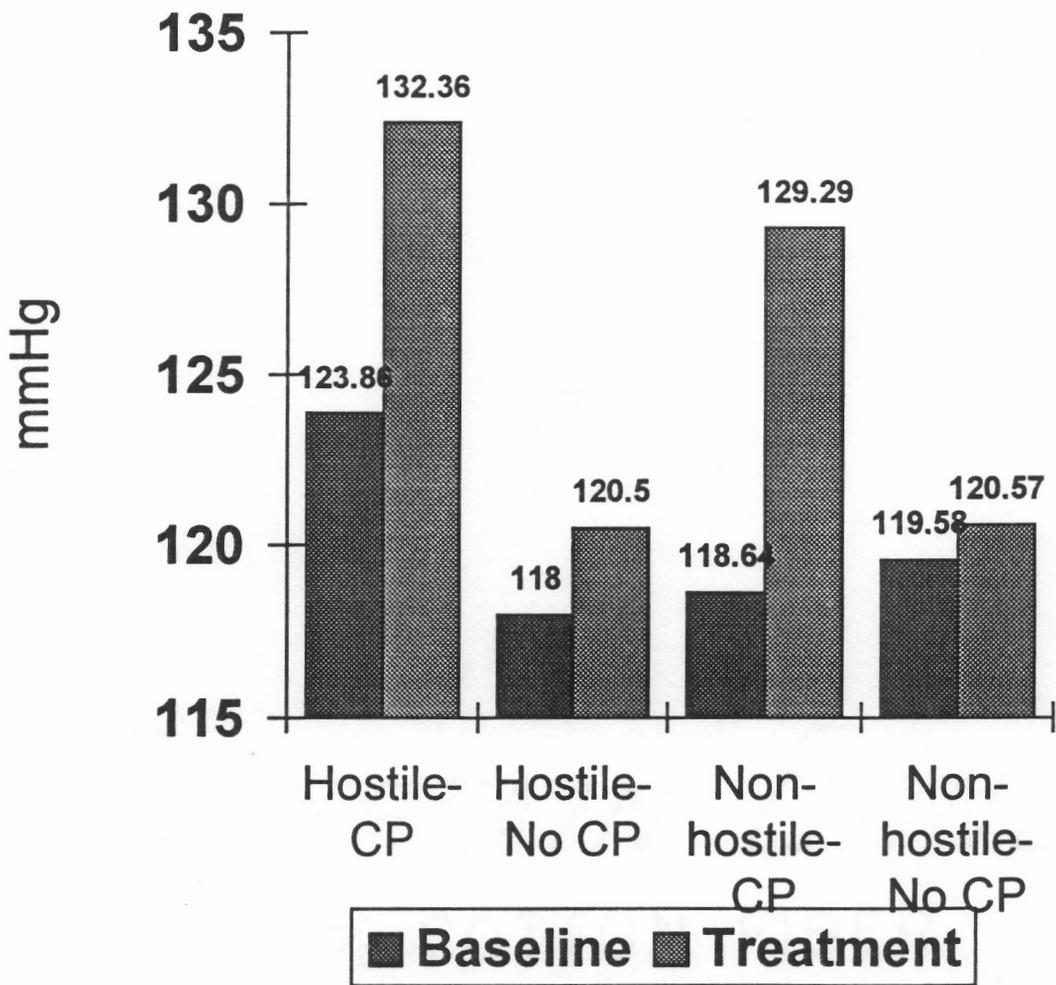
these subjects. These DBP increases occurred in the no CP

subjects also (see Figure 9). Heart-rate also increased across

all subjects in both CP conditions from baseline to test (see

Figure 10).

DISCUSSION

This experiment was designed to examine the effects of

physiological arousal on the perceptual accuracy of hostile and

non-hostile men presented with affective facial configurations

in either their LVF or RVF. Subjects were divided based on

measured hostility level (Group variable) and counterbalanced

assignment to the CP task. Four experimental subsets were

constructed; Hostile/Cold pressor, Hostile/No CP, Non-

hostile/Cold pressor, and Non-hostile/No CP. Subjects were

assessed on their accuracy in the identification of three

categories of affective facial configurations in the left and

the right visual fields.

Three-way Interaction

The significant three-way interaction of Group X Visual

Field X Affect Category (see Figure 2) indicated that hostile

men, as theorized, differed in the right cerebral mediation of

affect functions as compared to non-hostile men. Non-hostiles

were more accurate in the assessment of affective faces

presented in their LVF than those presented in their RVF for all

three of the affect categories examined. Hostiles, however,

showed this pattern of LVF superiority only in relation to

46

Diastolic Blood Pressure Change
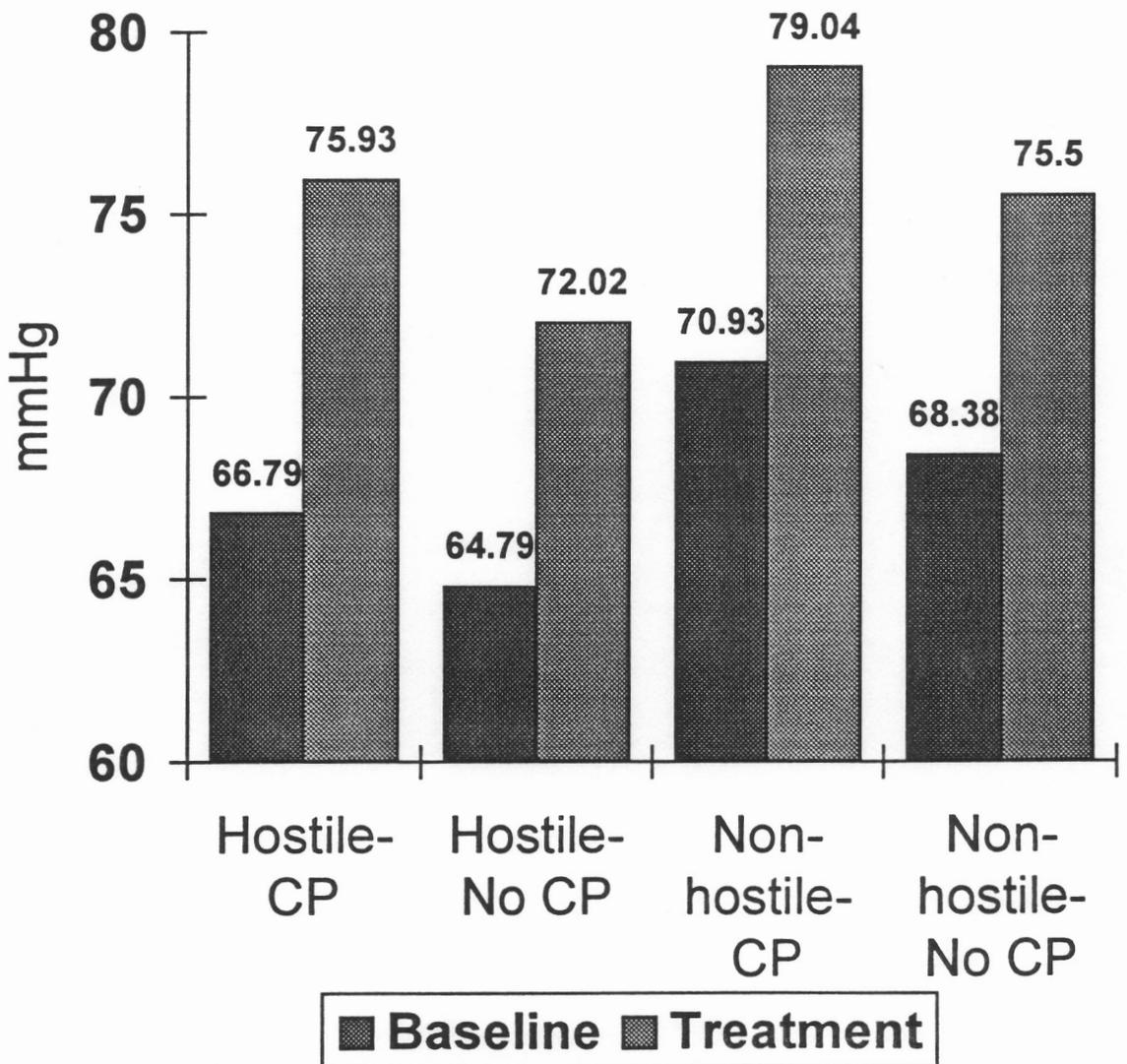
Figure 9

Heart Rate Change

Figure 10

48
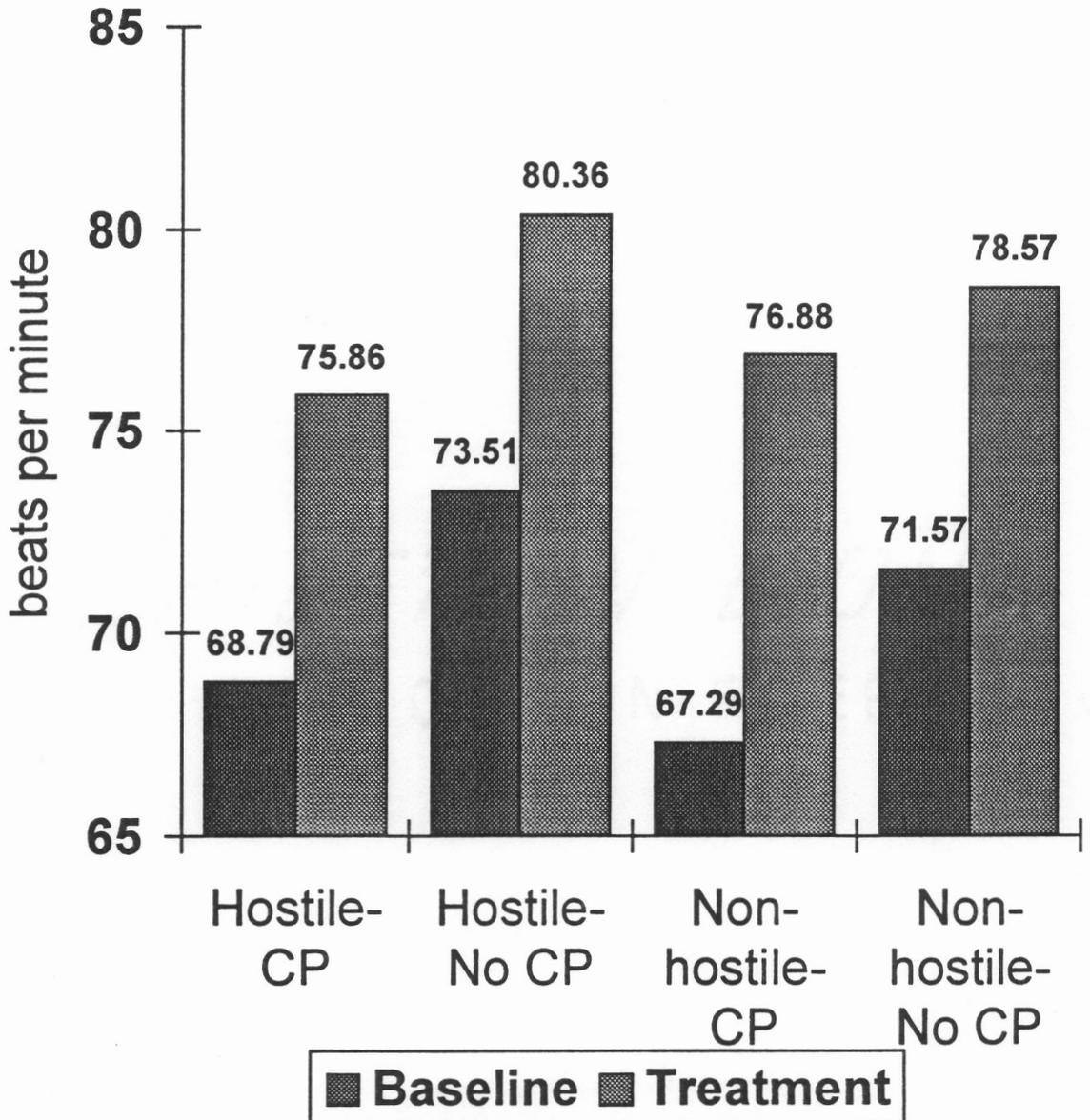
neutral facial configurations. They showed commensurate levels of accuracy in both visual fields when presented with happy faces. When presented with angry faces, they showed more accuracy in their RVF.

Hostiles performed significantly better than non-hostiles only when angry or happy facial configurations were presented in their RVF. At only one other level (happy faces presented in their LVF) did hostiles perform similarly to non-hostiles. Non-hostiles consistently showed better accuracy than hostiles within each other affect category and visual field.

These results provide evidence that the facial affect perception of hostile men is compromised or differs as compared to non-hostile men when the stimuli are presented in their LVF. This experiment offers an important qualification to this finding, however. Hostiles do not demonstrate generalized difficulty with facial affect perception across all visual field and affect categories. In specific situations or with specific categories of affect, hostiles perform as well as, or even better, than non-hostiles. In this experiment, hostiles were more accurate than non-hostiles when presented with angry and happy faces in their RVF.

This was not the case with neutral affect perception, however. Hostiles demonstrated a consistent LVF advantage when assessing neutral facial configurations. They also showed reliably less accurate neutral facial affect perception than

non-hostiles in each visual field, regardless of CP condition.

Thus, the hypothesized group accuracy difference with neutral

faces was confirmed. Hostiles were less accurate than non-

hostiles in the assessment of neutral facial configurations.

Hostiles showed differential rates of accuracy with angry

faces, however. This occurred relative to visual field.

Hostiles were significantly more accurate in the assessment of

angry faces presented in their RVF as compared to those

presented in their LVF. This finding was interesting because it

indicated a paradoxical performance pattern for hostiles in

relation to the left cerebral hemisphere and angry affect

recognition.

Generally, research has confirmed a significantly positive

LVF bias in the perception of angry affective stimuli. However,

these findings have been primarily based on normals (non-

hostiles). In this experiment, hostiles were not only more

accurate with angry faces presented in their RVF as compared to

their LVF, they were significantly more accurate than non-

hostiles in RVF angry facial affect assessment. Thus, there is

evidence that both the right and left cerebrums of hostile men

may perceive angry facial affect very differently than non-

hostile or normal men.

The effect of the proposed right hemisphere alteration in

hostile men may actually act to improve angry facial affect

perception in their RVF while negatively impacting angry facial

affect perception in their LVF. Perceptual accuracy of happy

faces presented in the RVF would also show this incremental

effect (as compared to non-hostiles). However, hostiles'

perceptual accuracy of happy faces in their LVF would not be as

adversely affected as that for angry faces because of the

theorized left hemisphere role in positive affect perception.

Thus, as found, hostiles would perform similarly in both visual

fields in the perception of happy facial configurations and

significantly better than non-hostiles in the RVF.

Visual Field Effect

The finding showing a LVF affect recognition advantage in

non-hostiles is consistent with the research literature.

Traditionally, other experimenters have shown that normal

subjects have a LVF advantage in the recognition of facial

emotion (Landis et al., 1979; Ley & Bryden, 1979; McKeever,

1977). These results have led to proposals of a right

hemisphere advantage in affect perception. Other research has

shown that this right hemisphere advantage occurs in relation to

facial affect expression as well. One experiment found that the

left side of one's face expresses more emotion than the right

side (Sackheim et al. 1978).

As stated above, however, hostiles did not follow this

pattern. They were less accurate than non-hostiles in the

perception of affect in faces presented in their LVF, (again,

see Figure 2). This provided further evidence of altered

functioning in the right hemisphere in response to this stimulus
category.

Affect Category and Accuracy

As hypothesized, each group showed varied accuracy across
the three categories of facial affect. Happy facial
configurations were perceived more accurately, followed by
neutral faces, and then angry faces. Scores ranged from 14 to
20 (X = 17.65) for happy faces, 7 to 19 (X = 11.86) for angry
faces, and from 7 to 20 (X = 15.19) for neutral faces (see
Figure 6 and Table 5). This finding confirmed other research
examining the speed of affective facial configuration
recognition. One study showed that the presentation of
positively valenced faces produced more accurate and faster
responding than the presentation of negatively valenced faces
(Demakis, Harrison, & Campden, 1993). In general, happy faces
seem qualitatively distinctive from other categories of
affective faces as evidenced by subjects' high levels of
accurate identification and speed of recognition.

Lateralization of Positive Affect

This finding lends support to theories stating that
recognition of positive affect is less lateralized than that of
negative affect. The ability of both hemispheres to accurately,
consistently, and jointly recognize happy facial configurations
may lead to generally better performance in positive affect
recognition as compared to angry affect recognition. This is

52

also true if one considers the meta-theory of mass action as a partial explanation for brain system behavior. Then, tasks utilizing both cerebral hemispheres can be assumed to be performed more efficiently than tasks that rely primarily on a single hemisphere.

Likewise, these results lend support to theories stating that negative affect expression and perception is lateralized to the right hemisphere (Morris et al., 1991; Silberman & Weingartner, 1986). In both the hostile and non-hostile groups, less of a difference was noted between visual field accuracy rates for happy faces than for angry or neutral faces.

Arousal Effects

It was further predicted that increases in physiological arousal through the use of the CP procedure would increase these differences. It was hypothesized that hostiles would become less accurate with neutral faces and more accurate with angry faces after experiencing the CP. This did not occur. Cold pressor presentation did not significantly differentiate hostiles' accuracy from that of a no CP state.

Thus, the hypothesis that hostiles would show significant change in their perceptual accuracy of neutral facial configuration assessment relative to CP presentation was not confirmed. Hostiles showed similar performance in both the CP and no CP conditions. Interestingly though, non-hostiles showed

a non-significant trend toward a different performance pattern (see Figure 10).

The non-hostiles in the no CP condition showed larger discrepancies between visual field accuracy rates than those in the CP condition. They showed more accuracy in the LVF and less accuracy in the RVF than the CP non-hostiles. As predicted, their accuracy improved in the CP-presentation condition, but this occurred only in the RVF. Presentation of the CP appeared to have a negative impact on accuracy when faces were presented in their LVF.

If the no CP, non-hostile subjects are considered true controls in this experiment, their results can be generalized to the "normal" population. Thus, normals in a no CP state could be said to generally perceive facial affect differently from hostiles, especially in the LVF. *However, when stressed or aroused, their performance changes so that they make affective perceptions much more like hostiles. They become less accurate in the LVF and more accurate in the RVF* (see Figure 10). The implication of this effect is that physiological arousal may differentially impact the right and left cerebrum so that a non-hostile's perceptual accuracy begins to emulate that of a hostile's. This proposal is based partly on Heilman's research demonstrating a right hemisphere role in visceral autonomic activation and interpretation of viscero-autonomic changes (Heilman, et al., 1993).

This concept can be referred to as *dynamic laterality*.
Davidson (1993) discussed a concept similar to this in terms of
a diathesis/stress model. He explained that measures of
asymmetrical anterior activation are associated with an
individual's vulnerability or propensity to experience certain
positive or negative emotions, *given the requisite environmental
elicitors*. He noted, for example, that an individual with
hypoactivation of the left frontal cerebral region would be
specifically vulnerable to depression in the presence of
negative life events.

The results of the present experiment would lead to a
similar conclusion relative to hostile and non-hostile men who
are presented with a cerebral activation stimulus. No
perceptual change would be noted due to the theorized
predisposition of hostile men to an altered right frontal
cerebral region. They would continue to perform at the same
level of accuracy despite the stimulus. Non-hostile men,
however, would likely demonstrate significant perceptual changes
in response to the stimulus due to their lack of this
predisposition.

Davidson (1993) goes on to point out that the major
implication of his neuropsychological theory of diathesis/stress
is that considerable variability would result in individuals
with unilateral brain damage. Using the concept of dynamic
laterality, this theory could be further specified. The

cerebral hemispheres respond in a differential fashion to
similar stimuli. For example, a lateralized stimulus (left-
handed CP presentation) may produce varying levels of activation
between hemispheres. Finally, the concept of dynamic laterality
can be applied to both perceptual and expressive behaviors. A
transactional system of ongoing expressive and perceptive
behaviors interacting with the environment best describes this
process.

Arousal and Stimulus Quality

The effect discussed above was not predicted in this
experiment. The hypotheses for this experiment were based on an
implicit assumption that changes in autonomic arousal (as
measured by blood pressure and heart-rate) result in global
effects on the cerebral hemispheres. The results of this
experiment, however, lead to a different conclusion.
Concomitant cerebral efficiency relative to autonomic arousal is
not likely a generalized, unitary phenomenon. *Each hemisphere's
cognitive efficiency may simply be a function of the current
stimulus*. Thus, in this experiment, the CP task may have acted
as a stimulus primarily for right hemisphere systems rather than
for both hemispheres. Differences, as a function of visual
field, would then be noted. A similar effect would be noted
relative to an affective stimulus also. One example would be
the perception of an affective facial configuration or the

kinesthetic feedback from making an affective facial
configuration.

The experiment on which this project was based found a
similar type of differential effect (Herridge & Harrison, 1993).
Autonomic change (skin conductance) at either upper extremity
was differentially affected by an affective stimulus (making
facial configurations). The differing skin conductance
responses were linked to the contralateral cerebral hemisphere.
This indicated that affective stimuli may differentially
activate cerebral systems.

In the present experiment the left hand was used for the
implementation of the CP and thus the right hemisphere was
differentially affected due to its primary role in right
extremity sensation. This lateralized stimulus could also have
been instrumental in the variable results noted in the
experiment.

The different rates of accuracy between visual fields may
be partly a function of the stimulus. This may have resulted in
the non-hostiles' tendency to show more similar levels of
accuracy when aroused as compared to that of hostiles.

Neuropsychological Model of Hostility

Using the above proposal, the results of this experiment
can then be applied cautiously to the proposed
neuropsychological model being tested. There was an absence of
significant change in perceptual accuracy associated with CP

57

presentation for the hostile subjects. This may be due to the
proposed "normal" state of elevated physiological arousal in
these subjects. When hostiles are presented with an arousing
stimulus, this "default" mode of heightened arousal may change
perceptual behavior very little at the level of the right
cerebrum. The result would only be consistently poor
performance on right hemisphere tasks.

However, the non-hostiles' "default" activation level is
likely lower than that of the hostiles and thus an arousing
stimulus may have a negative impact on performance of right
hemisphere perceptual accuracy tasks. This appeared to be the
case in this experiment (see Figure 10).

Interpretation of Major Findings and Conclusions

The experimental results of this investigation created
questions about the neuropsychological mechanisms of the
hostility construct. However, two important conclusions can be
drawn from these data. The first is support of the model being
tested and involves how hostiles' cognitive efficiency at facial
affect perception tasks may be a function of an alteration in a
right hemisphere system. This alteration may differentially
impact the left hemisphere in a way that requires more
examination.

The second conclusion is that the effects of autonomic
arousal on right cerebral cognitive efficiency in hostiles may
be small. Facial affect recognition accuracy may not change in

58

hostiles due to a pre-morbid state of high physiological arousal. However, the effects of this arousal are still important in the maintenance of a high arousal state.

As described above, the first conclusion from these data is that that right hemisphere activity is altered in hostiles. Thus, there are different expectancies in regard to their perceptual accuracy with facial configurations presented in their LVF. However, the effect of this proposed right hemisphere alteration on left hemisphere functioning has not been discussed. From these results, it seems that left hemisphere efficiency is increased in hostiles as compared to non-hostiles. The generally negative effects of heightened physiological arousal in hostiles may only apply to right hemisphere functions. The effect on left hemisphere perception may be positive due to its more moderate activation state. Thus, an arousing stimulus' effects on perceptual accuracy in hostiles may be more likely to be noted at the level of the RVF.

Secondly, an arousing stimulus such as the CP may not have a significant additive effect on perceptual accuracy in hostiles' LVF, given the assumption that they generally operate in a heightened state of physiological arousal. They are already performing less efficiently and the CP may not add to the already present negative effect. Differences may begin to be noted, however, in their accuracy on RVF tasks. Also, non-hostiles (who are not pre-morbidly in a heightened arousal

state) would show changes across tasks in both visual fields. These effects would be expected to be even stronger when the stimulus presentation is already biased toward perception at the right cerebrum (i.e. a left-handed presentation of a CP).

Clinical Implications

The implications from this experiment for therapeutic intervention with hostile men are varied. Traditionally, these individuals rarely seek out therapy and if they do, are often less involved than individuals with other psychological difficulties. They may feel frustrated due to a chronic state of anger that has impeded their occupational and social success. They may also exhibit paranoid ideation and feel that other people seem to be "out to get" them.

According to the results from this experiment it would be important to recommend a two-part intervention involving: (1) encouraging them to take time to assess other people's intentions toward them; and (2) provide education about the stress-arousal and stress-performance relationships.

Regarding cognitive attributions, it would be important to convince hostiles that more accurate perceptions of others intentions can be made by getting more verbal feedback and taking more time to make decisions about others' mood states. Practicing these skills using various individually appropriate scenarios in therapy would likely prove very useful.

Education about the brain and body's response to stress or heightened physiological arousal could prove useful. Hostiles may misinterpret a therapist's intentions and believe that he is being told "this is all in your head". Hostiles would likely respond better to a therapist who gives a biological/physiological explanation of how the brain and body function together. This approach also allows them to begin to understand the negative long-term effects of hostility on the cardiovascular system and start to change their behavior pattern so as to avoid various types of related physiological pathology.

Advantages and Disadvantages of this Experiment

One particular deficiency in this experiment was the sample, a group of college men, which makes generalization difficult. The incidence of hostility in this population may be different than others. Also, women and older men may show different patterns of accuracy than younger men.

Sample size was also problematic based on the results. Increased statistical power through larger group sample sizes may have allowed the Group x Visual Field x Cold Pressor effect to be significant. Also, use of more extreme Ho scale cutoff scores (above 30 and below 10) could possibly provide greater distinctions on the dependent variable.

A conceptual problem regarding the effect of the CP task was also noted previously. It is likely that differential hemispheric effects may result from a left-handed CP task. To

61

avoid this problem it is recommended that further experiments use bilateral or alternating CP presentations to control for differing arousal effects.

It is also recommended that the non-hostile grouped be matched for reactivity to the CP in order to prevent a possibly confounding effect. In this experiment, only the hostiles received an initial exposure to the CP and were partially defined by their autonomic reactivity. Future experiments should examine initial reactivity of the non-hostile group and define them accordingly.

Overall, the experimental protocol proved to be otherwise very efficient. Only one subject was lost due to an inability to keep his hand in the CP for the required amount of time. Increasing the time required may result in a greater loss of subjects while not adding any increase to a heightened physiological arousal level already achieved by the initial time requirement.

In reference to data gathering equipment, the use of an automated blood pressure unit is recommended in that it allowed for no direct interruption of the experiment and produced more efficient and reliable data gathering. The dependent variable of accuracy could be coupled with speed of responding through the use of a button selection mechanism labeled with the three categories of affect. Then comparisons between response speed

and accuracy could be made and assessed relative to group and CP condition.

Future research designs should also examine other hostility measures as grouping variables. Inclusion of subjects scoring high on the social-interactive dimension who are not physiologically as reactive as others should also be a goal. The greatest difficulty to be faced by researchers will be in the definition of the sample. Argument about the true nature of hostility and what makes an individual hostile will continue. Thus, it will become more important to thoroughly describe the type of hostile individual being examined. An important future goal is to begin to reliably distinguish among the many types of hostiles. This will lead to more appropriate interventions and allow for greater amounts of positive change in their lives.

References

Anderson, K. J. (1990). Arousal and the inverted-u hypothesis: A critique of Neiss's "reconceptualizing arousal." Psychological Bulletin, 107, 96-100.

Ax, A. F. (1953) The physiological differentiation between fear and anger in humans. Psychosomatic Medicine, 15, 433-442.

Butter, C. M., Snyder, D. R. & McDonald, J. A. (1970). Effects of orbital frontal lesions on aversive and aggressive behaviors in rhesus monkeys. Journal of Comparative Physiology and Psychology, 72, 132-144.

Carver, C. S., & Matthews, K. A. (1986). Psychometric assessment. In N. Schneiderman, S. M. Weiss, & P. G. Kaufmann (Eds.) Handbook of Research Methods in Cardiovascular Behavioral Medicine, (pp. 483-494). New York: Plenum Press.

Cook, W., & Medley, D. (1954). Propose hostility and pharisaic-virtue scales for the MMPI. Journal of Applied Psychology, 38, 414-418.

Coren, S. P., Porac, C., & Duncan, P. (1979). A behaviorally validated self-report inventory to assess 4 types of lateral preferences. Journal of Clinical Neuropsychology, 1, 55-64

Damasio, A. R., & Anderson, S. W. (1993). The frontal lobes. In
        K. M. Heilman & E. Valenstein (Eds.) <u>Clinical
        Neuropsychology,</u> (pp.409-460). New York: Oxford
        University Press.

Davidson, R. J. (1993). Cerebral asymmetry and emotion:
        Conceptual and methodological conundrums. <u>Cognition and
        Emotion,</u> <u>7</u>, 115-138.

Davidson, R. J. (1992). Prolegomenon to the structure of
        emotion: Gleanings from neuropsychology. <u>Cognition and
        Emotion,</u> <u>6</u>, 245-268.

Demakis, G. J., Harrison, D. W., & Campden, M. (1993). A test of
        Kinsbourne's selective activation model. International
        Journal of Neuroscience, 10, 1-7.

Dembroski, T. M., & Williams, R. B. (1989). Definitions and
        assessment of coronary-prone behavior. In N.
        Schneiderman, S. M. Weiss, & P. G. Kaufmann (Eds.)
        <u>Handbook of Research Methods in Cardiovascular Behavioral
        Medicine,</u> (pp.553-570). New York: Plenum Press.

Ekman, P., & Friesen, W. V. (1978). <u>Pictures of facial affect</u>.
        Palo Alto, CA: Consulting psychologists Press.

Ekman, P., Levenson, R. W., & Friesen, W. V. (1983). Autonomic
        nervous system activity distinguishes among emotions.
        <u>Science,</u> <u>221</u>, 1208-1210.

Garrett, J. C., & Harrison, D. W. (1989). Pupillometric assessment of arousal to sexual stimuli: Novelty effects or preference? Archives of Sexual Behavior, 18:3, 191-201.

Harrison, D. W. (1990). The vascular orienting response and the law of initial values. BiologicalPsychology, 31, 149-155.

Harrison, D. W., & Gorelczenko, P. M., & Cook, J. (1990). Functional asymmetry for facial affect perception in high and low hostile men and women. International Journal of Neuroscience, 55, 89-97.

Harrison, D. W., Gorelczenko, P. M. (1990). Sex differences in the functional asymmetry for facial affect perception. International Journal of Neuroscience, 52, 11-16.

Harrison, D. W. & Kelly, P. L. (1989). Age differences in cardiovascular and cognitive performance under noise conditions. Perceptual and Motor Skills, 69, 547-554.

Harrison, D. W., Kelly, P. L., Gavin, M., & Isaac, W. (1989). Extracranial and digital vascular events: An analysis of methods in bvp amplitude and biofeedback research. Biological Psychology, 29, 1-9.

Heilman, K. M., Bowers, D., and Valenstein, E. (1993). Emotional disorders associated with neurological diseases. In K. M. Heilman & E. Valenstein (Eds.) Clinical Neuropsychology, (pp.461-498). New York: Oxford University Press.

Henry, J. P. & Meehan, J. P. (1981). Psychosocial stimuli,
    physiological specificity, , and cardiovascular disease.
    In H. Weiner, M. A. Hofer, & A. J. Stunkard (Eds.) <u>Brain,</u>
    <u>Behavior, and Bodily Disease</u> (pp.305-333). New York: Raven
    Press.

Herridge, M. L., & Harrison, D. W. (1994). Hostility: A
    neuropsychological model of dishabituation to affective
    stimuli. Preliminary Exam Paper, Virginia Tech.

Herridge, M. L., & Harrison, D. W. (1993). Differential effects
    of facial configuration on bilateral skin conductance as a
    function of hostility. Thesis, Virginia Tech.

Houston, B, K. (1986). Psychological variables and
    cardiovascular and neuroendrocrine activity. In K. A.
    Matthews (Ed.) <u>Handbook of Stress, Reactivity, and</u>
    <u>Cardiovascular Disease</u>, pp.207-230, New York: Wiley.

Houston, B. K. (1989). Personality dimensions in reactivity and
    cardiovascular disease. In N. Schneiderman, S. M. Weiss,
    & P. G. Kaufmann (Eds.) <u>Handbook of Research Methods in</u>
    <u>Cardiovascular Behavioral Medicine</u>, (pp.553-570). New
    York: Plenum Press.

Houston, B. K. (1992). Personality characteristics, reactivity,
    and cardiovascular disease. In J. R. Turner, A. Sherwood,
    & K. C. Light (Eds.) <u>Individual Differences in</u>
    <u>Cardiovascular Response to Stress</u>, New York: Plenum Press.

Jennings, J. R. (1992). Is it important that the mind is in a body? Inhibition and the Heart. Psychophysiology, 29, 369-383.

Krantz, D. S., Manuck, S. B., & Wing, R. R. (1986). Psychological stressors and task variables as elicitors of reactivity. In K. A. Matthews (Ed.) Handbook of Stress, Reactivity, and Cardiovascular Disease, pp. 85-108, New York: Wiley.

Landis, T., Assal, G., and Perret, E. (1979). opposite cerebral hemispheric superiorities for visual associative processing of emotional facial expressions and objects. Nature, London, 278, 739-740.

Ley, R. G., and Bryden, M. P. (1979). Hemispheric differences in processing emotions and faces. Brain and Language, 7, 127-138.

McKeever, W. F. (1977). Lateral tachistoscopic recognition, cerebral dominance, and dyslexia. Bulletin of Orton Sociology, 27, 26-36

Mills, P. J., and Dimsdale, J. E. (1992). Sympathetic nervous system responses to psychosocial stressors. In J.R. Turner, A. Sherwood, & K.C. Light (Eds.) Individual Differences in Cardiovascular Response to Stress, pp.33-50, New YorK: Plenum Press.

Morris, M. K., Bradley, M., Bowers, D., Lang, P. J., & Heilman, K. M. (1991). Valence-specific hypoarousal following right-temporal lobectomy. Presented at the 19th Annual Meeting of the International Neuropsychology Society, San Antonio.

Pope, M. K., & Smith, T. W. (1991). Cortisol excretion in high and low cynically hostile men. Psychosomatic Medicine, 53, 386-392.

Pribram, K. H., & McGuinness, D. (1992). Attention and para-attentional processing. Annals New York Academy of Sciences, 65-87.

Sackheim, H., Gur, R. and Saucy, M. (1978). Emotions are expressed more intensely on the left side of the face. Science, 202, 434-436.

Scott, T.R., Wells, W.H., Wood, D. Z., & Morgan, D. I. (1967). Pupil response and sexual interest re-examined. Journal of Clinical Psychology, 23, 433-438.

Sergent, J. (1982). Theoretical and methodological consequences of variations in exposure duration in visual laterality studies. Perception & Psychophysics, 31, 451-461.

Silberman, E. K., & Weingartner, H. (1986). Hemispheric lateralization of functions related to emotion. Brain and Cognition, 5, 322-353.

Smith, T. W. & Allred, K. D. (1989). Blood-pressure during social interaction in high and low cynically hostile males. Journal of Behavioral Medicine, 12, 135-143.

Smith, T. W., & Houston, B. K. (1987). Hostility, anger expression, cardiovascular responsivity, and social support. Biological Psychology, 24, 39-48.

Sokolov, E. N. (1963). Perception and the Conditioned Reflex. Oxford: Pergamon.

Walrath, L. C., & Stern, J. A. (1980). General considerations. In H. M. Van Praag (Ed.) Handbook of Biological Psychiatry: Part II Brain Mechanisms and Abnormal Behavior, (pp.1-44). New York: Marcel Dekker, Inc.

Williams, R. B. (1986). Patterns of reactivity and stress. In K. A. Matthews (Ed.) Handbook of Stress, Reactivity, and Cardiovascular Disease, pp.109-126, New York: Wiley.

Williams, R. B., Haney, T. L., Lee, K. L., Kong, Y. H., Blumenthal, J. A., & Whalen, R. E. (1980). Type a behavior, hostility, and coronary atherosclerosis. Psychosomatic Medicine, 42, 539-549.

Williams, R. B., & Williams, V. W. (1993). Anger Kills, New York: Times Books.

APPENDIX A

INFORMED CONSENT TO PARTICIPATE IN RESEARCH

Title of Research Study: The Effects of Hostility and Arousal on Facial Affect Perception: A Test of a Neuropsychological Model of Hostility

Experiment #:_____

1. PURPOSE OF EXPERIMENT:

To evaluate your appropriateness for further participation in an experiment on facial affect perception.

2. PROCEDURE TO BE FOLLOWED IN THIS STUDY:

To accomplish the goals of the study you will be asked to fill out questionnaires. Depending on your scores on the questionnaires, you may then be asked to place your hand in ice-water one time and have your blood pressure taken approximately four times.

3. ANONYMITY OF SUBJECTS AND CONFIDENTIALITY OF RESULTS:

The results of this study will be kept strictly confidential. At no time will the researchers release your results to anyone without your written consent. The information you provide will have your name removed and only a subject number will identify you during analyses and any write-up of the research.

4. DISCOMFORTS AND RISKS FROM PARTICIPATING IN THE STUDY:

The blood pressure measurements are generally pain-free but may become uncomfortable for some individuals. The ice-water task is painful but does not cause any injury. If you wish to discuss these or any other discomforts you may experience, you may call the project director. Because most of the tests are mainly evaluative, there are no serious risks involved. You may take your hand out of the ice-water at any time. If discomfort becomes too great, please let us know and we will stop the tests. You can cease participation in the experiment at any time. The session should last approximately 45 minutes.

5. EXPECTED BENEFITS:

By participating in this experiment, you may gain new knowledge of experimental design or protocol which might prove helpful in the future. If you wish to know the results of your tests, you can receive this information at the end of the experiment.

6. FREEDOM TO WITHDRAW:

You are free to withdraw from participation in this study at any time without any penalty.

7. EXTRA CREDIT:

Introductory and Other Psychology Students
If you are currently taking Introductory Psychology (or a course that offers credit for participation), you will receive one credit point toward your final grade for your participation.

8. USE OF RESEARCH DATA:

The information from this research may be used for scientific or educational purposes. It may be presented at scientific meetings and/or published and reproduced in professional journals or books, or used for any other purpose that Virginia Tech's Department of Psychology considers proper in the interest of education, knowledge, or research.

9. APPROVAL OF RESEARCH:

This research project has been approved by the Human Subjects Committee of the Department of Psychology and by the Institutional Review Board of Virginia Tech.

10. SUBJECT'S PERMISSION

I have read and understand the above description of the study. I have had an opportunity to ask questions and have had them all answered. I hereby acknowledge the above and give my voluntary consent for participation in this study. I further acknowledge that I have reported all medical problems and know of no reason for my non-participation in this experiment.

I further understand that if I participate I may withdraw at any time without penalty.

I understand that should I have any questions regarding this research and its conduct, I should contact any of the persons named below.

PRIMARY RESEARCHER: Matthew L. Herridge	PHONE: 953-1476
FACULTY ADVISOR:	David W. Harrison	PHONE: 231-4422
CHAIR, HSC:	Richard Eisler	PHONE: 231-6914
CHAIR, IRB:	Ernest Stout	PHONE: 231-9359

SUBJECT'S SIGNATURE: _____   DATE: _____

SUBJECT'S ID: _____

....

SUBJECT COPY

I have read and understand the above description of the study. I have had an opportunity to ask questions and have had them all answered. I hereby acknowledge the above and give my voluntary consent for participation in this study.

I further understand that if I participate I may withdraw at any time without penalty.

I understand that should I have any questions regarding this research and its conduct, I should contact any of the persons named below.

PRIMARY RESEARCHER: Matthew L. Herridge	PHONE: 953-1476
FACULTY ADVISOR:	David W. Harrison	PHONE: 231-4422
CHAIR, HSC:	Richard Eisler	PHONE: 231-6914
CHAIR, IRB:	Ernest Stout	PHONE: 231-9359

SUBJECT'S SIGNATURE: _____   DATE: _____

APPENDIX B

Handedness Questionnaire
R = Right   L = Left   B = Both

1.	With which hand would you throw a ball to hit a target?	R	L	B
2.	With which hand do you draw?	R	L	B
3.	With which hand do you use an eraser on paper?	R	L	B
4.	With which hand do you remove the top card when dealing?	R	L	B
5.	With which foot do you kick a ball?	R	L	B
6.	If you wanted to pick up a pebble with your toes, which foot would you use?	R	L	B
7.	If you had to step up onto a chair, which foot would you place on the chair first?	R	L	B
8.	Which eye would you use to peep through a keyhole?	R	L	B
9.	If you had to look into a dark bottle to see how full it was, which eye would you use?	R	L	B
10.	Which eye would you use to sight down a rifle?	R	L	B
11.	If you wanted to listen to a conversation going on behind a closed door, which ear would you place against the door?	R	L	B
12.	If you wanted to listen to someone's heartbeat, which ear would you place against their chest?	R	L	B
13.	Into which ear would you place the earphone of a transistor radio?	R	L	B

History Questionnaire

Have you ever experienced or been diagnosed with any of the following, or are you experiencing any of the following at present? Please circle the appropriate response and explain "Yes" answers below.

1.	Vision difficulties, blurred vision, or eye disorders	Yes	No
2.	Blindness in either eye	Yes	No
3.	If Yes to either of the above, have problems been corrected	Yes	No
4.	Severe head trauma/injury	Yes	No
5.	Stroke	Yes	No
6.	Learning disabilities (problems of reading, writing, or comprehension)	Yes	No
7.	Epilepsy or seizures	Yes	No
8.	Paralysis	Yes	No
9.	Neurological surgery	Yes	No
10.	Alcohol abuse	Yes	No
11.	Prescription medication	Yes	No
12.	Psychiatric difficulties	Yes	No
13.	Arthritis	Yes	No
14.	Heart or lung problems	Yes	No
15.	Reynaud's syndrome	Yes	No
16.	Psoriasis or skin problems	Yes	No

Please explain any "yes" responses:

_____

_____

_____

_____

_____

_____

_____

APPENDIX D

Cook and Medley (Ho) Scale

Instructions

      This inventory contains numbered statements. Read each statement and decide whether it is true as applied to you or false as applied to you. If a statement is true or mostly true, as applied to you, circle the T. If a statement is false or not usually true, as applied to you, circle the F. Remember to give your own opinion of yourself. Do not leave any blank if you can avoid it. Thank you for your participation.

1.   When I take a new job, I like to be tipped
      off on who should be gotten next to.   T   F

2.   When someone does me a wrong I feel I should
      pay him back if I can, just for the principle
      of the thing.   T   F

3.   I prefer to pass by school friends, or people
      I know but have not seen for a long time,
      unless they speak to me first.   T   F

4.   I have often had to take orders from someone
      who did not know as much as I did.   T   F

5.   I think a great many people exaggerate their
      misfortunes in order to gain the sympathy and
      help of others.   T   F

6.   It takes a lot of argument to convince most
      people of the truth.   T   F

7.   I think most people would lie to get ahead.   T   F

8.   Someone has it in for me.   T   F

9.   Most people are honest chiefly through fear
      of being caught.   T   F

10. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it.   T   F

11. I commonly wonder what hidden reason another person may have for doing something nice for me.   T   F

12. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.   T   F

13. I feel that I have often been punished without cause.   T   F

14. I am against giving money to beggars.   T   F

15. Some of my family have habits that bother and annoy me very much.   T   F

16. My relatives are nearly all in sympathy with me.   T   F

17. My way of doing things is apt to be misunderstood by others.   T   F

18. I don't blame anyone for trying to grab everything he can get in this world.   T   F

19. No one cares much what happens to you.   T   F

20. I can be friendly with people who do things which I consider wrong.   T   F

21. It is safer to trust nobody.   T   F

22. I do not blame a person for taking advantage of someone who lays himself open to it.   T   F

23. I have often felt that strangers were looking at me critically.   T   F

24. Most people make friends because friends are likely to be useful to them.   T   F

25. I am sure I am being talked about.   T   F

26. I am likely not to speak to people until they speak to me.   T   F

27. Most people inwardly dislike putting themselves out to help other people. T F

28. I tend to be on my guard with people who are somewhat more friendly than I had expected. T F

29. I have sometimes stayed away from another person because I feared saying or doing something that I might regret afterwards. T F

30. People often disappoint me. T F

31. I like to keep people guessing what I'm going to do next. T F

32. I frequently ask people for advice. I like to let people know where I stand on things. T F

33. I am not easily angered. T F

34. I have often met people who were supposed to be experts who were no better than I. T F

35. I would certainly enjoy beating a crook at his own game. T F

36. It makes me think of failure when I hear of the success of someone I know well. T F

37. I have at sometimes had to be rough with people who are rude or annoying. T F

38. People generally demand more respect for their own rights than they are willing to allow for others. T F

39. There are certain people whom I dislike so much that I am inwardly pleased when they are catching it for something they have done. T F

40. I am often inclined to go out of my way to win a point with someone who has opposed me. T F

41. I am quite often not in on the gossip and talk of the group I belong to. T F

42. The man who had most to do with me when I was a child (such as my father, stepfather, etc.) was very strict with me. T F

43. I have quite often found people jealous of my good ideas just because they had not thought of them first.   T   F

44. When a man is with a woman he is usually thinking about things related to her sex.   T   F

45. I do not try to cover up my poor opinion or pity of a person so that he won't know how I feel.   T   F

46. I have frequently worked under people who seem to have things arranged so that they get credit for good work but are able to pass off mistakes onto those under them.   T   F

47. I strongly defend my own opinions as a rule.   T   F

48. People can pretty easily change me even though I thought that my mind was made up on a subject.   T   F

49. Sometimes I am sure that other people can tell what I am thinking.   T   F

50. A large number of people are guilty of bad sexual conduct.   T   F

Screening Data Form

Subject Name: _____

Subject ID: _____

Date: _____

Phone No.(s) _____

Cook Medley		Handedness	History
T or F		R or L or B	Y or N
1.	26.	1.	1.
2.	27.	2.	2.
3.	28.	3.	3.
4.	29.	4.	4.
5.	30.	5.	5.
6.	31.	6.	6.
7.	32.	7.	7.
8.	33.	8.	8.
9.	34.	9.	9.
10.	35.	10.	10.
11.	36.	11.	11.
12.	37.	12.	12.
13.	38.	13.	13.
14.	39.		14.
15.	40.		15.
16.	41.		16.
17.	42.		
18.	43.		
19.	44.		
20.	45.		
21.	46.		
22.	47.		
23.	48.		
24.	49.		
25.	50.		

....
..

Ho: _____   Hand: _____

Group: HH   H   NH   NA

	BSLN1	BSLN2	BSLN3	TEST	CHANGE
SBP					
DBP					
HR					

Data Form

Subject Name: _____		**Slide Set 1**		Order: _____	

Subject ID: _____

      Response

Group: Hostile   Non-hostile

Condition: Cold pressor No CP

Physiological Measures:

Trial	SBP	DBP	HR
1			
2			
3			
4			
5			
6			

Slide Set 1   Order: _____

No.	Correct	Response			Response		
1	H	H	A	N	H	A	N
2	A	H	A	N	H	A	N
3	N	H	A	N	H	A	N
4	H	H	A	N	H	A	N
5	H	H	A	N	H	A	N
6	A	H	A	N	H	A	N
7	N	H	A	N	H	A	N
8	A	H	A	N	H	A	
9	N	H	A	N	H	A	N
10	N	H	A	N	H	A	N
11	H	H	A	N	H	A	N
12	A	H	A	N	H	A	N

Slide Set 2   Order: _____

No.	Correct	Response			Response		
1	H	H	A	N	H	A	N
2	H	H	A	N	H	A	N
3	A	H	A	N	H	A	N
4	N	H	A	N	H	A	N
5	N	H	A	N	H	A	N
6	A	H	A	N	H	A	N
7	H	H	A	N	H	A	N
8	N	H	A	N	H	A	N
9	A	H	A	N	H	A	N
10	A	H	A	N	H	A	N
11	N	H	A	N	H	A	N
12	H	H	A	N	H	A	N

Slide Set 3   Order: _____

No.	Correct	Response			Response		
1	N	H	A	N	H	A	N
2	H	H	A	N	H	A	N
3	A	H	A	N	H	A	N
4	H	H	A	N	H	A	N
5	A	H	A	N	H	A	N
6	N	H	A	N	H	A	N
7	A	H	A	N	H	A	N
8	H	H	A	N	H	A	N
9	N	H	A	N	H	A	N
10	H	H	A	N	H	A	N
11	N	H	A	N	H	A	N
12	A	H	A	N	H	A	N

Slide Set 4   Order: _____

No.	Correct	Response			Response		
1	H	H	A	N	H	A	N
2	N	H	A	N	H	A	N
3	A	H	A	N	H	A	N
4	A	H	A	N	H	A	N
5	H	H	A	N	H	A	N
6	A	H	A	N	H	A	N
7	N	H	A	N	H	A	N
8	N	H	A	N	H	A	N
9	H	H	A	N	H	A	N
10	N	H	A	N	H	A	N
11	H	H	A	N	H	A	N
12	A	H	A	N	H	A	N

Slide Set 5   Order: _____

No.	Correct	Response			Response		
1	A	H	A	N	H	A	N
2	N	H	A	N	H	A	N
3	N	H	A	N	H	A	N
4	H	H	A	N	H	A	N
5	N	H	A	N	H	A	N
6	H	H	A	N	H	A	N
7	H	H	A	N	H	A	N
8	A	H	A	N	H	A	N
9	A	H	A	N	H	A	N
10	N	H	A	N	H	A	N
11	A	H	A	N	H	A	N
12	H	H	A	N	H	A	N

INFORMED CONSENT TO PARTICIPATE IN RESEARCH

Title of Research Study: The Effects of Hostility and Arousal on Facial Affect Perception: A Test of a Neuropsychological Model of Hostility

Experiment #:_____

1. PURPOSE OF EXPERIMENT:

You are invited to participate in a study designed to evaluate your perception of emotional facial configurations under different conditions.

2. PROCEDURE TO BE FOLLOWED IN THIS STUDY:

To accomplish the goals of the study you will be asked to judge the type of facial emotion presented to you by a slide projector. Your blood pressure will be taken six times during the procedure. You may also be asked to place your hand in ice-water five times during the procedure.

3. ANONYMITY OF SUBJECTS AND CONFIDENTIALITY OF RESULTS:

The results of this study will be kept strictly confidential. At no time will the researchers release your results to anyone without your written consent. The information you provide will have your name removed and only a subject number will identify you during analyses and any write-up of the research.

4. DISCOMFORTS AND RISKS FROM PARTICIPATING IN THE STUDY:

The blood pressure measurements are generally pain-free but may become uncomfortable for some individuals. The ice-water task is painful but does not cause any injury. If you wish to discuss these or any other discomforts you may experience, you may call the project director. Because most of the tests are mainly evaluative, there are no serious risks involved. You may take your hand out of the ice-water at any time. If discomfort becomes too great, please let us know and we will stop the tests. You can cease participation in the experiment at any time. The session should last approximately 45 minutes.

5. EXPECTED BENEFITS:

By participating in this experiment, you may gain new knowledge of experimental design or protocol which might prove helpful in the future. If you wish to know the results of your tests, you can receive this information at the end of the experiment.

6. FREEDOM TO WITHDRAW:

You are free to withdraw from participation in this study at any time without any penalty.

7. EXTRA CREDIT:

Introductory and Other Psychology Students
If you are currently taking Introductory Psychology (or a course that offers credit for participation), you will receive one credit point toward your final grade for your participation.

8. USE OF RESEARCH DATA:

The information from this research may be used for scientific or educational purposes. It may be presented at scientific meetings and/or published and reproduced in professional journals or books, or used for any other purpose that Virginia Tech's Department of Psychology considers proper in the interest of education, knowledge, or research.

9. APPROVAL OF RESEARCH:

This research project has been approved by the Human Subjects Committee of the Department of Psychology and by the Institutional Review Board of Virginia Tech.

10. SUBJECT'S PERMISSION

I have read and understand the above description of the study. I have had an opportunity to ask questions and have had them all answered. I hereby acknowledge the above and give my voluntary consent for participation in this study. I further acknowledge that I have reported all medical problems and know of no reason for my non-participation in this experiment.

I further understand that if I participate I may withdraw at any time without penalty.

I understand that should I have any questions regarding this research and its conduct, I should contact any of the persons named below.

PRIMARY RESEARCHER: Matthew L. Herridge   PHONE: 953-1476
FACULTY ADVISOR: David W. Harrison   PHONE: 231-4422
CHAIR, HSC: Richard Eisler   PHONE: 231-6914
CHAIR, IRB: Ernest Stout   PHONE: 231-9359

SUBJECT'S SIGNATURE: _____   DATE: _____

SUBJECT'S ID: _____

....

SUBJECT COPY

I have read and understand the above description of the study. I have had an opportunity to ask questions and have had them all answered. I hereby acknowledge the above and give my voluntary consent for participation in this study.

I further understand that if I participate I may withdraw at any time without penalty.

I understand that should I have any questions regarding this research and its conduct, I should contact any of the persons named below.

PRIMARY RESEARCHER: Matthew L. Herridge   PHONE: 953-1476
FACULTY ADVISOR: David W. Harrison   PHONE: 231-4422
CHAIR, HSC: Richard Eisler   PHONE: 231-6914
CHAIR, IRB: Ernest Stout   PHONE: 231-9359

SUBJECT'S SIGNATURE: _____   DATE: _____

Matthew Lynn Herridge

Date of Birth: August 17, 1967

Place of Birth: Parkersburg, WV

Marital Status: Married, two children

Home Mailing Address: 201 Powderhorn Road
                               Charleston, WV 25314

Work Mailing Address: Robert C. Byrd Health Sciences Center of WVU
                               Department of Behavioral Medicine & Psychiatry
                               501 Morris Street
                               PO Box 1547
                               Charleston, WV 25326-1547

E-Mail Address: Constantia@msn.com

Telephone Numbers: Home: (304) 744-6080
                            Office: (304) 341-1500

Education:

Institution	Dates Attended	Degree Received
Ohio Valley College Parkersburg, WV	8/85 - 5/87	A.A.
Harding University Searcy, AR	8/87 - 5/89	B.A.
Abilene Christian University Abilene, TX	8/89 - 5/91	Transfer
Virginia Polytechnic & State University Blacksburg, VA (Full APA Accreditation)	8/91 - 5/95	M.S., Ph.D.
WVU Health Sciences Center Charleston Area Medical Center Charleston, WV (Full APA Accreditation)	6/95 - Present	Internship

Dissertation Title
The effects of hostility and arousal on facial affect perception: A test of a neuropsychological model of hostility.
Advisor: David W. Harrison, Ph.D., Licensed Clinical Neuropsychologist

Thesis Title
Hostility, facial configuration, and bilateral asymmetry on galvanic skin response.
Advisor: David W. Harrison, Ph.D., Licensed Clinical Neuropsychologist

Undergraduate Major:	Psychology
Undergraduate Minor:	Biology
Graduate Major:	Clinical Psychology
Graduate Specializations:	Neuropsychology, Behavioral Medicine, Health Psychology

Psychology G.P.A. History

Harding University:	3.91
ACU:	3.94
Virginia Tech:	3.61

Academic Honors

ACT Scholarship
President of Psychology Club - Harding University
Outstanding Psychology Student Award 1989 - Harding University
Psychology Department Award 1991 - Abilene Christian University

Experience:

Clinical

6/95 - Present
Psychology Intern, WVU Health Sciences Center in Charleston, WV. I am currently completing my internship at the Department of Behavioral Medicine and Psychiatry which serves the community through a three-hospital network. My rotations and experiences have been varied and have included psychiatric inpatient care, outpatient services, psychiatric consultation service, neurosurgery, medical rehabilitation, cardiac rehabilitation, emergency department, family medicine, neuropsychological assessment, and psychological assessment. Therapy experience has included individual, family, and group (inpatient, anxiety disorders, chronic pain, stop-smoking, and Huntington's disease) situations.

5/94 - 6/95
Neuropsychological Treatment Director, Hollins Head Injury Rehabilitation Program: I was hired at the beginning of the summer to assist in the neuropsychological evaluation and treatment of clients at the HHIRP. The program functions as both a day-treatment and residential facility for

individuals who have experienced brain injury. My primary role was to assess and then design treatment strategies that would allow the clients to return to an occupation. Cases have involved various cerebrovascular disorders such as left and right hemisphere strokes and cerebral hemorrhage as well as neoplastic, traumatic, degenerative, and convulsive brain injuries. Beginning in September, 1994 my status changed from full-time to part-time due to the beginning of the academic year. I also acted in a liaison role between HHIRP and Virginia Tech for the purpose of a cooperative externship site.

5/93 - 8/93
Graduate Clinician, Virginia Tech Psychological Services Center: Hired for 15 hours per week of therapeutic work. Cases included family therapy, couple's therapy, anger management, psycho-physiological disorders, and depressive disorders.

5/92 - 8/92
Graduate Clinician, Salem Veteran Affairs (VA) Hospital: I was hired by the Salem VA as part of my externship requirement. See practicum for details of experience.

8/91 - 5/92
Graduate Clinical Assistantship, Virginia Tech Psychological Services Center: Served as assistant for management of the center.

5/91 - 8/91
Psychological Assistant, Adolescent Unit, Big Spring State Hospital: Following my practicum experience, I was hired to work full-time on the Adolescent Unit for the summer. Due to the lack of a psychologist on this unit, I was asked to fulfill duties which involved complete assessments of patients, one hour of therapy per patient per week, group therapy, and participation in team diagnosis and treatment evaluation. The unit housed approximately 20 patients with primary diagnoses of conduct disorder and depression.

Practicum Experience

Note: Virginia Tech's Clinical Practicum Training requires a minimum of 1200 hours over 4 years. I completed these requirements in May, 1993 and continued to be involved in therapy and with the Neuropsychology treatment team for my remaining two years in the Ph.D. program. The practicum model included a weekly three-hour team meeting, supervised client contact, and direct weekly supervision for each client being seen. Psychological and neuropsychological evaluation reports were also expected for each client.

8/94 - 5/95
Virginia Tech Practicum VI, Neuropsychology Treatment Team: Acted in a supervisory role with other team members. Continued to see clients (adults and children) where I served as the principal clinician. Cases included assessment and treatment of learning disabilities, brain injury due to birth trauma, and cerebrovascular disorders.

8/93 - 5/94
Virginia Tech Practicum V, Neuropsychology Treatment Team: Supervised experience in the evaluation and therapy of neuropsychologically impaired adult and child clients. Cases involved traumatic brain injury due to car accident, learning disabilities, brain injury due to birth trauma, irritable bowel syndrome (IBS), and depression and anxiety disorders. Asked to consult for other teams and present neuropsychological cases.

5/94
Attended workshop on Psychotropic Drugs, Virginia Psychological association Conference, 6 CE credits.

8/92 - 5/93
Virginia Tech Practicum IV, Neuropsychology Treatment Team: Supervised experience in the evaluation and therapy of neuropsychologically impaired adult and child clients. Cases involved traumatic brain injury, suicidal ideation, learning disabilities, uncontrolled anger, and anxiety disorders.

5/92 - 8/93
Virginia Tech Practicum III, Externship at the Salem Veteran Affairs (VA) Hospital: Supervised experience included daily psychological consultations for medical staff, evaluation and therapy for Post Traumatic Stress Disorder (PTSD) ward, facilitator for Stroke Support group, co-facilitator and therapist for Cardiac Recovery group, co-facilitator for Chronic Pain group, and facilitator for Stop Smoking (nicotine patch) group.

8/91 - 5/92
Virginia Tech Practicum II, Clinical Treatment Team: Supervised experience in the evaluation and therapy of adults and children. Saw 5-6 individual cases per week. Cases involved depression, anxiety, chronic pain (migraines), learning disabilities, intelligence assessment, Attention Deficit Hyperactivity Disorder (ADHD), couple's therapy, grief therapy, PTSD, sexual abuse, anger management, suicidal ideation, personality disorders, and other mental disorders.

4/92
Attended workshop on Couple's Therapy at Virginia Psychological Association conference, received 3 CE credits

Note: Because of prior therapy experience at ACU, my first practicum at Virginia Tech was waived.

1/91 - 5/91
ACU Practicum III, Externship at the Big Spring State Hospital, Big Spring, TX: This state hospital serves the western half of Texas. I completed 160 hours of adult and adolescent evaluation and therapy with residents. Cases involved schizophrenia, obsessive compulsive disorder, manic depression, personality disorders, suicidal ideation and attempts, conduct disorder, and oppositional-defiant disorder.

8/90 - 12/90
ACU Practicum II, ACU Counseling Center: Completed 246 hours of supervised client and group therapy, and intellectual and personality assessment. Clients were students at ACU and cases included depression, anxiety, suicidal ideation, sexual abuse, couple's therapy, and anger management.

4/91
Attended workshop/conference on Sleep Disorders and treatment, Little Rock AR.

5/90-8/90
ACU Practicum I - Completed 100 hours of community client contact (adults and children) in the city of Abilene. Cases included anxiety disorders, depression, and learning disabilities.

Research

Refereed Publications

Demakis, G.W., Herridge, M. L., & Harrison, D. W. (1994). Pathological display of positive affect: A bilateral electrodermal case study. Neuropsychiatry, Neuropsychology, and Behavioral Neurology, 7:3

Herridge, M. L., & Harrison, D. W. (1993). Hostility, facial configuration, and bilateral asymmetry on galvanic skin response. Manuscript submitted for publication, revision in progress.

Refereed Abstracts

Demakis, G.W., Herridge, M. L., & Harrison, D. W. (in press). Pathological display of positive affect: A bilateral electrodermal case study. Archives of Clinical Neuropsychology.

Presentations

Herridge, M. L., & Harrison, D. W. (1996) The effects of hostility and arousal on facial affect perception: A test of a neuropsychological model of hostility. Scheduled for CAMC Research Day presentation, April 25.

Herridge, M. L. & Blanton, P. D. (1996). Neuropsychological assessment in the medical environment. Scheduled for presentation to Nursing Seminar, April.

Herridge, M. L. (1995). The neuropsychology of hostility. Presented at Psychiatry Grand Rounds, Charleston Area Medical Center, September, 1995.

Parker, J., & Herridge, M. L. (1995). EEG effects of light intensity in male with anoxic encephalopathy; A case study. Presented at Virginia Psychological Association Spring Conference.

Demakis, G.W., Herridge, M. L., & Harrison, D. W. (1994). Pathological display of positive affect: A bilateral electrodermal case study. Presented at the National Academy of Neuropsychology Fall Convention.

Herridge, M. L., & Harrison, D. W. (1994). Hostility, facial configuration, and bilateral asymmetry on galvanic skin response. Presented at Virginia Psychological Association Spring Conference.

Herridge, M. L. (1993). Hardiness and hostility as predictors of coronary artery bypass surgery outcome. Presented at the Virginia Psychological Association Spring Conference.

Perkins, S., & Herridge, M. L. (1991). Developmental psychopathology: The overlap of self-reported depression and conduct disorder. Presented at Southwestern Psychological Association Spring conference.

Grants, Ongoing Research, Research Experience

Herridge, M. L., Lehman, G., & Almase, I. (1996). Psychosocial status changes and chronic pain rehabilitation. Outcome study on effects of group intervention with chronic pain sufferers.

Herridge, M.L., & Linton, J. C. (1996). Effects of cardiac rehabilitation on quality of life and psychosocial outcomes. Grant application submitted to CAMC Foundation, Charleston, WV.

Herridge, M. L., & Harrison, D. W. (1996). The effects of hostility and arousal on facial affect perception: A test of a neuropsychological model of hostility. Dissertation.

Herridge, M. L. (1994). Hardiness and hostility as predictors of coronary artery bypass surgery outcome.

Ragsdale, K., Eisler, R., & Herridge, M. L. (1992). Investigation of correlations between post-traumatic stress disorder, male gender role stress, hostility, and outcome variables within a 30-day treatment program. Veteran's Administration research project.

Participation in data-gathering for federally-funded skin cancer prevention study, Summer 1992.

Served as supervisor for undergraduate researchers, 1990-1995.

Teaching

1/96-Present
Faculty position at West Virginia Graduate College, Charleston WV. Instructor for two sections of Learning and Memory.

10/95-Present
Instructor for Therapy Skills Seminar. A seminar course provided for the medical residents, WVU Health Sciences Center, Charleston, WV.

8/93 - 5/95
Faculty position at Hollins College, Roanoke, VA: I served two years as the instructor for Clinical Neuropsychology and Neuropsychological Assessment at Hollins. These classes were taught to Hollins graduate students in the M.S. degree program in Psychology.

8/94 - 12/94
Graduate Teaching Assistantship, Virginia Tech: Instructor for Theories of Personality course.

1/95 - 5/95
Graduate Teaching Assistantship, Virginia Tech. Instructor for the Honors (majors only) section of Personality Theory.

1/94 - 5/94
Graduate Teaching Assistantship, Virginia Tech: I served as the instructor for two laboratory sections of the Psychology of Motivation.

8/93 - 12/93
Graduate Teaching Assistantship, Virginia Tech: Served as the teaching assistant for the graduate Research Methods course and guest lecturer.

10/93
Guest lecturer for senior seminar course on neuropsychology, Virginia Tech.

1/93 - 5/93
Graduate Teaching Assistantship, Virginia Tech: Served as the teaching assistant for the Honors Abnormal Psychology class.

10/92
Guest lectured for two sessions of Introductory Psychology course in auditorium.

8/91 - 5/92
Graduate Teaching Assistantship, Virginia Tech: Served as a lab instructor for 5 sections of Introductory Psychology, responsible for lectures, grading and test construction.

1/91 -5/91
Graduate Teaching Assistantship, Abilene Christian University: Served as the teaching assistant for Abnormal Psychology. Duties included test construction, grading, and guest lectures.

8/90 - 12/90
Graduate Teaching Assistantship, Abilene Christian University: Served as the teaching assistant for History and Systems. Duties included test construction, grading, and guest lectures.

1/90 - 5/90
Graduate Teaching Assistantship, Abilene Christian University: Served as the teaching assistant for Theories of Personality. Duties included test construction, grading, and guest lectures.

8/89 - 12/89
Graduate Teaching Assistantship, Abilene Christian University: Served as the teaching assistant for Introductory Psychology. Duties included test construction, grading, and guest lectures.

Professional Organizations:

National Academy of Neuropsychology (NAN)

American Psychological Association (APA)

APA Division 38: Health Psychology

APA Division 40: Clinical Neuropsychology

Virginia Psychological Association (VPA)

Virginia Academy of Clinical Psychologists (VACP)