

THE EFFECTS OF MASCULINE GENDER ROLE
STRESS APPRAISAL AND GENDER RELEVANCE OF
THE TASK ON STRESS AROUSAL IN A COMPETITIVE SITUATION

by

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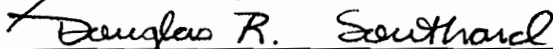
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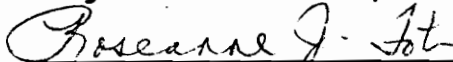
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The Effects of Masculine Gender Role
Stress Appraisal and Gender Relevance of
the Task on Stress Arousal in a Competitive Situation

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(Abstract)

In our society, gender role stereotypes define the areas in which men are thought to excel. Recent research has focused on the male gender role and how it effects the psychological and physical health of men. Maintaining an acceptable level of masculinity may be deleterious to men's physical and/or psychological health. Success in competition is a broad dimension of the male role which has repeatedly been shown to be of great importance to men. Men who are strongly committed to the stereotypical masculine role can be differentiated from men who are not committed to the masculine role by the Masculine Gender Role Stress (MGRS) rating scale (Eisler & Skidmore, 1987). The MGRS scale was developed based on the Lazarus & Folkman (1984) transactional model of stress, appraisal and coping. Men that score high on the MGRS scale are likely to identify more with the stereotypical, masculine role and are likely to appraise competitive situations as more stressful than low MGRS men. Likewise, high MGRS men are more likely to feel more threatened when outperformed by a female than low MGRS men. Furthermore, high MGRS men should appraise masculine-relevant situations as more challenging to than low MGRS men.

High and low MGRS men were placed in a competitive situation against a female in which the gender relevance (masculine or feminine) of the competitive stressor was varied. Those in the masculine relevant (MR) condition were lead to believe that men outperformed women on the competitive task while men in the feminine relevant (FR) condition were told that women outperformed men on the task. The purpose of this study was to investigate the effects of MGRS appraisal and the gender relevance of the competitive stressor on men's cardiovascular, emotional and cognitive responding throughout the process of a competition. This study examined the physiological and self-report responding of the following 4 groups: 1) High MGRS men in a MR relevant situation, 2) High MGRS men in a FR situation, 3) Low MGRS men in a MR situation and 4) Low MGRS men in a FR situation. These 4 groups were compared on physiological (systolic blood pressure, SBP; diastolic blood pressure, DBP; and heart rate, HR) and self-report measures of stress and anger. Subjects also rated their opponent before and after the competition on a measure of masculinity and femininity.

All 4 groups were expected to exhibit an increase in stress arousal during the competitive task. This first prediction was confirmed. All 4 groups evidenced a significant increase in SBP, DBP and HR during the competitive task. Based on MGRS theory,

high MGRS men were expected to exhibit greater stress arousal than low MGRS men. This prediction was not supported for SBP, DBP or HR. Subjects in the MR condition were expected to evidence greater stress arousal than subjects in the FR condition. This prediction was not supported for SBP, DBP or HR. The following interaction pattern was predicted based on MGRS theory and the Lazarus & Folkman (1984) model: High MGRS men in the MR condition were expected to evidence the highest increase in stress arousal while high MGRS men in the FR condition were expected to evidence the second highest increase in stress arousal; no differences between low MGRS subjects were expected as a function of gender relevance appraisal. There was a significant interaction that occurred between MGRS and gender relevance appraisal. However, the pattern that emerged was considerably different than the hypothesized pattern. Those with the highest elevations, overall, were low MGRS subjects in the MR condition and high MGRS subjects in the FR condition. Low MGRS subjects in the FR condition and high MGRS men in the MR condition maintained the lowest elevations.

On a self-report measure of stress, high MGRS subjects were expected to report greater stress than low MGRS subjects. This prediction was not supported. Men competing in the masculine relevant condition were expected to exhibit a greater self report of stress than men in the feminine relevant condition. This prediction was not supported. An interaction between MGRS and gender relevance was also predicted but not supported. On a self-report measure of anger, it was predicted that high MGRS would report a greater amount of anger than low MGRS men after losing in the competition. This prediction was supported. It was predicted that subjects in the masculine relevant competition would alter their appraisal of the opponent by rating her as less feminine and more masculine after losing in the competition. This prediction was also supported. Also, an interaction pattern emerged as high MGRS men in the feminine relevant condition increased their masculine rating of the opponent although this was not significant.

The physiological results were inconsistent with past studies in this area. Methodological and theoretical issues related to these results are discussed. The self-report measures yielded results that are consistent with MGRS theory and the Lazarus & Folkman model of stress, appraisal and coping. The potential influence of cognitive appraisal of gender relevance and stress are discussed as well as implications for future research.

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Introduction

A psychosocial view of masculine gender role stress has been recently developed by Eisler and his colleagues (Eisler & Skidmore, 1987; Eisler & Blalock, 1991; Eisler, Skidmore & Ward, 1988). This view is based on a cognitive model of masculinity and gender role appraisal of stress. Gender roles serve to mediate one's appraisal and coping with life's problems and environmental situations. This view purports that rigid commitment to the masculine gender role may produce dysfunctional and stressful coping patterns in men. The purpose of this study is to investigate issues related to gender determined appraisal of stress in males and gender relevance of the stressor during a competitive situation.

First, a review of the competition literature and issues relating to stress arousal will be discussed in order to provide the necessary background for understanding the competition process. Given that this study is directed toward men, the concept of masculinity, the masculine gender role and issues relating to men's health will be discussed as well as the relationship between masculinity and competition. This will be followed by an explanation of the Lazarus & Folkman (1984) model of stress, appraisal and coping which served as the foundation for the concept of masculine gender role stress (MGRS). This study also examined men's cognitive appraisal of their female opponent. Therefore, a discussion of Lazarus and Folkman's (1984) ideas on reappraisal and coping will be provided. The

empirical development of a measure of masculine gender role stress (MGRS) will then be reviewed followed by a discussion of gender role stress and dysfunctional coping patterns in men. This study examines the effects of MGRS and gender relevance of the situation on men's physiological and cognitive responding. Therefore, a discussion of gender relevance will provide the background necessary to understand this concept. Much of the literature on competition and stress has focused on the Type A behavior pattern. Therefore, the relationship between Type A men and competition will briefly be discussed. The Type A behavior pattern has sometimes been associated with commitment to masculine values. Therefore, it is necessary to contrast Type A behavior and MGRS constructs. Given that this study also examines the emotional responding (anger) of men, the effects of anger and hostility on men will be reviewed and integrated into the context of competitive situations. Finally, the rationale for this study and the a priori hypotheses will be reviewed.

The Competition Process

Competition is a process in which an individual's performance is compared to a standard in the presence of at least one other person who is aware of the criterion for comparison (Marten, 1976; cited in Gill, 1986). Marten (1976) describes the following stages within the competition process: 1) Objective Competitive Situation-a social achievement situation, 2) Subjective Competitive Situation-the individual's perceptions, interpretations and appraisals of the competitive situation,

personality and individual differences enter the process at this point, 3) Response-physiological, psychological, and behavioral reactions, and 4) Consequences-winning or losing which are associated with feelings of either success or failure.

The competition process is dynamic; consequences at one point in time may affect skills, conditions or perceptions for subsequent competitive situations.

Competition: Stress Arousal, Performance and Emotionality

Competition itself has a mediating effect on performance in humans and animals (Washburn, Hopkins & Rumbaugh, 1990). Monkeys have been found to exhibit an increase in performance when placed in a competitive situation versus a non-competitive situation. Other authors have found that increased cardiovascular reactivity is positively associated with competitiveness (Keltikangas-Jarvinen & Keinonen, 1988).

Competition can also effect one's emotionality. For example, the combined characteristics of success, power and competition comprise one of the male gender role stress factors that has significantly correlated with depression in college men (Good & Mintz, 1990). The authors suggested that more traditional men may experience a compounded risk given their increased likelihood for depression coupled with their decreased likelihood of seeking therapy. Also, men and women have been found to exhibit an increase in somatic anxiety prior to a competition and a decrease in self-confidence (Jones, Swain & Cale, 1991). Abadie (1989) found that winning teams exhibit a

decrease in anxiety while losing teams exhibit an increase in anxiety post-losing. Other authors (Tharion, McMenemy, Terry & Rauch, 1990) have found that male subject's tension increased prior to a competition. They suggest that this increase is due to a fear of failure or anxiety.

Masculine Gender Role and Competition

Society rewards competition and power for men while it shuns caring and sensitivity (Eisler, 1990). Men are expected to acquire power, prestige and high status while being strong, confident and self-reliant. In addition to these attributes, the male role strongly prohibits the exhibition of feminine characteristics and qualities (e.g. emotional expressiveness). Society places great pressure on men to succeed in all of these areas while failing to do so results in societal ridicule and the breakdown of the male self-concept (Franklin, 1988).

Gill (1986) assessed the effects of losing in a competitive motor maze task in male and female 5th and 6th grade boys and girls. Girls and boys responded differently to "the competition" and girls didn't think they would do as well as boys. The boys often cried during the competition or after whereas the little girls did not. Overall, the boys were more concerned with winning. Weinberg and Ragan (1979) found that males, when compared to females, were more interested in a competitive activity than a non-competitive activity.

Gill, Deeter & Gruber (1985) developed the "Competitiveness Inventory" which consists of several sport achievement and

competitiveness items. Three factors emerged: 1) competitiveness orientation (e.g. "I look forward to competing") 2) win orientation (e.g. "I hate to lose" and 3) personal goal orientation (e.g. "Reaching personal performance goals is very important to me"). These researchers administered the competitive inventory to college students and found that males scored slightly higher than females on competitiveness orientation. Males scored lower than females on goal orientation and males scored much higher on win orientation. The authors suggest that masculinity and competitiveness are very related.

Cross-Cultural studies have exemplified the dominant role of competitiveness in the American culture. Nelson & Kagan's 1972 study (cited in Gill, 1986) found Mexican children to be less competitive than American children. They found that American mothers tended to reward their children based on achievements whereas Mexican mothers praised and encouraged their children regardless of success.

Mathes and Battista's (1985) study on college students' participation in physical activity showed that men rated competition as significantly more important than women did. Kaplan (1983) has suggested that men, unlike women, play video games to compete, vent aggression and assert themselves. In a study by Jones, Swain & Cale (1991), men were found to maintain an equivalent level of cognitive anxiety over time prior to a competition. Also, competition may have a different meaning for men as opposed to women. Battista's (1990) study found that

while the primary motive for participating in a competitive sport was for enjoyment for both men and women, men reported that competitiveness itself was enjoyable while women reported that they enjoyed a feeling of self-satisfaction and beauty in movement. One's perception of competitiveness has even been shown to be related to combativeness in the area of spouse abuse. Based on reports from 143 college men, scores on a measure of "unpleasant" competitive behaviors were positively related with scores on the Index of Spouse Abuse (Laner, 1989).

The majority of studies investigating competition and gender have focused on the relationships between same sex competitors. The effects of winning and losing on women have been explored in opposite-gender competitors, but not on men (Allen, Saadati & Clements, 1988). In the study by Allen et al. (1988), college females who were told that they were competing against a male exhibited greater competitive motivation than those that were told that they were competing against a female. Given the increasing number of women in the work force today and their ability to successfully compete with men, the implications for stress in men when competing with women is an important area for future research.

Masculinity

Throughout a man's development, masculine values are instilled and accented to varying degrees. The dimensions of the masculine gender role are complex while the stereotypes of masculinity elicit numerous assumptions, expectancies and

attitudes within men. Witkin-Lanoil (1986) described the traditional expectations of boys growing up in our society. According to this author, boys are expected to be stronger than girls, be less emotional and intuitive, be more aggressive and impulsive, be active and alert, and to be more self-reliant than girls. Other authors have described the masculine gender role stereotype in detail. Cook (1985) has compiled the characteristics of the masculine gender role stereotype based on several sources. Men who fit the stereotypical role of masculinity are defined as: aggressive, independent, unemotional, objective, dominant, competitive, logical, rational, adventurous, decisive, self-confident, ambitious, worldly, assertive, able to act as a leader, analytical, strong, sexual, knowledgeable, physical, successful, good in mathematics and science, and the reverse of feminine characteristics (e.g. gentle, emotional, nurturing, etc.).

In our society, the negative consequences of failing in "masculine" areas places men under extreme pressure to succeed and win, especially in competitive situations. The constant strain of being competitive and winning in every day situations may produce dysfunctional arousal coping patterns in men.

The Male Gender Role and Health

The male gender role greatly emphasizes the importance of achieving, competing and succeeding at all costs. In addition to these requirements, men in our society are expected to be strong, fearless, competent, successful in attracting females,

autonomous, stoic and in control at all times (Barnett, et al., 1987). In moderation, adherence to the male role can be adaptive for both men and women (Cook, 1985). The author suggests that the greatest psychological and physical benefits occur when a masculine/feminine balance occurs. However, some men are "excessively committed" to the masculine role which may increase their vulnerability to psychological stress (Eisler & Blalock, 1991).

Recent research has focused on the male gender role and how it effects the psychological and physical health of men. Men and women differ in their prevalence of mental and physical health problems. For example, men are more prone to alcoholism, antisocial behavior, lung and bladder cancer, sexual deviance, atherosclerosis, and ischemic heart disease than women (Gove, 1979; Waldron, 1986). Statistics show that men have an earlier mortality rate than women and that they engage in more risk taking behaviors (Barnett, Biener & Baruch, 1987). For example, men tend to; drive faster, drive less cautiously, drive under the influence of alcohol, drink alcohol more heavily and engage in more hazardous smoking habits than women (Waldron, 1986).

The socialization of gender roles is very influential in the maintenance of these risky behaviors. For example, it is more socially acceptable for a man to smoke cigarettes than for a woman. According to Waldron (1986), cultural influence is an important factor that contributes to males' higher mortality rate in industrial societies.

Recent studies have focused on the relationship between gender role conflict and psychological well-being. Some authors have suggested that the masculine gender role and depression are incompatible (Warren, 1983). As a result, men may be motivated to camouflage their feelings associated with depression through alcohol abuse or aggression. More importantly, men may avoid getting professional help given the incompatibility between the male gender role and psychotherapy (Eisler, 1990).

The constant struggle to maintain a level of masculinity acceptable to one's self-concept may be deleterious to one's physical and/or psychological health. For example, men that adhere to the traditional role of masculinity have been found to be at an increased risk for depression (Good & Mintz, 1990). Furthermore, Helgeson (1990) found that extreme or negative masculinity is related to a poor prognosis of heart attack severity. The author suggests that Type A behavior, social support and health practices may mediate the relationship between cardiovascular disease outcome and masculinity.

Stress may develop within some men who try to live up to the masculine role that has been impressed upon them throughout their lifetime. Emotional stress may be elicited since men are constantly expected to suppress their emotions, dependencies, feelings and motives for affiliation. The continuous demand for men to be superior to women may also increase stress over time (Kagen Kagan, Havemann, & Segal, 1984).

Stress, Appraisal and Coping

Lazarus & Folkman (1984) have proposed a transactional model of stress, appraisal and coping. Stress can be defined as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984). This model emphasizes the importance of appraisal to an individual's well being and rests on the assumption that situational and personality factors can influence the cognitive appraisal process. Cognitive appraisal is defined as "evaluative cognitive processes that intervene between the encounter and the reaction" (Lazarus & Folkman, 1984). The cognitive appraisal of stress is influenced by pre-existing notions about reality along with the strength of commitment to these beliefs. If an individual has a high stake in the outcome of a situation, a considerable amount of stress can be produced if the person feels threatened or challenged. Emotional reaction and stress response levels are affected by the cognitive appraisal process. Stressful appraisals can include evaluative cognitions characterized by harm, loss, threat and/or challenge. While these cognitions are considered separate, they often occur simultaneously.

According to Lazarus & Folkman (1984), person factors and situation variables are interdependent processes that influence the extent to which harm/loss, threat or challenge will be experienced. The two most important person factors described by Lazarus & Folkman (1984) are commitments and beliefs.

Commitments express what is important or meaningful to the person while beliefs are preexisting notions about reality. According to the authors, "The extent to which any event is stressful is determined by a confluence of person and situation factors in a specific transaction." (Lazarus & Folkman, 1984).

Reappraisal and Coping with Threatening Situations

Lazarus & Folkman (1984) discuss the process of reappraisal which occurs when an appraisal is changed based on new information from the environment and/or information from the person's own reactions. Reappraisal is thought to resist or nourish pressures on the person and can serve as a coping mechanism. While there are different types of reappraisal, defensive reappraisal is of interest in this study. Defensive reappraisal refers to the effort made by the person to distort the past or to deal with present harms and threats by viewing them in less damaging and/or threatening ways.

According to Lazarus and Folkman (1984) coping is a process in which thoughts and behaviors are constantly changing to manage the external and/or internal demands that are taxing or exceeding the resources of the person. The way in which an individual appraises a situation can also influence their coping process. Appraisal can mediate emotions, thoughts and behavior which can shift over time throughout the coping process.

Masculine Appraisal of Stress and Coping

Preexisting notions about masculinity contribute to the ways in which men appraise environmental situations as stressful.

Throughout socialization, men acquire a cognitive schema for masculinity in varying degrees. Consistent with the Lazarus and Folkman (1984) model, the male role stereotype provides a masculine cognitive schema which acts as the interpretive guide for appraising situations. This cognitive schema provides information that specifies which situations should be perceived as threatening or stressful, and it determines which coping responses are gender appropriate.

Because the masculine cognitive schema influences the appraisal of situations, the degree to which men adhere to the male role indirectly effects their coping strategies. For example, rigid adherence to the male role may limit the number of coping strategies available for utilization from the pool of gender approved tactics. Rigid adherence to the male role may not only limit one's range of coping strategies, but it may obfuscate the individual's objective appraisal of the situation in the first place. As a result, unhealthy behavior patterns may be implemented by men due to dysfunctional appraisal and coping responses.

These dysfunctional coping patterns may result in a variety of clinical problems such as marital conflict, violence and sexual dysfunction (Eisler & Blalock, 1991). Given the emphasis that is placed on men to achieve and succeed in this society, men who adhere to the masculine stereotype are at an increased risk for dysfunctional coping. Because they are constantly driven to succeed, they appraise more situations as stressful and are more

likely to use dysfunctional coping resources.

Cognitive Appraisal of Stress in Men: MGRS

Based on the Lazarus & Folkman (1984) model, a psychosocial view of masculine gender role stress was been developed by Eisler and his colleagues (Eisler & Skidmore, 1987; Eisler & Blalock, 1991; Eisler, Skidmore & Ward, 1988). This view is based on a cognitive model of masculinity and gender role appraisal of stress. Eisler & Skidmore (1987) attempted to measure the cognitive appraisal of stressful events for men. They developed a scale that measures the degree to which men appraise gender-role-related situations as stressful. Men who are strongly committed to the stereotypical masculine role can be differentiated from men who are not committed to the masculine role by the Masculine Gender Role Stress (MGRS) rating scale (Eisler & Skidmore, 1987).

Research on the MGRS scale has identified five factors or types of situations which men are likely to appraise as stressful. The five factors are: 1) **Physical Inadequacy** - these items reflect an inability to be physically fit, sexually competent, or appearing "manly" (e.g. "being perceived as having feminine traits") 2) **Emotional Inexpressiveness** - these items include situations which require the man to express emotions such as fear, love and sorrow (e.g. "telling someone that you feel hurt by what she/he said") 3) **Subordination to Women** - these items include situations in which men are outperformed by a woman, a woman makes more money, a woman is more successful or a

woman is in control (e.g. "having a female boss") 4)

Intellectual Inferiority - these items include situations in which the male's lack of ambition, rational abilities or decisiveness are questioned (e.g. "having to ask for directions when you are lost") and 5) **Performance Failure** - these items include potential failures in the areas of work and sex (e.g. "being unable to become sexually aroused when you want"). Men that score high on the MGRS scale are likely to identify with the stereotypical, masculine role and appraise masculine relevant situations as challenging and/or threatening.

Men high in MGRS appraisal may be at increased risk for maladaptive behaviors. High MGRS men showed greater cardiovascular reactivity when exposed to the painful cold-pressor test than low MGRS men (Skidmore, 1987). Skidmore (1987) also found that high MGRS men exhibited greater stress arousal than low MGRS men when interviewed by a female regarding academic and social success with women. High MGRS men have been found to evidence greater cardiovascular reactivity to male relevant stressors than low MGRS men, which places high MGRS men at greater risk for heart disease (Lash & Skidmore, 1990; Lash, Eisler & Schulman, 1990). High MGRS men are more prone to be influenced by anxiety and anger and they are more likely to smoke, abuse alcohol, neglect exercise, exhibit poor dietary habits, and not use seat belts (Skidmore & Eisler, 1990). Furthermore, high MGRS men are less verbally expressive and report less satisfaction in their social support systems than low

MGRS men (Blalock & Saurer, 1990).

Stress arousal has also been found to change as a function of the environmental situation. Lash (1989) explored the effects of masculine gender role stress appraisal on cardiovascular reactivity when the challenge of a task was manipulated as either high masculine challenge or low masculine challenge. High MGRS men exhibited greater systolic blood pressure (SBP) reactivity than low MGRS men under high challenge. Equal or less reactivity was exhibited under low masculine challenge conditions suggesting that MGRS appraisal influences stress arousal.

Gender Relevance of the Stressor

Gender relevance refers to the description of the task, situation or stressor as one in which men or women should excel. A gender relevant task is one in which a specific gender role performance is expected. A masculine relevant task is one in which men should be good at, according to the male gender role stereotype. Most likely, men should surpass women on a masculine relevant task. For example, according to the masculine gender role, men are thought to be intelligent, analytical and rational when it comes to problem solving. Therefore, a masculine relevant task would be one in which a male is asked to use his logical and analytical abilities to solve a difficult puzzle. According to the appraisal model, men should appraise this situation as one in which men are expected to do well. A feminine relevant task is one in which women are thought to excel and most likely, surpass men. As a result, men should appraise

this situation as one in which they are not expected to excel.

Recent studies on stress arousal have included the concept of gender relevance in evaluating the stress response. Cardiovascular reactivity is most often used as the measure of stress arousal in this area of study. Matthews, Davis, Stoney, Owens & Caggiula (1991) used the Stroop color-word task in a study that explored sex differences in psychophysiological responses when the gender relevance of the task was manipulated. During the Stroop task, subjects were presented with a series of slides containing a target color-word written in an incongruent color. Subjects were asked to select the color word from the list which matched the ink color of the target word while listening to an audiotape that recited colors randomly. Their manipulation included a masculine relevant, feminine relevant and gender neutral description of the task. The authors found that the subject's perceptions of the task were influenced by the gender relevance of the task. However, the gender relevance of the task did not influence the physiological responses of the subjects. Both men and women were compared under masculine and feminine relevant conditions and they did not significantly differ on SBP, DBP or HR.

Other researchers have found significant physiological differences when the gender relevance of the task was manipulated. Using the cold-pressor task as the stressor, Lash, Gillespie, Eisler & Southard (1991) found that men exhibited

greater stress arousal than women during a masculine relevant task versus a gender neutral task. Lash (1991) also used the cold-pressor task when exploring gender differences in stress arousal when the gender relevance of the task was manipulated (masculine relevant, feminine relevant and gender neutral). Men were found to exhibit greater SBP and HR than women when the stressor was described as masculine relevant. Women exhibited greater SBP reactivity than men when the stressor was described as feminine relevant.

Issues relating to gender and stress have mostly focused on women and little research has been done on gender role stereotypes and their relationship to stress (Eisler & Skidmore, 1987). Lash & Skidmore (1990) have recently shown that men adhering rigidly to negative male stereotypes exhibited increased blood pressure when placed in a high masculine relevant challenge condition when compared to similar men in a low masculine relevant challenge group.

Competition and the Type A Behavior Pattern

Competition plays an important part in the physiology and psychology of the Type A behavior pattern. When compared to Type B men, Type A's have been shown to exhibit more elevations in SBP, catecholamines and sometimes HR on moderately competitive tasks. Type A's have even been shown to elicit competitiveness and anger in their opponent (Matthews, 1982). Type A men are so competitive that they are more likely to cheat in order to achieve success than Type B men (Perry, Kane, Bernesser &

Spicker, 1990). The excessive competitiveness found in the Type A behavior pattern can be self-defeating for the Type A man.

Heilbrun, Friedburg & Wydra (1989) have suggested that Type A men use extreme competitiveness as a means of seeking approval from others. Unfortunately, Type A men become more aggressive in competitive situations than Type B men which has a negative impact on others. The authors concluded that Type A men are more emotionally dependent and that aggressiveness becomes a maladaptive coping strategy used in competitive situations.

Van Egeren (1979) studied the psychophysiology of Type A and Type B subjects when placed in a interactive situations. Partners could either cooperate, compete, punish, reward or withdraw on each interaction. When Type A's interacted with each other, they became more distrustful, more angry, more threatening, less cooperative, more punishing and attempted to dominate each other when compared to Type A's interacting with Type B's. Furthermore, when Type A's competed against each other as well as Type B's, their vasomotor responses (HR and digital blood volume pulse) were twice as large as Type B's who were competing against each other.

MGRS and Competitive Challenge

High MGRS men appraise competitive situations as threatening, especially when there is a moderate possibility of losing. High MGRS men perceive being outperformed in competition by a woman to be particularly stressful. This is reflected in the MGRS factor "Subordination to Women" (Eisler & Skidmore, 1991). Men's

appraisal of the situation as competitive is critical in determining the amount of stress arousal experienced by men.

A Comparison Between Type A and High MGRS Men

Type A and MGRS characteristics appear to have a lot in common as they are constructs that overlap in several areas. For example, both Type A and high MGRS men value competitiveness, are easily challenged and are more cardiovascularly reactive than their respective counterparts. Although they overlap somewhat, they are independent. Therefore, important difference between these constructs and their theory based predictions should be noted.

The theory behind the Type A behavior pattern assumes that Type A persons have certain characteristics which influence their responding regardless of the situation. It was developed in order to better understand what types of men and women are more likely to engage in behaviors which place them at greater risk for cardiovascular disease. MGRS theory was developed in order to understand the relationship between gender roles their effect on the mental and physical health problems of men. Type A theory can be differentiated from MGRS theory given that the MGRS is a situation specific construct based on cognitive appraisal. High MGRS and Type A men differ when it comes to the appraisal of situations. For example, Type A men are likely to be competitive across all situations, whether or not it is expected that men should excel in that particular situation. On the contrary, MGRS

level interacts with the gender relevance of a situation and is based on one's cognitive appraisal of that situation.

MGRS looks at an appraisal mechanism and is able to explain why men are aroused in certain situations. Unlike the Type A construct, MGRS theory predicts which gender relevant circumstances will produce stress in men. High MGRS men appraise masculine relevant situations as more stressful than low MGRS men. Therefore, MGRS theory would predict high MGRS men to be more aroused cardiovascularly than low MGRS in a masculine relevant situation.

Anger, Hostility and Health

Anger and hostility appear to play an important role in the development of hypertension and heart disease. For example, men high in hostility are six times more likely to have a heart attack than men low in hostility (Gaylin, 1984). Also, scores from the Cook and Medley Hostility scale have been shown to predict coronary heart disease morbidity and mortality as well as to correlate with the severity of coronary artery disease (Barefoot, Williams, & Dahlstrom, 1983; Shekelle, Gale, Ostfeld & Paul, 1984; Williams, Haney, Lee, Kong, Blumenthal & Whalen, 1980).

In a study on emotions and stress arousal (Uchiyama, Hanari, Ito, Takahashi, Okuda, Goto & Tsuji, 1990) subjects watched 4 films that elicited anger, joy, sadness or fear. Subjects evidenced the greatest SBP, DBP and HR increases after watching the anger eliciting film when compared to the other films.

However, an association between stress arousal and anger does not always occur in laboratory studies. Weidner, Friend, Ficarrotto & Mendell (1989) found that men and women who scored high on the Cook Medley Hostility scale had greater blood pressure responses (SBP and DBP) to a stressful task than men and women who scored low on the hostility scale. While subjects high in hostility also reported more anger, blood pressure reactivity was not found to be related to anger. In a study that explored the relationship between anger expression and racism (Armstead, Lawler, Gorden, Cross & Gibbons, 1989), black subjects reported more state anger when watching an anger provoking situation than subjects watching a neutral situation. Similar to the previous study, the anger provoking situation did not increase subjects SBP or DBP.

Research that has been done on the psychophysiological correlates of hostility have consistently found anger to be associated with cardiovascular reactivity (Schwartz, Weinberger and Singer, 1981; Wolf & Wolff, 1951). Hostility represents the most coronary-prone dimension of the Type A behavior pattern (Burns & Katkin, 1992). According to Burns & Katkin (1992), anger and hostility are thought to be directly linked to coronary heart disease by investigators in the field of coronary heart disease. The authors also purport that cardiovascular hyperactivity results when certain Person X Situation interactions occur and they suggest that future research in this area should focus on the dynamics of person and environmental

variables.

Rationale of Current Study and Hypotheses

According to Lazarus & Folkman (1984), person factors and situation variables are interdependent processes that influence appraisal of stress. Past studies have consistently found the person factor, MGRS, to effect cardiovascular reactivity and to interact with the situation variable, gender relevance of the stressor, when examining stress arousal (Lash 1989; 1991, Lash et al., 1990 & Skidmore 1987). Skidmore (1987) found high MGRS men to exhibit greater stress arousal than low MGRS men during the cold-pressor task. Lash et al. (1990) found that high MGRS men exhibited greater stress arousal under masculine relevant conditions versus gender neutral situations. Further work by Lash (1991) has shown that high MGRS men under high masculine challenge are more reactive than low MGRS men. Yet while under low masculine challenge, low MGRS men exhibit greater stress arousal than high MGRS men (Lash, 1989). However, Matthews et al. (1991) used the Stroop color-word task to examine sex differences in stress arousal. They found that the gender relevance of the task (masculine, feminine or neutral) had no effect on men and women's reactivity (SBP, DBP or HR) to stress.

The present study is an extension of the work done by Lash (1989; 1991), Lash et al. (1990) & Skidmore (1987) and was designed to examine stress as a function of competition versus pain in men who differ in MGRS appraisal. Also, the study will examine gender relevance under different circumstances than the

work done these authors and the comparisons between subjects will also be different. The studies by Lash (1989; 1991) and his colleagues [Lash et al. (1990) & Skidmore (1987)] examined subjects engaging in the painful cold-pressor task. The present study further expands past research in this area by the addition of an interactive, competitive element in which men actually compete against a female opponent. This study also plans to use the Stroop color-word task as the stressor because it can easily be structured as a competitive game. Furthermore, past research in this area (Lash (1989; 1991), Lash et al. (1990), & Skidmore (1987) has not looked at differences in stress arousal between high and low MGRS men under both masculine and feminine relevant situations.

This study was designed to examine the effects of MGRS and gender relevance throughout the competition process on stress arousal, anger responding and cognitive evaluation of an opponent. Physiological measures will be recorded periodically throughout the experiment. In order to maintain a stressful environment throughout the experiment, the subjects will lose throughout the competition. Furthermore, high MGRS men should find competitive threats from women as particularly stressful given that one component of high MGRS scale was found to be fear of subordination to women (Eisler & Skidmore, 1990). Therefore, subjects will compete against a female opponent who outperforms them on the Stroop color-word task.

There are 3 types of stress appraisals: challenge, harm/loss

and threat (Lazarus & Folkman, 1984). Theoretically, this study places men in a competitive situation which should induce the appraisal of challenge. Furthermore, subjects are losing throughout the competition which should result in the potential appraisal of threat and harm/loss. Overall, men value competitiveness and success more than women. Therefore, all male subjects are expected to exhibit an increase in stress arousal given the objective competitive situation itself which includes failure.

Specific Predictions

Effects of MGRS

High MGRS men have been found to exhibit greater stress arousal than low MGRS men on the cold-pressor task which has been thought to be perceived as a masculine ability to endure pain (Skidmore, 1987). According to Gill (1986) sport and competition are usually thought of as masculine activities. It is hypothesized that a competition, like the cold-pressor, will also be perceived as a masculine task and should elicit differences between high and low MGRS men. Men that score high on the MGRS scale are likely to identify with the stereotypical, masculine role and appraise masculine relevant situations as challenging and/or threatening. Men high in MGRS find both of these situations stressful; losing in a competition (performance failure) and a competitive threat from a woman (subordination to women). Therefore, competitive situations that involve a constant threat from a female opponent should produce a

significantly greater increase in stress arousal in high MGRS subjects than low MGRS subjects.

Effects of Gender Relevance Appraisal

Men appraise masculine situations as more stressful than women (Eisler & Skidmore, 1987). Past research has found masculine relevant conditions to elicit greater stress arousal in men and women than gender neutral challenge (Lash, 1991). Therefore, men who are competing against an opponent on a masculine relevant task should appraise the situation as more challenging than men who are competing against an opponent on a feminine relevant task. It is hypothesized that masculine relevant competitive situations should elicit greater stress arousal in male subjects than feminine relevant competitive situations.

Interaction of MGRS and Gender Relevance Appraisal

The process of a competition is influenced by personality variables and environmental factors. It is the interactive effect of the two variables, MGRS and gender relevance of the competition, which comprise the crucial components of the theoretical model being investigated in this study. Past research (Lash, 1990) has found high MGRS men to be more reactive than low MGRS men under masculine relevant conditions while no differences between high and low MGRS men occurred under gender neutral conditions.

High MGRS men competing in a masculine relevant competition should appraise competitive threats from women as more

threatening when being outperformed than high MGRS men in a feminine relevant competition. Therefore, it is predicted that high MGRS men in the masculine relevant condition will evidence the greatest increase in stress arousal. High MGRS men competing in a feminine relevant competition should also experience an increase in stress arousal because high MGRS subjects are more reactive than low MGRS men. However, this increase should be smaller than the increase evidenced by high MGRS men in the masculine relevant condition given that the potential harm/loss should not be as threatening. It is predicted that high MGRS men in the feminine relevant condition should evidence the second highest increase in stress arousal.

Given that low MGRS men do not appraise competitive threats from women to be as threatening as high MGRS men do, manipulation of the gender relevance of the competition should not influence the stress arousal in low MGRS subjects. Therefore, low MGRS men are expected to evidence similar increases in stress arousal when competing under both gender relevant conditions. These increases should be significantly lower than the high MGRS increases in stress arousal.

Self Report Measures

Men who compete against and lose to a female are expected to experience frustration, hostility or anger as well as psychological stress. Therefore, an anger and stress scale (CASS) was designed for this particular study. This scale includes questions relating to the subject's perceived experience

of stress, anxiety, anger, hostility, frustration and aggressiveness. Individual scores for anger and stress will be from extracted from the scale and used in the analysis.

Stress

The rationale for the self-report measure of stress is equivalent to the rationale for the physiological responding of high and low MGRS men. The hypotheses are also similar and are listed below.

MGRS Level

High MGRS subjects are also expected to report a greater amount of stress than low MGRS subjects.

Gender Relevance Appraisal

Men competing in the masculine relevant condition are expected to report a greater amount of stress than men competing in the feminine relevant condition.

MGRS and Gender Relevance Appraisal

High MGRS men competing in the masculine relevant condition are expected to report the greatest amount stress. High MGRS men competing in the feminine relevant condition are expected to report less stress than high MGRS men in the masculine relevant condition. No differences between low MGRS men are expected when the gender relevance of the competitive situation is manipulated.

Anger

Several studies have found anger to increase in subjects that are placed in stressful or frustrating situations (Uchiyama et. al., 1990, Armstead et. al. 1989). High MGRS men are more

likely to appraise a competitive threat from a woman as more threatening than low MGRS men. Given that all subjects lose to a female opponent, high MGRS men should appraise this outcome as more harmful and/or threatening than low MGRS men. Therefore, high MGRS men are expected to report more anger than low MGRS men after losing in the competition.

Opponent's Ratings

One's appraisal of a situation as challenging, harmful or threatening is thought to mediate one's cognitive reactions and coping processes. Reappraisal can occur as a person reevaluates the way in which they appraise an environmental situation. In an attempt to expand Lazarus & Folkman's (1984) concept of reappraisal, subjects will be given an opportunity to "reappraise" the opinion of their opponents personality characteristics. A personality attribution measure that taps the subjects opinion of his opponent's level of masculinity and femininity will be administered before and after the competition in order to determine changes in the subjects perception of the opponent after losing in the competition. It is predicted that men that lose to woman in the masculine relevant condition will alter their appraisal of the opponent by viewing her as less feminine and more masculine. No change in appraisal is expected for subjects in the feminine relevant condition.

Method

Subjects

Subjects were 128 male undergraduate students, ranging in age from 16 to 34 years, with an overall mean age of 20.11. Table 18 contains more extensive information of subject characteristics. Subjects were from psychology and sociology courses at Virginia Polytechnic Institute & State University and received extra-credit for their participation. Students with a history of cardiovascular disorders (heart disease, high blood pressure, etc.) were asked not to participate. Those who scored above 101 on the MGRS scale were designated as high-MGRS subjects (N=30) while those who scored below 80 were designated as low-MGRS subjects (N=33). In the second phase of the experiment, 7 high- and 4 low-MGRS subjects were eliminated on the basis of either; 1) knowledge or suspicion of a confederate's participation in the experiment 2) knowledge or suspicion that the confederates keyboard was not hooked up to the computer or 3) suspicion that the feedback given to them was false. A total of 52 subjects were used in the final analysis.

Confederates

Two female undergraduate confederates, alternated posing as the subject's opponent in the pseudo-competition. Each confederate followed a standardized routine of posing as a student and was trained in the areas of confidentiality, ethical considerations and the detection of distress in the subject (see Appendix B).

Apparatus and Measures

The Stroop color-word task was presented as the competitive task to the subject on an IBM computer screen. A series of target color words were displayed in an incongruent color to the subject (e.g. the word "red" displayed in green). The task required the subject to quickly select the correct color of the word (red, green, purple, blue or orange) by pressing one of 5 designated keys on an IBM keyboard that were labeled "R", "G", "P", "B" and "O".

Physiological Measures. Systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR) were measured with a Critikon Dinamap vital signs monitor (model 845XT). The cardiovascular signals were displayed and recorded by a research assistant on the data collection sheet (see Appendix I) in an adjacent room.

Psychological Measures. During the first stage of the experiment, subjects completed the 40 item Masculine Gender Role Stress (MGRS) scale (see Appendix C) which was developed by Eisler and his colleagues (Eisler & Skidmore, 1987).

During the second stage of the experiment, subjects completed the Personal Attributes Questionnaire (PAQ), a 55-item assessment instrument which measured the degree to which the respondent perceived his opponent as masculine or feminine (see Appendix E), before and after the Stroop color-word competition. A masculine and feminine score was obtained for each form filled out by the subject. After the competition, subjects completed

the Competition Anger and Stress Scale (CASS) which was developed for the present experiment in order to determine the subjects' self-report of stress and anger after losing in a competition (see Appendix D). A stress and anger score was obtained for each subject.

Experimental Design

The subject's physiological responses were assessed during anticipation, general instructions, practice phases, gender relevance instructions, competition trials and recovery phases of the Stroop color-word competition (see Appendix I). All subjects returned within a 2 week period and physiological baseline measurements were collected. The physiological data analysis of the anticipation, competition trials and recovery phases required a series of 2 by 2 by 20 ANACOVA's with repeated measures, using the return-day baseline as the covariate. Subjects' PAQ change scores and mean CASS scores were compared in a series of 2 by 2 factorial-design ANOVA's.

Procedure

Pre-Experimental Stage

In the first stage of the experiment, all subjects signed an informed consent form (See Appendix A) and completed the MGRS scale. Subjects were told that they would be participating in a 2-part experiment that included a non-physical competition against another student. No information regarding the nature of the experiment was provided at this time.

Experimental Stage

Subjects were contacted by phone for the second phase of the experiment by a female experimenter. They were told that another student would be scheduled at the same time and that this would be their opponent. All subjects were asked to refrain from ingesting medications, recreational drugs, caffeine, alcohol or nicotine 24 hours prior to the experiment. Subjects in the high- and low- MGRS groups were randomly assigned to either the masculine or feminine gender relevant condition for the competition. At the scheduled competition, subjects were met by a confederate who arrived and introduced herself as a fellow student participating in the experiment. The subject and confederate were then met by one of two female experimenters and screened for their abstention from alcohol, caffeine, medications and nicotine. The subject and confederate were then placed in separate rooms. The subject was asked to rate his opponent on the PAQ (see Appendix H). Upon completion of the PAQ, the subject and the confederate were taken into the experimental room. The subject was placed in front of a computer that contained the Stroop color-word task while the confederate was seated directly across from the subject in front of a mock computer screen.

Baseline (Time 1, 2 & 3). The experimenter placed an appropriately sized blood pressure cuff onto the subject's non-dominant arm. A blood pressure cuff was also placed on the confederates arm which inflated every minute with an extremely low inflation rate (approximately 60 mm.). The subject and

confederate were told to keep their non-dominant arms as motionless as possible and that their cuffs would inflate periodically throughout the experiment. The subject and confederate were asked to relax and rest in their chairs for 5 minutes. The anticipation phase occurred after this period of relaxation. Three cardiovascular measures (SBP, DBP and HR) were obtained from the subject prior to the competition phase. These 3 measures were obtained every 60th second and were obtained every 60th second for the duration of the experiment for a total of 20 minutes.

Competition appraisal phase (Time 4). After physiological measures were taken during the anticipation phase, general instructions were played over an intercom to the subject and confederate (see appendix F). General instructions were read and tape recorded by a male graduate student. The subjects were told that the purpose of the experiment was to explore the effects of stress on performance in a competitive situation.

Practice Phase (Time 5 & 6). A keyboard was placed on the subject's lap and a mock keyboard was placed on the confederate's lap. Next, the subject was taught the Stroop-color word task that is used in the competition and was given two practice trials. During each practice trial, one SBP, DBP and HR measure was obtained. False feedback was given after each trial and the subject was lead to believe that he was losing by a few percentage points (See Appendix H).

Gender relevance appraisal (Time 7 & 8). After the practice

trials, gender relevant instructions were played over the intercom. The identical male graduate student read the gender relevant instructions that were taped and played over the intercom. Subjects were then given a more complete description of the competitive task that included false information. Half of the subjects were told that this task taps men's abilities and that men usually outperform women on it (masculine relevance). The other half were told that the task taps women's abilities and that women usually outperform men on it (feminine relevance). The following instructions were given to the subjects depending on the gender relevance condition:

Masculine relevance appraisal:

Those who do well on this type of task have been shown to have the ability to think and react quickly, to integrate logical information, and to use perceptual skills to their advantage. Many studies have shown that this task is related to intelligence, analytical and mathematical ability, speed, endurance, and success at business decision-making. We will be assessing your abilities by how you perform on this task. Good performance gives us an indication of some of your abilities important in athletic and other types of competition. Men usually outperform women on this task. Use your logic and decision making abilities to do well on this task. Try as hard as you can to react as quickly as possible.

Feminine relevance appraisal:

Those who do well on this type of task have been shown to be

sensitive to subtle color differences, to have the ability to express emotions and to exhibit nurturing behavior. Many studies have shown that this task is related to patience, artistic skills, social skills, sensitivity, the ability to sense other people's feelings and to sympathize with them. We will be assessing your abilities by how you perform on this task. Good performance gives us an indication of some of your abilities important in interpersonal relationships and care-giving. Women usually outperform men on this task. Use your sensitivity and expressive abilities to do well on this task. Try as hard as you can to react as quickly as possible.

Competition phase (Time 9, 10, 11, 12, 13, 14, 15, 16 & 17).

Next, the experimenter briefly entered the experimental room to inform the subject and confederate that the competition was going to start. They were informed that three competition trials would ensue and that the person who achieved the highest percentage correct during 2 of the 3 trials would win the competition. The experimenter started the first trial, told the opponents to begin and then left the room. During each competition trial, 2 physiological measurements were taken. After each trial, a one minute rest period occurred and one measurement was taken before the false feedback was given. The series of feedback given to the subject and confederate were as follows: the subject lost in the first trial, won in the second trial and lost the final tie breaker.

Recovery phase (Time 18, 19 & 20). Three measurements were

obtained after the subject was informed of losing the competition. The blood-pressure cuffs were removed and the subject and confederate were escorted out of the competition room and separated once again. The subject was then asked to fill the CASS and the PAQ. Upon completion of the questionnaires, the subject was debriefed (see Appendix G).

Return-day baseline assessment. The subject was asked to return for a baseline measurement session which was scheduled 7-14 days after the subject completed the experimental phase. Upon arrival at the lab, the subject was seated in the same chair as during the competition. The same blood pressure cuff was wrapped around his non-dominant arm. After the subject rested for 15 minutes, 5 measurements were obtained.

Data Reduction and Analysis

All Statistical analyses were conducted on the Statistical Analysis System (SAS).

Physiological Measures

In order to test for an overall effect of stress arousal, a series of univariate analyses were performed on the difference between the pre- and competition scores for each group. The difference score was computed for each group as follows: the competition average (times (9, 10, 12, 13, 15 and 16)/6) minus the competition baseline average (points (1, 2 and 3)/3). This analyses was performed on each group's SBP, DBP and HR which resulted in a total of 12 univariate tests. These analyses will be referred to as the "peak analysis" within the results section.

All peak analyses are reported in Table 17 and presented in Figures 11, 12 and 13.

The mean of the last three return-day measures was defined as the covariate baseline. A series of 2 (MGRS) x 2 (Gender Relevance) analyses of variance (ANOVA) were performed for the SBP, DBP and HR baselines. Next, the groups were compared on their physiological responses for each reading throughout the experimental phase for a total of 20 readings. The 4 groups were compared during the following phases: competition baseline (3), general instructions/practice (3), gender relevance appraisal (2), competition (9) and recovery (3). A series of 2 (MGRS) by 2 (Gender Relevance) repeated measures analysis of covariance (ANACOVA) using the mean return-day baselines as the covariates was performed. Each of these 3 analyses will be referred to an "individual time analysis". A second set of analyses was performed on the average of certain stages within the experiment. Each of these 3 analyses will be referred to as a "stage analysis". The following stages are listed and include the individual points that will be averaged within their respective stages; a) competition baseline-1st, 2nd and 3rd readings 2) competition appraisal-4th, 5th and 6th reading, 3) gender relevance appraisal-7th and 8th reading, 4) competition-9th, 10th, 12th, 13th, 15th and 16th readings (the rest periods were not included) and 5) recovery-18th, 19th and 20th readings. The individual point analyses are reported in the results section of this document while the stage analyses are summarized in figures

and table format. All adjusted means and levels of significance are reported in table format.

Self-Report Measures

A series of 2 (MGRS) x 2 (Gender Relevance) ANOVA'S were performed on the subjects' mean ratings on the anger and stress scales derived from the CASS. Additionally, a series of 2 (MGRS) x 2 (Gender Relevance) ANOVA's were performed on the masculine and feminine scores, derived from the PAQ, that were taken before and after the experimental phase. The difference scores between pre- and post-measures were used as the dependent variables.

All of the physiological and psychological analyses were conducted using ANACOVA and ANOVA procedures for unequal N's [high MGRS-masculine relevance ($N = 11$), high MGRS-feminine relevance ($N = 12$), low MGRS-masculine relevance ($N = 15$), low MGRS-feminine relevance ($N = 14$)]. ANACOVA was used on the physiological measures in order to decrease error variance attributable to subject differences in baselines, increasing the power of the analyses. For each series of ANACOVA's, the covariates met the 3 necessary assumptions: 1) there were no significant differences between the 4 groups, 2) the relationship between the covariate and the dependent variable was the same in each 4 groups, and 3) parallelism-there was no significant interaction between the covariates and their respective groups. Overall, the covariates significantly reduced error variance.

Results

Analysis of Physiological Data

Systolic Blood Pressure

Peak Analysis

All four groups evidenced a significant increase in SBP responding during the competitive task.

Covariate Analysis

The return-day baseline ANOVA's evidenced no significant differences between groups. As a result, the SBP baseline was used as the covariate in a 2 x 2 x 20 repeated measures analysis of covariance. Table 1 presents the adjusted mean SBP levels for the four experimental groups at each time during the experimental phase for a total of 20 measures each. These group means are graphically displayed in figure 1.

Overall Effects

Overall, there were no significant main effects for MGRS or gender relevance. There was a significant interaction between MGRS and gender relevance [$F(1, 47) = 4.41, p = .0410$]. Those with the highest elevations, overall, were low MGRS subjects in the masculine relevant (MR) condition and high MGRS subjects in the feminine relevant (FR) condition. These elevations were maintained throughout the entire experiment and began prior to any experimental manipulation.

Individual Time Analysis

Competition Baseline

There were no significant main or interaction effects during

time 1, 2 and 3.

Competition Appraisal

There were no significant main or interaction effects during time 4 and 5. During time 6, there was a significant interaction [$F(1, 47) = 6.42, p = .0031$] in which the low MGRS subjects in the FR condition maintained a lower mean than the low MGRS subjects in the MR condition. The high MGRS subjects in the FR condition maintained the highest mean and the high MGRS subjects in the MR condition maintained the lowest mean.

Gender Relevance Appraisal

The above interaction pattern continued and was significant during time 7 [$F(1, 47) = 5.88, p = .0192$] but not at time 8. There were no significant main effects during time 7 and 8.

Competition

There were no significant interactions during time 9, 10, 11 and 12. A significant interaction of the above pattern occurred during time 13 [$F(1, 47) = 5.71, p = .0175$] yet was not significant during time 14, 15 and 16. A dissimilar type of interaction pattern occurred at time 17 [$F(1, 47) = 6.52, p = .0191$] and was significant. The low MGRS subjects in the FR condition dropped below the high MGRS subjects in the MR condition. The low MGRS subjects in the MR condition remained higher than both of the previous groups and were very similar to the high MGRS subjects in the FR condition. There were no significant main effects during time 9-17.

Recovery

During time 18, there were no significant main or interaction effects. During time 19, a significant interaction effect [$F(1, 47) = 4.75, p = .0343$] occurred with subjects in the low MGRS/MR condition evidencing equal means with subjects in the high MGRS/FR condition that were greater than subjects in the low MGRS/FR condition and High MGRS/MR condition. Those in the low MGRS/FR condition maintained a slightly higher mean than subjects in the high MGRS/MR condition. There were no significant main or interaction effects during time 20.

Table 1: Adjusted Mean Systolic Blood Pressure in mm Hg for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal: Time Analysis.

PHASE	Low MGRS		High MGRS	
	Feminine Gender Relevance	Masculine Gender Relevance	Feminine Gender Relevance	Masculine Gender Relevance
Return Day Baseline	120.21	117.86	120.11	115.27
Baseline				
1	125.83	126.31	128.96	123.82
2	121.74	120.80	127.97	122.34
3	122.16	121.31	127.69	123.31
Competition Appraisal				
4	123.31	123.67	124.63	119.17
Practice Trials				
5	133.47	132.95	135.67	125.44
6	130.07	136.00	140.64	129.09
Gender Relevance Appraisal				
7	128.18	131.75	131.86	122.60
8	128.55	130.25	130.77	125.55
Competition Trial 1				
9	133.58	134.55	137.45	126.81
10	134.89	139.07	139.55	132.70
Rest 11	125.78	131.33	131.56	127.65
Trial 2				
12	132.35	136.05	136.84	131.08
13	132.64	138.96	137.83	130.40
Rest 14	127.42	130.16	132.74	127.77
Trial 3				
15	132.62	135.21	135.99	130.13
16	133.52	138.90	137.61	132.78
Rest 17	125.53	133.35	131.32	127.39
Recovery				
18	123.70	127.12	127.07	124.21
19	121.83	125.70	125.47	120.54
20	124.29	124.13	121.64	121.37

Systolic Blood Pressure

Individual Time Analysis

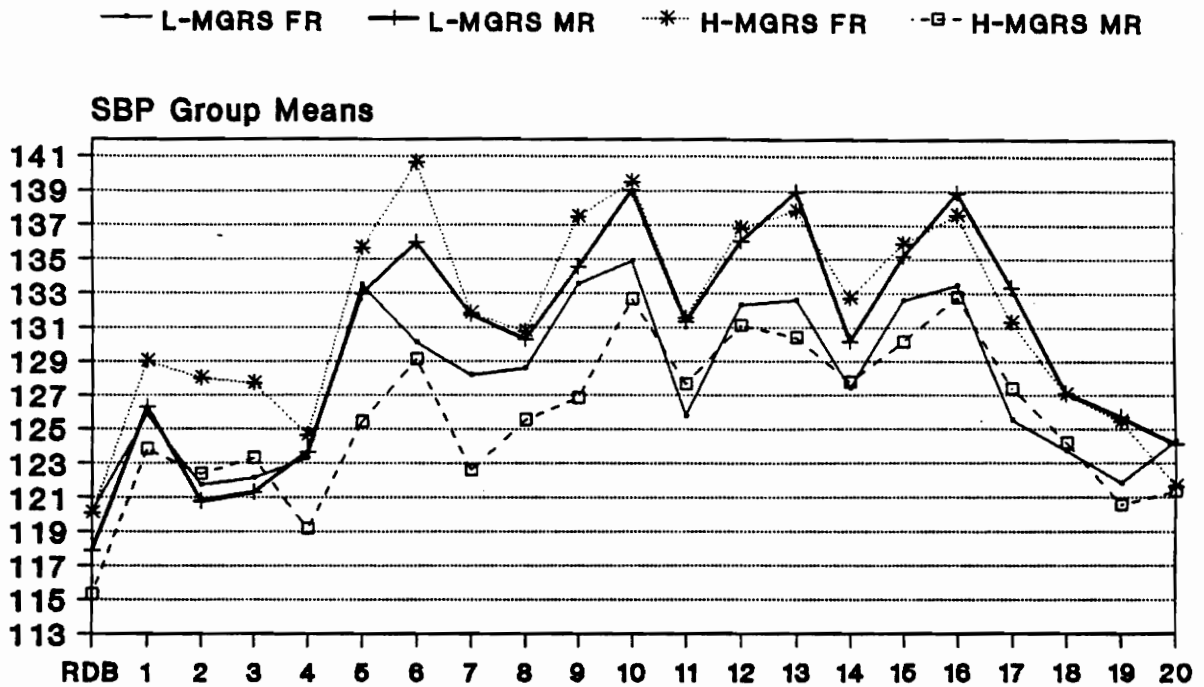


Figure 1: Mean SBP for the Four Experimental Groups During Each Individual Time.

Table 2: Adjusted Mean Systolic Blood Pressure in mm Hg for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal: Stage Analysis.

PHASE	Low MGRS		High MGRS	
	Feminine Gender Relevance	Masculine Gender Relevance	Feminine Gender Relevance	Masculine Gender Relevance
Return Day Baseline				
	120.21	117.86	120.11	115.27
Competition Baseline				
	123.24	122.81	128.21	123.16
Competition Appraisal				
	128.95	130.88	133.65	124.57
Gender Relevance Appraisal				
	128.37	131.00	131.32	124.07
Competition				
	133.27	137.13	137.54	130.65
Recovery				
	123.27	125.65	124.73	122.04

Systolic Blood Pressure Stage Analysis

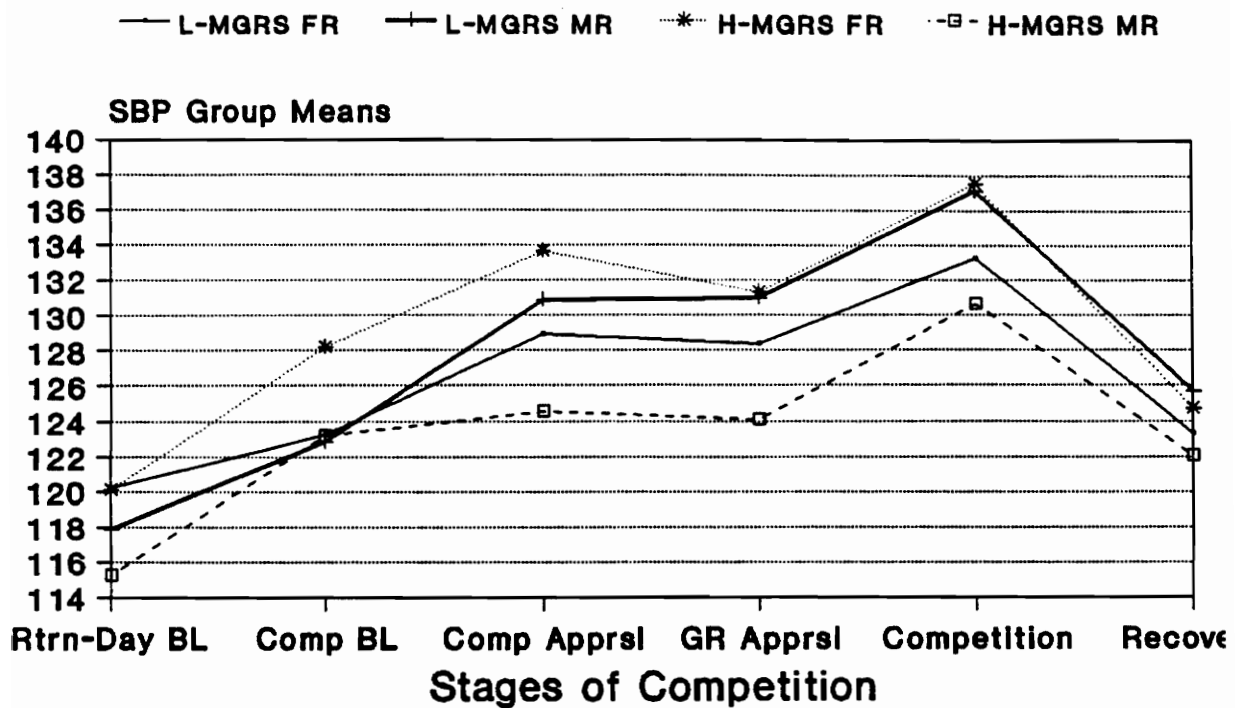


Figure 2: Mean SBP for the Four Experimental Groups During Each Stage.

Diastolic Blood Pressure

Peak Analysis

All four groups evidenced a significant increase in DBP during the stressor.

Covariate Analysis

The return-day baseline ANOVA's evidenced no significant differences between groups. As a result, the DBP baseline was used as the covariate in a 2 x 2 x 20 repeated measures analysis of covariance. Table 3 presents the adjusted mean DBP levels for the four experimental groups at each point during the experimental phase for a total of 20 measures each. These group means are graphically displayed in figure 3.

Overall Effects

Overall, there were no significant main or interaction effects.

Individual Time Analysis

Baseline

During time 1, a significant main effect for gender relevance occurred [$F(1, 47) = 4.28, p = .0441$] with the subjects in the MR condition evidencing a higher DBP than subjects in the FR condition. However, at times 2 and 3, this main effect dissolved. There were no significant interaction effects during time 1, 2 and 3.

Competition Appraisal

There were no significant main effects or interaction effects during time 4 and 5. During time 6 there was a

significant interaction effect [$F(1, 47) = 6.41, p = .0147$] with the subjects in the high MGRS/FR conditioning evidencing equal means with subjects in the low MGRS/ MR condition. These two groups maintained a greater DBP than subjects in the high MGRS/MR condition and Low MGRS/ FR condition. Subjects in the high MGRS/MR condition evidenced a slightly greater DBP than subjects in the low MGRS/FR condition.

Gender Relevance Condition

During time 7 and 8, there were no significant main or interaction effects.

Competition

There were no significant main or interaction effects during time 9, 10, 11, 13, 14, 15, 16 and 18. There was a significant main effect for gender relevance during time 12 [$F(1, 47) = 5.57, p = .0224$] and 17 [$F(1, 47) = 6.95, p = .0113$] with subjects in MR condition maintaining a higher DBP than subjects in the FR condition. There was no significant main or interaction effects during time 12 and 17.

Recovery

There were no significant main or interaction effects during time 18, 19 and 20.

Table 3: Adjusted Mean Diastolic Blood Pressure in mm Hg for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal: Time Analysis.

PHASE	Low MGRS		High MGRS	
	Feminine Gender Relevance	Masculine Gender Relevance	Feminine Gender Relevance	Masculine Gender Relevance
Return Day	Baseline			
	66.07	64.60	62.00	62.12
Baseline				
1	67.74	71.62	67.88	71.42
2	66.60	69.82	68.88	68.85
3	65.11	68.82	71.07	69.28
Competition Appraisal				
4	67.80	70.59	66.79	69.83
Practice Trials				
5	73.41	78.02	77.63	76.73
6	73.61	80.06	80.70	74.27
Gender Relevance Appraisal				
7	66.44	73.00	72.10	73.68
8	67.28	71.34	68.67	70.61
Competition Trial 1				
9	74.26	75.34	74.82	75.56
10	74.61	81.34	77.67	79.73
Rest 11	67.19	71.74	68.01	70.17
Trial 2				
12	75.68	80.87	75.26	79.28
13	76.58	79.15	76.87	78.89
Rest 14	66.72	69.80	69.52	70.31
Trial 3				
15	74.67	77.72	75.55	78.64
16	76.12	78.67	78.83	79.27
Rest 17	66.07	68.37	65.75	73.29
Recovery				
18	65.46	66.40	65.85	69.10
19	63.16	67.10	65.10	67.16
20	63.25	65.50	65.44	66.59

Diastolic Blood Pressure

Individual Time Analysis

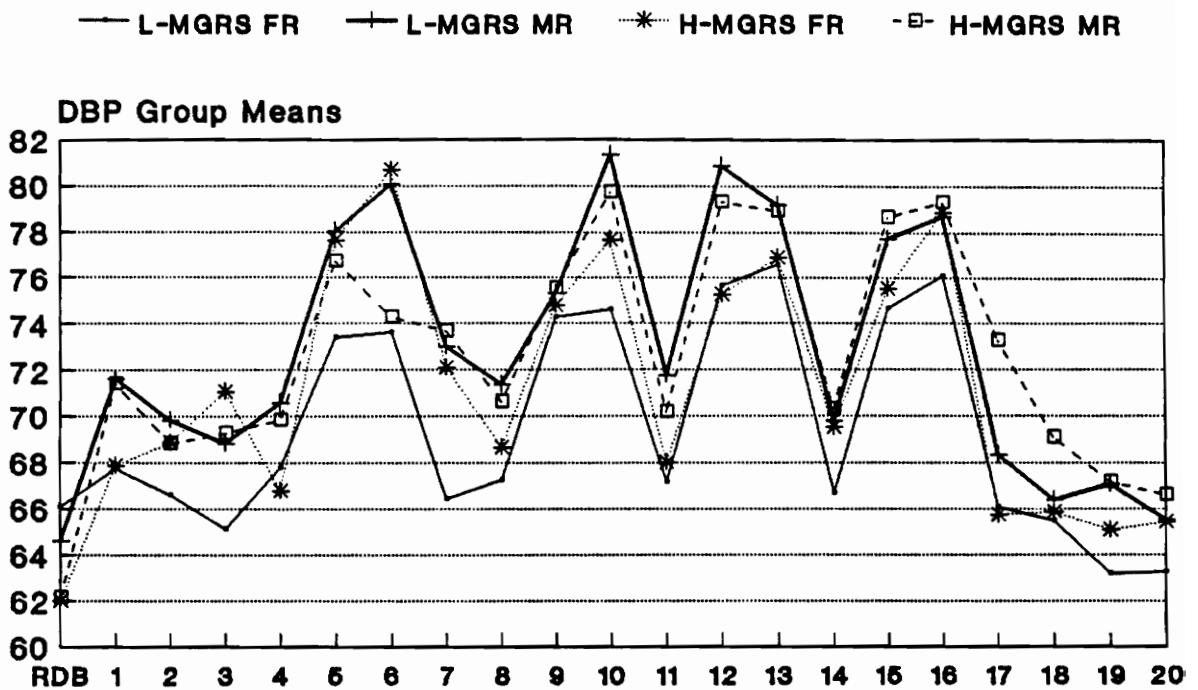


Figure 3: Mean DBP for the Four Experimental Groups During Each Individual Time.

Table 4: Adjusted Mean Diastolic Blood Pressure in mm Hg for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal: Stage Analysis.

PHASE	Low MGRS		High MGRS	
	Feminine Gender Relevance	Masculine Gender Relevance	Feminine Gender Relevance	Masculine Gender Relevance
Return Day Baseline				
	66.07	64.60	62.00	62.12
Competition Baseline				
	66.48	70.09	69.28	69.85
Competition Appraisal				
	71.61	76.22	75.04	73.61
Gender Relevance Appraisal				
	66.86	72.17	70.38	72.14
Competition				
	75.32	78.85	76.50	78.56
Recovery				
	63.96	66.34	65.46	67.62

Diastolic Blood Pressure Stage Analysis

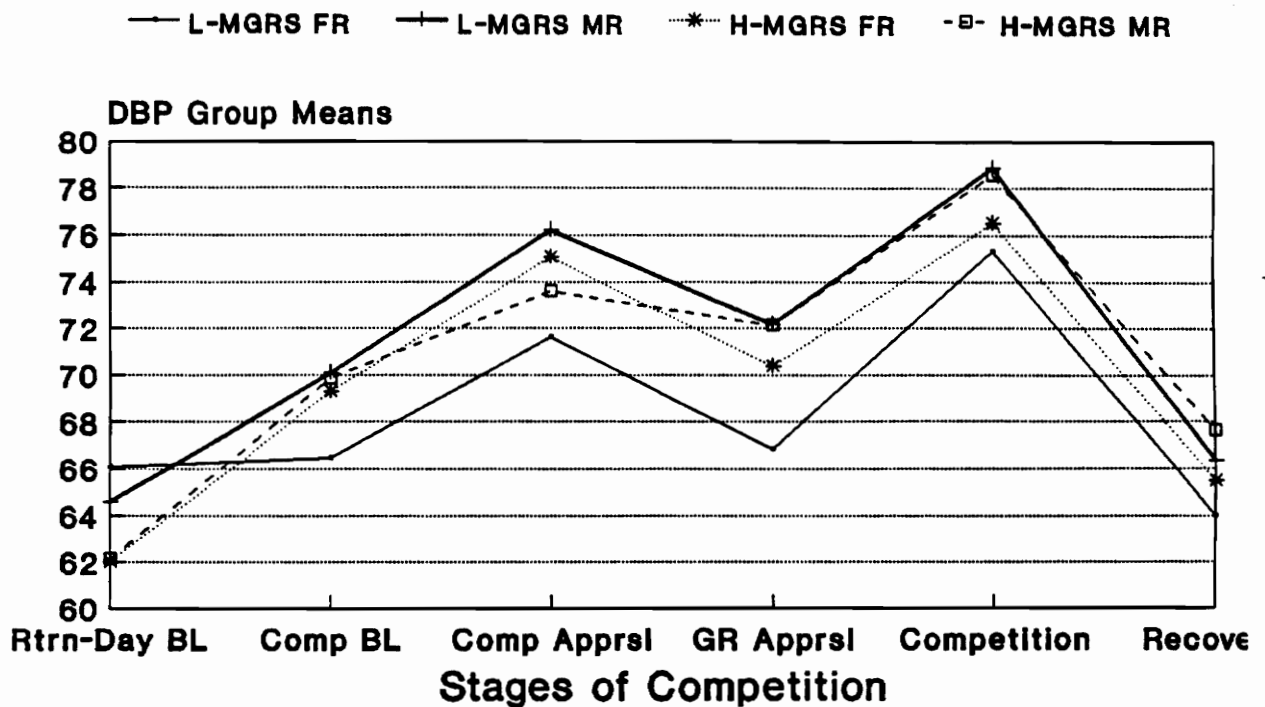


Figure 4: Mean DBP for the Four Experimental Groups During Each Stage.

Heart Rate

Peak Analysis

All four groups evidenced a significant increase in HR during the stressor.

Covariate Analysis

The return-day baseline ANOVA's evidenced no significant differences between groups. As a result, the HR baseline was used as the covariate in a 2 x 2 x 20 repeated measures analysis of covariance. Table 5 presents the adjusted mean HR levels for the four experimental groups at each point during the experimental phase for a total of 20 measures each. These group means are graphically displayed in figure 5.

Overall Effects

Overall, there were no significant main effects for MGRS or gender relevance and there were no significant interaction effects.

Individual Time Analysis

Competition Baseline

There were no significant main or interaction effects during time 1, 2 and 3.

Competition Appraisal

There were no significant main or interaction effects during time 4, 5 and 6.

Gender Relevance Appraisal

There were no significant main or interaction effects during time 7 and 8.

Competition

There were no significant main or interaction effects during time 9, 10, 11, 12, 13, 14, 15, 16 and 17.

Recovery

There were no significant main or interaction effects during time 18. At time 19, there was a significant MGRS main effect [$F(1, 47) = 4.37, p = .0420$] with the low MGRS subjects maintaining a higher HR than the high MGRS subjects. There were no significant interaction or main effects during time 19. During time 20, there were no significant interaction or main effects.

Table 5: Adjusted Mean Heart Rate in mm Hg for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal: Time Analysis.

PHASE	Low MGRS		High MGRS	
	Feminine Gender Relevance	Masculine Gender Relevance	Feminine Gender Relevance	Masculine Gender Relevance
Return Day Baseline				
	67.02	70.00	65.97	71.03
Baseline				
1	71.66	71.16	72.30	72.59
2	72.60	72.68	72.32	70.39
3	73.84	73.41	73.03	70.87
Competition Appraisal				
4	78.89	77.35	75.32	74.39
Practice Trials				
5	82.34	83.94	82.61	77.42
6	83.51	82.50	83.92	79.99
Gender Relevance Appraisal				
7	76.26	76.13	73.89	73.15
8	77.85	78.52	76.42	73.73
Competition				
Trial 1				
9	93.89	98.05	92.63	90.09
10	89.48	90.86	88.41	87.01
Rest 11	80.69	83.64	80.64	78.43
Trial 2				
12	87.82	92.60	86.00	84.46
13	88.90	91.73	89.38	85.97
Rest 14	82.45	84.55	80.93	79.82
Trial 3				
15	92.81	96.03	90.93	86.71
16	91.70	94.24	91.83	89.76
Rest 17	84.37	84.48	85.58	79.77
Recovery				
18	78.21	75.36	70.97	71.44
19	77.46	75.80	71.53	69.80
20	79.26	75.25	74.17	72.03

Heart Rate

Individual Time Analysis

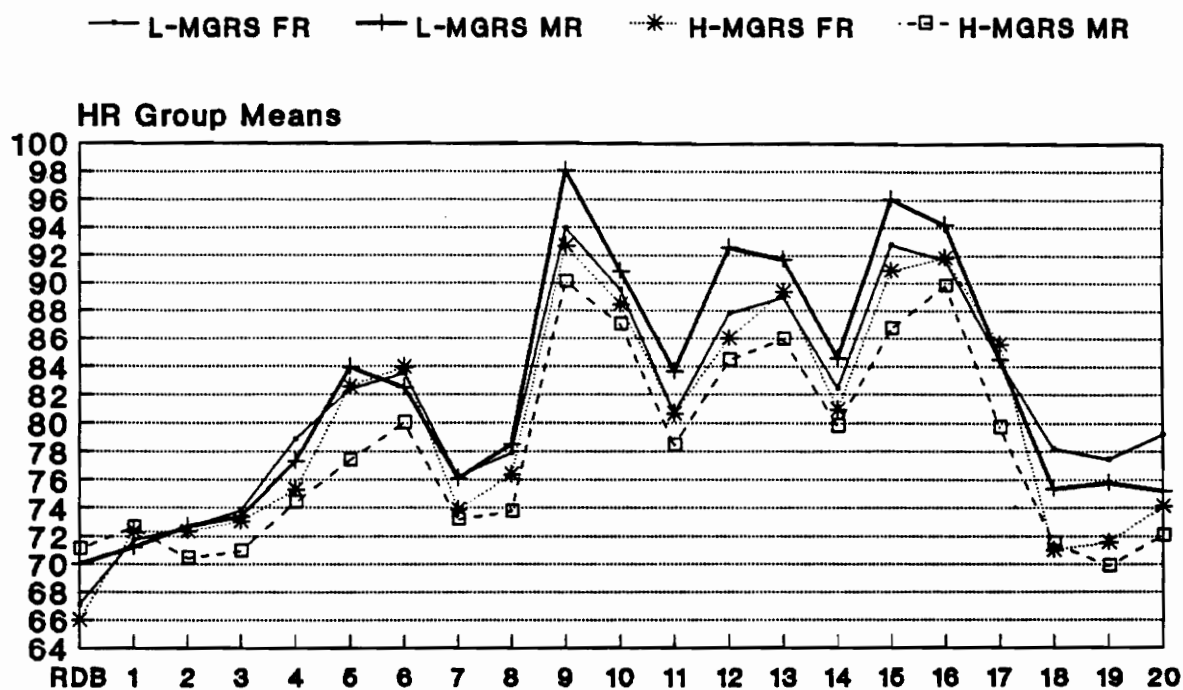


Figure 5: Mean HR for the Four Experimental Groups During Each Individual Time.

Table 6: Adjusted Mean Heart Rate in mm Hg for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal: Stage Analysis.

PHASE	Low MGRS		High MGRS	
	Feminine Gender Relevance	Masculine Gender Relevance	Feminine Gender Relevance	Masculine Gender Relevance
Return Day Baseline 67.02		70.00	65.97	71.03
Competition Baseline 72.70		72.42	75.55	71.28
Competition Appraisal 81.58		81.26	80.62	77.27
Gender Relevance Appraisal 77.05		77.32	75.15	73.44
Competition 90.77		93.92	89.86	87.33
Recovery 78.31		75.47	72.22	71.09

Heart Rate Stage Analysis

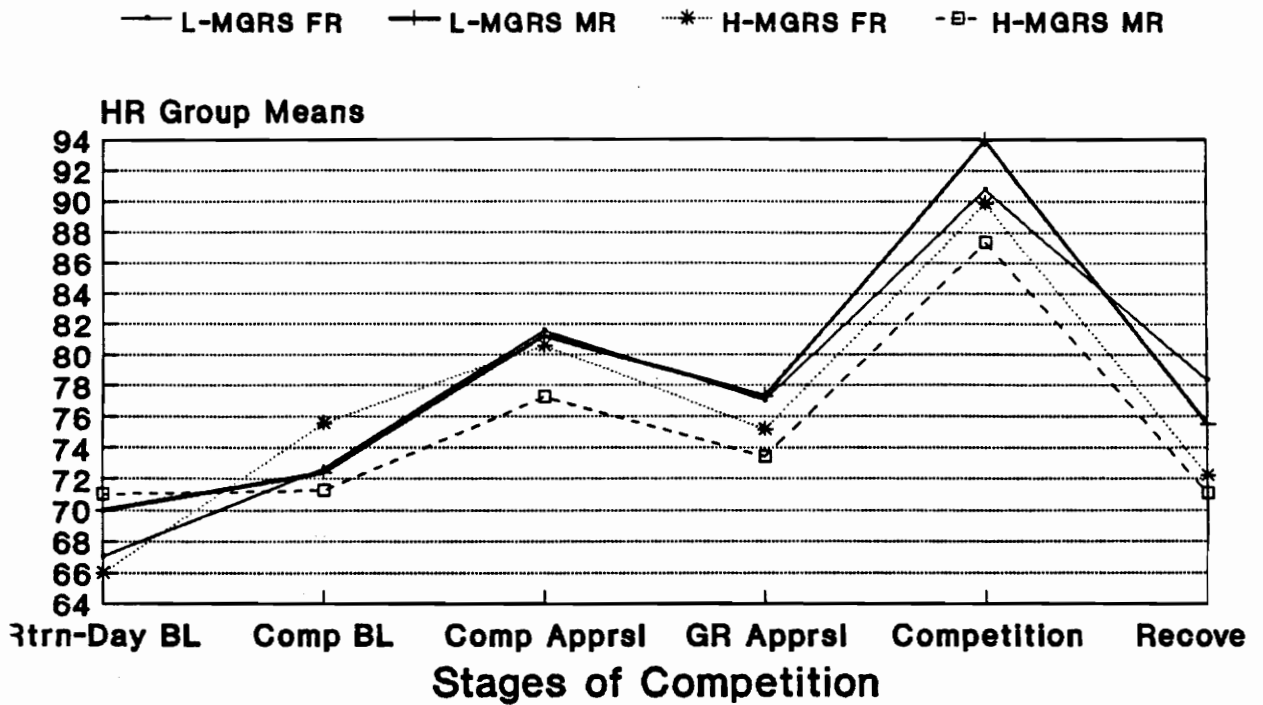


Figure 6: Mean HR for the Four Experimental Groups During Each Stage.

Analysis of Self-Report Data

Competition Anger and Stress Scale (CASS)

Stress Scores

Table 13 presents the mean stress scores for the four experimental groups. A main effect trend for MGRS emerged [$F(1, 47) = 2.31$ $p = .135$] as high MGRS subjects reported more stress during the competition than low MGRS subjects. However, this difference was not significant. There was no significant gender relevance main effect or interaction effect.

Anger Scores

Table 14 presents the mean anger scores for the four experimental groups. There was a significant main effect for MGRS [$F(1, 47) = 4.43$ $p = .040$] as high MGRS subjects reported greater anger than low MGRS subjects post-competition. These results are graphically displayed in figure 7. There was no significant main effect for gender relevance or an interaction effect.

Table 13: Mean Stress Scores from the CASS for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal.

<u>Masculine Relevance</u>		<u>Feminine Relevance</u>	
Low MGRS	High MGRS	Low MGRS	High MGRS
35.1	37.3	31.0	38.0

Table 14: Mean Anger Scores from the CASS for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal.

<u>Masculine Relevance</u>		<u>Feminine Relevance</u>	
Low MGRS	High MGRS	Low MGRS	High MGRS
24.2	29.1	21.2	30.5

ANGER SCORES

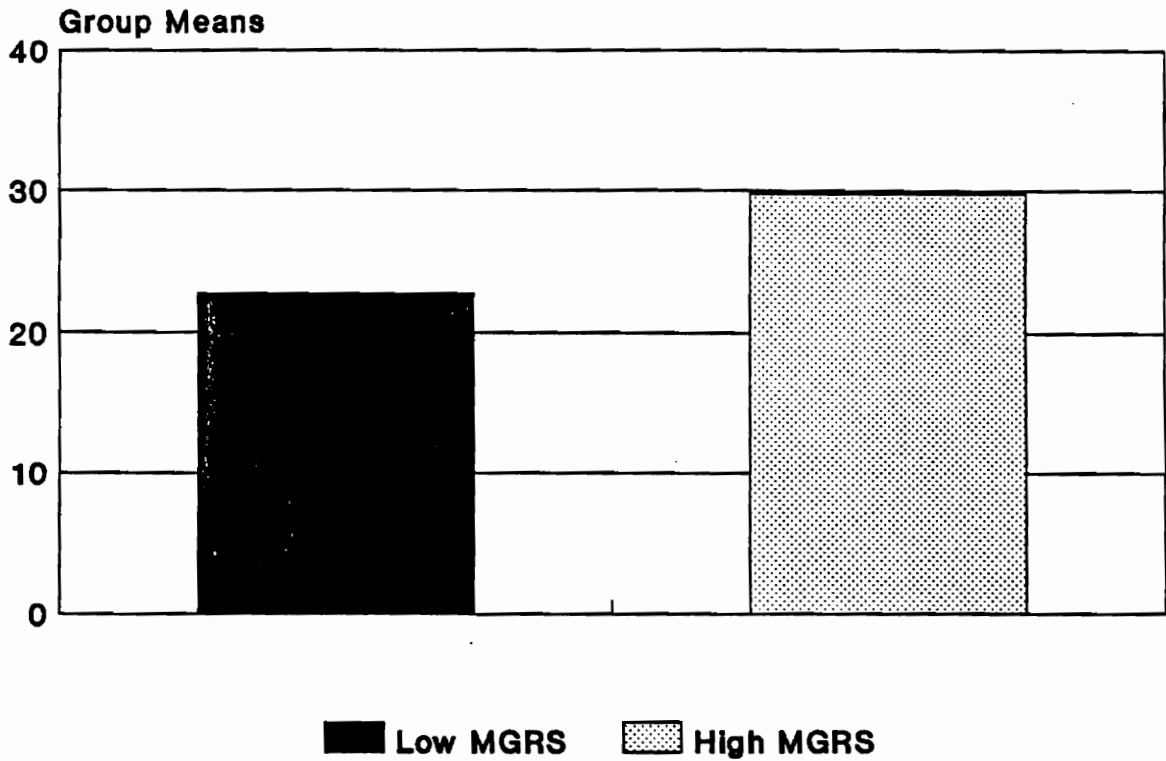


Figure 7: Mean Anger Scores for the High and Low MGRS Groups.

Opponent's Ratings

Masculine Scores

Table 15 presents the mean masculine scores for the four experimental groups before and after the competition. Figure 9 graphically displays the data. There was a significant main effect for gender relevance [$F(1, 48) = 8.66$ $p = .005$] as subjects in the MR condition rated their opponent as significantly more masculine after the competition than subjects in the feminine-relevant appraisal condition. There was no significant main effect for MGRS. There was an interaction trend that emerged [$F(1, 48) = 1.70$ $p = .198$] in which low MGRS subjects in the FR condition exhibited no change in their rating of the opponent while the high MGRS subjects in the FR condition increased their rating of their opponent's masculinity. However, this interaction effect was not significant.

Feminine Scores

Table 16 presents the mean feminine scores for the four experimental groups before and after the competition. Figure 10 graphically displays the data. There was a significant main effect for GR [$F(1, 47) = 6.19$ $p = .016$] as subjects in the MR condition rated their opponent significantly less feminine after the competition than subjects in the FR condition. There was no significant MGRS main effect or interaction effect.

Table 15: Mean Masculine Scores from the PAQ for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal Before and After the Competition.

Phase	<u>Masculine Relevance</u>		<u>Feminine Relevance</u>	
	Low MGRS	High MGRS	Low MGRS	High MGRS
Before	60.0	63.5	69.4	65.5
After	68.7	71.2	68.7	69.6

Masculine Scores (PAQ)

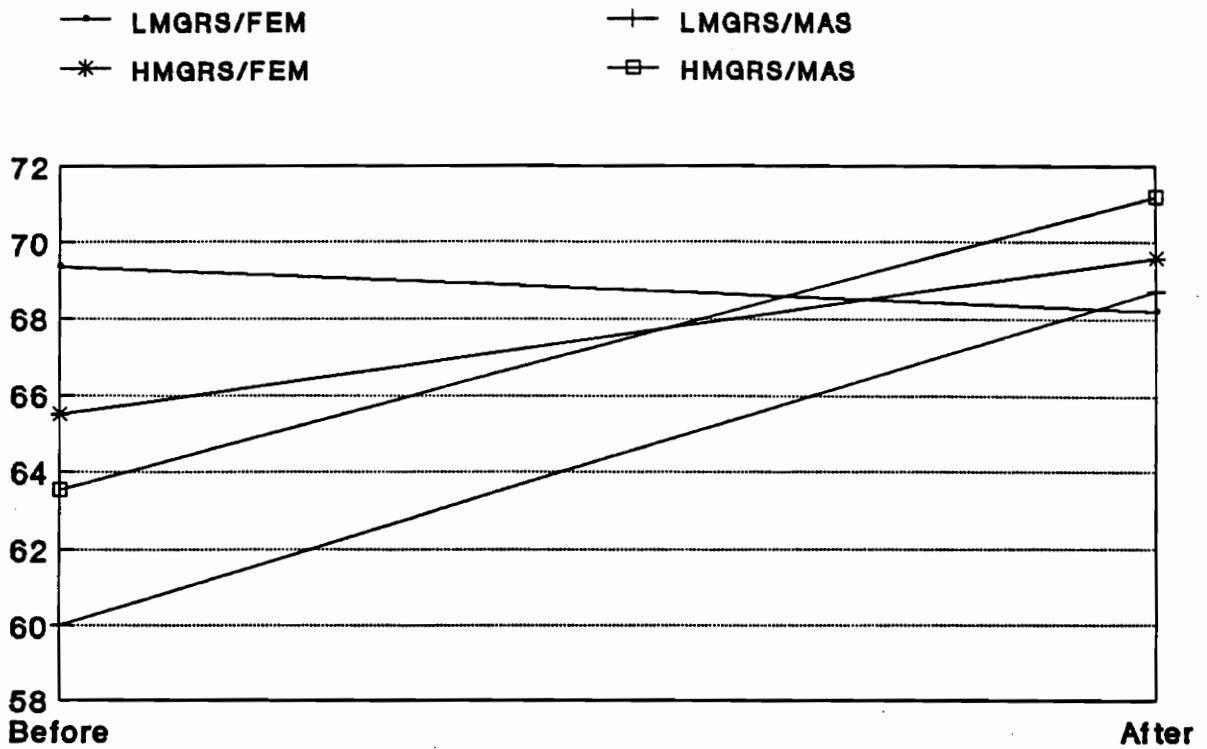


Figure 8: Mean Masculine Scores on the PAQ for the Masculine and Feminine Relevant Groups.

Table 16: Mean Feminine Sores from the PAQ for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal Before and After the Competition.

Phase	<u>Masculine Relevance</u>		<u>Feminine Relevance</u>	
	Low MGRS	High MGRS	Low MGRS	High MGRS
Before	58.6	61.1	58.7	61.2
After	51.9	55.1	57.6	58.5

Feminine Scores (PAQ)

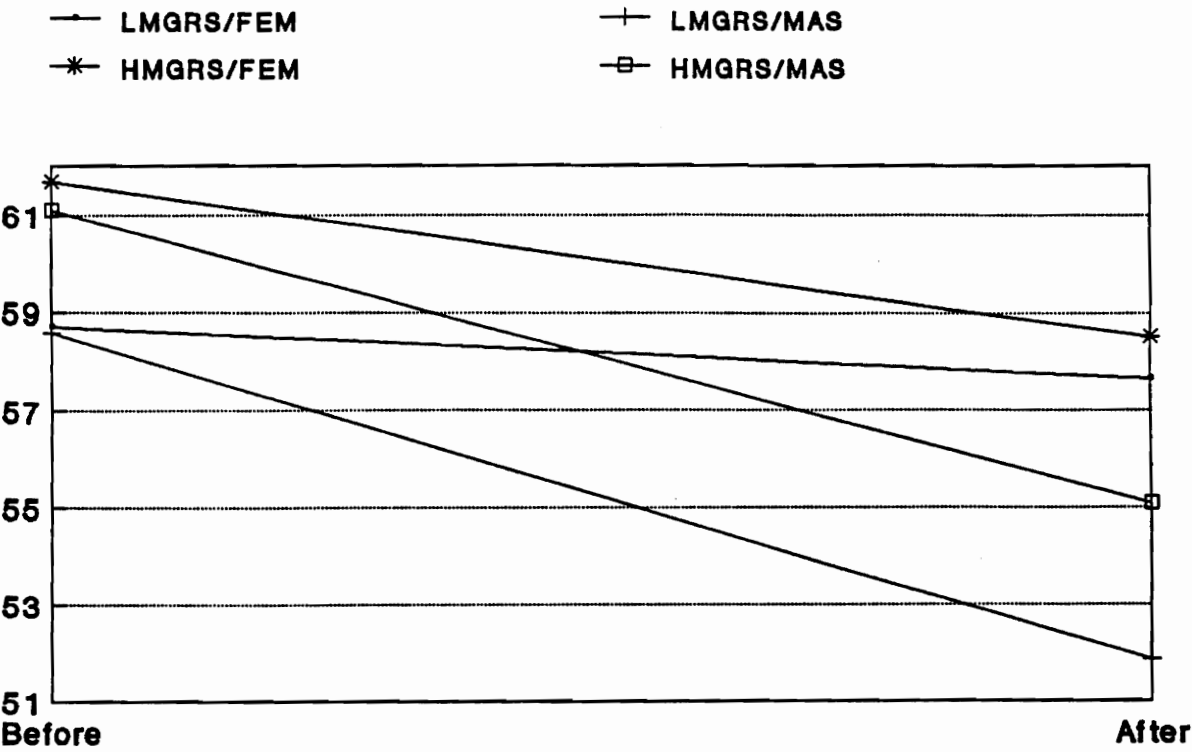


Figure 9: Mean Feminine Scores on the PAQ for the Masculine and Feminine Relevant Groups.

Discussion

Physiological Measures

Overall Stress Arousal (Peak Analyses)

All subjects were expected to exhibit an increase in stress arousal during the competitive task. This first prediction was confirmed. All 4 groups evidenced a significant increase in SBP, DBP and HR during the competitive task. This effect was exceedingly strong as indicated by the p-values in Table 17.

First of all, these results can be interpreted as a manipulation check which demonstrated that the attempt to place the subjects in a stressful environment was successful. Secondly, the amount of increase in cardiovascular responding is notable given that this was a non-physical competitive activity. The range of increases were approximately as follows: 13-20 mm for SBP; 9-16 for DBP; 15-24 for HR (See Table 19).

Overall Effects

Level of MGRS

Based on MGRS theory and the work done by Skidmore (1987), high MGRS men were expected to exhibit greater stress arousal than low MGRS men, overall. This prediction was not supported for SBP, DBP or HR.

One explanation for these results is that the MGRS groups were not homogeneous on subject characteristics at the beginning of the study (See Table 18). All 4 groups had similar age ranges and means with the exception of high MGRS men in the MR condition. The age range is greater due to one subject who was

34 years old. However, this did not appear to have had an effect on the results. Another possibility is that the high MGRS groups had dissimilar MGRS scores. However, both high MGRS groups had similar MGRS scores and MGRS variability. Therefore, subject characteristics did not appear to account for the lack of findings on MGRS.

Given that sport and competition are usually thought of as masculine activities (Gill, 1986) it was hypothesized that a competitive situation, like the cold-pressor task (Skidmore, 1987), would be appraised as a masculine activity. Therefore, a similar effect for MGRS was predicted. It is possible that this particular competition was not perceived as a "masculine" activity because it was a computer task. Many of the subjects were disappointed upon arriving to the experiment as they thought they would be participating in a physical competition.

Another explanation is that cardiovascular responding in a competitive situation is not influenced by the level of MGRS. One way to rule out this possibility would be to assess the amount of stress arousal increase in both high and low MGRS groups. If the subjects were over stressed, then one could argue that there was a ceiling effect which prevented MGRS differences from emerging. However, the increases in stress arousal were similar to the increases that Lash (1989, 1991) found during the cold-pressor task.

Furthermore, it is likely that MGRS level did not influence responding in the competitive situation given that most subjects

reported during the debriefing that they tried hard and wanted to do well on the task. Men have been found to score much higher on win orientation than women (Gill et al., 1985), to enjoy competition (Battista, 1990) and to rate competition as significantly more important than women (Mathes and Battista (1985). Perhaps this tendency for men to value competition is more influential on stress arousal than the level of MGRS.

Gender Relevance Appraisal

Subjects in the MR condition were expected to evidence greater stress arousal than subjects in the FR condition. This prediction was not supported for SBP, DBP or HR.

These results are inconsistent with the work done by Lash (1991) who found the gender relevance of the task to influence stress arousal. Lash (1991) found subjects performing a masculine relevant task to evidence greater SBP, DBP and HR than subjects performing a gender neutral task. However, the study by Lash (1991) compared men and women and did not include a feminine relevant condition. While the results of this study are inconsistent with the work done by Lash (1991), they are consistent with the Matthews et al. (1991) study who found that the gender relevance of the instructions did not influence stress arousal in male or female subjects on the Stroop color-word task.

One explanation for the results of this study is that the subject's did not believe the different gender relevant descriptions of the task. However, all subject's were asked during the debriefing whether or not they did believe the gender

relevant description of the task. All subject's who were suspicious were thrown out of the study. Furthermore, a pilot study was carried out prior to this study which resulted in all subject's reporting belief in the gender relevance manipulation based on a self-report questionnaire. Therefore, it appears that the gender relevance manipulation was successful.

Another explanation is that the randomization of subjects into the gender relevant groups was unsuccessful. Once again, it is important to look at the subject characteristics (See Table 18). Both groups appear to have similar age ranges and means. The MR groups appear to have slightly more age variability than the FR groups. However, the MR groups appear to be less homogeneous than the FR groups when the breakdown of race is considered. The MR groups have more race diversity within groups than the FR groups. In particular, the high MGRS subjects in the MR condition have the least homogenous within group race variability, overall. However, even these differences do not appear to account for the absence of significant differences on gender relevance appraisal given the small percentage of minorities in the group overall.

Subjects in the FR condition were told that the Stroop was a task in which women usually outperformed men. It is possible that those in the FR condition were just as challenged as subjects in the MR condition. Given that all subjects lost during both practice trials, the potential threat of losing may have been equally challenging for all 4 groups. Given that men

greatly value competition (Gill et al., 1985; Battista, 1990; Mathes and Battista, 1985), it is possible that they value all types of competition, regardless of the gender relevance. This possibility is further supported by the lack of finding an MGRS effect and by comments made from subjects during the debriefing. Two subjects in the FR condition reported that they wanted to outperform the confederate just because the instructions reported that women usually outperform men.

MGRS and Gender Relevance Appraisal

High MGRS men in the MR condition were expected to evidence the greatest increase in stress arousal while high MGRS men in the FR condition were expected to evidence the second greatest stress arousal increases; no differences between low MGRS subjects were expected as a function of gender relevance appraisal. This predicted pattern of responding was not supported on DBP or HR. However, there was an overall significant interaction that occurred between MGRS and gender relevance on SBP that was considerably different than the hypothesized pattern (See Figure 1). Those with the highest elevations, overall, were low MGRS subjects in the MR condition and high MGRS subjects in the FR condition. Low MGRS subjects in the MR condition evidenced a slightly greater increase in SBP than high MGRS subjects in the FR condition prior to time 7. Throughout the rest of the competition, these 2 groups maintained similar increases in stress arousal. Low MGRS subjects in the FR condition and high MGRS men in the MR condition maintained the

lowest elevations, overall. Prior to time 6, low MGRS subjects in the FR condition evidenced a slightly greater stress arousal increase than high MGRS in the MR condition. Throughout the rest of the competition, these 2 groups were similar.

These results are perplexing as they are incompatible with Lash's (1989) study that found MGRS to interact with gender relevance on stress arousal in men. In his study, he found high MGRS men to evidence greater stress arousal than low MGRS men under high masculine challenge conditions. In comparison to Lash's (1989) study, subjects in this experiment exhibited responding in the opposite direction. In this study, low MGRS men exhibited greater SBP than high MGRS men in the MR condition. Yet the most important difference between this study and the work done by Lash (1989; 1989), is that in this study, MGRS level began to interact with gender relevance before the gender relevance manipulation occurred.

How can one account for differences between gender relevant groups when the gender relevance has not yet occurred? The most reasonable possibility is that the randomization into the 4 groups did not produce homogeneous groups for baseline SBP, DBP or HR. This is a sampling problem that could account for the overall, counter-intuitive results for all of the physiological results. Although statistical analyses were performed in order to assure that the 4 groups did not have different baseline blood pressures or heart rates, there were differences that approached significance but were not significant at the .05 level (e.g. $p =$

.0763).

If one could be sure that this sampling problem undermined potential results, there would be two different ways of interpreting the data. First of all, one could argue that these pre-existing baseline differences could have prevented a priori hypotheses from being confirmed. This could mean that the MGRS theory does apply to competitive situations but was not able to present itself during this study given these undesirable circumstances.

On the other hand, these pre-existing differences at baseline could have been the only reason for the unexplainable, significant interaction pattern that emerged. If so, one would predict that if the groups were similar during baseline (return-day), then there may have been no group differences at all. If this were the case, there could be several interpretations of the results. It could mean that the MGRS theory does not apply to competitive situations. Another explanation could be that no results emerged because the subjects were over stressed due to problems with the methodology. Yet another alternative could be that the competitive nature of the competition had an effect on high and low MGRS subjects that has not been thoroughly included in the MGRS theory. Perhaps the groups differed on the subfactors within the MGRS scale, although they were similar on overall MGRS scores. For example, perhaps one of the high MGRS groups had several subjects who were extremely high on the performance failure and subordination to women factors while low

on the other three. This variety of high MGRS men may evidence different patterns of stress arousal than high MGRS men with extremely elevated scores on the intellectual inferiority and emotional expressiveness subfactors. Further research on the specific subfactors would be needed to rule out this possibility.

Another explanation for these results is that the MGRS theory does not take into account enough variables to predict behavioral responding in this type of competitive situation. This would suggest the need for an extension of the model itself. However, it is also possible that the relationship between the research operations and the MGRS theory is what requires further examination rather than the statistical results and the MGRS theory. In other words, it is possible that certain methodological problems served as threats to the internal validity of this study. The first possible threat is history. There was a significant amount of time between the administration of the MGRS questionnaire and the actual experiment. The range of time elapsed was 1 - 6 weeks. It is possible that certain events (e.g. personal experiences in competitive situations in the real world) took place during this time that influenced the subjects' responding. A second possible threat to the internal validity is the type of information contained in the instrumentation. First of all, the items on the MGRS questionnaire may have influenced the subjects predetermined ideas regarding what the experiment was about. For example, many of the items asked about competitive situations that involved

women. It is possible that several subjects were able to guess correctly what this study was investigating, how men react to losing against women. This in turn, may have influenced their behavioral and cardiovascular responding. Secondly, the GR relevant instructions may have been too suggesting of masculine/feminine expectancies. For example, "Most women outperform men on this task" may have caused the subjects to question whether or no the instructions were valid". Because a manipulation check for these instructions was not implemented, it is unclear whether or not an instrumentation effect of this type occurred.

A third possible threat to the internal validity of these results may have been the selection of treatment groups, a selection-instrumentation problem. Although randomization was employed, there is the possibility that the groups were not equivalent at the beginning of the study. According to Cook & Campbell (1979), a selection-instrumentation threat to internal validity occurs when "different groups score at different mean positions on a test whose intervals are not equal. The best known examples of selection-instrumentation occur when there are differential 'ceiling' and 'floor' effects, the former being when an instrument cannot register any more true gain in one of the groups, and the latter when more scores from one group than another are clustered at the lower end of a scale." (Cook & Campbell, 1979). It is possible that a selection-instrumentation threat to internal validity occurred in this study as one

treatment group did cluster at the lower end the MGRS scale.

The possibility of a selection-instrumentation threat to internal validity not only demands closer scrutiny but may be helpful in re-conceptualizing the MGRS scale. It is this possibility which contributes a final explanation for the results of this study as it appears to be the strongest argument given the differences in stress arousal at baseline (return-day). The overall interaction effect for SBP appears to have emerged based on the responding of the low MGRS groups. Figure 1 shows that both high MGRS groups evidence similar increases in SBP throughout the entire competition (time 1 - 20). It appears that the 2 low MGRS groups responded cardiovascularly in opposite directions during the second practice trial which resulted in the significant interaction effect. The actual point in which the low MGRS groups split was during time 6. Those in the MR condition evidenced an increase in SBP while those in the FR condition evidenced a decrease in SBP. This is supported by the strength of the interaction effect at time 6 [$F(1, 47) = 6.42, p = .0031$] which was much larger in magnitude than the overall interaction effect [$F(1, 47) = 4.41, p = .0410$].

This strongly supports the possibility that the reactivity within the low MGRS groups resulted in the interaction effect. It is interesting to note that the 6th reading was taken after the subjects were told that they lost the first practice trial. Furthermore, this same interaction pattern emerged throughout the competition (time 9 - 17) and was either significant or

approached significance. This possibility is further supported by the different type of interaction pattern occurred at time 17 [$F(1, 47) = 6.52, p = .0191$] and was significant. The low MGRS subjects in the FR condition dropped below the high MGRS subjects in the MR condition. The low MGRS subjects in the MR condition remained higher than both of the previous groups and were very similar to the high MGRS subjects in the FR condition.

How is it possible for 2 low MGRS groups to evidence such differences in stress arousal prior to the gender relevance manipulation? Although both high and low MGRS subjects were randomly assigned into the gender relevant conditions, a close examination of the low MGRS groups reveals a difference in the mean MGRS scores of the groups. While the difference between the low MGRS/MR subjects' mean MGRS score of 52.93 and the low MGRS/FR mean MGRS score of 60.93 was not significant at the .05 level, significance was approached [$T(27) = 1.65, p < .10$] suggesting that these groups may have been different in terms of MGRS level.

An examination of the low MGRS groups on DBP, reveals a similar pattern that occurred on SBP. The low MGRS group in the MR condition maintained a much higher DBP throughout the experiment than low MGRS subjects in the FR condition. While this effect was not significant overall, during time 6 this interaction pattern was significant [$F(1, 47) = 6.41, p = .0147$]. During time 6, subjects in the high MGRS/FR conditioning evidenced equal means with subjects in the low MGRS/MR condition.

These two groups maintained a greater DBP than subjects in the high MGRS/MR condition and Low MGRS/FR condition. An examination of the low MGRS groups on HR reveals a similar pattern in which both low MGRS groups maintained a higher HR than the high MGRS groups, although this effect was not significant. However, during time 19, there was a significant MGRS main effect [$F(1, 47) = 4.37, p = .0420$] with the low MGRS subjects maintaining a higher HR than the high MGRS subjects. This occurred during the recovery stage; after losing the competition.

Much research has been dedicated to high MGRS men and the detrimental effects of stress arousal while responding to stressors. However, stress arousal in low MGRS groups has received little attention. When the results of Lash's 1989 study are examined in more detail, one finds an interesting result that occurred with low MGRS men during the cold-pressor task. Lash (1989) predicted that under low masculine challenge conditions, high and low MGRS men would not differ in stress arousal. However, low MGRS men did evidence greater stress arousal than high MGRS men under low masculine challenge conditions.

It is possible that there may be a point in which extremely low scores on the MGRS scale result in increased stress arousal. One way to explore this would be to compare the low MGRS scores of Lash's (1989) study with low MGRS scores of this study. Unfortunately, this information is not available and the comparison cannot be performed. However, Skidmore (1987) assessed the effects of MGRS level on stress arousal and found

incremental differences for low, middle and high MGRS men, respectively on SBP. He reported that the group-by-group comparisons resulted in a linear relationship between MGRS and systolic reactivity. The low MGRS men in his study had an average MGRS score of 66 while those in this study had average scores of approximately 53 and 61. Given that differences between low and extremely low MGRS men have not been studied, it is possible that a curvilinear relationship exists between MGRS and cardiovascular reactivity rather than a linear relationship. Perhaps the extremes at both end of the MGRS spectrum result in increased stress arousal.

Overall, the results of this study as well as the findings by Lash (1989), suggest that stress arousal in low MGRS men may be influenced by different or similar situational factors when compared to high MGRS men. Furthermore, different subgroups of low MGRS men may exist [e.g. (0-55) and (55-80)] that respond differentially or similarly under certain circumstances with greater reactivity. An expansion of MGRS theory regarding implications for low MGRS men would be beneficial as well as further research on possible subgroups within high and low MGRS men.

Self-Report Measures

Stress

On the self-report measure of stress, high MGRS subjects were expected to report greater stress than low MGRS subjects. This prediction was not supported. However, a trend emerged in

the direction of the prediction. Men competing in the MR condition were expected to exhibit a greater self report of stress than men in the FR condition. This prediction was not supported. An interaction between MGRS and gender relevance was also predicted but not supported.

Anger

On the self-report measure of anger, it was predicted that high MGRS subjects would report a greater amount of anger than low MGRS men after losing in the competition. This prediction was supported and is consistent with MGRS theory. However, this measure was not given before and after the competition. Although the differences were significant, one must be careful in interpreting these results given the possibility that high MGRS subjects could have been more angry at the beginning. Future studies in this area would benefit from administering all self-report measures of emotional responding pre- and post-competition.

Opponent's Ratings

It was predicted that all subjects in the MR condition would rate their female opponent as less feminine and more masculine than subjects in the FR condition after losing in the competition. This prediction was supported. All subjects in the MR condition rated their opponent as significantly less feminine than subjects in the FR condition after the competition. Similarly, subjects in the MR condition rated their opponent as significantly more masculine after the competition when compared

to subjects in the FR condition. Also, an interaction pattern emerged as high MGRS men in the FR condition increased their masculine rating of the opponent although this was not significant.

These results suggest that the Lazarus & Folkman (1984) concept of reappraisal, which is presented as a self-reflected coping process, can be generalized to the appraisal of other people. Cognitive reappraisal can include realistic or distorted interpretations of reality. One explanation for the results obtained in this study is that the subject's in MR condition were more threatened by their loss in the competition than subject's in the FR condition. Perhaps a "masculine" appearing female who outperforms a male subject in a MR competition is less threatening than a "feminine" appearing female who outperforms a male subject. It is possible that these subjects coped with the situation by distorting reality. As a result they reappraised their perception of the opponent which served to decrease the amount of stress and lessen the degree of threat experienced by the subject. This appears logical given that the subjects could not control their outcome in the competition. They all lost. However, they could control the way in which they perceived their female opponent. This reappraisal mechanism could serve as a coping response to a threatening situation when loss or harm is unavoidable.

These results, when combined with the greater amount of perceived anger in high MGRS subjects, suggests that losing to a

female resulted in a very salient experience of harm or loss for these subjects. Verbal responses made by certain subjects during or after the competition support this explanation. For example, a high MGRS subject in the MR condition stated to the confederate after losing, "pure luck! Must be because you're a girl. I'll never have to be able to name off colors in my life anyway". Others became angry as evidenced by one subject who threw his pencil at the confederate after losing.

Methodological Issues and Implications for Future Research

There are several factors that may have affected the results found in this study. Perhaps the patterns would have been different if the task was easier or not as fast. It is also possible that the patterns would have been different if the opponent was a male. The gender of the opponent and task difficulty would need to be manipulated in future research in order to determine these possibilities. Likewise, the gender of the experimenter may also elicit different responses and future research in this area would be informative.

Another methodological issue is the difference between groups during return-day baseline. In order to determine whether or not the results would have confirmed the a priori hypotheses, a replication of this study would be required with all 4 groups evidencing similar SBP, DBP and HR prior to the experiment. This is a methodological issue which demands closer attention. Given the large variability of physiological responses between and within individuals, future studies in this area may benefit from

the stratification of subjects into groups based on their initial cardiovascular baselines. This would allow for more accurate comparison between groups and increase the validity of the results.

Future research in this area should also take into consideration the many problems that occur when using a confederate and giving false feedback in a competitive situation. Given the high percentage of subjects that were eliminated (11%), the comments that were elicited during the debriefing were noted. Several subjects were computer literate and became suspicious when observing the mock set up. In future research it would be helpful to have two complete computers in a room that could be started separately. Another option would be to use a different task or game in which a confederate can be trained to win every time.

Another problem that occurred was with the false feedback. Although the stroop-color word task was difficult (the color-words flashed every .8/sec.), several subjects were sure that they did better or worse than the scores that were given to them. These scores were based on averages that were determined from pilot tests. An alternative would be to find an extremely ambiguous or difficult task in which the subject was unable to determine how well he was doing. And finally, it would be in the best interest of the experimenter to use freshmen as most of the subjects who were eliminated in this study were upper classmen in upper division classes.

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Table 7: MANACOVA Results: Systolic Blood Pressure Time Analysis
p Values.

PHASE	MAIN EFFECTS		INTERACTION
	MGRS	Gender Relevance	EFFECT
Overall			
	.8890	.4624	.0410
Baseline			
1	.8859	.3902	.2168
2	.0813	.1451	.2869
3	.1053	.2661	.4426
Competition Appraisal			
4	.5038	.2947	.2238
Practice Trials			
5	.3678	.0779	.1038
6	.5182	.3311	.0031
Gender Relevance Appraisal			
7	.3067	.2962	.0192
8	.6300	.5038	.1827
Competition			
Trial 1			
9	.5493	.1456	.0768
10	.7800	.6674	.0751
Rest 11	.6892	.7586	.0759
Trial 2			
12	.9338	.7312	.1120
13	.5477	.8437	.0175
Rest 14	.6206	.7114	.1951
Trial 3			
15	.7774	.6086	.1767
16	.7487	.9313	.1122
Rest 17	.9759	.5131	.0480
Recovery			
18	.9298	.9191	.2457
19	.7069	.7997	.0343
20	.2352	.9251	.9810

Table 8: MANACOVA Results: Systolic Blood Pressure Stage Analysis
p Values.

PHASE	MAIN EFFECTS		INTERACTION
	MGRS	Gender Relevance	EFFECT
Overall	.8178	.3176	.0445
Baseline	.1902	.1840	.2540
Competition Appraisal	.7304	.1388	.0225
Gender Relevance Appraisal	.4076	.3469	.0433
Competition	.6841	.5830	.0516
Recovery	.5885	.9392	.2061

Table 9: MANACOVA Results: Diastolic Blood Pressure Time
Analysis p Values.

PHASE	MAIN EFFECTS		INTERACTION EFFECT
	MGRS	Gender Relevance	
Overall	.5262	.0781	.4571
Baseline			
1	.9871	.0465	.9247
2	.7418	.4113	.4025
3	.2160	.7025	.2730
Competition Appraisal			
4	.6784	.1627	.9518
Practice Trials			
5	.5598	.4443	.2584
6	.8054	.9987	.0147
Gender Relevance Appraisal			
7	.1472	.0564	.2375
8	.8580	.1009	.5578
Competition			
Trial 1			
9	.8537	.6567	.9327
10	.7731	.0776	.3431
Rest 11	.8687	.1333	.5889
Trial 2			
12	.6207	.0224	.7662
13	.9951	.2955	.8994
Rest 14	.4803	.3939	.6154
Trial 3			
15	.7020	.1830	.9923
16	.4884	.5174	.6473
Rest 17	.2386	.0113	.1675
Recovery			
18	.4472	.2875	.5560
19	.5575	.0726	.5676
20	.3754	.3406	.7574

Table 10: MANACOVA Results: Diastolic Blood Pressure Stage
Analysis p Values.

PHASE	MAIN EFFECTS		INTERACTION
	MGRS	Gender Relevance	EFFECT
Overall			
	.4885	.1000	.3333
Baseline			
	.5190	.2791	.4306
Competition Appraisal			
	.8477	.4405	.1464
Gender Relevance Appraisal			
	.3067	.0365	.2855
Competition			
	.8069	.1199	.6798
Recovery			
	.3422	.1133	.9373

Table 11: MANACOVA Results: Heart Rate Time Analysis p Values.

PHASE	MAIN EFFECTS		INTERACTION
	MGRS	Gender Relevance	EFFECT
Overall	.3331	.8091	.6362
Baseline			
1	.7391	.9719	.8993
2	.6791	.7699	.7465
3	.6044	.6937	.7891
Competition Appraisal			
4	.3340	.7184	.9280
Practice Trials			
5	.4007	.6330	.3611
6	.7396	.4438	.6451
Gender Relevance Appraisal			
7	.4596	.9056	.9333
8	.3681	.7723	.6254
Competition			
Trial 1			
9	.1998	.8236	.3501
10	.5378	.9983	.7284
Rest 11	.4926	.9250	.5014
Trial 2			
12	.1825	.6669	.3954
13	.4722	.9385	.3962
Rest 14	.4428	.9049	.6932
Trial 3			
15	.1676	.9020	.3563
16	.6066	.9565	.5864
Rest 17	.6928	.5272	.5053
Recovery			
18	.0776	.7073	.5944
19	.0420	.5621	.9901
20	.1663	.3114	.7549

Table 12: MANACOVA Results: Heart Rate Stage Analysis.

PHASE	MAIN EFFECTS		INTERACTION EFFECT
	MGRS	Gender Relevance	
Overall			
	.8408	.8156	.8715
Baseline			
	.8329	.8106	.8715
Competition Appraisal			
	.4474	.5799	.6414
Gender Relevance Appraisal			
	.4048	.8370	.7744
Competition			
	.2948	.9315	.4260
Recovery			
	.0738	.4983	.7676

Table 17: Peak Analysis Paired t-test Results: SBP, DBP and HR.

	<u>Masculine Relevance</u>		<u>Feminine Relevance</u>	
	Low MGRS	High MGRS	Low MGRS	High MGRS
SBP				
t-obs	7.55	3.38	5.05	4.46
p value	.0000	.0003	.0000	.0005
DBP				
t-obs	6.30	3.23	5.36	2.89
p value	.0000	.0045	.0000	.0073
HR				
t-obs	9.02	8.31	8.35	4.71
p value	.0000	.0000	.0000	.0003

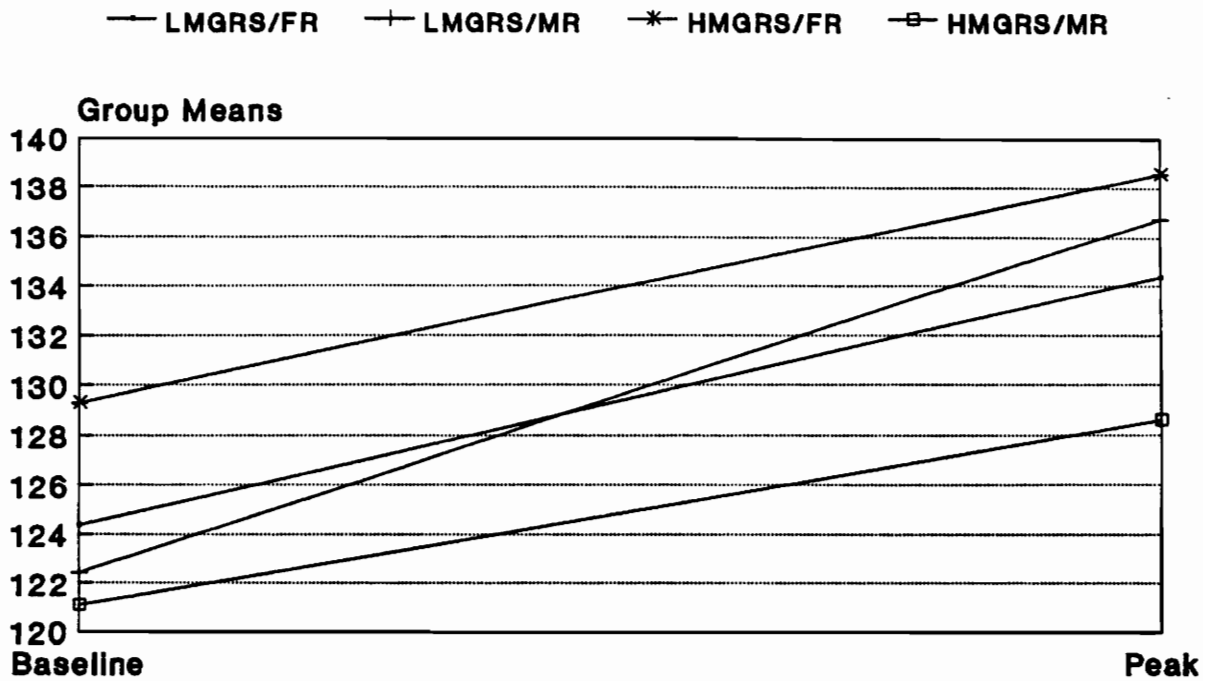
Table 18: Subject Characteristics for High and Low MGRS Groups as a Function of the Gender Relevance Appraisal.

	<u>Masculine Relevance</u>		<u>Feminine Relevance</u>		<u>Overall</u>
	Low MGRS	High MGRS	Low MGRS	High MGRS	
SUBJECT NUMBER	15	11	14	12	52
AGE					
Range	18 - 22	18 - 34	18 - 25	18 - 22	18-34
Mean	19.8	21.27	20.28	19.25	20.11
Sample Standard Deviation	1.08	4.47	1.72	1.28	2.42
MGRS					
Range	37 - 71	110-140	43 - 77	112-140	37-140
Mean	52.93	123.72	60.93	122.83	86.19
Sample Standard Deviation	14.02	10.83	11.29	9.83	35.36
RACE					
<u>White</u>					
Number	12	8	12	10	42
%	80.00	72.72	85.71	83.33	80.76
<u>Black</u>					
Number	1	0	0	1	2
%	6.66	0.00	0.00	8.33	3.84
<u>Asian</u>					
Number	1	2	2	1	6
%	6.66	18.18	14.28	8.33	11.53
<u>Spanish</u>					
Number	0	1	0	0	1
%	0.00	9.09	0.00	0.00	1.92
<u>Middle Eastern</u>					
Number	1	0	0	0	1
%	6.66	0.00	0.00	0.00	1.92

Table 19: Increase in Stress Arousal: Current and Past Studies.

MEAN INCREASE:			
	SBP	DBP	HR
Current study (Stroop)			
Masculine Relevant			
Low MGRS	19.3	14.2	23.9
High MGRS	15.4	16.44	16.3
Feminine Relevant			
Low MGRS	13.1	9.32	23.75
High MGRS	17.4	14.5	23.89
Lash 1989 (Cold-Pressor)			
Low Masculine Challenge			
Low MGRS	10.4	9.5	3.5
High MGRS	6.7	7.0	3.5
High Masculine Challenge			
Low MGRS	13.3	7.8	11.9
High MGRS	17.3	7.3	13.7
Lash 1991			
STUDY 1 (Cold-Pressor)			
Gender Neutral	5.0	9.8	2.8
Masculine Relevant	15.9	7.8	19.4
STUDY 2 (Cold-Pressor)			
Feminine Relevant	16.5	15.2	3.4
Masculine Relevant	26.3	19.9	4.4
Matthews et. al. 1991 (Stroop, Mirror Imaging Task)			
Stroop	10.4	7.9	6.8
Mirror Imaging	10.8	9.3	6.7

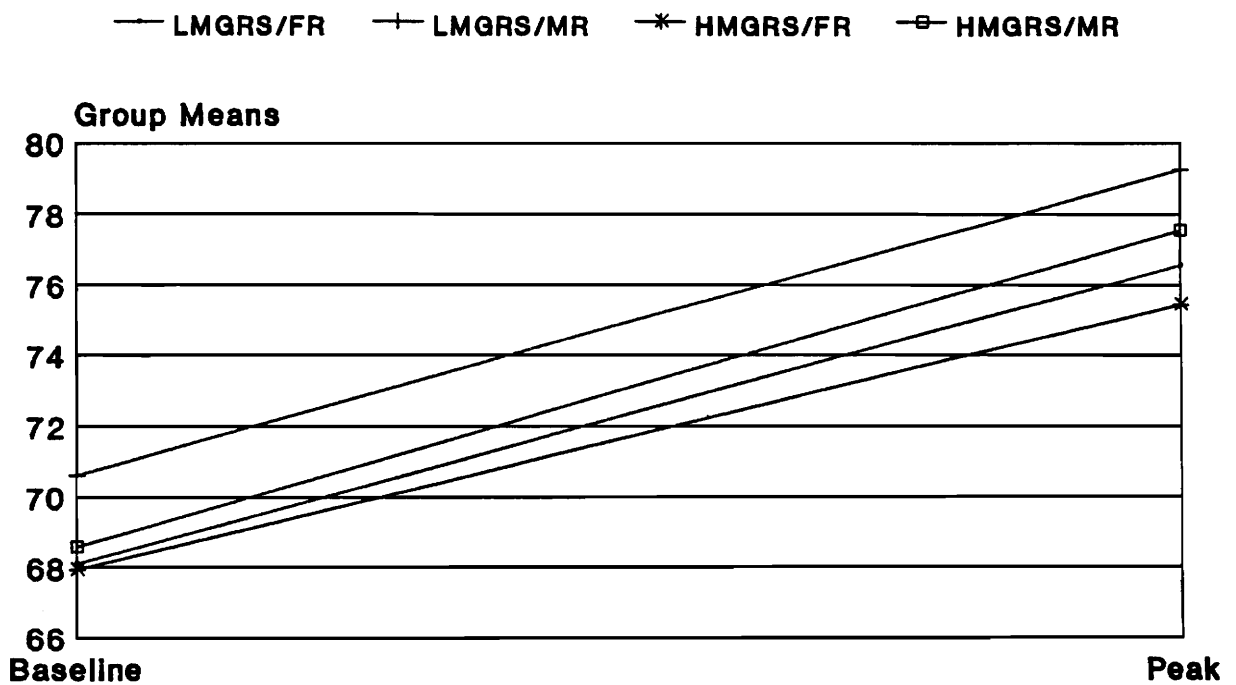
Systolic Blood Pressure Peak Analysis



Time Effect $F(1,48)=100.64$ $p=.0001$

Figure 10: Mean SBP for the Four Experimental Groups During the Baseline and Peak stages.

Diastolic Blood Pressure Peak Analysis



Time Effect $F(1,48)=67.03$ $p=.0001$

Figure 11: Mean DBP for the Four Experimental Groups During the Baseline and Peak stages.

Heart Rate Peak Analysis

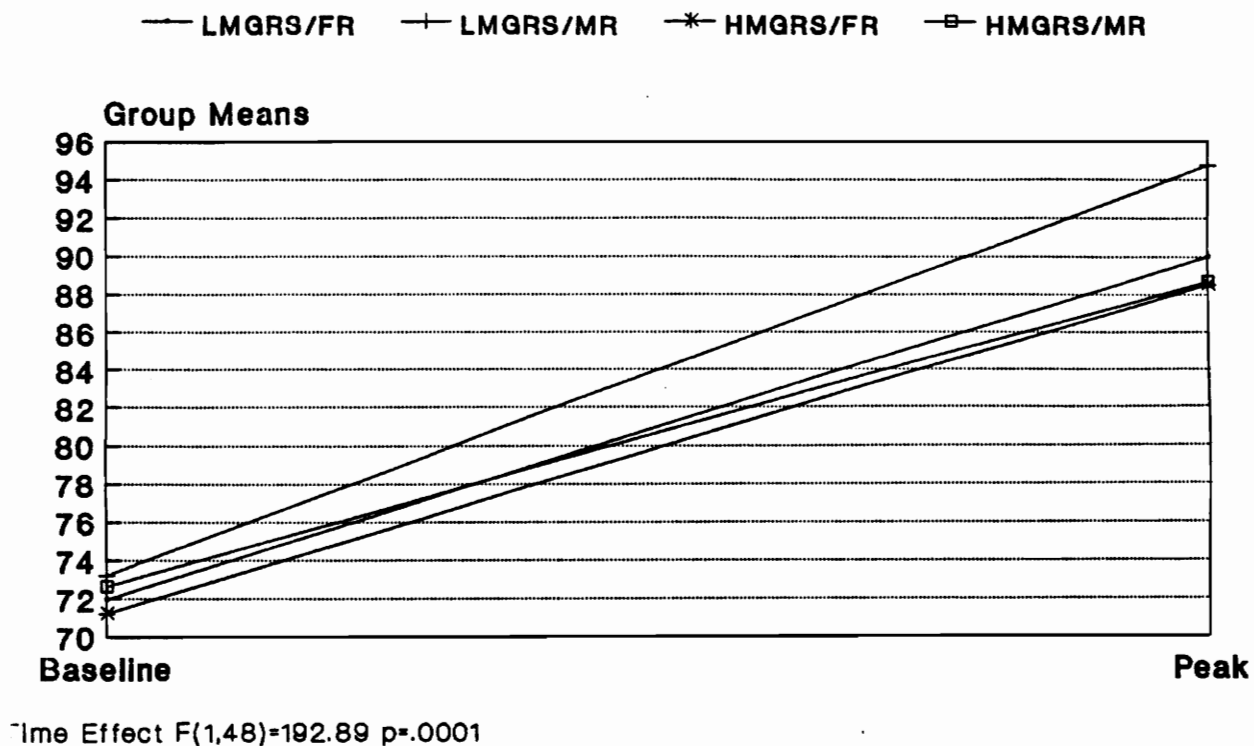


Figure 12: Mean HR for the Four Experimental Groups During the Baseline and Peak stages.

Appendixes

Appendix A: Informed Consent Form

You are invited to participate in a study investigating the effects of performance in a competitive situation. To accomplish the goals of the study, you will be asked to engage in a three phase experiment that includes a competition against another student from the psychology department or from the sociology department. Students participating in this experiment will have the potential to receive a total of 2-4 extra credit points toward their total grade, depending on the instructor. If you do not show up for any phase in the experiment without calling to reschedule, you may have the appropriate number of points deducted from your point total. The first session will take approximately 10-15 minutes and you will be asked to fill out a single questionnaire. The second phase will include a 20 minute competition and you will be filling out several questionnaires. This will require approximately 1 hour of your time. During the last session, you will have your blood pressure taken for approximately 5 minutes after resting for 15 minutes.

If you desire to participate in this study, you should know that you will be asked to have your blood pressure taken periodically throughout 15-20 minutes of the competition. You will also be asked to engage in a competitive game. You will be asked to fill out two questionnaires which will ask you to rate the task that you performed in the competition as well as your opponent. You will also be asked to come back at another time to have your blood pressure taken again. This experiment does not involve risk of any kind, however, the repeated blood pressure measurements may be experienced as somewhat uncomfortable. No guarantee of benefit has been made to induce you to participate other than the report of your systolic blood pressure, diastolic blood pressure and heart rate. Participants have the right to have their blood pressure cuff taken off at any time during the experiment.

The information accumulated by this research may be used for scientific or education purposes and information relating to your responses may be presented at scientific meetings and/or published and republished in professional journals or books, or used for any other purpose which Virginia Tech's Department of Psychology considers proper in the interest of education, knowledge or research. However, results will be kept strictly confidential. At no time will the researchers release the results of the study to anyone other than individuals working on the project without your written consent. Your name and responses will be numerically coded as to conceal your identity and ensure confidentiality. 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.

Participation is voluntary and you may withdraw your consent to participate at any time during the experiment and will not lose your extra credit points. 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.

I have read and understand the above description of the experiment, had an opportunity to ask questions and had them all answered, and hereby acknowledge the above and give my voluntary consent for participation in this study. I understand that I am participating freely in full understanding that I need not participate if I do not wish to, and if I participate I may withdraw at any time without penalty. I understand that if I should have any questions about this research and its conduct, I may contact any of the following:

Researcher:	<u>Kristine Brady</u>	phone: 552-3604
Faculty Advisor:	<u>Richard Eisler, Ph.D.</u>	phone: 231-7001
Chair, HSC:	<u>Helen Crawford, Ph.D.</u>	phone: 231-6581
Chair, IRB:	<u>Ernest Stout, Ph.D</u>	phone: 231-5284

Signature: _____ Date: _____

Subject ID# _____

Appendix B: Subject Distress Criteria

The following criteria will be explained to the confederate and role-play training will implemented:

1. If the subject says anything to indicate that the blood pressure cuff is hurting him or is extremely uncomfortable (e.g. "ouch, this hurts" or "how long do I have to keep this on?"), the confederate will be told to ask the subject if he would like to discontinue the experiment without losing any credit. If he agrees to continue and the aversive statements continue, the confederate will be instructed to discontinue the experiment.

2. If the subject exhibits any non-verbal signs of distress (e.g. holding his arm tightly or making painful faces) the confederate will be instructed to ask the subject if he is experiencing any pain. If the subject says that he is, the confederate will be told to ask the subject if he would like to discontinue the experiment without losing any credit. If he agrees to continue and the non-verbal signs of distress continue, the confederate will be instructed to discontinue the experiment.

3. If the subject becomes extremely angry, anxious or frustrated during the task (e.g. starts hitting things or sweating profusely), the confederate will be instructed to immediately discontinue the experiment.

Appendix C: Masculine Gender Role Stress Scale

Date _____ Last 5 digits of SSN _____ Sex: M F Age _____
 Race _____ Marital Status: S M D W _____
 Education _____

Directions: Please read the descriptions of the following situations. Then rate how stressful the situation would be for you. Give each item a rating on the scale from 0 to 5, ranging from not stressful to extremely stressful.

For example: Driving a car 0
 Discovering you have a serious illness 5
 Losing your keys 2

Not Stressful
 Stressful

Extremely

0-----1-----2-----3-----4-----5

1. Feeling that you are not in good physical condition _____
2. Telling your spouse that you love him/her _____
3. Being outperformed at work by a woman _____
4. Having to ask for directions when you are lost _____
5. Being unemployed _____
6. Not being able to find a sexual partner _____
7. Having a female boss _____
8. Having your lover say that she/he is not satisfied _____
9. Letting a woman take control of the situation _____
10. Not making enough money _____
11. Being perceived by someone as "gay" _____
12. Telling someone that you feel hurt by what they said _____
13. Being married to someone who makes more money than you _____
14. Working with people who seem more ambitious than you _____
15. Finding you lack the occupational skills to succeed _____

16. Losing in a sports competition _____
17. Admitting that you are afraid of something _____
18. Being with a woman who is more successful than you _____
19. Talking with a "feminist" _____
20. Being unable to perform sexually _____
21. Being perceived as having feminine traits _____
22. Having your children see you cry _____
23. Being outperformed in a game by a woman _____
24. Having people say that you are indecisive _____
25. Being too tired for sex when your lover initiates it _____
26. Appearing less athletic than a friend _____
27. Talking with a woman who is crying _____
28. Needing your spouse to work to help support the family _____
29. Having others say that you are too emotional _____
30. Being unable to become sexually aroused when you want _____
31. Being compared unfavorably to men _____
32. Comforting a male friend who is upset _____
33. Admitting to your friends that you do housework _____
34. Working with people who are brighter than yourself _____
35. Getting passed over for a promotion _____
36. Knowing you cannot hold your liquor as well as others _____
37. Having a man put his arm around your shoulder _____
38. Being with a woman who is much taller than you _____
39. Staying home during the day with a sick child _____
40. Getting fired from your job _____

Appendix D: Competition Anger and Stress Scale (CASS)

We are interested in how you felt during the competition. The following items include several different feelings that you may or may not have experienced during the competition that you just participated in. Rate each item on a scale from 1 to 7. A rating of 1 indicates that you did not experience the feeling at all during or after the competition while a rating of 7 indicates that you strongly experienced the feeling during or after the competition.

1-----	2-----	3-----	4-----	5-----	6-----	7
not a			somewhat			extremely
all						

1. I found myself to be competitive during the contest
2. I became frustrated during the competition*
3. I enjoyed the match
4. I felt angry during the competition*
5. I was motivated to try hard during the contest
6. I felt confident that I could win the contest
7. I felt discouraged during the match
8. I found myself to be annoyed during the competition*
9. I feel as if I could win the competition if I had another chance
10. I felt nervous during the match
11. I could have done better in the contest
12. I found myself becoming hostile toward the opponent during the competition.*
13. I felt calm during the competition
14. I found myself becoming tense throughout the competition
15. I tried to concentrate during the match
16. I felt as if I was being provoked during the match*
17. I found the contest to be stressful

18. I felt confident during the competition
19. The competition made me upset*
20. I felt myself becoming aggressive during the match*
21. I felt determined to win the competition
22. I was pleased with my performance
23. I became depressed during the match
24. I was irritated during the contest*
25. My temper started to kick in during the competition*
26. I felt in control of myself
27. I had a hard time concentrating on the task
28. I was worried about my performance
29. I felt bored during the match
30. I started to panic during the match
31. I was afraid that I would not do well during the
competition
32. I found the task to be difficult
33. I felt agitated during the competition*
34. I felt relaxed during the contest
35. I felt sick to my stomach

Appendix E: Personal Attributes Questionnaire (PAQ)

Personal Attributes Scale

On the following pages are a series of 5-point scales which describe a variety of psychological characteristics. For each item, you are to rate your opponent on that characteristic. For example, how artistic do you think he/she is? On the scale below very artistic is indicated at the far right and not at all artistic at the far left.

Not at all artistic 1...2...3...4...5 Very Artistic

If you think your opponent is moderately artistic, your answer might be 4; if you think he/she is very unartistic you should choose 1, etc..

For each item, code in the number on the scantron that corresponds to the number that best describes your opponent.

Please be sure to answer every item.

- | | | | |
|---------|---|-------------------|--|
| ___ 1. | Not at all aggressive | 1...2...3...4...5 | Very aggressive |
| ___ 2. | Not at all independent | 1...2...3...4...5 | Very independent |
| ___ 3. | Not at all emotional | 1...2...3...4...5 | Very emotional |
| ___ 4. | Does not hide emotions at all | 1...2...3...4...5 | Almost always hides emotions |
| ___ 5. | Nonconforming to social expectations | 1...2...3...4...5 | Conforming to social |
| ___ 6. | Not at all considerate | 1...2...3...4...5 | Very considerate |
| ___ 7. | Not at all easily influenced | 1...2...3...4...5 | Very easily influenced |
| ___ 8. | Very ungrateful | 1...2...3...4...5 | Very grateful |
| ___ 9. | Very submissive | 1...2...3...4...5 | Very Dominant |
| ___ 10. | Dislikes math and science very much | 1...2...3...4...5 | Likes math and science very much |
| ___ 11. | Poor at sports | 1...2...3...4...5 | Good at sports |
| ___ 12. | Not at all excitable in a <u>major</u> crisis | 1...2...3...4...5 | Very excitable in a <u>major</u> crisis |
| ___ 13. | Not at all excitable in a <u>minor</u> crisis | 1...2...3...4...5 | Very excitable in a <u>minor</u> crisis |
| ___ 14. | Very passive | 1...2...3...4...5 | Very active |
| ___ 15. | Not at all able to devote self completely to others | 1...2...3...4...5 | Able to devote self completely to others |
| ___ 16. | Very blunt | 1...2...3...4...5 | Very tactful |
| ___ 17. | Weak conscience | 1...2...3...4...5 | Very strong conscience |
| ___ 18. | Very rough | 1...2...3...4...5 | Very gentle |
| ___ 19. | Not at all helpful to others | 1...2...3...4...5 | Very helpful to others |
| ___ 20. | Not at all competitive | 1...2...3...4...5 | Very competitive |
| ___ 21. | Very home oriented | 1...2...3...4...5 | Very worldly |
| ___ 22. | Not at all skilled in | 1...2...3...4...5 | Very skilled in |

business			business		
___ 23.	Knows the way of the world	1...2...3...4...5		Does not know the way of the world	
___ 24.	Not at all kind	1...2...3...4...5		Very kind	
___ 25.	Low mechanical aptitude	1...2...3...4...5		High mechanical	
___ 26.	Indifferent to other's approval	1...2...3...4...5		Highly needful of other's approval	
___ 27.	Feelings not easily hurt	1...2...3...4...5		Feelings easily hurt	
___ 28.	Not at all adventurous	1...2...3...4...5		Very adventurous	
___ 29.	Not at all aware of feelings of others	1...2...3...4...5		Very aware of feelings of others	
___ 30.	Not at all religious	1...2...3...4...5		Very religious	
___ 31.	Not at all outspoken	1...2...3...4...5		Very outspoken	
___ 32.	Not at all interested in sex	1...2...3...4...5		Very interested in sex	
___ 33.	Can make decisions	1...2...3...4...5		Has difficulty	
___ 34.	Gives up very easily	1...2...3...4...5		Never gives up easily	
___ 35.	Very shy	1...2...3...4...5		Very outgoing	
___ 36.	Never cries	1...2...3...4...5		Cries very easily	
___ 37.	Almost never acts as a leader	1...2...3...4...5		Almost always as a leader	
___ 38.	Very neat in habits	1...2...3...4...5		Very sloppy in habits	
___ 39.	Very quiet	1...2...3...4...5		Very loud	
___ 40.	Not at all intellectual	1...2...3...4...5		Very intellectual	
___ 41.	Not at all self-confident	1...2...3...4...5		Very self-confident	
___ 42.	Feels very inferior	1...2...3...4...5		Feels very superior	
___ 43.	Not at all creative	1...2...3...4...5		Very creative	
___ 44.	Always sees self as running the show	1...2...3...4...5		Never sees self as running the show	
___ 45.	Always takes a stand	1...2...3...4...5		Never takes a stand	
___ 46.	Not at all understanding of others	1...2...3...4...5		Very understanding of others	
___ 47.	Very cold in relations with others	1...2...3...4...5		Very warm in relations with others	
___ 48.	Very little need for security	1...2...3...4...5		Very strong need for security	
___ 49.	Not at all ambitious	1...2...3...4...5		Very ambitious	
___ 50.	Dislikes children	1...2...3...4...5		Likes children	
___ 51.	Does not enjoy art and music at all	1...2...3...4...5		Enjoys art and music very much	
___ 52.	Easily expresses tender feelings	1...2...3...4...5		Does not express tender feelings at all	
___ 53.	Goes to pieces under	1...2...3...4...5		Stands up well	

	pressure		under pressure
<u>54.</u> Retiring		1...2...3...4...5	Forward
<u>55.</u> Not at all timid		1...2...3...4...5	Very timid

Appendix F: General Instructions

General Instructions

We are exploring the effects of stress on performance in a competitive situation. The game that will be used in this competition requires you to quickly report the name the color that is flashed in front of you. This color will be either; red, green, purple, blue or orange. Each color will be printed in the form of a word which may be an incongruent color. Your responses to the task will be recorded on a computer in the next room. We will inform you of your scores throughout the experiment. Whoever gets the highest percentage correct during in two out of three trials will win the competition.

Appendix G: Standardized Debriefing Statement

The purpose of this experiment was to study men who are placed in a competitive situation against women. When studying challenge and performance, it is necessary to place subjects in challenging situations. As a result, we purposely told you to try as hard as you can and we purposely had you sit across from your opponent. We also had you believe that you were losing during the experiment to heighten your level of challenge. Half of the subjects in this study had the task described as a "feminine" task while the other half had the task described to them as "masculine". We were trying to see if men who competed against and lost to a female on a "masculine" task would become more stressed than men who competed against and lost to a female on a "feminine" task.

In order to explore the effects of stress in men when competing against a female, it was also necessary to use some deception in this experiment. I need to inform you that the person you competed against was a trained experimenter posing as another student participating in the experiment. I regret the need for this deception, but for the purposes of studying individual's reactions to challenging situations, it was necessary to make the situation challenging by having you believe that you were losing. Given the difficulties of manipulating a game in which a certain person can be trained to "win" every time, it was more practical to give you false feedback regarding your results and to use a trained opponent posing as another student in order to ensure that you had "lost the game". Everyone who participated in this study competed against the same opponent. Your opponent's keyboard was not even hooked up to the computer. The feedback that we gave you was false regarding the number of colors that you named correctly. We do not know who would have actually won in this competition nor do we know how many colors you named correctly. We also would like to tell you that there are no known gender differences on the task that you just performed. In fact, the task is equally challenging for men and women. I would like to explain to you that it is very normal for people to become upset when trying to do well on the task that you were asked to perform. It is also very normal for people to become upset when losing in a competition.

We apologize for any discomfort or distress that you may have experienced as a result of this experiment. As you can see, the only way to study the effects of challenge on men when losing to a female is to have men believe that they lost to a female in a competitive situation.

In order to carry out a valid experiment, it is important that you do not discuss the experiment with anyone else. Please do not discuss your experiences here with other students. If someone comes into the experiment knowing what we are trying to do, it will invalidate the results. Thank you for participating in our study. Do you have any questions? Would you agree not to talk to any other students about this experiment? Great, I really appreciate it.

Appendix H: Competition Protocol

INTRODUCTION-HALLWAY

- 1) "Hi, my name's _____ and I'm assisting the researchers that are running this experiment."
- 2) Ask subjects if they have smoked, drank caffeine or alcohol.
- 3) "Why don't you both follow me?"

QUESTIONNAIRES

- 1) "Have you filled out an informed consent form?"
- 2) "Before we begin, I need you to fill out a questionnaire. (To Pam or Hayley), why don't you go outside and wait on the steps for me, I'll be right with you." Give subject a scantron and PAQ. What I would like for you to do is to rate your opponent on a variety of psychological characteristics. For each one, you are to rate your opponent on that characteristic. This may be difficult to do because you have just met your opponent. However, we are interested in first impressions and you are asked to rate your opponent on this scale according to how you think he/she might be like. You will be guessing on many of the questions. For example, how studious do you think he/she is? On the scale below very studious is indicated at the far right and not at all studious at the far left. If you think he/she looks like a moderately studious person, your answer might be 3; if you think he/she is not studious at all, you should choose 1, etc. For each item, write the number that best describes your opponent on the scantron that was given to you. Do not write on this questionnaire. Please be sure to answer every item and number each question. Your opponent will not see these responses so please be honest."
- 3) Leave the room and go talk to Pam or John for a minute or so. Take a scantron, pencil and PAQ with you.

ANTICIPATION-EXPERIMENTAL ROOM

- 1) When subject is done, go and get confederate. Take them into experimental room.

"Please sit down and make yourselves comfortable. I will be coming in and out of the room throughout the experiment. Some of the instructions will be played through an intercom so be sure and pay attention when you hear the voice come over the speakers."

"Before we begin, I need to test the blood pressure machine to make sure that we can get a reading. Sit back in the chair and try to relax. Which hand do you write with? Place that arm on the chair with your palm facing upwards. It is important that you keep this arm as relaxed as possible throughout the experiment. If you have any questions, at any time during the experiment, please feel free to ask me."

2) Put cuffs on and test blood pressure

3) "During this experiment, you will have your blood pressure taken every minute. Don't worry, this is a safe procedure. Most people find having their blood pressures taken repeatedly to be uncomfortable and this is normal. If you feel that you are extremely uncomfortable or if you are experiencing any pain, please let me know."

"For the next 5 minutes, we would just like to have you just relax and rest in your chairs. After 5 minutes, your blood pressure cuff will start to inflate. For now, close your eyes and picture something peaceful. You will hear the next instructions over the intercom."

4) Leave the room and wait for 5 minutes. Go in room and hit cycle on confederates machine (1 minute). Get 3 baseline readings.

5) Play the general instructions tape
(000-008;030-038)

PRACTICE STAGE

1) Return and show the demonstration of the stroop. "Let me show you those colors that they were talking about" Explain which key abbreviation corresponds to which color.

2) "The beep may not correspond to your responses so you shouldn't pay attention to it. Please hold the keyboard in your lap and try to stay as still as possible. It is very important that you do not move the arm that has the blood pressure cuff on it. Do you have any questions?"

3) Start first practice trial (2 sec. intervals for .3 min.)
Pam/Hayley 20% Subject 19%

4) Start second practice trial (2 sec. intervals for .3 min.)
Pam/Hayley 24% Subject 21%

5) "I'll be right back"

6) Leave the room and play gender relevant instructions.
(Feminine 011-020 20 sec.; Masculine 042-052 30 sec.)

COMPETITION STAGE

1) Return to room and set up for the first competition
(.8 sec. intervals for 2 min.)

2) "This is the first game in our competition. Remember that the best score in two out of three games wins the competition. Are you ready to begin? Remember to keep the arm that has the blood pressure cuff on it still" Wait

for the cuff to start inflating, then hit return and say, "GO!".

3) Give feedback. "Pam/Hayley, you got 41% and _____, you got 34%."

Start second competition (.8 sec. intervals for 2 min.)

"Remember to keep the arm that has the blood pressure cuff on it still". Wait for the cuff to start inflating, then hit return and say, "GO!".

4) Give feedback. Pam/Hayley, you got 34% correct and _____, you got 37% correct. Since you each have won a game, we will have to go into a tie breaker. Whoever wins this last game, will win the competition. Are you both ready?"

start third competition (.8 sec. intervals for 2 min.)

"Remember to keep the arm that has the blood pressure cuff on it still". Wait for the cuff to start inflating, then hit return and say, "GO!".

5) "Congratulations Pam/Hayley, you won! You got 52%, and _____, you got 41%. You both did really well. This is a very difficult task. We need to take a couple of more blood pressure readings and then I will be back to take off the BP cuffs."

- 8) get three more BP readings
- 9) return and take off BP cuffs and escort them outside
- 10) have them split up again and fill out the PAQ
- 11) have them fill out the CASS
- 12) read debriefing statement
- 12) have subject fill out 2 op-scans for extra-credit or sign the appropriate sheet
- 13) exit and restart stroop for next subjects

Appendix I: Data Collection Sheet

SUBJECT NUMBER _____
MGRS _____ INSTRUCTIONS _____

5 MINUTE REST PERIOD

	S	D	H
ANTICIPATION	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

GENERAL INSTRUCTIONS TAPE (000-008;030-038)

	_____	_____	_____
PRACTICE TRIALS			
1	_____	_____	_____
2	_____	_____	_____

GENDER INSTRUCTIONS (FEM 011-020;MAS 042-052)

	_____	_____	_____
	_____	_____	_____

COMPETITION TRIALS

1	_____	_____	_____
	_____	_____	_____
rest	_____	_____	_____
2	_____	_____	_____
	_____	_____	_____
rest	_____	_____	_____
3	_____	_____	_____
	_____	_____	_____
rest	_____	_____	_____

RECOVERY

_____	_____	_____
_____	_____	_____
_____	_____	_____

POST-EXPERIMENT BASELINE

SUBJECT NUMBER _____
MGRS _____ INSTRUCTIONS _____

S D H

Curriculum Vita: Kristine Lynn Brady

PERSONAL INFORMATION

Born: October 25, 1967
Birthplace: Mesa, Arizona

Business Address: Department of Psychology
Virginia Polytechnic Institute
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Blacksburg, Virginia 24061

Home Address: 904-A South Main
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EDUCATION

M.S., Clinical Psychology.
Virginia Polytechnic Institute and State University
Blacksburg, VA
Area of Specialization: Adult Clinical
M.S. awarded January 1993

B.A., Psychology.
University of California
Irvine, CA
Major: Psychology
B.A. awarded May 1989

HONORS/AFFILIATIONS

- American Psychological Association, Student Affiliate
- Division 12, Student Affiliate
- Division 12, section III, Student Affiliate
- Psychology Club President, 1988-1989, UCI, Irvine, CA
- Honors in Psychology, UCI, Irvine, CA

RELATED EXPERIENCE

Research

Research Assistant, Center for Research and Health Behavior,
VPI & SU. Blacksburg, VA
January 1993 - present

- Grant sponsored by the National Cancer Institute
- Recruiting and training of participants

Master's Thesis Development, VPI & SU. Blacksburg, VA
August 1991-1992

- Designed and conducted experiments on the effects of masculine gender role stress (MGRS), gender relevance and opponent gender on men in competition
- Trained research assistants, experimenters and confederates
- Multivariate statistical analyses using the Statistical Analysis System (SAS)

Research Assistant, National Institute of Mental Health,
Blacksburg, VA August 1990 - May 1991

- Administered and scored the Diagnostic Interview for Children and Adolescents (DICA) at St. Albans Psychiatric Hospital
- Attended two local/regional conferences on disturbance in serious emotionally disturbed children

Clinical

Clinical Practicum, Southwestern Virginia Mental Health Institute, Marion Virginia May 1992 - present

Supervisors: Jay Harper, Ph.D.
Richard Mears, Ph.D.
Trudy Teel, Psy.D.

- SWVMHI is a Joint Commission Accredited psychiatric inpatient hospital with 266 beds
- Worked on an acute admissions ward for 8 months
- Psychological assessment and evaluation of inpatients for diagnostic and treatment purposes
- Individual, group and family therapy
- Ongoing seminar in neuropsychological testing
- Ongoing seminars regarding medical issues in psychiatric populations
- Assistance in forensic evaluations including court ordered evaluations in the areas of competency to stand trial and mental status during the time of the offense
- Personality (projective and objective), intelligence and neuropsychological evaluations
- Development of behavioral modification treatment plans for individual clients

Clinical Practicum, Department of Psychology, VPI & SU, Blacksburg, VA September 1991 - May 1992

Supervisors: Russell Jones, Ph.D.
Robert Stephens, Ph.D.

- School visits and teacher conferences
 - ADHD testing and evaluations
 - family, individual and couples therapy
 - Co-family therapy with a licenced clinical psychologist
- Testing, Rosemead School of Professional Psychology
Rosemead, CA. May 1991 - August 1992
Supervisor: Thomas Brady, Ph.D.

- Psychological and intelligence testing for missionary applicants

Clinical Practicum, Department of Psychology, VPI & SU, Blacksburg, VA September 1990 - May 1991

Supervisors: Jack Finney, Ph.D.
Ross Greene, Ph.D.

- Co-therapy with two licenced clinical psychologists
- Child behavioral therapy
- Planned and lead parent training groups for ADHD/ADD children
- Family therapy

Teaching

Teaching Assistant, Department of Psychology, VPI & SU,
Blacksburg, VA August 1992 - Present

Professors: David Lombard, M.S.
Russell Jones, Ph.D.

- Guest lecture for Abnormal Psychology courses on a regular basis
- Test development and administration
- Responsible for holding review sessions for mid-term and final examinations

Laboratory Instructor, Department of Psychology, VPI & SU,
Blacksburg, VA January 1992 - June 1992

- Taught three laboratory sections for undergraduate Introductory Psychology course
- Developed and graded quizzes and essays

Laboratory Instructor, Department of Psychology, VP&SU,
Blacksburg, VA August 1991 - December 1991

- Taught one laboratory section for undergraduate Introductory Psychology course
- Developed and graded quizzes and essays

Teaching Assistant, Department of Statistics, VPI & SU,
Blacksburg, VA August 1991 - December 1991

Professor: Bob Schulman, Ph.D.

- organized computer help sessions for the computer statistical package, SAS

Signature: _____

Kristine Brady