

ABSTRACT

Title of Dissertation: MATURE HUMOR OR IMMATURE WIT?:  
THE INTERACTION EFFECTS OF LAUGHTER,  
HUMOR PRODUCTION, HUMOR APPRECIATION,  
AND DEFENSIVE COPING STRATEGIES ON  
EMOTIONAL AND PHYSICAL STRESS SYMPTOMS

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The purpose of this study was to investigate the use of humor and mirth in stress management by an adult population with the potential for high occupational stress. The primary objective was to test the efficacy of each of the humor components (laughter, humor appreciation, and humor production) in mediating the stress response while controlling for other coping strategies. Two new instruments were developed for use in this study; (1) the Emotional Coping Scale to assess laughter and humor production, (2) the Stress Mediators Inventory to measure mature coping and immature defense strategies.

Over 2,000 employees of the University of Maryland College Park campus were surveyed, using random probability sampling, stratifying by the 9 EEO occupational categories, such as administration and professionals. Questionnaires were dispersed through inter-campus mail. Results from the 754 returned questionnaires were analyzed with the appropriate

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multivariate techniques. Males, minorities, faculty, skilled crafts, service maintenance, and fellowship students were under-represented.

With these limitations in mind, results suggest: (1) men scored significantly higher than women on all three components of humor, as measured by this study; (2) humor appreciation and laughter, but not humor production were significantly related to emotional stress, while only laughter was related to physical stress symptoms, such that those with higher humor scores showed lower stress scores; (3) the type of humor response (self directed, other directed, or neutral) as compared to non-humorous responses was not consistently related to stress symptoms; (4) the interaction effect between humor variables and immature defense strategies for coping with stress did not significantly predict stress; (5) there appears to be a stress and coping profile that is significantly different for many of the 9 occupational groups, such that those with high demand and low control jobs show higher stress scores.

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AND DEFENSIVE COPING STRATEGIES ON EMOTIONAL AND  
PHYSICAL STRESS SYMPTOMS

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## Dedication

To my husband Bob, without whom there would have been no Ph.D. Who could have guessed that on that fateful night at the *Shamrock*, eleven years ago, when you delivered your "you can do so much more with your life" lecture, that it would change both of our lives forever.

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## CHAPTER ONE

### INTRODUCTION

#### Problem Statement

The purpose of this study was to investigate the use of humor and mirth in stress management by an adult population with the potential for high occupational burnout.

Specifically, the goals were 1) to explore the possible existence of gender differences for the 'sense of humor,' 2) to compare the effectiveness of humor appreciation, humor production, and laughter in predicting stress symptoms, 3) to compare the effectiveness of humor responses (hostile, self deprecation, or situational) with non-humorous responses (hostile or neutral) in predicting stress symptoms, 4) to examine the interaction of mirth and humor with other coping techniques in reducing stress-related disorders, and 5) to conduct a needs assessment for personalized stress interventions based upon occupational stress profiles.

#### Rationale

Due to profound changes in American society, workers often become disconnected and alienated from their families and communities, and increasingly insistent upon attaining personal gratification from their work. As a result, **work** may no longer be seen as the basis of satisfaction and fulfillment. More frequently it is a source of stress and discontentment. These trends have produced employees with

higher expectations of self-fulfillment and fewer resources to cope with frustrations, both in their professional and family roles (Manning, 1989). Personal frustration is growing and 'burnout' is an increasingly frequent condition of the white-collar labor force.

Burnout from occupational stress results in emotional exhaustion, interpersonal detachment, and perceptions of low individual accomplishment. The consequences both at work and at home are serious: lower job involvement, substandard work performance, alienation from co-workers and family members, alcohol dependence and substance abuse, on-the-job accidents, absenteeism, higher employee turnover, poor health, and greater probability of cardio-vascular disease (Frankenhauser & Gardell, 1976).

The most salient flaw in traditional research on work and organizations is the simplistic analysis of stress. Burnout results not from stress per se, but from **unmediated stress**. A more precise specification of stress is needed that examines personal coping responses which moderate the impact of both life and work stressors. Joking relationships in the workforce, for example, have been found to release tension among employees (Kotter, 1982; Shafer, 1980), convey social and organizational roles (Coser, 1959), help employees deal with novel situations, offer stability in the face of organizational change (Illian, 1976), and alleviate boredom (Roy, 1960).

Humor implies strength, maturity, superiority in the face of danger and calamity; it symbolizes victory and triumph over defeat. Through humor, individuals become psychologically detached from certain aspects of their immediate situations. This distancing protects them from potentially emotionally threatening situations, that is, humor can reduce the cognitive experience of debilitating, stressful stimuli (Dixon, 1980; Robinson, 1983). Allport (1937, 1961); Combs and Snygg (1959); Maslow (1961); O'Connell, 1960; and Rogers (1951, 1961) have acknowledged that well adjusted people have the best sense of humor.

The appreciation and creation of humor have been credited with many adaptive functions (Goldstein & McGhee, 1972; Ziv, 1984). Cognitive functions ascribed to humor center on the process of "pleasure in mastery," referring to enjoyment derived from successfully meeting the intellectual challenge involved in understanding or creating humor. Defensive functions concern the avoidance or alleviation of fears and anxiety. Social functions include the enhancement of interpersonal relations and group cohesiveness, power and social control, as well as the expression of sexual or aggressive feelings. The physiological function is arousal reduction or relaxation produced by laughter (McGhee, 1974).

Given the multiple adaptive functions attributed to humor, it is not surprising that a good 'sense of humor' is often theoretically associated with adjustment in terms of

maturity, health, or effective coping (Martin & Lefcourt, 1983). Even though there has been increased attention paid recently to humor, relatively few studies in the literature have directly investigated its stress-moderating effects. What is more surprising, is that many of the studies are contradictory and inconclusive. Making a case for humor as "the best medicine" is complicated by the inconsistency in measuring and comparing various aspects of humor.

First, research is needed to determine whether it is humor production, humor appreciation, laughter or their combined effects that control stress and anxiety. Results of several studies, for example, indicate that humor appreciation does not appear to moderate the effects of life stress (Nezu, et.al., 1988; and Safranek & Schill, 1982). In a comparison of humor appreciation and humor production, Martin & Lefcourt (1983) found that individuals must be able to use or produce humor in a stressful situation in order for humor to moderate stress symptoms. Laughter has been shown to reduce anxiety and anger (Robinson, 1983; Smith, 1973), yet no research has simultaneously compared the health benefits of all three humor components.

Second, empirical studies have been remiss in delineating the types of stressful stimuli associated with humor. Rothbart (1973) argues that arousal changes alone do not determine whether laughter or some other response occurs; rather, this depends on the evaluation of the

context surrounding the arousal. As long as arousal does not increase excessively, an evaluation of the situation as safe or inconsequential will lead to laughter. If arousal does get high, or the stimulus or context is judged to be threatening, laughter will be replaced by some other presumably negative emotional response, such as hostility or passivity.

Third, there is a controversy of what constitutes 'healthy' humor and laughter from both the psychological and physiological perspective. Robinson (1983) questions the healthiness of ridicule, sarcasm, black humor and sick jokes in relationship to hostility and denial of reality. She expresses fear regarding the abuse and destructiveness of humor and cruel laughter. Moody (1978) postulates that to be healthy, mirth must occur within the context of understanding, love, and support, and must include the object of the humor in the laughter. McGhee (1974) raised the issue that self- versus other-directed humor might be the distinction between mature humor and childish wit. Although the literature offers theoretical arguments about the beneficial effects of self-directed humor (Freud, 1905; Mindess, 1971), much of the empirical research points to the detrimental effect that such humor might have on adaptation and coping (Avneri, 1982; Coser, 1960; Zillman & Stocking, 1976).

Finally, the most blatant omission in humor and stress research has been the lack of control for other coping strategies used by the subjects during stressful situations. It is conceivable that the equivocal findings on the stress mediating effects of humor may result from an interaction between the sense of humor and other ego defenses. Bond and associates (1967) report that while humor loads with the other mature defenses in a factor analysis, it has the lowest eigenvalue, thus explaining the least amount of variance. This suggests that humor must operate in conjunction with other mature defenses in order to be truly effective and healthy. Humor's emotional distancing potential, for example, could exacerbate the consequences of avoidance strategies in an interpersonal conflict, or enhance the outcome of a healthy confrontation.

Should humor, in fact, play a significant role in managing stress and tension, it may not be the panacea that the popular press has made it out to be. In a study of college students, Carey (1989) found that women cope most effectively with a variety of strategies, such as diet and exercise, cognitive reappraisal, and problem solving. Men rely primarily on humor to deal with stress. Nevertheless, the variance in physical and mental stress symptoms accounted for by humor was very modest for either sex; between two and six percent. This suggests that the impact that humor has on mediating stress symptoms is minor

compared to other coping mechanisms.

In summary, there is a natural propensity for individuals to use humor and laughter when they find themselves in moderately stressful situations. The study of humor and stress is a complicated task, however. Current empirical data on humor and stress are difficult to interpret due to problems of conceptualizing and measuring these variables. Much remains to be identified in humor research. Specifically, this study attempted to answer the following questions: how do each of the components of humor--production, appreciation, and affect--function as adaptive mechanisms; how does the perception of the stressor as threatening or challenging influence the selection of humor as a coping technique; how does the object of humor production affect the producer and the target of humor; and finally, how might the use of other defense strategies compare or interact with humor in moderating stress?

### Hypotheses

Descriptive and inferential statistics were used to test the following hypotheses which deal with sense of humor and stress:

- [1] Men will report significantly higher scores than women on measures of the Laughter and Humor Production subscales of the Emotional Coping Scale (ECS), and the Meta-message Sensitivity subscale (appreciation) of the Sense of Humor Questionnaire (SHQ).

- [2] Laughter, humor production, and humor appreciation will be associated with reported stress symptoms, such that those with higher scores on Laughter, Humor Production, and Meta-message Sensitivity will show lower scores on the Multiple Affective Adjective Checklist (MAACL) and the Physical Stress Symptom Scale (PSSS).
- [3] The interaction between humor and immature defenses will be significantly associated with reported stress symptoms, such that:
- (a) those with higher scores on Laughter, Humor Production, and Meta-message Sensitivity (humor appreciation, and higher scores on Defenses will show increased scores on the MAACL and PSSS;
  - (b) those with higher scores on Laughter, Humor Production, and Meta-message Sensitivity (appreciation), and lower scores on Defenses will show decreased scores on the MAACL and PSSS.
- [4] Mature coping strategies will be associated with reported stress symptoms, such that those with higher scores on the Coping subscale of the Stress Mediators Inventory (SMI) will show lower scores on the MAACL and PSSS.
- [5] Immature defense strategies will be associated with reported stress symptoms, such that those with higher scores on the Defenses subscale of the SMI will show higher scores on the MAACL and PSSS.

[6] There will be significant differences in scores on measures of MAACL, PSSS, ECS, Laughter, Humor Production, Meta-message Sensitivity (appreciation), and Hassles Scale-abridged by occupation.

### Limitations

There are four limitations in this research design. First, the use of self-report, paper and pencil measures may be biased. People are sometimes unwilling or unable to remember, or to describe what they know, feel and do. There is also a typically low response rate (from 10 to 50%), associated with mailed questionnaires, even after a number of follow-up mailings. The large proportion who do not return questionnaires may be significantly different from those who do return them in ways that are central to the study. Third, the use of cross-sectional, rather than longitudinal data, does not permit the researcher to rule out threats to internal validity, such as history or regression to the mean. Finally, the lack of true experimental manipulation and control of the independent variables make causal analysis inconclusive.

### Definition of the Variables

**Coping Strategies** - (see Stress Mediators)

**Defense Strategies** - (see Stress Mediators)

**Humor (also Sense of Humor)** - is the ability to feel, appreciate, or understand humor; usually attributed to people in the conformist sense, which emphasizes the degree

to which a person agrees with most other people about what is considered humorous; the quantitative sense, which refers to how often a person laughs or smiles and how easily s/he is amused; and the productive sense which focuses on the extent to which the person tells funny stories and amuses other people (Eysneck, 1972). According to this definition, humor has the following three components:

**Humor Appreciation** - consists of two components, 1) comprehension, or the ability to accurately perceive humorous stimuli in one's environment, and 2) the enjoyment of humor and the humorous role (Svebak, 1974). Humor appreciation will be operationalized as a score on the Meta-message Sensitivity subscale (humor appreciation) of the Sense of Humor Questionnaire (Svebak, 1974), which assesses the ability to recognize humor in situations.

**Laughter** - occurs when a person smiles, exhales in short bursts of air, shakes slightly, and emits a sound. The use of this behavior as a coping strategy is assessed as a score on the Laughter subscale of the Emotional Coping Scale, (scale developed for this study), which measures one's perceived tendency to laugh in response to situation-bound arousal.

**Humor Production** - the active component of humor is assessed by the Humor Production subscale of the Emotional Coping Scale, (developed for this study).

**Stress** - is the non-specific result of any demand upon the body, whether mental or physical. Stress Symptoms are objective bodily and chemical indicators and/or subjective mental changes that appear after any demand (Selye, 1982).

**Mental symptoms** - are operationally defined as a scores on the hostility, anxiety, and depression subscales of the Multiple Affective Adjective Checklist, (Zuckerman, 1960).

**Physical symptoms** - are assessed as a score on the Physical Stress Symptom Scale (Allen & Hyde, 1983).

**Stress Mediators** - are either passive individual characteristics (e.g. personality), or active processes that influence stress. These effects to manage the environment, internal demands, and conflicts among demands can be divided into two categories; mature coping strategies and immature defense strategies (Haan, 1977).

**Mature Coping Strategies** - processes that represent reasonably accurate assessment of situation and self and reasonably accurate acts based on this information. These acts are presumed to be the normative and preferred way to deal with problems (Haan, 1977). Coping is operationalized as a score on the Mature Coping subscale of the Stress Mediator Inventory, (developed for this study). Items represent: relaxation, cognitive reappraisal, social support, diet and exercise, and problem-focused strategies (e.g. time management).

**Immature Defense Strategies** - acts used when coping attempts fail (Haan, 1977). Defenses are assessed by a score on the Defenses subscale of the Stress Mediator Inventory, (developed for this study). The item domain includes chemical dependencies, avoidance, and irrational beliefs.

**Stressors (also Arousal)** - are external events or conditions that affect the organism (Goldberger & Breznitz, 1982). These stimuli are generally characterized as daily hassles (Kanner, et.al., 1981) or major life events (Lazarus, 1981). Stressors will be measured as self-reported evaluations of various aspects in an individual's life, such as work, home, health, family, and recreation. Stressors are assessed by a score on the abridged version of the Hassles Scale (Kanner, et.al., 1981--see Chapter Three/Instrument Development and Validation for a description of how the scale was collapsed from 52 to 8 items).

CHAPTER TWO  
LITERATURE REVIEW

Preface

Dixon (1980) proposed that the capacity to enjoy humor is the outcome of a development of an alternative mechanism to the primitive adrenergic response to stress. It replaces the fight or flight response to stress because the individual can cope with the sources of stress by viewing them as stimuli with alternating meanings.

This research project is based upon the theory of Dixon, that humor is an effective coping mechanism in mediating the effects of stress. The following literature review first defines what is meant by coping and defenses and explains how humor and wit fit into this mature-immature distinction. Humor is defined by its three components-- production, appreciation, and laughter--and an integration of humor theories is presented. Finally, the research pertaining to humor and stress is reviewed and the methodological issues involved are discussed.

Coping With Stress

The term 'coping' broadly refers to efforts to manage the environment, internal demands and conflicts among demands (Lazarus, 1966, pg. 81). Coping affects health outcomes by influencing the frequency, intensity, and patterning of neuroendocrine stress responses. This may occur in two ways, by preventing stressful events from

control are not related to strain, whereas events perceived as uncontrollable have an adverse effect on functioning irrespective of whether or not they were anticipated (McFarlane et.al., 1980). Folkman and Lazarus (1980) note that individuals are more likely to employ defensive or emotion-focused coping in response to stressors that they appraise as uncontrollable.

Personality attributes of the individual are a second factor in individual differences. Constructs such as self-esteem, social competence, self-efficacy, sense of humor, and field dependence (Pearline & Schooler, 1978; Witkin et.al., 1971; and Wylie, 1979), locus of control (Johnson & Sarason, 1979; Lefcourt, et.al., 1981; Sandler & Lakey, 1982) and the multifaceted personality style called hardiness (Kobasa, 1979; Kobasa, et.al., 1982; Kobasa, et.al., 1985) are also examples of dispositional moderators of the stress response.

Finally, individual patterns of coping responses are recruited to manage the resulting level of arousal (Chan, 1977). It is the combination and/or interaction of implementing several strategies that determines the intensity and duration of the physical stress response. For instance, humor in the short run reduces anxiety. In the long run, it may constitute an avoidance of problems and solutions which then negate the positive effects seen in the short term (Labbott & Martin 1987).

Sigmund Freud (1915) referred to our efforts to manage the environment and cope with arousal as defense mechanisms. Immature defenses, such as projection and passive aggressive behavior serve to deny the occurrence of threat and transfer responsibility. Alternatively, the mature defenses of sublimation, altruism, suppression, and humor recognize the threat but control the pain until the threat can be dealt with. Defenses are dynamic and reversible. Individuals generally move from immature to mature during the lifespan, yet under increased stress, mature mechanisms may revert to those that are less adaptive (Vaillant, 1977).

#### Wit and Humor as a Defense Mechanisms

There are many kinds of humor--comic, nonsense, burlesque, farce, satire, irony, wit, a joke, a pun, or an epigram. The different types of humor have differential functions in sending communications and facilitating relationships. They can establish control or autonomy, intimacy or distance, and make for group cohesion, disunity, or disbandment (Long & Graesser, 1988; and Siporin, 1984). Humorous expressions are ways to relax and fantasize; to entertain and be entertained; to be playful, regressive, and creative; to appreciate incongruity, absurdity, and paradox; and to bear with and reconcile ourselves to the contradictions and polarities of the good and bad.

Humor helps us express affection, defiance, or hostility in nonaggressive ways. It relieves anxiety,

embarrassment, tension, and conflict, and also protects and helps us recover from pain, disaster, or despair (Siporin, 1984). In therapy, humor is credited with enabling emotional catharsis, creating an atmosphere of closeness and equality, developing a sense of realistic proportions, and confronting hidden internal processes (Gruner, 1989).

Chafe (1987) claims that humor's basic evolutionary, adaptive function is a disabling one. The humor state arises in us in the first instance in order to keep us from doing things that would be counterproductive. "The things it keeps us from doing are things that our natural, schema-based human reasoning might lead us into, but which, given the larger reality of a particular situation, would be undesirable, bad, or sometimes even disastrous" (pg. 126). In essence, the humor state is one in which we are, quite simply, disabled. While you are laughing, you cannot do anything else. Physiologically it incapacitates, and psychologically it diverts attention to itself so that all else is forgotten or ignored.

Persons with a positive self-concept use humor effectively during stressful periods (Goldsmith, 1979). The degree of humor appreciation consistently correlates positively with psychological maturity, and negatively with restrictive life styles (O'Connell, 1970). For this reason, humor is a good indicator of change in psychiatric patients over time. Harrelson and Stroud (1957) report that hostile,

distance-maintaining humor responses in earlier psychiatric sessions are replaced by healthier, warmer, more person involved, and spontaneous humor in later sessions.

Humor is a social activity that alters the status of the humorist positively and that of the object or victim negatively. Affiliative humor is focused on creating or maintaining group cohesiveness, with the identity of the victim more or less incidental (Alexander, 1986). Alternatively, wit that is other-directed disparages, belittles, debases, demeans, humiliates, or otherwise victimizes (Zillmann, 1983). Ostracizing humor singles out a victim. Others may be present or absent, either incidental affiliates of the humorist or unaffected (Alexander, 1986).

Freud regarded humor as a higher order adaptive mechanism, the epitome of maturity. It can never be applied without some element of an observing ego, and it never excludes other people (Vaillant, 1977). The comic spirit that enables us to laugh is a basic necessity for personal growth and for optimal social functioning. The ability to enjoy what is funny and to laugh at ourselves are signs of personal adjustment and self-esteem, of individuation, and of being human (Clabby, 1980; Grotjahn, 1970; and Siporin, 1984). Mindess (1971) and O'Connell (1977) emphasized the liberating qualities of humor as it mitigates feelings of inferiority. Such humor requires a self-respecting modesty

based on underlying self strength and simultaneous recognition of and regard for others (Polland, 1990).

Wit, on the other hand, was viewed by Freud mainly as a regressive mechanism providing circuitous release for sadistic and sexual urges (O'Connell, 1976). In contrast to humor, wit always involves distraction. Emotional affect is displaced or concealed (Vaillant, 1977). Gratification is made possible because the censor is deceived temporarily by the humorous camouflage (Byrne, 1958).

Feinberg (1978) argues that all humor has some element of aggression present ranging from mild satisfaction of twisting a word out of shape to the malicious pleasure of watching a humiliating practical joke. He equates superiority humor with aggression. This hostility may be seen directly in the joke or the hostility must be clearly implied against some one or some group suggested by the joke. According to Young and Frye (1966), wit jokes have a quality of being insulting, mordant, and morose.

The mature sense of humor is a capacity for sympathetic laughter at oneself and one's place in the world. Allport articulated that, "so many tangles in life are ultimately hopeless that we have no appropriate sword other than laughter. I venture to say that no person is in good health unless he can laugh at himself quietly and privately" (1968, pg. 93). Others, however, postulate that self humor is inferior in coping (Bizi et.al., 1988). Allport (1954), for

example, argues that "one who can laugh at oneself is unlikely to feel greatly superior to others."

What a person laughs at and how they laugh presumably provide significantly revealing clues about them. For example, individuals with higher levels of anxiety, depression, and hostility generally rate humor with other as the referent funnier than those with self as the referent (Redlich, et.al., 1951; Scogin & Merbaum, 1983; and Starer, 1961). Scogin & Merbaum (1983) speculate these individuals are threatened by humor that involves a self identification. This humor potentially hits too close to their own feelings of vulnerability.

Clearly, what distinguishes mature humor from childish wit is the target of the humor; this is self versus others. Martin Grotjahn (1970) states that humor develops in stages which run parallel to the other stages of child development; the final stage being the ability to laugh at the self. This requires a recognition of our own contradictions and mastery of the relationship with the self. It presupposes a high degree of maturity, an ability to stand apart from ourselves, to observe our own antics and to understand ourselves better. Ironically, in adults more humor is directed at others, followed by self-deprecating humor, and then generalized targets depending on the situation (Pollio, 1988).

## Humor Components--Production, Appreciation and Laughter

Eysneck (1972) describes the sense of humor as the ability to feel, appreciate, or understand humor. A person may be attributed with a sense of humor one of three ways. The first is in the productive sense, which focuses on the extent to which the person tells funny stories and amuses other people. The second is in the conformist sense, which emphasizes the degree to which a person agrees with most other people about what is considered humorous. This passive form of humor is often referred to as humor comprehension and/or appreciation. The third is the quantitative sense, which refers to how often a person laughs or smiles and how easily they are amused. Another name for this affective component of humor is mirth. Each of these components is discussed in detail below.

First, the active component of humor is creation. Humor production denotes the ability to bring neutral stimuli or situations into a new, funny context (Helh & Ruch, 1985). Humor creation can be further divided into two types--production and reproduction, the former typified by the inventor of funny instances and the latter by the joke teller (Babad, 1974). Humor production is usually assessed by confronting subject's with incomplete jokes or cartoons without captions and giving them the task of producing funny endings. Sociometric methods and questionnaires are used less frequently to assess the ability to create humor

(Babad, 1974; Ziv, 1984).

All humans are capable of producing humor. When subjects of Nevo and Nevo's (1983) study were asked to respond to captionless cartoons with a humorous remark, no one said they could or would not be able to respond with humor. They could not specify any rules on how they did it, yet most of the subjects answered with more aggression and sex from the point of view of content, and with more presentations by the opposite, displacements, plays on words, and absurdities from the point of view of technique. These findings reinforce the psychoanalytic point of view, which consists primarily of the sublimation of such socially unacceptable drives as aggression and sex. That is to say, hostile and sexual impulses are being discharged under the socially acceptable cover of a joke.

Second, the more passive aspects of humor are comprehension and appreciation. They refer to an individual's susceptibility to experience amusement, mirth and cheerfulness in the presence of humorous stimuli and situations. Usually subjects rate jokes or cartoons presented to them according to their 'funniness' or similar criteria as a measure of humor appreciation (Helh & Ruch, 1985).

What kinds of people like what kinds of jokes? In the area of content, Hassett and Houlihan (1979) report that sexual humor is the most popular category. Ethnic jokes was

the second most popular category, scoring higher than jokes based on hostility, wordplay, or just plain silliness. With regard to humor structure, Ziv (1984) has hypothesized that people with different personalities may prefer different types of humor. The emotional extroverts who appear touchy, restless, angry, or aggressive would probably find aggressive humor most funny. The easygoing, stable extroverts who display sanguine behaviors would probably laugh most heartily at interpersonal jokes. The controlled, inhibited stable introverts would be most likely to get a laugh from intellectual humor. The moody and unsociable emotional introverts would appear to derive less enjoyment from humor than any of the other types.

Several studies support Ziv's personality theory of humor appreciation. General appreciation appears to be closely associated with sensation-seeking (Ruch, 1988). Conservatism, or generalized fear of uncertainty is predictive for the funniness rating of incongruity-resolution humor and the rejection rating of the nonsense jokes (Wilson, 1973). Finally, while Type A's and B's do not differ in their appreciation of hostile humor, Type B's give significantly higher funniness ratings to non-hostile humor than Type A's (Friedman & Rosenman, 1974).

Socialization of the sexes may influence humor preferences as well. Females appreciate self-disparaging nonsense humor more than do males (O'Connell 1960; Zillmann

& Stocking, 1976). Males, more than females appreciate hostile, enemy-disparaging humor. Females assign significantly higher ratings to salient jokes than males, and males showed a clear preference for taboo humor, whereas females rated taboo and salient jokes equally (Gavanski, 1986).

Third, the expressive component of humor refers to differences in quality and quantity of reactions to humorous stimuli, that is a smile, laughter, body movements, facial response (Helh & Ruch, 1985; Littmann, 1983; and Monro, 1963). A true definition of laughter may be impractical. It is the outcome of such a variety of different causes, that it is doubtful whether a common basis can be found for them all (Ludovici, 1974). Laughter is a context-dependent phenomenon; what we laugh at, and even if we laugh, depends on the situation in which laughter occurs (Chapman & Foot, 1977; and Pollio, 1988). This may be due to the need for heightened arousal and tension while at the same time there is a judgment that the situation is safe or inconsequential (Rothbart, 1973).

The reaction to humor can differ depending on the degree to which different systems are involved. Investigators studying the relationship between arousal and humor have clearly shown that laughter is associated with increased activity of the sympathetic nervous system, heart rate, skin conductance and muscle tension, altered

respiratory patterns, and characteristic EEG changes (Averill, 1969; Fry, 1979; Godkewitsch, 1976; Goldstein et.al., 1989; Langevin & Day, 1972; Levi, 1965; and McGhee, 1983).

Physiologically, laughter is credited with enhancing the immune system (Cousins, 1979; and Dillon, et.al., 1985), healing and pain-killing properties (Cogan et.al., 1985; and Dillon & Totten, 1989), and a calming effect (White, 1982). Fry and Stoft (1971) and Fry (1977, 1979) found that the effects of laughter are comparable to those of physical exercise, however, other non-humorous procedures such as medications, relaxation, meditation, exercise, contingency management, diet, systematic desensitization, and power gratification can also achieve the same results as well as or better.

Socially, laughter is credited with arousal reduction. Chapman (1975a, 1975b), suggests that humorous laughter is instigated to alleviate an individual's arousal when it reaches uncomfortable proportions in everyday encounters. In any two-person interaction a ceiling level of intimacy is gradually attained but the parties involved occasionally fall out of synchrony. One person may begin to promote intimacy rather more swiftly than the other finds comfortable. The injection of humor into the conversation allows the other person to rapidly diminish his or her discomfort by laughing (Patterson, 1976).

Previous research indicates that responsiveness to humor is both adaptive and reinforcing (Bowlby, 1965; Mahler, 1961; and Piaget, 1950). Smiling and laughter act as interpersonal mechanisms which evoke positive responses in others (Davis, & Farina, 1970; and Fine, 1977). One's ability to elicit desired responses from others is important in fostering a sense of personal effectiveness in the interpersonal realm (Lefcourt et.al., 1974; and Piaget, 1950).

Jesting and laughter together could be a functional response to anxiety. Clinical observations have supported the view that the humor responsible for reducing anxiety is generally initiated by the anxious individual (Ryback, 1983). Bizi and associates (1988) also found active production, more than passive humor appreciation, to be associated with effective performance under stressful conditions.

On the other hand, if the humor were initiated by an external source and seen as directed toward the individual, high anxiety may cause such a person to perceive the humor as threatening or ridiculing, inappropriate and incompatible with their present emotional state. It is not surprising then to find that people who are asked about humor enjoyment, prefer non-aggressive humor, whereas, people who are asked to create humor use more aggression and sex in the answers than any other theme (Nevo & Nevo, 1983; and Scogin

& Merbaum, 1983).

### An Integration of Humor Theories

There are a number of humor theories which stress emotional and motivational components; humor as sudden glory which comes from feeling superior to someone, humor as relief from empathic suffering, humor as vicarious enjoyment of sex and aggression, humor as relief from other emotional tension, and so on (Flugel, 1954). Collectively, these Psychodynamic theories contend that humor is a relief phenomenon that occurs when an increase in arousal or tension has been dispelled (Berlyne, 1967, 1969; Rothbart, 1973). That is, arousal is the motivating force behind the appreciation of humor (Lefcourt, et.al., 1974).

A number of studies support the arousal reduction theory (eg. Pinderhughes & Zigler, 1985; Prerost, 1977; Shultz & Zigler, 1970; and Stokols, et.al., 1973), while others have not been as successful in confirming the relief theory of humor (Berkowitz, 1970; Leak, 1974; and Ziv, 1988). There are several possible explanations for these equivocal findings. First, laughter was not controlled for in any of the research. The question is raised whether the arousal reduction is from the mind set, as Freud suggests, or from the release of tension through physical exertion. Chapman (1975a) has suggested that humor, in triggering laughter, can ameliorate excessive socially induced arousal and alleviate some forms of motivational arousal in a

socially acceptable manner (Stokols, et.al., 1973).

Alternatively, Byrne (1958) suggests that subjects in drive-arousing situations are spontaneously prone to make jokes, giggle at the remarks of others, etc. (humor production). This reaction may not carry over to the more artificial task of rating cartoons in the experimental environment (humor appreciation). Another explanation for the failure of empirical data to support the relief theory may be that strong laughter actually adds to humor-induced arousal before eventually reducing it (Chapman & Foot, 1976; Godkewitsch, 1976; and Langevin & Day, 1972).

Goldstein and associates (1989) argue against Freud's view that repressed impulses find relief in a disguised form in jokes. Instead, they speculate that salience of certain themes leads to enhanced attention to these themes, to a better availability of the information necessary to understand the joke, and finally to enhanced funniness of jokes with these themes. There is limited support for the salience theory (Prerost & Brewer, 1977; and Shurcliff, 1984), however.

Finally, it is probable that humor exerts its effects at least partly by modifying cognitive mediational processes. Smith (1973) demonstrates that arousal changes alone do not determine whether laughter or some other response occurs, rather this depends on the evaluation of the context surrounding the arousal. As long as arousal

does not increase excessively, an evaluation of the situation as safe or inconsequential will lead to laughter (Rothbart, 1973).

This brings us to the second, most popular group of humor theories. Incongruity, superiority, or cognitive theories focus on this cognitive evaluation of the arousing stimulus. Koestler (1964) describes cognitive humor as occurring when two previously unrelated constructs converge upon some single element; the consequence of which he termed bisociation. The mirthful response resulting from bisociation is said to reflect a sense of pride or superiority born of contrast with others' or one's own recent state of ignorance or naivete--one now 'laughs down' at or draws away from his prior involvement and seriousness. Mirth responses and funniness ratings increase as comprehension increases (Pinderhughes & Zigler, 1985).

Researchers agree that all stimuli we consider funny have incongruent elements. Incongruity is defined as a conflict between what is expected and what actually occurs in a joke (Shultz, 1976). Some investigators (Nerhardt, 1976; and Rothbart, 1973) postulate that incongruity alone is sufficient to produce humor. Others claim that the incongruity also has to be solved in order to understand or get the joke (Shultz 1972; and Suls 1972).

To achieve a second, non-serious perspective about a serious subject, without discarding the first viewpoint, is

to acquire a new relationship to the subject matter (Littmann, 1983; and Young & Frye, 1966). If a person's initial arousal to a stimulus is very high, the response is likely to be avoidance, while if the arousal is only moderate, curiosity and attempts at problem solving or exploration may follow rather than laughter. It is only when a relatively arousing stimulus is judged to be not dangerous or challenging that laughter results and that laughter achieves the function of dissipating tension (Gavanski, 1986; Laffal, et.al., 1953; and Rothbart, 1973).

Deckers and associates (1977) claim that the laughter that resulted in an experiment that varied subjects' expectancy about the heaviness of the final weight after progressively larger and heavier weights were handled, supports incongruity theory. In other words, laughter occurred because the lightness of the weight was incongruous with the expectation of a heavy weight. An explanation from the arousal standpoint is that expectancy, itself, is arousal and the discrepancy (non-threatening) would permit relief through laughter. Which theory is correct?

Schachter (1967) presents impressive evidence that emotional states consist of two major components: physiological arousal and socially determined cognitions. On the basis of research in which arousal of the sympathetic nervous system was induced by injections of epinephrine, Schachter concludes, "precisely the same physiological

state... can be manifested as anger, euphoria, amusement, fear, or... no emotion at all," (1967, pg. 124). Such results are virtually incomprehensible unless we specify the fashion in which cognitive and physiological factors interact.

In their study of cognitive and physiological determinants of emotional states, Schachter and Singer (1962) demonstrate that cognitive processes play a major role in the development of emotional states. Given a common state of physical arousal produced by injection of sympathomimetic amine or epinephrine, subjects can be induced readily into states of euphoria or of anger by means of cognitive manipulations. To what extent the state of physical arousal is a necessary component of emotional experience is not completely clear. This study supports the theory that formulation of emotion is a function of a state of physical arousal and of an appropriate cognition.

To summarize, there are two major theories of humor; Freudian arousal-reduction, and cognitive incongruity. The results of psychoanalytic research may be equivocal for several reasons. For instance, while it is humor appreciation that is usually tested, arousal reduction could be the result of laughter or humor production. Nevertheless, the cognitive aspect of humor can not be ignored. Humor, like other emotions, consists both of physical arousal and cognitive appraisals.

## Humor and Stress

In antiquity, humor referred to the four fluids in man's psychology. A balanced or proper proportion of these bodily liquids was considered necessary to one being in good humor. Contrarily, one was thought not to be himself, or out of humor when the fluids were disproportionate. To the present, this implicit association between humor and mental health has persisted (Banmen, 1982).

Unfortunately, the premier investigation in this area was not encouraging. Safranek and Schill (1982) found that neither humor use (subject's reports of how often and how hard they tried to be funny in various situations) nor humor appreciation (subjects' ratings of the funniness of a variety of jokes) moderated the relationship between stressful life events and either depression, state anxiety, or trait anxiety.

Later, Martin and Lefcourt (1983) reported three studies indicating that humor does moderate the impact of stressful life events on mood. In Study 1, sense of humor was measured by four self-report scales, of which scores on three of the humor scales interacted with stressful life events scores in predicting mood disturbance. As hypothesized, correlations between life stress and mood disturbance were significantly greater in low-humor subjects than in high-humor subjects.

Martin and Lefcourt's (1983) other studies replicated

these findings using behavioral measures of subjects' humor production. In Study 2, subjects had to produce an impromptu humorous monologue using a collection of common objects, such as an old shoe or a cracked coffee mug; and in Study 3, subjects were asked to ad lib a funny narrative while watching a stressful film. The humor scores derived from subjects' performances in both of these situations also moderated correlations between life stress and mood disturbance measures. Although their studies are compelling, each involved multiple regression analysis of data from small samples ( $n$ 's = 56, 62, and 25 for Studies 1, 2, and 3, respectively, with Study 3 subjects' being a subsample of Study 1).

Porterfield (1987) attempted to replicate Martin and Lefcourt's findings. Negative life events were significantly related to depression in his study, however, there was no evidence that sense of humor moderated that relationship. Instead, subjects with higher humor scores reported significantly less depression than did those with lower scores regardless of their life stress levels. This finding suggests that sense of humor mitigates depression directly, rather than by assisting individuals to cope with stressful life events.

Additional research is reported which examined the effect of subliminal stimuli on subjectively rated anxiety (Robles, et.al., 1987). Threatening images, neutral images,

and humorous images were embedded in three separate videotapes, and were shown to subjects at exposure times that precluded recognition of the images. Self-rated state anxiety assessed immediately afterward was highest among subjects exposed to the threatening images, lower in the group exposed to the neutral images, and lowest in the group exposed to the humorous images. No effect was seen on trait anxiety.

Other studies using Martin and Lefcourt's Coping Humor scale show mixed results. Duncan and Feisal (1979) showed that coping humor, internal locus of control, and irrational beliefs had no significant effect on moderating the relationship between stress and stressors. However, Lobbott and Martin (1987) report that correlations of negative events and mood disturbance were significantly smaller for individuals high in coping humor than for those low in coping humor. In another investigation (McCrae, 1984), the use of humor diaries showed that moods were correlated with humor incidents and overt laughter; humor and laughter are positively related to elation ( $r=.30$  and  $.29$  respectively), surgency ( $r's= .39$  &  $.41$ ), vigor ( $r's=.18$  &  $.18$ ) and negatively related to anxiety ( $r's=-.60$  &  $-.67$ ), fatigue ( $r's=-.24$  &  $-.27$ ), hostility ( $r's=-.32$  &  $-.28$ ), and concentration ( $r's=-.45$  &  $-.49$ ).

Finally, physical measures of stress effects show consistent support for a humor mediating effect. Dillon,

Minchoff, and Baker (1985) found that salivary immunoglobulin A (S-IgA), which defends the body against viral upper respiratory infections (URI), increased significantly after subjects viewed a humorous videotape, but not after they viewed a non-humorous control tape. Although this increase was short lived, subjects' scores on the Coping Humor Scale correlated .77 with S-IgA concentrations prior to viewing the humorous tape. The higher the Coping Humor score, however, the less there was a change in S-IgA levels after viewing the humorous video (correlation of Coping Humor with pre-tape to post-tape change in S-IgA = -.65). These potent correlations suggest both that there is a ceiling in S-IgA concentrations, and that high-humor subjects are initially nearer that ceiling than are low-humor subjects.

Dillon and Totten (1989) also found that coping humor in mothers is inversely related to URI incidence in their infants and higher IgA levels in the saliva and breast milk of mothers. Mothers who used humor were more likely to be older, and have a higher level of hardiness. Given the evidence that human immunologic competence can be compromised by stress (Jemmott & Locke, 1984), the data from these two studies suggest that maintaining a humorous outlook may protect the immune system from stress shock or help restore it when damage has been done. If so, the linkage between stressful life events and physical

symptomatology should be weaker in high-humor than in low-humor individuals.

Current empirical investigations provide only weak support for the use of humor to reduce the affective and physical effects of stress. In addition, it is impossible to conclude from prior data which of the humor components (laughter, appreciation, or production) is responsible for reducing the mood disturbances or for enhancing the immune system. Therefore, the studies that did not find a stress-moderating effect for humor may have measured the wrong humor component, or disregarded the salience of the humorous stimuli.

#### Methodological Issues Related to Humor

Although in the past 10 years or so the upsurge of interest and activity in humor research has gained increasing momentum, it remains the case that remarkably little is known about humor's functions in everyday interactions. One reason is that, by and large, humor studies have not been sufficiently exhaustive in the measures and procedures adopted. A second reason is that nearly all researchers have confined themselves to studying responses to humor stimuli that they themselves have selected and arranged. Consequently, research has been too insensitive, truncated, and even asocial with regard to the total domain of the humor response.

Humor loses much of its character when placed under

insensitive laboratory scrutiny (McGhee & Goldstein, 1983). Reading a joke and responding to a questionnaire, for example, is not the same as hearing the joke in a work or social setting. How people state they would react to a written joke may not be the same as hearing the joke in a non-experimental setting (Smeltzer & Leap, 1988).

The presence of experimenters with different types of personalities has been shown to affect the smiling and laughter of subjects (McGhee & Goldstein, 1983). The knowledge of being observed also may influence affective expression (Osborne & Chapman, 1977). Children who did not know that they were being observed, laughed four times as much as controls, but smiled only 60% as much.

The overt disregard for the target and audience of humor production results in an incomplete analysis from the standpoint of an interactionist. The effect of our behaviors on others has indirect consequences on our own experience of stress. Hostile humor, for instance, can alienate the target and/or audience, thereby reducing the potential for social support.

The paper-and-pencil tests of humor developed thus far are inadequate for researching humor for several reasons. First, they focus on various types of humor content; for example, aggressive, sexual, or nonsense, rather than measuring a generalized propensity toward humor regardless of the type of humor involved (Martin & Lefcourt, 1983). In

addition to content, there is a lack of comparability with regard to humor structure. For instance, how do we know that the sex jokes used in a certain study are comparable to the sex jokes used in another study? The importance of the structure component in humor, such as jokes, puns, or cartoons, turns out to be quite high; it roughly contributes half as much to the variance of rated funniness scores as does content (Ruch and Hehl, 1986). Finally, such measures are concerned primarily with self-reported humor appreciation rather than the daily production of humor (Martin & Lefcourt, 1983).

Second, humor is socially desirable and there is a tendency to over-rate oneself in having a sense of humor, and the traits that contribute to or predispose one to an appreciation of humor. Omwake (1939) found that approximately 1.4 per cent of adults, in general, will rate themselves below average on humor, while 25% rate themselves in the highest category--very superior (Omwake, 1939).

There is evidence that self-reports of humor actually reflect more of humor appreciation, while the sociometric method of measurement (peer ratings) represent humor production (Bizi et.al., 1988; and Fine, 1975). College students were asked to rate themselves and their same-sex best friend on sense of humor, a regression analysis showed that the major determinant of one's own sense of humor is the quality of the jokes which one appreciates. The major

determinant of the sense of humor of one's best friend is the quality of jokes that he or she produces (Fine, 1975).

Yet another serious problem remains in the measurement of sense of humor. Many researchers have argued that mirth responses are a less reliable and valid measure of the humor response than are funniness ratings (e.g. Berlyne, 1969; Chapman 1976; and Sheehy-Skeffington, 1977), and consequently, less than 15% of studies have used mirth responses as a dependent variable. However, verbal ratings of humor stimuli on a funniness scale and behavioral mirth responses (smiling and laughing), often vary relatively independently of each other (Leventhal & Cupchick, 1975; Leventhal & Mace, 1970; and Young & Frye, 1966). Cassell (1974) concludes that most humor scales in their present form are mainly a measure of humor evaluation, whereas smiling and laughing are mainly measures of humor appreciation. His findings underscore the importance of including both measures in humor research.

Finally, sex differences in responses to humor generally have been ignored. Not controlling for gender differences, may be a significant factor for inconsistent findings in humor research (Borges, et.al., 1980; Decker, 1983; Ingrando, 1980; and Wilson & Molleston, 1981). There is strong evidence that gender differences do exist. Research shows, for example, that children as young as seven years of age regard joke-telling as something of a male

prerogative. In the company of an experimenter males often seem to compete with each other to respond first, to respond most, and to respond most effusively (McGhee & Goldstein, 1983). While there appears to be no biological data or a priori reasons for the value of humor to be sex-linked, it appears that early social conditioning may establish stereotypical, male-oriented humor values that show up during the late high-school years (Wilson & Molleston, 1981). However, the college experience may be responsible for neutralizing this male-oriented stereotype, resulting in a more androgynous role-attitude toward humor related behavior (Vitulli & Tyler, 1988).

Several questions of methodology have been raised regarding humor research. Humor is fragile and does not retain its normal characteristics in the experimental situation. Existing written instruments focus too much on humor evaluation, not enough on sense on humor as a personality variable or coping strategy, and never are all three humor components examined together.

### Conclusion

Individual patterns of coping responses are recruited to manage arousal. It is the combination and/or interaction of several coping strategies that determines the intensity and duration of the physical stress response. Theoretically, the sense of humor is seen as an important coping or adaptive function. The ability to enjoy what is

funny and laugh at ourselves are signs of mature humor, and therefore should be able to mediate the stress response. The three factors that characterize the sense of humor are the active production of humor, the passive appreciation of humor, and the affective expression of humor. Of these three elements, it is humor production and laughter which are credited with reducing stressful arousal. There must be heightened arousal and tension, along with a judgment that the stimulus is safe in order for humor to occur.

The theories of humor are basically two; Psychoanalytic and cognitive. The research in support of these two theories and research in support of the stress-mediating effect of humor have shown mixed results. Further research is needed which addresses the methodological flaws of prior studies. This would include developing instruments that incorporate the three aspects of humor, and that identify the target of humor. In addition, the literature suggests that humor interacts with the use of other defenses. This important hypothesis has been omitted in the past. Consequently, the purpose of this investigation is to test these theoretically-derived notions of the stress mediating effects of humor by placing an increased emphasis on the type of humorous responses, and the situations in which they occur.

## CHAPTER THREE

### METHODOLOGY

#### Description of the Population

The research design used in this study required a large population sample in order to analyze the relationships of nearly 25 variables. In addition, the participants should have been experiencing similar group-related stressors, so as to identify and compare the usefulness of different coping patterns. The University of Maryland at College Park (UMCP) personnel conveniently met both of these criterion. Although faculty differ from staff on levels or types of stressors, most all employees at the University were feeling the strain of state budget cutbacks, which included longer hours, increased duties and responsibilities, paycuts, furloughs, and layoffs.

The nearly 9,000 full- and part-time employees of UMCP were divided into eight Equal Employment Opportunity (E.E.O.) occupational categories for the 1991-1992 academic year. Surprisingly, nearly one-third of the population was comprised of Graduate Assistants (31%), closely followed by Faculty at 27%. Next in size were the Secretarial/clerical personnel (14%) and Professionals, such as physicians and police officers (12%), while the remaining employment categories of Administrative, Technical, Skilled Crafts, and Service/maintenance were somewhat evenly distributed from 3-5%. Two-thirds of the staff were employed full-time (37%

part-time), and slightly more than half were male (43% female). A majority of employees were White (68%), 17% were Foreign, 12% were Black, and the remaining 5% were Asian, Hispanic, or Indian (Office of Institutional Studies, UMCP, Oct. 29, 1991).

#### Procedural Outline

The estimated sample size needed for regression of 24 variables using an .05 alpha, an 'effect size' of 25% of a standard deviation, and power of 99% (to assure that a Type II error will not occur) was between 625-775 (Cohen, 1969). Anticipating a response rate of approximately 35%, the total sample was set at 2000. A stratified random sampling design was used, in which 250 subjects were drawn randomly from each of the E.E.O. occupational categories. The disproportional sampling of the academic population was done for two reasons. First, by over-representing the less educated blue- and pink-collar workers, the sample would have greater external validity for this segment which has been under-studied. Second, the Office of Personnel Services at the UMCP was interested in using the data from this study as a needs assessment for future educational protocols on stress management. Professional stress profiles can not be identified accurately without a sufficient number of cases in each occupational group.

Data collection took place after the pilot study results were analyzed and final questionnaire revisions were

made. The office of Personnel Services obtained the mailing labels for the sample. Survey questionnaires, along with cover letters and return envelopes were sent through inter-campus mail to the subjects. (The use of inter-campus mail eliminated the cost of postage.) The cover letter stated the general purpose of the study, and assured confidentiality (see Appendix A). It emphasized the need for information that would enable the University to plan better intervention programs for dealing with the problems of occupational stress resulting from the economic recession and financial cutbacks at UMCP.

Each questionnaire was coded with a number corresponding to a number on the master list of the sample. In this way, returned questionnaires could be matched to the original mailing list and checked off as they were received. The responders could be compared to non-responders in order to determine if they differed significantly as a group on the basis of gender and/or occupation.

A follow-up letter was sent two weeks later, urging non-responders to complete the questionnaire (see Appendix B). As an incentive for participation, all interested subjects could receive their personal survey results, along with normative data, interpretation of that data, suggestions for improving coping strategies based upon their stress and coping profile, and who to contact for answers to questions about the results.

## Instrument Development and Validation

The selection of standardized measurements for the dependent variables in this study was relatively straightforward. However, available instruments for two of the more complex independent variables, sense of humor and coping strategies, were inadequate to answer the research questions presented in this study. It was necessary, therefore, to develop two new instruments, following the guidelines outlined by Benson and Clark (1982)--flowchart in Figure 1.

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<u>Phase I--Planning</u>	<u>Phase II--Construction</u>
(1) State Purpose of Test and Target Groups Identify and Define Domain of Test	(4) Develop Table of Specifications Hire and Train Item Writers
(2) Review Literature	Write Pool Items
(3) Write Objectives Select Item Format	(5) Qualitative Content Validations by Judges
	(6) Develop Revised Items
<u>Phase III--Quantitative Evaluation</u>	<u>Phase IV--Validation</u>
(7) First Pilot Study Administration	(10) Second Pilot Study Administration
(8) Run Item Analysis	(11) Repeat Steps 9-10
(9) Revise Instrument	(12) Begin Validation

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Figure 1

These phases are elaborated below for each of the two variables.

### **Emotional Coping Scale**

**Phase I**--Lefcourt and Martin (1983) define sense of humor as the ability to perceive, appreciate, or express what is funny, amusing, or ludicrous. It represents a higher order cognitive-emotional process. Review of the literature reveals that humor production can be targeted at others in a hostile nature, directed inward in a self-deprecating

manner, or neutrally targeted at the situation. In addition, the method or structure of delivery varies from jokes, stories and witty remarks to slapstick, clowning and teasing. Studies in which subjects recorded all humorous incidents for an entire day report that most frequent were incidents classified as spontaneous interpersonal humor (Graeven & Morris, 1975; Mannell & McMahon, 1983).

The objectives, therefore, of a quantitative measure of humor would be threefold: first, to contain elements of laughter, appreciation, and production; second, to identify the object of the humorous production; and third, to control for delivery method of the humorous production. One format that would incorporate interpersonal humor, while meeting the objectives for humor production and laughter is to describe hypothetical situations that are conducive to humor. The examinee is then asked how s/he would most likely react (smile, laugh, cry, etc.) and which type of response would s/he typically make (humorous/self, other, or neutrally directed; or non-humorous/hostile or neutral). By limiting the verbal responses to witty remarks, rather than jokes or stories, the confounding effect of humor structure is eliminated.

**Phase II**--Flugel (1954) identified the occasions conducive to the creation of superiority humor and laughter as relief, sympathy and sorrow, fear, anxiety and general distress. A list of nine situations, based upon Flugel's taxonomy, was

given to a group of four people who have a reputation for their sense of humor, in order to generate responses for each of the five categories. In a pre-test, the five types of item responses were identified with 100% accuracy by 10 examinees. Finally, the items were revised after Drs. Lawrence Mintz in American Studies and Edward Fink in Health Communications, two humor 'experts,' judged the questions for content validity (both experts served on the editorial board of Humor, International Journal of Humor Research).

**Phase III**--The improved items were pre-tested by a subsample of the population for item analysis, and concurrent validity. The questions were revised or dropped where necessary.

**Phase IV**--The second revision of the instruments was pilot tested two weeks later for calculation of test-retest reliability.

### **Stress Mediators Inventory**

**Phases I & II**--Stress mediators are either passive individual factors, such as personality traits, or active processes that influence stress. According to Haan (1988), they can be divided into two categories: (1) Coping strategies are process that represent a reasonably accurate assessment of a situation and self, and reasonably accurate acts based on this information. These acts are presumed to be the normative, preferred way to deal with problems. (2) Defense strategies are acts used when coping attempts fail.

The domain of coping and defense processes include problem-focused strategies, personality, avoidance, social support, attitudes, the relaxation response, and physical care. The simplest format to use is the self-report, Likert-type question. Two 'experts' in Stress Management, Drs. Glenn Schiraldi and Roger Allen in Health Education, judged the final list of strategies as having good face validity. The instrument required only one revision and one addition.

**Phases III & IV**--same as Phases III & IV for Sense of Humor above.

#### **Procedural Outline for the Pilot Study**

A minimum of 120 usable questionnaires were collected from the office of Graduate Studies and Research, a sub-sample of the study population, along with faculty and graduate students from the American University. Although randomization is excluded, this sampling strategy assured the testing of like subjects without contaminating the whole study population. (The occupations that were under-represented or missing are Technical, Skilled Crafts, and Service/maintenance.)

The examinees received a cover letter that explained the purpose of the pilot study, and guaranteed complete anonymity. The only demographic information asked for was age, gender, and the last four digits of the Social Security number for matching with the retest data. Voluntary

participation was emphasized.

Along with the cover letter, all examinees received the Emotional Coping Scale (see Appendix C), Stress Mediators Inventory, and Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960). Half of the group got Lefcourt and Martin's (1986) Situational Humor Response Questionnaire (SHRQ) and Coping Humor Scale (CHS); Ways of Coping Checklist (WCC, Vitaliano, et.al., 1985); and Coping Checklist (CC, McLean, 1976) instruments, while the other half got the Hassles Scale (Kanner, et.al., 1981), Novaco's Anger Inventory (NAI, 1975), Spielberger's State-Trait Anxiety Inventory (STAI, 1970), Schiraldi's Depression Check-up (DC, 1988), and Allen and Hyde's Physical Stress Symptom Scale (PSSS, 1983). The average completion time for the second questionnaire was approximately 20 minutes. Eight weeks later, all subjects again received the Emotional Coping Scale and Stress Mediator Inventory.

Participants from the Graduate Studies and Research office were asked to rate their peers on humor production, laughter, and professional appearance (scales of 1-10). Each participant was given two rating sheets, attached to a cover letter. They were instructed to put their name on the cover letter and the last four digits of their Social Security number on the rating sheets. They gave the rating sheets to two other office mates who knew the participant well. The peers completed the ratings, according to the

instructions in the cover letter, and returned only the rating sheet to the investigator.

Item discrimination was used to evaluate the items within each scale. This technique analyzes the extent to which each item contributes toward making the total scale a measure of individual differences. The internal criterion method for item discrimination of Likert-type items presumes that the total score provides a satisfactory measure of the trait even though some items may not be effective. Under this assumption, high and low groups are identified based upon the upper and lower 27% of the total score distribution (Isaac & Michael, 1981). Items that contribute little or not at all toward distinguishing those high from low on the measured trait are revised or simply excluded from the instrument. As a result of the analyses, one item was dropped from the Emotional Coping Scale; six items were dropped from, four items were combined into two statements, and two additional items were added to the Stress Mediators Inventory.

### **Validity**

Campbell and Fiske (1959) suggest the use of a multitrait-multimethod matrix table of correlations to demonstrate the role of convergent and discriminant validity in construct validation. This method requires at least two methods to measure at least two different traits (Figure 2).

<u>Coefficients</u>	Elements Contained in the Scores That Are Correlated	
	<u>Traits</u>	<u>Methods</u>
1. Reliability correlation	Same	Same
2. Convergent validity correlation	Same	Different
3. Discriminant validity correlation	Different	Same
4. Nonsense correlation	Different	Different
5. Concurrent Criterion validity	Similar	Same or Different

Figure 2

Measurements can share two types of features: traits and methods. Traits are the underlying constructs that the measures are supposed to tap, that is content. Methods are the form of the measurement, for example, paper and pencil questionnaires, interviews, census records, and so on. Any attempt to measure a construct is contaminated by aspects of the method that are irrelevant to the construct, but inevitable in the measure.

Theoretically then, validity is established when the reliability and convergent validity coefficients in the matrix are high and the discriminant validity and nonsense coefficients are low (Campbell & Fiske, 1959). One should also include concurrent criterion validity--similar trait, same method. Scores from two other standardized measures would distinguish those individuals who differ on the trait. The correlation coefficient should be almost as high, but not higher than the convergent coefficient. Validity coefficients from the pilot study data for the humor and coping instruments are in Tables 3.1 and 3.2.

Table 3.1

Measure of Emotional Coping

	Humor			
	<u>Laughter</u>		<u>Production</u>	
1. Reliability (test-retest/Cronbach's alpha).	.83**	.59	.84**	.60
2. Convergent/peer ratings (humor production & laughter).	.62**	.37**	.55**	.48**
3. Concurrent/SHRQ & CHS.	.49**	.46**	.56**	.51**
4. Discriminant/MCSDS.	NS		NS	
5. Nonsense/peer ratings on professional appearance.	NS		NS	

\*\* p<.001, NS = not significant

Table 3.2

Stress Mediators Inventory

	Coping				Defenses	
	<u>Coping</u>					
1. Reliability (test-retest/Cronbach's alpha).	.73**	.64	.79**	.69		
2. Convergent/STAI, DC, Hassles.	NS	NS	.52**	.53**		
		NS		.51**		
3. Concurrent/WCC, CC.	.38**	.37**	.41**	.51**		
4. Discriminant/MCSDS.	NS			-.38**		
5. Nonsense/peer ratings on professional appearance.	NS			NS		

\*\* p<.001, NS = not significant

Lefcourt and Martin (1983) report inter-correlations of various humor scales between .18 and .51. Inter-correlations for Laughter and Humor Production with the same humor scales fell within a slightly higher range (.51 to .56). Inter-correlations for the Coping and Defense scales with other coping measures were within a similar range between -.14 and .53. The relationship between peer ratings and humor scales in the Lefcourt and Martin study (1986) averaged an  $r=.53$ , while correlations for peer ratings, Laughter and Humor Production in the pilot study data were almost the same (.37 to .62). The Cronbach's alphas were moderate for all the measures, however, Nunally (1978) stipulates that an alpha of .60 is acceptable for a scale used in survey research.

The Multitrait-Multimethod Matrix approach does not establish content validity. There is no agreed upon criterion for determining the extent to which an empirical measurement reflects a specific domain of content (Carmines & Zeller, 1983). As a substitute, we must rely upon the subjective evaluations of knowledgeable judges to establish face validity. We can conclude from this 'expert' opinion and the data from Matrix that the instruments developed for this study are reliable and valid. They are equal to other standardized instruments that are currently available.

### **Hassles Scale-abridged**

Although it remained important to control for level of stressors in the data analysis, the Hassles Scale (Kanner, et.al., 1981) was not included in the final questionnaire for several reasons: (1) the length of the 52 item scale would have discouraged many from participating in the survey; (2) those who did answer the complete questionnaire could have suffered from exhaustion and answered all similar questions in a like manner, thus lowering reliability and validity; and (3) the cost of purchasing 2250 copies of the instrument for the survey was not financially feasible.

Instead, the questionnaire included eight questions that indicated general categories of recent hassles, such as work, health, family, friends, the environment, practical considerations, and chance occurrences. These categories of stressors were derived from factor analyses of the Hassles Scale.

Data for the two factor analyses came from a survey of 305 UMCP college students (Carey, 1989) and from the 60 UMCP staff surveyed for the pilot study. The first eight factors were similar in both analyses and accounted for 79 and 72% of the variance respectively.

These eight sources of stressors were originally intended to be used for descriptive purposes only, and are not used in primary hypothesis testing. However, the Cronbach's alpha for these eight items, calculated from the

survey data, was .70 (cases=736). In addition, when the items were combined into a scale, the score (referred to as the Hassles Scale-abridged in Chapter Four) correlated highly with emotional and physical stress (.48 and .54 respectively,  $p < .01$ ). In regressions on emotional and physical stress, stressors (Hassles Scale-abridged) generally contributed more than any other single variable to the adjusted  $R^2$ . Based on these findings, the combined eight stressors questions into a scale was included in a supplemental data analysis for Hypothesis Three and in the secondary analysis of Hypothesis Six.

#### Instrumentation

The questionnaire used in this study was comprised of the following instruments: (1) Emotional Coping Scale (Laughter and Humor Production subscales); (2) Sense of Humor Questionnaire, Meta-message Sensitivity subscale (appreciation); (3) Stress Mediators Inventory (Coping and Defenses); (4) Multiple Affective Adjective Checklist (Anger, Depression, and Anxiety); (5) the Physical Stress Symptom Scale; (6) the Hassles Scale-abridged; and (7) seven demographic questions (Appendix D).

#### **Measures for Coping With Stress**

[1] The Measure of Emotional Coping, developed for this investigation, is a list of seven emotionally arousing situations. Five of the seven situations are followed by questions that measure the subject's affective reaction, and

all seven of the situations are followed by questions that measure emotional verbal responses.

EXAMPLE: You trip and fall down on your rear end. Nothing is hurt, but you hear someone laughing from behind you.

- A  
f  
f  
e  
c  
t
- Your reaction might be to...
- a. get watery eyes or cry (0 pts)
  - b. smile (1 pt, laughter)
  - c. chuckle, giggle, or laugh (2 pts, laughter)
  - d. laugh heartily (3 pts, laughter)
  - e. make a surprised or unpleasant expression (0 pts)
  - f. no reaction (0 pts)

- E  
m  
o  
t  
i  
o  
n  
a  
l
- Your response might be...
- a. Say nothing (neutral--0 pts)
  - b. "Wow! What an interesting view from down here." (situational humor--1 pt humor production)
  - c. "It's pretty damn rude to laugh at someone else's misfortune." (hostile--0 pts)
  - d. "Don't worry, I'm not hurt, I have plenty of padding." (self humor--1 pt humor production)
  - e. "Are there any other tricks you would like me to perform for your pleasure and amusement?" (other humor--1 pt production)

A separate score is calculated for each laughter (0 to 3) and humor production (0 or 1). LAUGHTER subscale--scores can range from 0 to 15. Data from the pilot study conducted for the development of this instrument shows a mean of 3.86, SD=2.40 and skewness of .87 (n=121). Low scores indicate individuals who do not respond often to arousing stimuli with laughter, while high scorers frequently respond with laughter. Two week test-retest reliability was .83 ( $p < .001$ ,  $n=46$ ). The Cronbach's alpha of .59 (n=121) is understandably low due to the range of emotions, such as fear or loss, that the situations can produce. Laughter scores correlated between .46 and .50

( $p < .001$ ,  $n = 66$ ) with other humor measures, and between .37 and .62 ( $p < .001$ ,  $n = 53$ ) with peer ratings of humor and laughter. The particularly high correlations between this subscale and the Situational Humor Response Questionnaire (which also measures laughter) and peer ratings suggest good instrument validity.

HUMOR PRODUCTION subscale (HP)--scores can range from 0 to 7. Data from the pilot study conducted for the development of this instrument shows a mean of 2.96,  $SD = 1.75$  and skewness of .36 ( $n = 120$ ). Individuals who score low on HP do not respond often to arousing stimuli with humorous remarks, regardless of their ability to comprehend the humor in the situation. High scorers, however, are more likely to respond to stressful situations with humor production. The two week test-retest reliability was .76 ( $p < .001$ ,  $n = 53$ ). Cronbach's alpha was a modest .68. HP scores correlated between .40 and .56 ( $p < .001$ ,  $n = 121$ ) with other humor measures, and between .48 and .55 ( $p < .001$ ,  $n = 66$ ) with peer ratings of humor and laughter. These correlations establish HP as a valid measure of humor.

[2] Sense of Humor Questionnaire (SHQ--Svebak, 1974) was designed to assess generalized individual differences in humor production and appreciation, rather than particular types of humor. The Meta-message Sensitivity (MS) subscale consists of seven items that measure humor comprehension and the ability to recognize humor in situations.

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EXAMPLE: "I can usually find something comical, witty, or humorous in most situations."

Items are scored 1 (strongly disagree); 2 (mildly disagree); 3 (mildly agree); or 4 (strongly agree). Total scores can range from 7 to 28.

Individuals who score low on MS can not easily appreciate the humor in a situation, while those who score high on MS show a strong ability to comprehend humor.

Martin and Lefcourt (1983) reported reliability and validity data from a sample of 118 undergraduate students at the University of Waterloo. The Cronbach's alpha for the MS was .59 and the test-retest coefficient over a 1-month period was .78. Correlations for the MS with measures of coping humor and laughter range from .32 to .51 ( $p < .001$ ) in the Martin and Lefcourt study; between .49 and .59 ( $p < .001$ ) in a study of humor and coping styles (Rim, 1988); and from .67 to .88 ( $p < .001$ ) in the pilot study data. Martin and Lefcourt (1983) report non-significant correlations between MS and subjects' production of humor, which would suggest that this instrument does measure the comprehension component of humor apart from production.

[3] Stress Mediators Inventory (SMI), also developed for this investigation, is a list of 13 active processes that individuals generally use in reaction to stressful life events or daily hassles. Specifically, the two subscales identify mature coping strategies which theoretically mediate stress, and immature defense strategies that can

exacerbate the effects of stress.

EXAMPLES: "I work out my frustrations in exercise or sports."--coping  
"I turn to food, tobacco, alcohol or medications for comfort."--defense

Items are scored 0 (Not at all); 1 (Somewhat); 2 (Moderately so); and 3 (Very much so).

COPING subscale--included items 1, 3-5, 9, and 11. The scores range from 0 to 18. Data from the pilot study conducted for the development of this instrument shows a mean of 16.42, SD=4.32 and skewness of  $-.17$  ( $n=121$ ). Low scores indicate subjects who do not choose mature strategies as a primary defense against stress. High scoring individuals are effectively coping with stress. Two week test-retest reliability was  $.73$  ( $p<.001$ ,  $n=53$ ). The Cronbach's alpha of  $.64$  ( $n=121$ ) is moderate. The mature Coping subscale correlates between  $.35$  and  $.38$  ( $p<.001$ ,  $n=66$ ) with other measures of effective coping techniques. Correlations between Coping, other measures of defense strategies, Anxiety, Depression and Stressors are not significant. These data suggest that Coping is not a strong predictor of stress symptoms.

DEFENSES subscale--items 2, 6-8, 10, 12, 13. Scores range from 0 to 21. Data from the pilot study conducted for this study show a mean of 7.33, SD=3.76 and skewness of  $.42$  ( $n=121$ ). Low scores indicate little use of ineffective stress-mediating strategies, while those who score high on Defenses rely heavily on immature techniques to cope with

stress. The two week test-retest coefficient was .79 ( $p < .05$ ,  $n = 46$ ), and the Cronbach's alpha was .69 ( $n = 121$ ). The range of correlations between immature Defenses and other measures of ineffective coping techniques was from .41 to .51 ( $p < .05$ ,  $n = 53$ ), and between Defenses and measures of stress and stress symptoms was from .51 to .53 ( $p < .001$ ,  $n = 66$ ). Defenses were negatively related to a measure of effective coping ( $r = -.25$ ,  $p < .05$ ,  $n = 66$ ). These strong correlations provide evidence that immature Defenses are a valid measure of ineffective coping strategies used to deal with stress.

It should be noted that Defenses correlated significantly ( $-.38$ ,  $p < .05$ ,  $n = 66$ ) with the Marlowe-Crowne Social Desirability Scale (MCSDS, Crowne & Marlowe, 1960), which suggests that scores for those individuals who are high on MCSDS will tend to be deflated. Despite this limitation, multiple regression analyses, using the pilot study data, revealed that the Defenses subscale was the strongest predictor variable for the criterion variables of mental and physical stress symptoms. The addition of the Hassles Scale (Kanner, et.al., 1981) into the regression equation did not significantly increase the multiple R squared.

Should this finding be replicated in future studies, the Defenses subscale of the Stress Mediators Inventory may prove to be a very useful instrument in stress research.

### **Measures of Stress Symptoms**

[4] The Physical Stress Symptom Scale (PSSS--Allen & Hyde, 1983) is a list of 18 items, scored as frequencies in the categories of Cardiovascular, Respiratory, Gastrointestinal, Muscular, Skin, Immunity, and Metabolic symptoms.

EXAMPLES: Heart pounding; Constipation; Acne

Items are scored 0 (Not at all); 1 (Somewhat); 2 (Moderately so); and 3 (Very much so). Scores can range from 0 to 54. Low scores indicate persons who do not display many physical symptoms of stress. Individuals who score high on PSSS have above average physical reactions to stress.

Reliability was provided by a sample of 892 college students at the University of Maryland, College Park (Allen, 1989). The results indicated a two week test-retest correlation of .84. Validity was originally established through expert opinion. In a study on stress among undergraduate students (Carey, 1989), PSSS scores correlated .53 ( $n=305$ ,  $p<.05$ ) with stressors, and .44 ( $p<.05$ ) with anxiety. Results of current pilot study data for an adult population show that PSSS correlates .58 ( $n=62$ ,  $p<.05$ ) with depression; .55 ( $p<.05$ ) with anxiety; and .39 ( $p<.05$ ) with stressors. These data provide additional evidence of concurrent criterion validity for the scale.

[5] The Multiple Affect Adjective Check List (MAACL-- Zuckerman, 1960; Zuckerman, et.al., 1964) is a list of 47 adjectives grouped into three subscales assessing depression, anger, and anxiety. The instrument is brief, seldom requiring more than 5 minutes to complete. Subjects are instructed to indicate whether or not each adjective describes how they had been feeling over the last month, in general.

EXAMPLES: (+) Shakey; Lost (-) Calm; Active

Plus items are scored if they are checked, while Minus items are scored if they are not checked. The range of scores are 0 to 10 for the Anxiety subscale, 0 to 24 for the Depression subscale, and 0 to 13 for the Anger subscale. Individuals who have low scores on any of the three subscales or the combined MAACL do not tend to display the psychological symptoms related to stress (anxiety, depression, or anger). High scores on the MAACL indicate a person who has been experiencing a great many psychological symptoms. The three affective measures correlate highly with each other (average  $r=.71$ ). Therefore, a summed z-score composite MAACL score could be created for use in analysis.

Thirteen validity studies, that used stressful films, "surprise exam" threats, anxiety reducing drugs, or hypnosis to induce anxiety, depression and anger are reported in the Manual for the MAACL (Zuckerman, et. al., 1964). Although

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the exact data are not reported, the studies consistently showed significant increases from the baseline measures. Additional validity is provided for the anxiety portion of the MAACL. Correlations with other measures of anxiety, range from .57 (n=246,  $p < .05$ ) for the Taylor Manifest Anxiety Scale to .65 (n=44,  $p < .05$ ) for the Welsh Anxiety Scale. Spearman Brown Split half coefficients range from .79 to .90 for the three subscales, while eight day test-retest correlations average .76 for the General version. [6] Hassles Scale (abridged) are eight questions which ask the subject to indicate the amount that each general category of stressors has been a hassle for them during the prior month.

EXAMPLE: Your health and/or appearance

Items are scored 0 (None or not applicable), 1 (Somewhat), 2 (Moderately so), and 3 (Very much so).

### Data Analysis

The data analysis begins with a general description of the sample population. This involves frequency distributions, measures of central tendencies, and variability. Using .05 significance levels where appropriate, the hypotheses were analyzed as follows:

**Hypothesis One** -- Men will report significantly higher scores than women on measures of the Laughter and Humor Production subscales of the Emotional Coping Scale (ECS), and Meta-message Sensitivity (humor appreciation) subscale

of the Sense of Humor Questionnaire (SHQ). One tailed t-tests were used to determine if there are significant gender differences for laughter, humor production and appreciation.

**Hypothesis Two** -- Laughter, humor production, and humor appreciation will be associated with reported stress symptoms, such that those with higher scores on the Laughter and Humor Production, and Meta-message Sensitivity will show lower scores on the Multiple Affective Adjective Checklist (MAACL) and the Physical Stress Symptom Scale (PSSS).

Multiple correlations in separate regression analyses will be used to determine if humor production, laughter and humor appreciation significantly predict affective and physical stress symptoms.

**Hypothesis Three** -- The interaction between humor and immature defenses will be significantly associated with reported stress symptoms, such that:

(a) those with higher scores on Laughter, Humor Production, and MMS (appreciation), and higher scores on Defenses will show increased scores on the MAACL and PSSS;

(b) those with higher scores on Laughter, Humor Production, and MMS, and lower scores on Defenses will show decreased scores on the MAACL and PSSS. Analyses of variance of emotional and physical stress were used to test the main effects of the humor variable, immature defenses, and their interaction effects.

**Hypothesis Four** -- Mature coping strategies will be associated with reported stress symptoms, such that those with higher scores on the Coping subscale of the Stress Mediators Inventory will show lower scores on the MAACL and PSSS. Multiple correlations in a regression analysis were used to determine if mature coping stress mediators significantly predict affective and physical stress symptoms.

**Hypothesis Five** -- Immature defense strategies will be associated with reported stress symptoms, such that those with higher scores on the Defenses subscale of the SMI will show higher scores on the MAACL and PSSS. Multiple correlations in a regression analysis were used to determine if defensive stress mediators significantly predict affective and physical stress symptoms.

**Hypothesis Six** -- There will be significant differences in scores on measures of MAACL, PSSS, ECS, Laughter, Humor Production, Meta-message Sensitivity (appreciation), and Hassles Scale (abridged) by occupation. Tukey-HSD Multiple Range Tests were conducted on all ANOVA's of the stressors, stress, and moderator variables by occupation with F's significant at the .05 level or better.

## CHAPTER FOUR

### RESULTS

#### Sample

For purposes of this study, the Office of Personnel Services generated a mailing list, including names, titles, and on-campus addresses of 2250 UMCP staff. The computer randomly selected 250 names from each of nine occupational groups, as designated by the University of Maryland Centralized Personnel System. Previously, there had been only eight occupational categories. Since the beginning of the study, however, a ninth occupation (Fellowship Students) was added. The names of 13 individuals who had participated in the pilot study, or who had served on the doctoral committee were dropped from the final mailing list, leaving a total list of 2237 names.

Survey questionnaires were mailed between April 27 and May 4, 1992. Each questionnaire had been coded by number so that returns could be checked off of the master list of names and addresses. Follow-up letters then were mailed to non-responders approximately two and a half to three weeks after the original mailing. A second questionnaire was omitted from the follow-up mailing due to the additional expense that it would have incurred. Participants who no longer had the original questionnaire and needed another copy simply returned the follow-up letter to the investigator. A second copy was sent promptly.

Only two respondents indicated their refusal to answer the questionnaire by writing notes to the investigator, while three others returned blank questionnaires. Interestingly, the negative responses were offset by five telephone or written requests from non-sampled employees to participate in the study. Their completed questionnaires were not used in the data analysis, however, as it would have compromised the randomization process necessary for performing multi-variate analysis. The remaining 754 returned questionnaires were complete and usable.

Attempts were made to recruit an equal number of participants from each of the nine occupational categories. The response rates, however, varied from a low of 12% to a high of 48% (see Table 4.1).

Table 4.1

SURVEY SAMPLE

Occupational Categories	n	N	% of Group	% of Total
	Mailed	Return	Sampled	Sample
Executive/ administrative	245	82	33.9	10.9
Faculty	248	65	25.4	8.6
Professional	249	118	47.4	15.6
Secretarial/ clerical	243	118	48.2	15.6
Technical/para- professional	250	95	38.4	12.6
Skilled Crafts	250	67	27.2	8.9
Service/ maintenance	250	31	12.0	4.1
Fellowship	250	58	23.2	7.7
Graduate Assistant	250	97	38.8	12.9
Total	2237	754	mean 33.7	100.0

It would be an error to leave these three under-represented groups intact for purposes of complex multivariate analyses, as there would be an increased risk of running data analysis with empty cells. Consequently, occupational groups were collapsed from nine into six, based upon similarities of other demographic characteristics (see Tables 4.2 a & b). In particular, groups that were not significantly different on levels of education and salary were combined. These include Faculty with Executive/administrators; Fellowship students with Graduate Assistants; and Skilled Crafts with Service/maintenance workers.

Table 4.2a

SAMPLE AND POPULATION DEMOGRAPHICS

Demographic Variables	Executive/ administrative		Faculty		Profes- sional		Secretary/ clerical		Techni- cal		Skilled Crafts		Service/ main- tenance		Graduate Assistant		Fellow- ships	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>Race</b>																		
Asian																		
Population	8	2.7	135	5.4	59	5.4	57	4.4	14	3.7	00	0.0	18	3.4	86	3.1	NR	
Sample	3	3.6	3	4.8	8	6.9	3	2.7	0	0.0	0	0.0	1	3.8	20	20.8	7	12.1
Black																		
Population	33	11.0	99	4.0	136	12.4	240	18.6	46	12.1	86	24.0	352	65.8	128	4.7	NR	
Sample	8	9.6	2	3.2	17	14.7	14	12.4	4	4.3	7	10.6	12	46.2	3	3.1	11	19.0
Hispanic																		
Population	1	0.3	32	0.0	10	0.9	20	1.6	4	1.1	45	1.4	57	10.7	32	1.2	NR	
Sample	1	1.2	1	1.6	2	1.7	3	2.7	0	0.0	4	6.1	4	15.4	4	4.2	1	1.7
Amer. Indian																		
Population	0	0.0	0	0.0	4	0.2	5	0.4	1	0.3	3	0.8	0	0.0	3	0.1	NR	
Sample	0	0.0	0	0.0	1	0.9	0	0.0	2	2.2	0	0.0	0	0.0	1	0.1	1	1.7
White																		
Population	255	85.0	2030	81.1	879	80.4	966	74.9	313	82.6	264	73.7	99	18.5	1462	53.3	NR	
Sample	70	84.3	56	90.3	86	74.1	92	81.4	83	90.2	54	81.8	8	30.8	64	66.7	37	63.8

Table 4.2a cont.

SAMPLE AND POPULATION DEMOGRAPHICS

Demographic Variables	Executive/ Faculty administrative		Profes- sional		Secretary/ clerical		Techni- cal		Skilled Crafts		Service/ main- tenance		Graduate Assistant		Fellow- ships			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
Other																		
Population	3	1.0	204	8.1	9	0.8	2	0.2	1	0.3	0	0.0	9	1.7	1033	37.6	NR	
Sample	1	1.2	0	0.0	2	1.7	1	0.9	3	3.3	1	1.5	1	3.8	4	4.2	1	1.7
Sample Totals	83	99.9	62	99.9	116	100	113	100.1	92	100	66	100	26	100	96	100.1	100	
<b>Gender</b>																		
Males																		
Population	210	70.0	181	72.3	536	49.0	110	8.5	290	76.5	349	97.5	271	50.7	1672	60.9	NR	
Sample	45	54.2	41	65.1	54	46.2	4	3.4	59	63.4	64	95.5	11	39.3	28	47.5	51	52.6
Females																		
Population	90	30.3	694	27.7	557	51.0	1180	91.5	89	23.5	9	2.5	264	49.3	1072	39.1	NR	
Sample	38	45.8	22	34.9	63	53.8	112	96.6	34	36.6	3	4.5	17	60.7	31	52.5	46	47.4
Sample Totals	83	99.9	62	99.9	116	100	113	100.1	92	100	66	100	26	100	96	100.1	100	

Table 4.2a compares the demographic characteristics of the survey sample with those for the total UMCP personnel population. The data indicate that the sample is roughly similar to the total population in terms of race, although there is evidence of some selection bias. Comparisons, however, are compromised by two factors. Sample data are given for nine occupational categories, while the Office of Institutional Studies provides data on only eight groups (previously, all graduate students were included in one group). Furthermore, institutional demographics include "foreign" as a sixth category of race. The survey refers to this sixth group as "other." (This problem was not foreseen, as a question on race was not included on the pilot study questionnaire.) Consequently, foreigners may respond to the question of race either as a minority, such as "asian," or as "other."

Specifically, Caucasians were over-represented by the sample, in six out of eight occupations. Whites in the sample for Executive/administrators was approximately equal to those in the population, but whites were under-represented by six percent for Professionals. Hispanics were over-represented in Skilled and Service/maintenance groups between five and six percent. The sample of fellowship students was 21% Asian compared with only three percent in the total population. Blacks in the sample were under-represented in the Technical and Skilled jobs by eight

and thirteen percent respectively, and significantly under-represented in the Service/maintenance jobs by a full 20%.

Gender also displayed a slight selection bias. Survey respondents were almost evenly divided between males (49%) and females (51%). While this is convenient for purposes of data analysis, it does not portray an accurate picture of the population, which is (57%) male and (43%) female. Men were significantly under-represented throughout the sample of the workforce by between two and sixteen percent.

Demographic variables that were reported for the survey population but are not available for the total population include age, education, income, and marital status/living arrangement. These data are listed by occupation in Table 4.2b.

Table 4.2b

OTHER SAMPLE DEMOGRAPHICS

Demographic Variables	Executive/ Faculty administrative		Profes- sional		Secretary/ clerical		Techni- cal		Skilled Crafts		Service/ main- tenance		Graduate Assistant		Fellow- ships			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
<b>Age</b>																		
20's	3	3.6	4	6.4	17	15.1	9	8.1	18	19.8	10	15.8	4	14.8	41	70.7	52	53.5
30's	12	14.5	18	29.1	44	38.8	31	27.9	36	39.6	18	28.7	9	33.3	13	22.2	36	37.1
40's	27	32.8	19	30.7	29	25.8	35	31.5	19	20.9	14	22.4	7	25.9	3	5.1	6	6.1
50's	29	35.4	16	25.7	17	15.3	28	25.2	11	12.1	14	22.4	5	18.5	1	1.7	2	2.1
60's	11	13.3	5	8.0	6	5.4	9	8.1	7	7.7	7	11.2	2	7.4	0	0.0	0	0.0
Totals	82	99.6	62	99.9	113	100.4	112	100.8	109	100.1	63	100.5	27	99.9	58	99.7	96	98.8
<b>Education</b>																		
Up to 10	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	7	10.5	8	29.6	0	0.0	1	1.0
11 or 12	1	1.2	0	0.0	4	3.5	46	40.7	18	19.4	42	62.7	15	55.5	0	0.0	0	0.0
13 or 14	1	1.2	0	0.0	3	2.6	36	31.9	29	31.2	9	13.5	2	7.4	0	0.0	0	0.0
15 or 16	14	17.1	4	6.3	48	42.1	27	23.9	34	36.6	7	10.5	2	7.4	22	37.3	25	26.0
17 or 18	23	28.0	15	23.8	48	42.1	3	2.7	10	10.8	1	1.5	0	0.0	27	45.8	51	53.1
19 or More	43	52.4	44	69.9	11	9.6	1	0.9	2	2.2	1	1.5	0	0.0	10	17.0	20	20.9
Totals	82	99.6	62	99.9	113	100.4	112	100.8	109	100.1	63	100.5	27	99.9	58	99.7	96	98.8

Table 4.2b cont.

OTHER SAMPLE DEMOGRAPHICS

Demographic Variables	Executive/ administrative		Faculty		Profes- sional		Secretary/ clerical		Techni- cal		Skilled Crafts		Service/ main- tenance		Graduate Assistant		Fellow- ships	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>Income</b>																		
< \$5,000	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.5	0	0.0	1	1.7	0	0.0
\$5,000--9,999	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	8	13.8	10	10.5
10,000-14,999	0	0.0	1	1.6	0	0.0	0	0.0	1	1.1	0	0.0	8	30.8	11	19.0	29	30.5
15,000-24,999	0	0.0	5	8.1	2	1.7	16	14.4	6	6.5	6	8.8	7	26.9	11	19.0	21	22.1
25,000-34,999	1	1.2	6	9.7	23	20.0	16	14.4	16	17.2	24	35.3	3	11.5	15	25.9	12	12.6
> 35,000	82	98.8	50	80.6	90	78.3	79	71.2	70	75.3	37	54.4	8	30.8	12	20.7	23	24.2
Totals	82	99.6	62	99.9	113	100.4	112	100.8	109	100.1	63	100.5	27	99.9	58	99.7	96	98.8
<b>Living Arrangement</b>																		
1 Other Adlt	40	48.2	21	33.3	1	0.9	35	30.2	35	37.2	11	16.2	10	35.7	24	40.7	39	40.2
1 Adlt + Chd	29	34.9	18	28.6	45	38.5	43	37.1	27	28.7	26	38.2	6	21.4	5	8.5	11	11.3
> 1 Adult Alone	4	4.8	6	9.5	38	32.5	9	7.8	11	11.7	5	7.4	5	17.9	16	27.1	27	27.8
> 1 Adt + Chd	1	1.2	2	3.2	7	6.0	14	12.1	4	4.3	9	13.2	3	10.7	3	5.1	2	2.1
Children Only	1	1.2	1	1.6	20	16.9	6	5.2	5	5.3	3	4.4	1	3.6	0	0.0	0	0.0
Totals	82	99.6	62	99.9	113	100.4	112	100.8	109	100.1	63	100.5	27	99.9	58	99.7	96	98.8

**Age**--The median age for Executive/administrators is 50. The age distribution for Professionals, however, is lower; half (53%) are in their 30's or less, while half (47%) are 40 or above. The ages of Faculty, and Secretary/clerical are evenly distributed with approximately a third in their 30's or less, a third in their 40's, and a third in the 50's or above. A full 79% of people in the Technical trades are age 40 or less. The majority of Skilled, Service/maintenance workers are between their 30's and 50's. Graduate and Fellowship students are the youngest groups, with 90% in their 30's or less.

**Education**--As might be expected, Executive/administrators, Faculty, Graduate and Fellowship students, and Professionals have attained the highest levels of education. Eighty percent of Executive/administrators and 94% of Faculty have had at least some graduate school, holding either a masters or doctoral degree. The majority of Professionals, Graduate and Fellowship students hold a bachelors degree, while between 51% and 73% have a masters degree or more. The occupations with the least amount of educational attainment are Skilled and Service/maintenance workers. These are the only groups to include some staff with a tenth grade education or less (10.5% and 29.6%, respectively), however, the mode is a high school degree (62.7% and 55.5%). The Secretary/clerical and Technical personnel have at least a high school degree and most have had 2-4 years of college

(96.5% and 87.2%, respectively).

**Income**--The survey question regarding salary asks for "combined household income" based upon the assumption that it is total income available for living expenses that affects individual stress. The highest level for this categorical variable is \$35,000 or more. As such, there is not as much variance as might be expected for the income variable. Income ranges are as follows: Executive/administrators \$35,000 or above (99%); Professional \$25,000 or above (98%); Faculty, Secretary/ clerical, and Skilled are \$15,000 or above (98%, 100%, 99%); Service/maintenance \$10,000 or above (100%); Graduate and Fellowship students \$5,000 or above (98%).

**Living Arrangement**--The majority of Executive/administrators (83%) are married or living with a significant other, and have only one child still at home (other children are likely to be grown and living away from home). This contrasts sharply with Graduate and Fellowship students who live with a spouse, one or more adults, or alone. But, only 5-13% of students have any children. Faculty have the largest percentage of singles living alone (24%), however, one-third are married and close to a third (29%) are married with one child at home. Professionals have the greatest percent of single parents (17%), and more than Graduate students, 32% share living quarters with two or more adults. Staff in Secretary/clerical, Technical, Skilled, and Service/

maintenance jobs are fairly heterogenous in their living arrangements, and are not significantly different.

The mean scores for the principal measures are reported in Table 4.3 by occupation (as regrouped into six categories). Group differences will be discussed in greater detail later under Hypothesis Five, however, there are two significant patterns worth mentioning here. In terms of stress, Executive/administrator/Faculty are the most 'well adjusted' group in the survey sample, while Secretary/clerical staff appear to be the least. For example, Secretary/clerical have the highest mean scores on affective and physical stress, the highest level of stressors, the lowest mean scores for two of the three humor variables, and the lowest level of coping skills (stress mediators). The profile for Executive/administrator/Faculty is just the opposite. These personnel have the lowest mean stress scores, the highest level of coping skills, and display the highest propensity for humor appreciation.

Table 4.3

MEAN DEPENDENT AND INDEPENDENT VARIABLES BY OCCUPATION

	Executive/ administrative/ Faculty n=148	Professional n=118	Secretary/ clerical n=117	Technical n=92	Skilled/ Service/ maintenance n=98	Graduate/ Fellowship n=156	Group n=749
<u>Variable</u>							
MAACL	mn=-.67 sd=2.08	mn=0.17 sd=1.92	mn=0.52 sd=2.71	mn=0.04 sd=2.29	mn=-.28 sd=2.11	mn=0.19 sd=2.25	mn=0.00 sd=2.26
Anxiety	mn=2.65 sd=2.20	mn=3.28 sd=2.20	mn=4.15 sd=2.88	mn=3.07 sd=2.38	mn=2.55 sd=2.20	mn=3.42 sd=2.64	mn=3.21 sd=2.48
Depression	mn=5.51 sd=3.45	mn=6.76 sd=3.57	mn=7.40 sd=4.61	mn=6.49 sd=3.94	mn=5.85 sd=3.55	mn=6.88 sd=4.02	mn=6.50 sd=3.92
Anger	mn=6.80 sd=2.46	mn=7.48 sd=2.57	mn=7.06 sd=2.65	mn=7.52 sd=2.54	mn=7.67 sd=2.45	mn=7.31 sd=2.37	mn=7.28 sd=2.51
PSSS	mn=6.52 sd=5.17	mn=8.47 sd=6.75	mn=11.17 sd=6.87	mn=8.68 sd=6.30	mn=8.18 sd=7.20	mn=8.87 sd=6.25	mn=8.60 sd=6.51
Stressors	mn=13.12 sd=4.19	mn=14.54 sd=3.84	mn=15.25 sd=3.89	mn=14.33 sd=4.43	mn=12.31 sd=5.27	mn=13.02 sd=4.18	mn=13.75 sd=4.38

Range of group scores for each measure: MAACL, -5.06 to 8.29 (standardized scores);

Anxiety, 0 to 10; Depression, 0 to 24; Anger, 1 to 13; PSSS, 0 to 42; Stressors, 0 to 24.

Table 4.3 cont.

MEAN DEPENDENT AND INDEPENDENT VARIABLES BY OCCUPATION

	Executive/ administrative/ Faculty n=148	Professional n=118	Secretary/ clerical n=117	Technical n=92	Skilled/ Service/ maintenance n=98	Graduate/ Fellowship n=156	Group n=749
<u>Variable</u>							
Laughter	mn=6.23 sd=4.42	mn=6.42 sd=4.18	mn=5.13 sd=3.98	mn=6.00 sd=4.03	mn=4.65 sd=4.42	mn=6.14 sd=4.02	mn=5.81 sd=4.25
Humor	mn=4.12	mn=4.39	mn=3.98	mn=4.64	mn=4.42	mn=4.19	mn=4.26
Production	sd=2.64	sd=3.06	sd=2.97	sd=3.03	sd=3.10	sd=2.78	sd=2.92
Meta- Message	mn=22.34 sd=2.77	mn=21.14 sd=3.48	mn=20.65 sd=3.54	mn=20.79 sd=3.64	mn=20.92 sd=3.19	mn=21.37 sd=3.30	mn=21.29 sd=3.37
Stress Mediators	mn=23.99 sd=4.88	mn=22.40 sd=5.23	mn=20.81 sd=5.90	mn=21.04 sd=6.11	mn=23.53 sd=5.50	mn=21.71 sd=5.61	mn=22.31 sd=5.62
Coping	mn=11.12 sd=2.78	mn=10.72 sd=3.22	mn= 9.75 sd=3.58	mn= 9.53 sd=3.30	mn=10.38 sd=3.41	mn=10.01 sd=3.23	mn=10.30 sd=3.28
Defenses	mn=8.12 sd=3.59	mn=9.39 sd=3.63	mn=9.97 sd=4.14	mn=9.43 sd=4.14	mn=7.83 sd=3.82	mn=9.27 sd=3.82	mn=8.99 sd=3.90

Range of group scores for each measure: Laughter, 0 to 24; Humor Production, 0 to 14;  
MMS (appreciation), 9 to 28; Stress Mediators, 3 to 36; Coping, 0 to 18; Defenses, 0 to 21.

In summary, the sample population is split evenly by gender; three-quarters are white and one quarter are minority. The job categories were collapsed into the six following groups, 19.5% Executive/administrator/Faculty, 15.6% Professionals, 15.6% Secretary/clerical, 12.6% Technical/Para-Professionals, 13% Skilled/Service/maintenance, and 20.6% Graduate/Fellowship students. Students are the youngest in the sample, Skilled/Service/maintenance have the lowest level of education, as well as income. One half of Executive/administrator/Faculty, but less than one percent of Professionals live with one other adult. Approximately 1/3 of all groups, except students, are 'married' with one child. Faculty have the largest percent of singles and Professionals have the highest percentage of single parents.

#### Results and Discussion--Primary Hypotheses

##### **Hypothesis One**

The first set of hypotheses address gender differences for the components of humor. Hypothesis One states that men will report significantly higher scores than women on the Laughter and Humor Production subscales of the Emotional Coping Scale (ECS), and humor appreciation as measured by the Meta-message Sensitivity subscale of the Sense of Humor Questionnaire (SHQ). Data analysis to test these hypotheses involved one-tailed t-tests of the three humor variables (see Table 4.4).

Table 4.4

T-TESTS of HUMOR VARIABLES by GENDER

Laughter by Gender

Sum of Squares	DF	Mean Square	T	Sig T
62.444	1	62.444	3.409	.038

Cell Means: Males=6.07 (n=364, SD=4.48)

Females=5.55 (n=366, SD=4.05)

Humor Appreciation by Gender

Sum of Squares	DF	Mean Square	T	Sig T
53.682	1	53.682	4.731	.015

Cell Means: Males=21.56 (n=356, SD=3.41)

Females=21.02 (n=366, SD=3.33)

Humor Production by Gender

Sum of Squares	DF	Mean Square	T	Sig T
52.552	1	52.552	6.156	.007

Cell Means: Males=4.55 (n=364, SD=3.18)

Females=3.99 (n=377, SD=2.64)

Results of the analyses show support in the predicted direction for laughter and humor appreciation ( $p < .05$ ), and humor production ( $p < .05$ ). Although the gender differences on the humor variables are statistically significant, probably due to the large sample size, a look at the mean scores between males and females reveal no 'practically significant differences,' (they are indistinguishable).

While it is not practical to declare males as possessing a better 'sense of humor,' it was necessary to perform separate data analyses by gender on subsequent hypotheses. This decision was based, in part, upon the fact that men and women also are significantly different on four out of five of the measures in addition to the humor variables (see Table 4.5).

Table 4.5

T-TESTS OF STRESS-RELATED VARIABLES BY GENDER

Variable	Males			Females			T	Sig. T
	Mean	n	SD	Mean	n	SD		
Coping	10.35	358	3.21	10.24	372	3.33	.126	.722
Defenses	8.28	357	3.80	9.75	369	3.89	28.204	.000
Stressors	12.93	355	4.36	14.61	367	4.22	27.376	.000
MAACL	- .15	360	2.18	.17	374	2.30	12.897	.043
PSSS	6.92	334	5.70	10.26	351	6.63	49.078	.000

**Hypothesis Two**

The second hypothesis refers to the efficacy of a sense of humor to mediate stress. Hypothesis Two states that laughter, humor production, and humor appreciation will be associated with reported stress symptoms, such that those with higher scores on Laughter, Humor Production, and Meta-message Sensitivity will show lower scores on the Multiple Affective Adjective Check List (MAACL) and Physical Stress Symptom Scale (PSSS). Multiple regression of affective and physical stress on laughter, humor appreciation and production tested this hypothesis. The regression analysis was repeated again, separately for men and women (see Tables 4.6 a, b, & c).

Table 4.6a--Group Results

MULTIPLE REGRESSION OF STRESS VARIABLES ON HUMOR VARIABLES

<u>MAACL (Emotional Stress)</u>		<u>PSSS (Physical Stress)</u>	
Multiple R	.278	Multiple R	.173
Adjusted R Square	.073	Adjusted R Square	.026
F = 18.843	Sig F = .000	F = 6.932	Sig F = .000
<u>Variable</u>		<u>Variable</u>	
Humor r=-.24**	Beta= - .247	Humor r=-.16*	Beta= - .138
<u>Appreciation</u>	Sig T=.000	<u>Appreciation</u>	Sig T=.001
Humor r=-.06	Beta= .044	Humor r=-.03,	Beta= .026
<u>Production</u>	Sig T=.286	<u>Production</u>	Sig T=.539
Laughter r=-.13**		Laughter r=-.09*	
Beta= - .095	Sig T=.021	Beta= - .083	Sig T=.049

\* Significance less than .05, \*\* Significance less than .01

Table 4.6b--Males Only

MULTIPLE REGRESSION OF STRESS VARIABLES ON HUMOR VARIABLES

<u>MAACL (Emotional Stress)</u>		<u>PSSS (Physical Stress)</u>	
Multiple R	.242	Multiple R	.234
Adjusted R Square	.050	Adjusted R Square	.046
F = 6.681	Sig F = .000	F = 6.228	Sig F = .000
<u>Variable</u>		<u>Variable</u>	
Humor r=-.19**	Beta= - .185	Humor r=-.17**	Beta= - .151
<u>Appreciation</u>	Sig T=.001	<u>Appreciation</u>	Sig T=.008
Humor r=-.02,	Beta= .080	Humor r= .04,	Beta= .140
<u>Production</u>	Sig T=.191	<u>Production</u>	Sig T=.022
Laughter r=-.15**		Laughter r=-.14*	
Beta= -.141	Sig T=.024	Beta = - .169	Sig T=.007

\* Significance less than .05, \*\* Significance less than .01

Table 4.6c--Females Only

MULTIPLE REGRESSION OF STRESS VARIABLES ON HUMOR VARIABLES

<u>MAACL (Emotional Stress)</u>	<u>PSSS (Physical Stress)</u>
Multiple R .317	Multiple R .119
Adjusted R Square .093	Adjusted R Square .005
F =12.737 Sig F = .000	F = 1.625 Sig F = .183
<u>Variable</u>	<u>Variable</u>
Humor r=-.29**, Beta= - .297	Humor r=-.11*, Beta= - .095
<u>Appreciation</u> Sig T=.000	<u>Appreciation</u> Sig T=.096
Humor r=-.06, Beta= .030	Humor r=-.07, Beta= - .035
<u>Production</u> Sig T=.586	<u>Production</u> Sig T=.547
Laughter r=-.14**	Laughter r=-.05
Beta= - .073 Sig T=.188	Beta= - .021 Sig T=.718

\* Significance less than .05, \*\* Significance less than .01

Group results show that the humor variables explain 7.3% of the variance for emotional stress ( $p < .0001$ ), but only 2.6% of the variance for physical stress ( $p < .0001$ ). Humor appreciation and laughter were significant in the predicted direction for both equations ( $p's < .05$ ), however, humor production was not significant in either analysis. In addition, it had a positive Beta, that is, the relationship between humor production and affective or physical stress was positive.

The regression of stress on humor for males indicates a lower  $R^2$  for emotional stress (from .073 to .05,  $p < .05$ ), but a higher  $R^2$  for physical stress (from .026 to .046,  $p's < .05$ ) than the group results. In contrast to the group, male humor production was significant for physical stress ( $p < .05$ ). Women, on the other hand, had an  $R^2$  of .097 for

emotional stress ( $p < .05$ ); although humor appreciation was the only significant predictor ( $p < .05$ ). None of the humor variables were significantly able to predict physical stress ( $p = .183$ ); for women.

Gender differences have emerged again into two interesting humor profiles. Humor appreciation and laughter are both effective in predicting emotional stress for males, however, the practical significance is moderate. Conversely, the pattern for women indicates only one significant predictor (appreciation) which explains nearly twice as much of the variance for affective symptoms. All three humor variables contribute to the variance of physical stress for males, while none are significant for female physical stress.

#### **Supplemental Analysis for Hypothesis Two**

The investigator conducted supplemental post hoc data analyses in order to compare the relationship of humor responses (hostile, self-deprecating, or neutral) with non-humorous responses (hostile or neutral) to stress symptoms. The Emotional Coping Inventory describes seven situations which vary in emotional intensity, each followed by a choice of five verbal responses (hostile humor, self-deprecating humor, neutral situational humor, hostile response and neutral response). Tukey-HSD Multiple Range Tests were performed on all ANOVA's of the emotional and physical stress variables by the five verbal responses with F's significant at the .05 level or better (Table 4.7).

Table 4.7a

ANALYSES OF VARIANCE OF STRESS VARIABLES BY VERBAL RESPONSES

MAACL (Emotional Stress) by Scenario One Response (Spilled Soup)

<u>Source</u>	<u>DF</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F</u>	<u>Sig F</u>
Between Groups	4	57.748	14.437	2.861	.023
Within Groups	728	3673.966	5.047		
Total	732	3731.714			

Tukey-HSD Multiple Range Test

<u>Mean</u>	<u>SD</u>	<u>Group</u>	<u>G G G G G</u>
-.447	2.03	Grp 3, Neutral Humor	r r r r r
-.377	2.22	Grp 1, Hostile Humor	p p p p p
.024	1.99	Grp 4, Self Humor	3 1 4 5 2
.067	2.32	Grp 5, Neutral	
.560	2.27	Grp 2, Hostile	* *

(\*) Denotes Pairs of Groups Significantly Different at the .05 Level

PSSS (Physical Stress) by Scenario One Response (Spilled Soup)

<u>Source</u>	<u>DF</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F</u>	<u>Sig F</u>
Between Groups	4	194.395	48.600	1.146	.334
Within Groups	679	28792.266	42.404		
Total	683	28986.661			

No Two Groups Are Significantly Different at the .05 Level

Results indicate that a Hostile response is associated with significantly higher levels of emotional stress than Neutral or Hostile Humor. There were no significant group differences for physical stress by verbal response.

Table 4.7b

ANALYSES OF VARIANCE OF STRESS VARIABLES BY VERBAL RESPONSES

MAACL (Emotional Stress) by Scenario Two Response (Trip and Fall)

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	4	51.931	12.983	2.562	.037
Within Groups	727	3684.175	5.068		
Total	731	3736.106			

Tukey-HSD Multiple Range Test

Mean	SD	Group	
-.286	2.35	Grp 4, Self Humor	G G G G G
-.142	2.45	Grp 2, Neutral Humor	r r r r r
-.085	2.02	Grp 5, Hostile Humor	p p p p p
.285	2.13	Grp 1, Neutral	4 2 5 1 3
.390	2.60	Grp 3, Hostile	

note: Group 3 was not significantly different due to a small n.

(\* ) Denotes Pairs of Groups Significantly Different at the .05 Level

PSSS (Physical Stress) by Scenario Two Response (Trip and Fall)

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	4	269.465	67.366	1.587	.176
Within Groups	679	28831.220	42.461		
Total	683	29100.684			

No Two Groups Are Significantly Different at the .05 Level

Results indicate that a Neutral response is associated with a significantly higher level of emotional stress than Self-deprecating Humor. There were no significant group differences for physical stress by verbal response.

Table 4.7c

ANALYSES OF VARIANCE OF STRESS VARIABLES BY VERBAL RESPONSES

MAACL (Emotional Stress) by Scenario Three Response (Dentist Drill)

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	4	26.603	6.651	1.293	.271
Within Groups	708	3642.210	5.144		
Total	712	3668.813			

No Two Groups Are Significantly Different at the .05 Level

PSSS (Physical Stress) by Scenario Three Response (Dentist Drill)

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	4	419.079	104.770	2.448	.045
Within Groups	661	28294.712	42.806		
Total	665	28713.791			

Tukey-HSD Multiple Range Test

Mean	SD	Group	
6.86	5.19	Grp 3 Neutral Humor	G G G G G
7.67	6.25	Grp 5 Hostile Humor	r r r r r
8.65	6.52	Grp 1 Neutral	p p p p p
8.78	6.54	Grp 4 Self Humor	3 5 1 4 2
13.67	10.19	Grp 2 Hostile	*

(\* ) Denotes Pairs of Groups Significantly Different at the .05 Level

Results indicate that a Hostile response is associated with a significantly higher level of physical stress than Neutral Humor. There were no significant group differences for emotional stress by verbal response.

Table 4.7d

ANALYSES OF VARIANCE OF STRESS VARIABLES BY VERBAL RESPONSES

MAACL (Emotional Stress) by Scenario Four Response (Funeral)

<u>Source</u>	<u>DF</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F</u>	<u>Sig F</u>
Between Groups	4	10.104	2.526	.492	.742
Within Groups	726	3729.691	5.137		
Total	730	3739.795			

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No Two Groups Are Significantly Different at the .05 Level

PSSS (Physical Stress) by Scenario Four Response (Funeral)

<u>Source</u>	<u>DF</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F</u>	<u>Sig F</u>
Between Groups	4	151.046	37.761	.888	.470
Within Groups	677	28778.761	42.509		
Total	681	28929.807			

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No Two Groups Are Significantly Different at the .05 Level

Results indicate that there were no significant group differences for emotional stress or physical stress by verbal response.

Table 4.7e

ANALYSES OF VARIANCE OF STRESS VARIABLES BY VERBAL RESPONSES

MAACL (Emotional Stress) by Scenario Five Response (Friend's Spouse)

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	4	15.550	3.888	.752	.557
Within Groups	728	3763.044	5.169		
Total	732	3778.595			

No Two Groups Are Significantly Different at the .05 Level

PSSS (Physical Stress) by Scenario Five Response (Friend's Spouse)

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	4	701.865	175.466	4.187	.002
Within Groups	680	28500.640	41.913		
Total	684	29202.505			

Tukey-HSD Multiple Range Test

Mean	SD	Group				
7.31	5.63	Grp 5 Neutral Humor	G	G	G	G
8.34	6.23	Grp 1 Neutral	r	r	r	r
9.06	7.06	Grp 4 Hostile	p	p	p	p
9.46	8.15	Grp 2 Self Humor	5	1	4	2
11.70	7.22	Grp 3 Hostile Humor				3

(\*) Denotes Pairs of Groups Significantly Different at the .05 Level

Results indicate that a Hostile Humor response is associated with higher levels of PSSS than Neutral Humor or a Neutral response. There were no significant group differences for emotional stress by verbal response.

Table 4.7f

ANALYSES OF VARIANCE OF STRESS VARIABLES BY VERBAL RESPONSES

MAACL (Emotional Stress) by Scenario Six Response (Promotion)

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	4	56.374	14.093	2.797	.025
Within Groups	724	3648.414	5.039		
Total	728	3704.788			

No Two Groups Are Significantly Different at the .05 Level

PSSS (Physical Stress) by Scenario Six Response (Promotion)

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	4	372.186	93.047	2.183	.069
Within Groups	674	28727.608	42.623		
Total	678	29099.794			

Tukey-HSD Multiple Range Test

Mean	SD	Group	G G G G G
8.37	6.45	Grp 2 Neutral	r r r r r
8.69	5.25	Grp 5 Hostile Humor	p p p p p
8.78	6.42	Grp 4 Neutral Humor	2 5 4 3 1
8.83	6.31	Grp 3 Self Humor	
12.55	10.22	Grp 1 Hostile	*

(\*) Denotes Pairs of Groups Significantly Different at the .05 Level

Results indicate that a Hostile response is associated with a significantly higher level of physical stress than Neutral Humor. There were no significant group differences for emotional stress by verbal response.

Table 4.7g

ANALYSES OF VARIANCE OF STRESS VARIABLES BY VERBAL RESPONSES

MAACL (Emotional Stress) by Scenario Seven Response (Late for Work)

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	4	35.292	8.823	1.709	.146
Within Groups	710	3664.834	5.162		
Total	714	3700.126			

No Two Groups Are Significantly Different at the .05 Level

PSSS (Physical Stress) by Scenario Seven Response (Late for Work)

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	4	161.793	40.448	.962	.428
Within Groups	664	27915.824	42.042		
Total	668	28077.617			

No Two Groups Are Significantly Different at the 0.050 Level

Results indicate that there were no significant group differences for emotional stress or physical stress by verbal response.

Verbal responses were associated significantly with emotional stress in only two of the seven described situations. The type of humorous or non-humorous verbal response successfully predicted physical stress symptoms for three of the seven situations in the Emotional Coping Scale. Finally, Tukey-HSD tests revealed no significant group stress differences at the .05 level for either scenario four or seven.

### **Hypothesis Three**

The third set of hypotheses tested the interaction effects of the humor variables with other defense strategies on moderating stress. Hypothesis Three states that the interaction between humor and immature defenses will be significantly associated with reported stress symptoms, such that: (a) those with higher scores on Laughter, Humor Production, and Meta-message Sensitivity (appreciation), and higher scores on the Defenses subscale of the Stress Mediators Inventory (SMI) will show increased scores on the MAACL and PSSS; (b) those with higher scores on Laughter, Humor Production, and Meta-message Sensitivity, and lower scores on Defenses will show decreased scores on the MAACL and PSSS. Analysis of variance of emotional and physical stress tested the main effects of the humor variables, immature defenses, and their interaction effects (Tables 4.8a, b, & c).

Table 4.8a--Group Results

ANALYSIS OF VARIANCE

STRESS VARIABLES BY HUMOR VARIABLES INTERACTING WITH DEFENSES

ANOVA--Emotional Stress by Laughter and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	725.328	4	181.332	45.763	.000
Laughter	34.795	2	17.397	4.391	.013
Defenses	685.026	2	342.513	86.441	.000
2-Way Interactions					
Laughter Defenses	24.132	4	6.033	1.523	.194
Explained	749.460	8	93.682	23.643	.000
Residual	2690.465	679	3.962		
Total	3439.925	687	5.007		

ANOVA--Physical Stress by Laughter and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	5047.325	4	1261.831	35.374	.000
Laughter	116.461	2	58.230	1.632	.196
Defenses	4905.919	2	2452.959	68.766	.000
2-Way Interactions					
Laughter Defenses	53.052	4	13.263	.372	.829
Explained	5100.377	8	637.547	17.873	.000
Residual	24220.703	679	35.671		
Total	29321.080	687	42.680		

	Cell Means (n/Cases) for MAACL Laughter			Cell Means (n/Cases) for PSSS Laughter		
	1	2	3	1	2	3
Defenses 1	-0.95 (52)	-0.40 (71)	1.59 (62)	5.48 (52)	8.54 (71)	12.97 (62)
Defenses 2	-1.27 (77)	-0.02 (100)	1.57 (93)	5.39 (77)	8.45 (100)	11.76 (93)
Defenses 3	-1.34 (71)	-0.48 (85)	0.67 (77)	4.49 (71)	8.19 (85)	11.08 (77)

Table 4.8a--Group Results cont.

ANALYSIS OF VARIANCE

STRESS VARIABLES BY HUMOR VARIABLES INTERACTING WITH DEFENSES

ANOVA--Emotional Stress by Humor Appreciation and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	859.617	4	214.904	56.389	.000
Humor Appreciation	156.665	2	78.333	20.554	.000
Defenses	624.982	2	312.491	81.995	.000
2-Way Interactions					
HumApp Defenses	18.798	4	4.699	1.233	.295
Explained	878.415	8	109.802	28.811	.000
Residual	2534.367	665	3.811		
Total	3412.781	673	5.071		

ANOVA--Physical Stress by Humor Appreciation and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	4784.550	4	1196.138	35.697	.000
Humor Appreciation	294.034	2	147.017	4.387	.013
Defenses	4160.638	2	2080.319	62.084	.000
2-Way Interactions					
HumApp Defenses	98.894	4	24.724	.738	.566
Explained	4883.445	8	610.431	18.217	.000
Residual	22282.935	665	33.508		
Total	27166.380	673	40.366		

Defenses	Cell Means (n/Cases) for MAACL Humor Appreciation			Cell Means (n/Cases) for PSSS Humor Appreciation		
	1	2	3	1	2	3
	1	-1.25 (72)	-0.12 (84)	1.52 (80)	4.00 (72)	8.75 (84)
2	-1.11 (53)	-0.43 (72)	1.15 (72)	5.74 (53)	8.04 (72)	12.14 (72)
3	-1.24 (75)	-0.30 (100)	1.15 (80)	4.83 (75)	8.33 (100)	11.75 (80)

Table 4.8a--Group Results cont.

ANALYSIS OF VARIANCE

STRESS VARIABLES BY HUMOR VARIABLES INTERACTING WITH DEFENSES

ANOVA--Emotional Stress by Humor Production and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	696.250	4	174.062	43.171	.000
Humor Production	5.717	2	2.859	.709	.493
Defenses	690.685	2	345.342	85.651	.000
2-Way Interactions					
HumProd Defenses	5.970	4	1.492	.370	.830
Explained	702.220	8	87.777	21.770	.000
Residual	2737.705	679	4.032		
Total	3439.925	687	5.007		

ANOVA--Physical Stress by Humor Production and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	4940.012	4	1235.003	34.463	.000
Humor Production	9.148	2	4.574	.128	.880
Defenses	4906.711	2	2453.355	68.462	.000
2-Way Interaction					
HumProd Defenses	48.966	4	12.242	.342	.850
Explained	4988.978	8	623.622	17.403	.000
Residual	24332.102	679	35.835		
Total	29321.080	687	42.680		

	Cell Means (n/Cases) for MAACL Humor Production			Cell Means (n/Cases) for PSSS Humor Production		
	1	2	3	1	2	3
Defenses 1	-0.24 (44)	0.09 (69)	2.02 (71)	5.70 (44)	9.43 (69)	12.24 (71)
Defenses 2	-1.11 (56)	-0.23 (91)	1.51 (77)	5.59 (56)	8.05 (91)	12.49 (77)
Defenses 3	-1.71 (97)	-0.61 (91)	0.51 (78)	4.61 (97)	7.79 (91)	10.29 (78)

Table 4.8b--Males Only

ANALYSIS OF VARIANCE

STRESS VARIABLES BY HUMOR VARIABLES INTERACTING WITH DEFENSES

ANOVA--Emotional Stress by Laughter and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	251.511	4	62.878	16.188	.000
Laughter	12.435	2	6.218	1.601	.203
Defenses	226.862	2	113.431	29.204	.000
2-Way Interactions					
Laughter Defenses	22.955	4	5.739	1.478	.209
Explained	274.466	8	34.308	8.833	.000
Residual	1239.033	319	3.884		
Total	1513.499	327	4.628		

ANOVA--Physical Stress by Laughter and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	1422.949	4	355.737	12.271	.000
Laughter	112.822	2	56.411	1.946	.145
Defenses	1222.311	2	611.155	21.082	.000
2-Way Interactions					
Laughter Defenses	17.178	4	4.294	.148	.964
Explained	1440.127	8	180.016	6.210	.000
Residual	9247.528	319	28.989		
Total	10687.655	327	32.684		

Defenses	Cell Means (n/Cases) for MAACL			Cell Means (n/Cases) for PSSS		
	1	2	3	1	2	3
1	-0.82 (29)	-0.24 (36)	1.01 (24)	4.66 (29)	7.72 (36)	10.33 (24)
2	-1.19 (36)	-0.01 (50)	1.77 (32)	5.25 (36)	7.58 (50)	10.31 (32)
3	-1.25 (53)	-0.16 (40)	0.34 (28)	4.26 (53)	6.10 (40)	8.79 (28)

Table 4.8b--Males Only cont.

ANALYSIS OF VARIANCE

STRESS VARIABLES BY HUMOR VARIABLES INTERACTING WITH DEFENSES

ANOVA--Emotional Stress by Humor Appreciation and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	298.783	4	74.696	19.785	.000
Humor Appreciation	55.391	2	27.695	7.336	.001
Defenses	236.879	2	118.440	31.371	.000
2-Way Interactions					
HumApp Defenses	27.424	4	6.856	1.816	.126
Explained	326.208	8	40.776	10.800	.000
Residual	1181.703	313	3.775		
Total	1507.910	321	4.698		

ANOVA--Physical Stress by Humor Appreciation and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	1279.134	4	319.783	11.925	.000
Humor Appreciation	123.653	2	61.826	2.306	.101
Defenses	1128.808	2	564.404	21.047	.000
2-Way Interactions					
HumApp Defenses	185.876	4	46.469	1.733	.142
Explained	1465.009	8	183.126	6.829	.000
Residual	8393.512	313	26.816		
Total	9858.522	321	30.712		

	Cell Means (n/Cases) for MAACL Humor Appreciation			Cell Means (n/Cases) for PSSS Humor Appreciation		
	1	2	3	1	2	3
	Defenses	1 -1.32 (40)	-0.08 (40)	1.06 (28)	1 3.50 (40)	7.38 (40)
	2 -0.81 (24)	-0.18 (38)	0.83 (26)	2 6.25 (24)	6.92 (38)	11.65 (26)
	3 -1.12 (54)	-0.12 (48)	1.31 (30)	3 4.81 (54)	7.15 (48)	9.37 (30)

Table 4.8b--Males Only cont.

ANALYSIS OF VARIANCE

STRESS VARIABLES BY HUMOR VARIABLES INTERACTING WITH DEFENSES

ANOVA--Emotional Stress by Humor Production and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	239.900	4	59.975	15.099	.000
Humor Production	.825	2	.412	.104	.901
Defenses	237.998	2	118.999	29.959	.000
2-Way Interactions					
HumProd Defenses	6.510	4	1.627	.410	.802
Explained	246.410	8	30.801	7.754	.000
Residual	1267.089	319	3.972		
Total	1513.499	327	4.628		

ANOVA--Physical Stress by Humor Production and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	1427.329	4	356.832	12.481	.000
Humor Production	117.202	2	58.601	2.050	.130
Defenses	1242.166	2	621.083	21.723	.000
2-Way Interaction					
HumProd Defenses	139.852	4	34.963	1.223	.301
Explained	1567.182	8	195.898	6.852	.000
Residual	9120.474	319	28.591		
Total	10687.655	327	32.684		

	Cell Means (n/Cases) for MAACL						Cell Means (n/Cases) for PSSS											
	Humor Production						Humor Production											
	1	2	3	1	2	3	1	2	3	1	2	3						
Defenses	1  0.23 (23)	0.23 (36)	1.07 (19)	1  5.74 (23)	8.47 (36)	9.05 (19)	2  -1.05 (36)	0.07 (41)	1.56 (24)	2  5.42 (36)	6.17 (41)	11.46 (24)	3  -1.71 (57)	-0.53 (48)	0.89 (38)	3  3.84 (57)	6.88 (48)	8.71 (38)

Table 4.8c--Females Only

ANALYSIS OF VARIANCE

STRESS VARIABLES BY HUMOR VARIABLES INTERACTING WITH DEFENSES

ANOVA--Emotional Stress by Laughter and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	456.412	4	114.103	28.525	.000
Laughter	30.827	2	15.413	3.853	.022
Defenses	436.603	2	218.302	54.573	.000
2-Way Interactions					
Laughter Defenses	10.907	4	2.727	.682	.605
Explained	467.319	8	58.415	14.603	.000
Residual	1348.051	337	4.000		
Total	1815.369	345	5.262		

ANOVA--Physical Stress by Laughter and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	2611.797	4	652.949	17.521	.000
Laughter	105.476	2	52.738	1.415	.244
Defenses	2523.330	2	1261.665	33.856	.000
2-Way Interactions					
Laughter Defenses	129.709	4	32.427	.870	.482
Explained	2741.506	8	342.688	9.196	.000
Residual	12558.612	337	37.266		
Total	15300.118	345	44.348		

	Cell Means (n/Cases) for MAACL			Cell Means (n/Cases) for PSSS		
	Laughter			Laughter		
	1	2	3	1	2	3
Defenses 1	-1.13 (22)	-0.35 (33)	1.98 (37)	6.64 (22)	9.79 (33)	14.81 (37)
Defenses 2	-1.36 (38)	-0.01 (47)	1.47 (61)	5.79 (38)	9.55 (47)	12.52 (61)
Defenses 3	-1.61 (18)	-0.68 (43)	0.81 (47)	5.17 (18)	10.37 (40)	11.83 (47)

Table 4.8c--Females Only cont.

ANALYSIS OF VARIANCE

STRESS VARIABLES BY HUMOR VARIABLES INTERACTING WITH DEFENSES

ANOVA--Emotional Stress by Humor Appreciation and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	539.587	4	134.897	36.015	.000
Humor Appreciation	107.877	2	53.939	14.401	.000
Defenses	361.274	2	180.637	48.227	.000
2-Way Interactions					
HumApp Defenses	24.594	4	6.148	1.642	.163
Explained	564.180	8	70.523	18.828	.000
Residual	1247.267	333	3.746		
Total	1811.448	341	5.312		

ANOVA--Physical Stress by Humor Appreciation and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	2510.365	4	627.591	16.649	.000
Humor Appreciation	84.722	2	42.361	1.124	.326
Defenses	2212.766	2	1106.383	29.351	.000
2-Way Interactions					
HumApp Defenses	35.078	4	8.770	.233	.920
Explained	2545.443	8	318.180	8.441	.000
Residual	12552.546	333	37.695		
Total	15097.988	341	44.276		

Defenses	Cell Means (n/Cases) for MAACL Humor Appreciation			Cell Means (n/Cases) for PSSS Humor Appreciation		
	1	2	3	1	2	3
	1	-0.76 (21)	-0.07 (32)	2.32 (51)	5.67 (21)	10.69 (32)
2	-1.25 (18)	-0.33 (48)	1.48 (53)	6.33 (18)	9.98 (48)	12.96 (53)
3	-1.74 (38)	-0.71 (41)	0.13 (40)	5.84 (38)	9.05 (41)	11.80 (40)

Table 4.8c--Females Only cont.

ANALYSIS OF VARIANCE

STRESS VARIABLES BY HUMOR VARIABLES INTERACTING WITH DEFENSES

ANOVA--Emotional Stress by Humor Production and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	439.138	4	109.785	26.997	.000
Humor Production	13.554	2	6.777	1.667	.190
Defenses	427.160	2	213.580	52.522	.000
2-Way Interactions					
HumProd Defenses	5.829	4	1.457	.358	.838
Explained	444.967	8	55.621	13.678	.000
Residual	1370.402	337	4.066		
Total	1815.369	345	5.262		

ANOVA--Physical Stress by Humor Production and Defenses

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects	2580.195	4	645.049	17.127	.000
Humor Production	73.874	2	36.937	.981	.376
Defenses	2505.030	2	1252.515	33.256	.000
2-Way Interaction					
HumProd Defenses	27.386	4	6.846	.182	.948
Explained	2607.580	8	325.948	8.654	.000
Residual	12692.538	337	37.663		
Total	15300.118	345	44.348		

	Cell Means (n/Cases) for MAACL Humor Production			Cell Means (n/Cases) for PSSS Humor Production		
	1	2	3	1	2	3
	Defenses	1 -1.19 (29)	-0.06 (43)	1.70 (51)	1 7.07 (29)	10.14 (43)
	2 -1.36 (29)	-0.74 (31)	1.33 (46)	2 5.31 (29)	9.65 (31)	12.41 (46)
	3 -1.57 (20)	-0.32 (49)	1.10 (48)	3 5.00 (20)	9.86 (49)	12.69 (48)

Results of the group data indicate that laughter explains some of the variance for emotional stress but not for physical stress ( $p$ 's=.05 and .20 respectively), humor appreciation mediates both types of stress ( $p$ 's equal to or less than .05), while humor production does not explain a significant portion of the variance for either emotional or physical stress ( $p$ 's=.49 and .88). For males, the only significant predictor is humor appreciation on emotional stress ( $p$ =.05). Laughter and humor appreciation both explain emotional stress for women ( $p$ 's<.05), but not physical stress. The main effect of immature defenses was significant for both emotional and physical stress ( $p$ <.05), regardless of gender. In contrast to the main effect of defenses, the interaction of defenses with humor does not significantly predict either emotional or physical stress, neither for males nor females.

The logical interpretation of the data in Table 4.8 is that humor appreciation moderates the experience of both affective and physical stress symptoms, regardless of one's capacity to respond to stressors with mature or immature coping strategies. There is no interaction between humor and coping efforts, therefore the effect of humor on stress is approximately the same both for individuals who are high or low in immature coping responses.

If we were to explore the impact that humor, interacting with immature ego defenses, has on moderating stress with the results of Table 4.8 only, one would conclude that Hypothesis Three is disproved. In reality, however, this type of analysis may be contributing to a Type II Error--accepting the null hypothesis when the null

hypothesis is false. The variance is reduced and power (1-Beta) is lost when continuous variables are collapsed into discrete variables, such as high, medium, low, as were humor and defenses in the ANOVA's above. Using multiple regression, where the interaction effects are calculated as the product of the independent variables, could lead to slightly different findings.

Furthermore, when the main effects of the humor variables are tested separately from each other, as in Table 4.8 ANOVA's, the results are somewhat inconsistent with those reported in Hypothesis Two (Table 4.6). The three humor variables are moderately correlated ( $r$ 's=between .25 and .42,  $p$ 's<.05). Consequently, the covariance should be controlled for by entering laughter, humor production, and humor appreciation simultaneously into the analyses.

#### **Supplemental Analysis for Hypothesis Three**

In order to test properly the theory that humor interacts with other coping activities, the investigator conducted multiple regressions on emotional and physical stress, using the 'simultaneous enter' method to include variables, such as humor, stress mediators (mature coping and immature defenses combined), gender, age, education, and occupation, in addition to the 2-way interactions of laughter x stress mediators, humor appreciation x stress mediators, production x stress mediators, and the interaction of laughter x appreciation x production. In addition, the variables anger, anxiety, and depression were entered into the equation on physical stress because the short-term emotional effects of stress are presumed to be precursors to the long-term physical manifestations of

stress (see Psychosomatic Model of Stress in Appendix E).

The order in which the independent variables were entered into the regression equation was based upon the theory that relatively static variables, such as personality, gender, age, and the sense of humor affect stressors, rather than the other way around. Therefore, these static variables were entered in the first block. The interaction of humor variables with stress mediators were entered in the second block, and stressors were entered last block. (See Tables 4.9 a & b for results. Analyses were also conducted separately for males and females--Tables 4.9 c & d).

Table 4.9a--Group Results

MULTIPLE REGRESSION OF EMOTIONAL STRESS, BLOCK ONE

Enter=Gender, Age, Education, Occupation, Laughter, Humor Appreciation,  
 Humor Production, Stress Mediators (SM); Enter=Laughter x SM,  
 Humor Appreciation x SM, Humor Production x SM, and Laughter x  
 Humor Appreciation x Humor Production; Enter=Stressors

Multiple R	.566	DF	Sum of Squares	Mean Square
Adjusted R Square	.309	12	1089.465	90.789
F = 25.781 Sig F = .000		657	2305.563	3.509
Variables in the Equation				
Variable	Beta	T	Sig T	
Occupation Skilled/				
Service	.021	.433	.665	
Humor Production	.045	1.250	.212	
Age	-.078	-2.031	.043	
Occupation Technical	-.033	-.783	.434	
Stress Mediators	-.483	-14.161	.000	
Occupation Professional	.038	.944	.345	
Gender	.044	1.224	.222	
Humor Appreciation	-.127	-3.596	.000	
Laughter	-.081	-2.215	.027	
Occupation Secretary/				
Clerical	.097	1.912	.056	
Occupation Executive/				
Administration/Faculty	-.028	-.615	.539	
Education	.031	.593	.553	
Occupation Graduates	.006	.121	.903	
(Constant)		6.875	.000	

Table 4.9a--Group Results cont.

MULTIPLE REGRESSION OF EMOTIONAL STRESS, BLOCK TWO

Multiple R	.575	DF	Sum of Squares	Mean Square
Adjusted R Square	.315	16	1123.642	70.228
F = 20.190 Sig F = .000		653	2271.386	3.478
Variables in the Equation				
Variable	Beta	T	Sig T	
Occupation Skilled/				
Service	.027	.553	.581	
Humor Production	.370	2.415	.016	
Age	-.082	-2.135	.033	
Occupation Technical	-.036	-.851	.395	
Stress Mediators	-.784	-3.946	.000	
Occupation Professional	.043	1.083	.279	
Gender	.042	1.147	.252	
Humor Appreciation	-.322	-2.550	.011	
Laughter	-.428	-2.852	.005	
Occupation Secretary/				
Clerical	.091	1.803	.072	
Occupation Executive/				
Administration/Faculty	-.021	-.466	.641	
Education	.032	.606	.545	
Occupation Graduates	-.001	-.027	.979	
Prod x Appc x Laf	.040	.517	.605	
Production x SM	-.386	-2.296	.022	
Laughter x SM	.368	2.208	.028	
Appreciation x SM	.402	1.549	.122	
(Constant)		4.840	.000	

Table 4.9a--Group Results cont.

MULTIPLE REGRESSION OF EMOTIONAL STRESS, BLOCK THREE

Variable	Beta	T	Sig T	
Multiple R	.615	DF	Sum of Squares	Mean Square
Adjusted R Square	.363	17	1285.773	75.634
F = 23.379 Sig F = .000		652	2109.256	3.235
Variables in the Equation				
Occupation Skilled/				
Service	-.009	-.179	.858	
Humor Production	.401	2.713	.007	
Age	-.057	-1.524	.128	
Occupation Technical	-.079	-1.916	.056	
Stress Mediators	-.703	-3.678	.000	
Occupation Professional	.002	.062	.951	
Gender	.076	2.142	.033	
Humor Appreciation	-.338	-2.776	.006	
Laughter	-.357	-2.455	.014	
Occupation Secretary/				
Clerical	.036	.718	.473	
Occupation Executive/				
Administration/Faculty	-.042	-.942	.346	
Education	-.005	-.094	.925	
Occupation Graduates	.033	.745	.457	
Prod x Appc x Laf	.011	.151	.880	
Production x SM	-.422	-2.600	.010	
Laughter x SM	.327	2.030	.043	
Appreciation x SM	.420	1.675	.094	
Stressors	.240	7.079	.000	
(Constant)		3.843	.000	

The first 'block' of variables entered into the regression equation on **emotional stress** resulted in a Multiple R of .57 ( $p < .05$ ), thus accounting for 31% of the variance (Table 4.9a). Significant independent variables included age, stress mediators, and the Secretary/clerical occupations. Consistent with the results found in Hypothesis Two, humor appreciation and laughter were also statistically significant, while humor production was not.

The interaction effects were entered in block two with no increase in the adjusted  $R^2$  of .31. Although the amount of explained variance remained the same, the factors that contributed to the  $R^2$  changed. The occupations of Secretary/clerical are no longer significant when the interactions of humor with other coping strategies are controlled for. Instead, humor production and the products of laughter and humor production with stress mediators are now significant. Their interactions are disordinal; meaning that the main effects of laughter, humor production, and stress mediators are no longer valid because a score on one variable is influenced by a score on the other.

Finally, when stressors were entered in block three, the Multiple R equals .62. The independent variables, humor production and appreciation, laughter, stress mediators, gender, the interactions of humor production and laughter with stress mediators, and stressors explain 36% of the variance on emotional stress. The variables with the

largest Beta weights are stress mediators (.70), humor production (.40), and the interaction of humor production with stress mediators (-.42). Stressors and gender had the lowest Beta's (.24 and .07, respectively).

Interestingly, the only 'demographic' variable that remains significant when all the predictors are included in the regression equation is gender. Occupation, age, and education do not contribute to the explained variance over and above an individual's coping strategies (including humor) and level of stressors.

Table 4.9b includes group results for physical stress.

Table 4.9b--Group Results

MULTIPLE REGRESSION ON PHYSICAL STRESS, BLOCK ONE

Enter=Gender, Age, Education, Occupation, Laughter, Humor Appreciation,  
 Humor Production, Stress Mediators, Depression, Anger, Anxiety;  
 Enter=Laughter x SM, Humor Appreciation x SM, Humor Production x SM,  
 and Production x Humor Appreciation x Laughter; Enter=Stressors

Multiple R	.557	DF	Sum of Squares	Mean Square
Adjusted R Square	.293	15	7897.153	526.477
F = 18.470 Sig F = .000		616	17558.999	28.505
Variables in the Equation				
Variable	Beta	T	Sig T	
Occupation Skilled/				
Service	.014	.270	.787	
Humor Production	.011	.286	.775	
Depress	.156	3.214	.001	
Age	-.120	-2.957	.003	
Occupation Technical	.017	.373	.709	
Stress Mediators	-.102	-2.473	.014	
Occupation Professional	.017	.399	.690	
Gender	-.181	-4.752	.000	
Humor Appreciation	.002	.053	.958	
Anger	.015	.399	.690	
Laughter	-.066	-1.738	.083	
Occupation Secretary/				
Clerical	.053	1.020	.308	
Anxiety	.264	5.854	.000	
Occupation Executive/				
Administration/Faculty	.015	.313	.755	
Education	-.069	-1.359	.209	
Occupation Graduates	-.050	-1.034	.302	

Table 4.9b--Group Results cont.

MULTIPLE REGRESSION ON PHYSICAL STRESS, BLOCK TWO

Multiple R	.564	DF	Sum of Squares	Mean Square
Adjusted R Square	.297	19	8103.309	426.490
F = 15.041 Sig F = .000		612	17352.843	28.354
Variables in the Equation				
Variable	Beta	T	Sig T	
Occupation Skilled/				
Service	.026	.496	.620	
Humor Production	-.116	-.718	.473	
Depress	.151	3.109	.002	
Age	-.116	-2.854	.005	
Occupation Technical	.018	.396	.692	
Stress Mediators	-.301	-1.446	.149	
Occupation Professional	.021	.506	.613	
Gender	-.185	-4.843	.000	
Humor Appreciation	-.035	-.268	.789	
Anger	.014	.382	.703	
Laughter	-.374	-2.359	.019	
Occupation Secretary/				
Clerical	.058	1.107	.269	
Anxiety	.263	5.849	.000	
Occupation Executive/				
Administration/Faculty	.017	.353	.724	
Education	-.062	-1.141	.254	
Occupation Graduates	-.048	-.999	.318	
Prod x Appc x Laf	.027	.335	.738	
Production x SM	.125	.711	.477	
Laughter x SM	.328	1.878	.061	
Appreciation x SM	.074	.277	.782	

Table 4.9b--Group Results cont.

MULTIPLE REGRESSION ON PHYSICAL STRESS, BLOCK THREE

		DF	Sum of Squares	Mean Square
Multiple R	.609			
Adjusted R Square	.351	20	9450.921	492.546
F = 18.039 Sig F = .000		611	16005.230	26.195
Variables in the Equation				
Variable	Beta	T	Sig T	
Occupation Skilled/ Service	-.016	-.311	.756	
Humor Production	-.020	-.132	.895	
Depress	.121	2.577	.010	
Age	-.090	-2.299	.022	
Occupation Technical	-.041	-.939	.348	
Stress Mediators	-.287	-1.433	.153	
Occupation Professional	-.023	-.566	.572	
Gender	-.155	-4.200	.000	
Humor Appreciation	-.078	-.615	.539	
Anger	.027	.735	.463	
Laughter	-.339	-2.225	.026	
Occupation Secretary/ Clerical	.007	.139	.890	
Anxiety	.172	3.825	.000	
Occupation Executive/ Administration/Faculty	-.014	-.301	.764	
Education	-.095	-1.795	.073	
Occupation Graduates	-.006	-.127	.899	
Prod x Appc X Laf	-.006	-.078	.938	
Production x SM	.027	.158	.875	
Laughter x SM	.327	1.948	.052	
Appreciation x SM	.137	.533	.594	
Stressors	.273	7.173	.000	

Block one variables explain 29% of the variance for **physical stress** (Multiple  $R=.56$ ,  $p<.05$ ). The significant predictor variables included stress mediators, gender, age, anxiety, and depression. None of the humor variables were significant. As in the regression on emotional stress, the adjusted  $R^2$  remained approximately the same in block two ( $R^2=.30$ ,  $p<.05$ ), yet the significant factors changed. Laughter becomes a predictor variable and other stress mediators drop out, when the interaction effects are included in the equation.

Stressors are entered in block three, resulting in an adjusted  $R^2$  of .35 ( $p<.05$ ) for physical stress. When all the independent variables are accounted for, the interaction effect of laughter with stress mediators is significant ( $p=.05$ ). Again, the interaction effect is disordinal. Laughter has the largest Beta weight (-.34), followed by the product of laughter with stress mediators (.33) and stressors (.27). The variables with the lowest Beta's are age (-.09) and anxiety (.17).

As anticipated, depression and anxiety are significantly related to physical stress symptoms; anger was not. The effect, however, is not particularly high when laughter and its interaction with stress mediators is controlled for.

Table 4.9c reports the final block results of the multiple regression equations on stress for men.

Table 4.9c--Males Only

MULTIPLE REGRESSION OF EMOTIONAL STRESS, BLOCK THREE ONLY

Enter=Age, Education, Occupation, Laughter, Humor Appreciation, Humor Production, Stress Mediators; Enter=Laughter x SM, Humor Appreciation x SM, Humor Production x SM, and Production x Appreciation x Laughter; Enter=Stressors (Block 1, Adjusted R<sup>2</sup>=.25, Block 2, Adjusted R<sup>2</sup>=.26)

Variable	Beta	T	Sig T
Multiple R	.603	DF	Sum of Squares
Adjusted R Square	.332	16	573.490
F = 11.197 Sig F = .000		313	1001.933
Variables in the Equation			
Occupation Skilled/Service	-.008	-.100	.920
Humor Production	.557	2.388	.018
Age	-.075	-1.331	.184
Occupation Technical	-.098	-1.449	.148
Stress Mediators	-.006	-.020	.984
Occupation Professional	.046	.800	.424
Humor Appreciation	.104	.498	.619
Laughter	-.537	-2.269	.024
Occupation Secretary/Clerical	.131	2.681	.008
Occupation Executive/Administration/Faculty	-.003	-.036	.971
Education	-.024	-.301	.763
Occupation Graduates	-.003	-.045	.964
Prod x Appc x Laf	-.072	-.649	.517
Production x SM	-.559	-2.170	.031
Laughter x SM	.599	2.279	.023
Appreciation x SM	-.453	-1.144	.253
Stressors	.294	5.965	.000

Table 4.9c--Males Only cont.

MULTIPLE REGRESSION OF PHYSICAL STRESS, BLOCK THREE ONLY

Enter=Age, Education, Occupation, Laughter, Appreciation, Production, Stress Mediators, Depression, Anger, Anxiety; Enter=Laughter x SM, Humor Appreciation x SM, Humor Production x SM, and Production x Appreciation x Laughter; Enter=Stressors (Block 1, Adj. R<sup>2</sup>=.24; Block 2, Adj. R<sup>2</sup>=.24)

Multiple R	.591	DF	Sum of Squares	Mean Square
Adjusted R Square	.307	19	3305.786	173.989
F = 8.118 Sig F = .000		287	6151.159	21.433
Variables in the Equation				
Variable	Beta	T	Sig T	
Occupation Skilled/				
Service	.128	1.494	.136	
Humor Production	.271	1.090	.277	
Depress	.065	.921	.358	
Age	-.178	-2.969	.003	
Occupation Technical	.039	.543	.588	
Stress Mediators	-.260	-.807	.420	
Occupation Professional	.011	.176	.861	
Humor Appreciation	-.102	-.473	.637	
Anger	.005	.092	.927	
Laughter	-.572	-2.257	.025	
Occupation Secretary/				
Clerical	.131	2.568	.011	
Anxiety	.127	1.793	.074	
Occupation Executive/				
Administration/Faculty	.059	.792	.429	
Education	-.035	-.419	.676	
Occupation Graduates	-.054	-.776	.438	
Prod x Appc x Laf	-.139	-1.205	.229	
Production x SM	-.144	-.529	.597	
Laughter x SM	.594	2.127	.034	
Appreciation x SM	.040	.097	.923	
Stressors	.306	5.234	.000	

The independent variables explained 33% of emotional stress and 31% of physical stress ( $p < .05$ ). Occupations Secretary/clerical, humor production, laughter, the products of production and laughter with stress mediators, and stressors significantly predict emotional stress. The interaction effects are disordinal. Humor appreciation does not effectively moderate affective symptoms for males when all the static personal factors are accounted for. Humor production, laughter and their interactions with stress mediators have similar Beta weights (between  $-.54$  and  $.60$ ), while occupation Secretary/clerical and stressors are low ( $.13$  and  $.29$ , respectively).

The number of significant independent variables predicting physical stress for men is low, including only occupation Secretary/clerical, age, laughter, laughter x stress mediators (a disordinal interaction effect), and stressors. Laughter and its interaction with stress mediators have the largest Beta's ( $-.57$  and  $.59$ , respectively), occupation and age have the smallest Beta weights ( $.13$  and  $-.18$ ). Surprisingly, none of the affective variables (anger, anxiety, or depression), nor other coping strategies were significant in moderating physical stress for males.

Table 4.9d reports the final block results of the multiple regression equations on stress for women.

Table 4.9d--Females Only

MULTIPLE REGRESSION OF EMOTIONAL STRESS, BLOCK THREE ONLY

Enter=Age, Education, Occupation, Laughter, Humor Appreciation, Humor Production, Stress Mediators; Enter=Laughter x SM, Humor Appreciation x SM, Humor Production x SM, and Production x Appreciation x Laughter; Enter=Stressors (Block 1, Adjusted R<sup>2</sup>=.36; Block 2, Adjusted R<sup>2</sup>=.37)

Multiple R	.651	DF	Sum of Squares	Mean Square
Adjusted R Square	.396	16	765.636	47.852
F = 14.876 Sig F = .000		323	1039.040	3.217

Variables in the Equation

Variable	Beta	T	Sig T
Occupation Skilled/			
Service	.016	.293	.770
Humor Production	.320	1.677	.095
Age	-.066	-1.295	.196
Occupation Technical	-.060	-1.168	.244
Stress Mediators	-1.116	-4.258	.000
Occupation Professional	-.034	-.638	.524
Humor Appreciation	-.559	-3.580	.000
Laughter	-.295	-1.599	.111
Occupation Secretary/			
Clerical	.014	.192	.848
Occupation Executive/			
Administration/Faculty	-.081	-1.410	.159
Education	.015	.214	.831
Occupation Graduates	.073	1.159	.247
Prod x Appc x Laf	.053	.493	.623
Production x SM	-.352	-1.738	.083
Laughter x SM	.196	.971	.332
Appreciation x SM	.947	2.761	.006
Stressors	.185	3.966	.000

Table 4.9d--Females Only cont.

MULTIPLE REGRESSION OF PHYSICAL STRESS, BLOCK THREE ONLY

Enter=Age, Education, Occupation, Laughter, Appreciation, Production, Stress Mediators, Depression, Anger, Anxiety; Enter=Laughter x SM, Humor Appreciation x SM, Humor Production x SM, and Production x Appreciation x Laughter; Enter=Stressors (Block 1, Adj. R<sup>2</sup>=.27; Block 2, Adj. R<sup>2</sup>=.27)

		DF	Sum of Squares	Mean Square
Multiple R	.597		5057.981	266.210
Adjusted R Square	.316	19	9142.376	29.975
F =	8.881	305		
Sig F =	.000			

Variable	Variables in the Equation		
	Beta	T	Sig T
Occupation Skilled/Service	-.101	-1.692	.092
Humor Production	-.216	-1.021	.308
Depress	.192	2.757	.006
Age	-.049	-.868	.386
Occupation Technical	-.076	-1.319	.188
Stress Mediators	-.201	-.679	.497
Occupation Professional	-.027	-.462	.644
Humor Appreciation	-.012	-.068	.946
Anger	.050	.948	.344
Laughter	-.271	-1.324	.186
Occupation Secretary/Clerical	-.073	-.900	.370
Anxiety	.200	3.210	.002
Occupation Graduates	.009	.135	.893
Administration/Faculty	-.023	-.368	.713
Education	-.144	-1.945	.053
Occupation Graduates		1.166	.245
Prod x Appc x Laf	.138	.481	.631
Production x SM	.109	.933	.352
Laughter x SM	.208	.222	.825
Appreciation x SM	.084	4.761	.000
Stressors	.257		

The results of the regression on emotional stress for women (Table 4.9d) are quite different from those of the males. The independent variables entered in block three explain 40% ( $p < .05$ ) of the variance, yet fewer variables are significant. They are humor appreciation, stress mediators, appreciation x stress mediators, and stressors. Coping strategies and the interaction of humor appreciation with stress mediators have the highest Beta weights (-1.12 and .95 respectively), while stressors have the lowest Beta (.19). The larger  $R^2$  may be due, in part, to the ordinal nature of the interaction effect, which suggests that humor appreciation and stress mediators operate in synergy with each other.

Again, the Multiple R for physical stress is high for women (.60,  $p < .05$ ); however, the factors responsible for explaining 32% of the variance are only three. Just as theory would predict it, stressors, anxiety, and depression are significant, with similar Beta weights (between .19 and .26). Neither humor, nor other coping mechanisms appear to moderate physical stress for the females.

In conclusion, men appear to respond to stressful arousal with all three types of humor more often than women, although this difference is not a practical one until all personal variables, such as age, education, and occupation are considered. When the relationship between humor and affective and physical stress symptoms is examined, laughter

and humor appreciation are significant predictors of stress. The failure of humor production to predict stress is likely a failure to measure jesting in its natural environment. There exists both a mature humor, that can reduce arousal or aid in coping with arousal, and an immature wit, that may serve to increase stressors and/or stress. Finally, the issue of an interaction effect between humor and immature coping defenses is unresolved. Several interactions take on significance in the regression on stress, when all the pertinent variables are entered. However, the explained variance does not increase, and the predicted pattern does not occur.

#### Results and Discussion--Secondary Hypotheses

##### **Hypothesis Four**

Hypothesis Four states that mature coping strategies will be associated with reported stress symptoms, such that those with higher scores on the Coping subscale of the SMI will show lower scores on the MAACL and PSSS. Results of the data analyses are reported for the total population, females and males only in Tables 4.10a, b, & c.

Table 4.10a-Group Results

MULTIPLE REGRESSION OF STRESS VARIABLES ON COPING

<u>Emotional Stress</u>		<u>Physical Stress</u>	
Multiple R	.335	Multiple R	.118
Adjusted R Square	.111	Adjusted R Square	.013
F = 86.903	Sig F = .000	F = 9.745	Sig F = .002
Variable--Coping		Variable--Coping	
Beta= - .335	Sig T=.000	Beta= - .118	Sig T=.002

Table 4.10b-Males Only

MULTIPLE REGRESSION OF STRESS VARIABLES ON COPING

<u>Emotional Stress</u>		<u>Physical Stress</u>	
Multiple R	.267	Multiple R	.120
Adjusted R Square	.068	Adjusted R Square	.011
F = 25.180	Sig F = .000	F = 4.782	Sig F = .030
Variable--Coping		Variable--Coping	
Beta= - .267	Sig T=.000	Beta= - .120	Sig T=.030

Table 4.10c-Females Only

MULTIPLE REGRESSION OF STRESS VARIABLES ON COPING

<u>Emotional Stress</u>		<u>Physical Stress</u>	
Multiple R	.390	Multiple R	.133
Adjusted R Square	.149	Adjusted R Square	.015
F = 61.782	Sig F = .000	F = 6.226	Sig F = .013
Variable--Coping		Variable--Coping	
Beta= - .390	Sig T=.000	Beta= - .133	Sig T=.013

The Coping subscale of the SMI significantly predicts both emotional and physical stress symptoms, for men as well as women (all  $p$ 's < .05), although the effect on physical stress is much less. The use of coping skills explains 11% of the variance for emotional stress, but only 1% for physical stress, (7% & 1% for males, and 15% & 2% for females, respectively). All Beta's are negative, which means that the theoretical effect of mature coping strategies is to **reduce stress**.

#### **Hypothesis Five**

Hypothesis Five states that immature defense strategies will be associated with reported stress symptoms, such that those with higher scores on the Defenses subscale of the SMI will show higher scores on the MAACL and PSSS. Results of the data analyses are reported for the total population, females and males only in Tables 4.11a, b, & c.

Table 4.11a-Group Results

MULTIPLE REGRESSION OF STRESS VARIABLES ON DEFENSES

<u>Emotional Stress</u>		<u>Physical Stress</u>	
Multiple R	.493	Multiple R	.409
Adjusted R Square	.242	Adjusted R Square	.166
F = 220.371	Sig F = .000	F = 137.743	Sig F = .000
Variable--Defenses		Variable--Defenses	
Beta=	.493 Sig T=.000	Beta=	.409 Sig T=.000

Table 4.11b-Males Only

MULTIPLE REGRESSION OF STRESS VARIABLES ON DEFENSES

<u>Emotional Stress</u>		<u>Physical Stress</u>	
Multiple R	.437	Multiple R	.335
Adjusted R Square	.188	Adjusted R Square	.110
F = 76.755	Sig F = .000	F = 41.318	Sig F = .000
Variable--Defenses		Variable--Defenses	
Beta=	.437 Sig T=.000	Beta=	.335 Sig T=.000

Table 4.11c-Females Only

MULTIPLE REGRESSION OF STRESS VARIABLES ON DEFENSES

<u>Emotional Stress</u>		<u>Physical Stress</u>	
Multiple R	.536	Multiple R	.416
Adjusted R Square	.286	Adjusted R Square	.171
F = 139.013	Sig F = .000	F = 71.972	Sig F = .000
Variable--Defenses		Variable--Defenses	
Beta=	.536 Sig T=.000	Beta=	.416 Sig T=.000

The data from Tables 4.11 a, b, & c support Hypothesis Five in the predicted directions, that is defenses are related to **increases in stress scores**. Immature defenses significantly predict emotional stress (adjusted  $R^2=.24$ /group,  $R^2=.19$ /males, and  $R^2=.29$ /females;  $p's<.05$ ), and physical stress (adjusted  $R^2=.17$ /group,  $R^2=.11$ /males, and  $R^2=.17$ /females,  $p's<.05$ ).

### **Hypothesis Six**

The last hypothesis examines occupational stress and burnout in the academic community. Hypothesis Six states that there will be significant differences in the reported scores on measures of MAACL, PSSS, ECS, Laughter, Humor Production, Meta-message Sensitivity (appreciation), and Hassles Scale-abridged by occupation. Tukey-HSD Multiple Range Tests were conducted on all ANOVA's of the stressors, stress, and moderator variables by occupation with F's significant at the .05 level or better (Tables 4.12 a through g).

Crosstabs and Chi Square tests were performed on stressors by occupation for each of the eight general categories of stressors as assessed by the individual questions in the Hassles Scale-abridged. Results are included in a table in Appendix F for reference purposes only. An analysis and interpretation of the results will be provided to the Office of Personnel Services for their use.

Table 4.12a

ANALYSIS OF VARIANCE OF MAACL by OCCUPATION

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	5	114.853	22.971	4.604	.000
Within Groups	723	3606.908	4.604		
Total	728	3721.761			

Tukey-HSD Multiple Range Test

Mean	SD	Group	
-.670	2.08	Grp 1, Executive/ Administration/Faculty	G G G G G G r r r r r r p p p p p p 1 5 4 2 6 3
-.276	2.11	Grp 5, Skilled/Service	
.035	2.28	Grp 4, Technical	*
.171	1.92	Grp 2, Professional	*
.194	2.25	Grp 6, Graduate Students	*
.5204	2.71	Grp 3, Secretary/Clerical	*

(\*) Denotes Pairs of Groups Significantly Different at the .05 Level

Table 4.12b

ANALYSIS OF VARIANCE OF PSSS by OCCUPATION

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	5	1372.933	274.587	6.780	.000
Within Groups	677	27418.917	40.501		
Total	682	28791.851			

Tukey-HSD Multiple Range Test

Mean	SD	Group	
6.521	5.17	Grp 1, Executive/ Administration/Faculty	G G G G G r r r r r p p p p p 1 5 2 4 6 3
8.180	7.20	Grp 5, Skilled/Service	
8.467	6.75	Grp 2, Professional	
8.678	6.30	Grp 4, Technical	
8.871	6.25	Grp 6, Graduate Students	*
11.174	6.87	Grp 3, Secretary/Clerical	* * * *

(\*) Denotes Pairs of Groups Significantly Different at the .05 Level

Table 4.12c

ANALYSIS OF VARIANCE OF STRESS MEDIATORS by OCCUPATION

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	5	1021.363	204.273	6.734	.000
Within Groups	712	21597.657	30.334		
Total	717	22619.020			

Tukey-HSD Multiple Range Test

Mean	SD	Group	
20.810	5.90	Grp 3, Secretary/Clerical	G G G G G
21.044	6.11	Grp 4, Technical	r r r r r
21.708	5.61	Grp 6, Graduate Students	p p p p p
22.397	5.23	Grp 2, Professional	3 4 6 2 5 1
23.532	5.50	Grp 5, Skilled/Service	* *
23.993	4.88	Grp 1, Executive/ Administration/Faculty	* * *

(\* ) Denotes Pairs of Groups Significantly Different at the .05 Level

Table 4.12d

ANALYSIS OF VARIANCE OF LAUGHTER by OCCUPATION

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	5	279.364	55.873	3.197	.007
Within Groups	730	12756.874	17.475		
Total	735	13036.238			

Tukey-HSD Multiple Range Test

Mean	SD	Group	
4.650	4.42	Grp 5, Skilled/Service	G G G G G
5.126	3.98	Grp 3, Secretary/Clerical	r r r r r
6.000	4.03	Grp 4, Technical	p p p p p
6.135	4.02	Grp 6, Graduate Students	5 3 4 6 1 2
6.230	4.42	Grp 1, Executive/ Administration/Faculty	* *
6.415	4.18	Grp 2, Professional	

(\* ) Denotes Pairs of Groups Significantly Different at the .05 Level

Table 4.12e

ANALYSIS OF VARIANCE OF HUMOR PRODUCTION by OCCUPATION

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	5	32.073	6.415	.757	.581
Within Groups	730	6183.840	6.243		
Total	735	6215.913			

No Two Groups Are Significantly Different at the .05 Level

Table 4.12e

ANALYSIS OF VARIANCE OF HUMOR APPRECIATION by OCCUPATION

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	5	245.640	49.128	4.508	.000
Within Groups	708	7715.211	10.897		
Total	713	7960.852			

Tukey-HSD Multiple Range Test

Mean	SD	Group	
20.646	3.54	Grp 3, Secretary/Clerical	G G G G G G
20.790	3.63	Grp 4, Technical	r r r r r r
20.920	3.19	Grp 5, Skilled/Service	p p p p p p
21.144	3.47	Grp 2, Professional	3 4 5 2 6 1
21.368	3.30	Grp 6, Graduate Students	
22.336	2.77	Grp 1, Executive/ Administration/Faculty	* * * *

(\*) Denotes Pairs of Groups Significantly Different at the .05 Level

Table 4.12f

ANALYSIS OF VARIANCE OF HASSLES SCALE (abridged) by OCCUPATION

Source	DF	Sum of Squares	Mean Squares	F	Sig F
Between Groups	5	693.360	138.672	7.588	.000
Within Groups	710	12975.214	18.275		
Total	715	13668.574			

Tukey-HSD Multiple Range Test

Mean	SD	Group	G G G G G G
12.312	5.27	Grp 5, Skilled/Service	r r r r r r
13.019	4.18	Grp 6, Graduate Students	p p p p p p
13.123	4.19	Grp 1, Executive/ Administration/Faculty	5 6 1 4 2 3
14.330	4.42	Grp 4, Technical	*
14.540	3.84	Grp 2, Professional	* *
15.252	3.89	Grp 3, Secretary/Clerical	* * *

(\*) Denotes Pairs of Groups Significantly Different at the .05 Level

The data analyses in the 4.12 Tables confirm the hypothesis that occupational groups differ significantly on the tested stress, humor, and coping variables ( $p's < .05$ ), except for humor production ( $p = .58$ ). The results of the Tukey-HSD tests suggest two distinct profiles; the first copes most effectively with stressors, and the second is most susceptible to stress and occupational burnout. Briefly, the Executive/administrator/Faculty (E/A/F) profession is associated with lower scores on measures of stress and higher scores on coping and humor measures, although this group did not have the lowest scores on stressors. Personnel in the Secretary/clerical (S/C) vocations, on the other hand, scored higher on stressors and stress, and lower on coping and humor measures than any of the other occupations.

To summarize results from the secondary data analyses; (a) the Coping and Defenses subscales of the SMI proved to be valid measures of mature coping strategies and dysfunctional ego defenses; (b) Defenses is a more effective predictor of physical and affective stress than Coping; (c) SMI does not offer a substitute for the traditional measures of stressors (life changes or daily hassles)--the abridged version of the Hassles Scale with only eight questions was a stronger predictor of stress symptomology than SMI; (d) occupational groups differ significantly on reported experience of stressors, coping, humor, and stress; (e)

vocations high in demands and low in control are related to stress and burnout; and (f) female dominated S/C jobs are characterized as highly stressful, while E/A/F personnel appear to be the most well adjusted.

## CHAPTER FIVE

### DISCUSSION

#### Summary

The purpose of this study was to investigate the use of humor and mirth in stress management by an adult population with the potential for high occupational burnout. Due to inadequacies in available instruments for measuring two of the more complex independent and dependent variables (sense of humor and coping strategies), the Emotional Coping Scale and the Stress Mediators Inventory were developed, piloted and validated.

Survey questionnaires were mailed to 2237 UMCP faculty and staff based upon a stratified random sampling design. The overall response rate was 34%. Data was analyzed to answer questions concerning gender differences for the 'sense of humor'; the effectiveness of humor appreciation, humor production, and laughter to predict stress; the efficacy of humor and non-humorous responses to predict stress; the interaction effect of mirth and humor with other coping techniques on stress-related disorders, and identification of occupational stress profiles.

#### Limitations

It was the intention of this study to draw conclusions that are true beyond the limits of the UMCP academic community, that is to generalize results to other people, situations and times. However, there are two factors that

threaten the strength of the study's external validity. These threats were selection bias and instrumentation.

### **Selection Bias**

A breakdown of the response rate by demographics revealed that the survey sample differs from the population on gender, race, and occupation. Specifically, males were under-represented and Caucasians were over-represented. The response rate for Service/maintenance workers (12%) was half again as low as the next lowest occupational category (Fellowship Students, 23%).

One can only speculate as to why there was such a distinction between group response rates. Faculty, for example, are traditionally poor responders to mailed surveys. As members of the academic community, they may be asked to respond to several surveys per month (Gilbert, personal communication, 1992). This forces faculty to be selective in terms of their service obligations. Timing is a second crucial factor in low faculty participation. The questionnaires for this study were sent out during the last two weeks of the Spring 1992 semester; a particularly busy time. Many faculty leave campus for a break or vacation once their final course grades have been submitted.

The time frame probably explains the low 23% response rate of the Fellowship students as well. This particular occupational category differs from the other groups in that these students are awarded stipends without any campus

"work" obligations. Rather, Graduate Fellows receive a stipend to work on their own research. There is no requirement, therefore, for Fellowship students to receive on-campus office space or a departmental mailbox. As a rule, these students have finished their coursework and are not too accessible. The investigator relied on the departments to forward questionnaires and follow-up letters to the students' off-campus addresses. U.S. postage was not included on the return envelopes, which likely reduced the incentive for students to mail in completed questionnaires.

Two other occupational groups that were below the anticipated response rate were Skilled Crafts and Service/maintenance personnel. These occupations are characterized by lower educational levels. The pilot study failed to sufficiently test for questionnaire 'readability.' The propensity of males not to respond to the survey questionnaires further exacerbated the low response rate of these groups, which are male-dominated occupations.

In addition, Skilled Crafts and Service/maintenance staff work out-of-doors, in workshops, or throughout an entire building. They generally do not have an office space or a desk at which it is convenient to fill out a questionnaire. Without providing these workers with time during the work day to answer the survey questions, it was necessary for many to take the questionnaire home to complete. They would have to return it then to work in

order to use the inter-campus mail. These extra complications may have lowered the incentive for skilled crafts and service maintenance personnel to participate in the survey.

### **Instrumentation**

By and large, paper and pencil scales are inadequate to assess humor's functions in everyday interactions. Nearly all research has been confined to studying humor responses to stimuli that the researchers have selected and organized. For example, the seven scenarios described in the Emotional Coping Scales are not exhaustive of the universe of emotionally arousing situations. Nor do the verbal responses control for all combinations of humorous content and structure.

The scale was originally developed by a 'committee' made up of individuals known for their exceptional 'sense of humor', but whose backgrounds are somewhat homogeneous (3 white/1 black, 1 male/3 females, middle class, educated). This could explain further why the response rate was weaker for persons in the lower socio-economic, minority, and/or male groups.

In addition to the influences that selection bias and instrumentation have on external validity, history also serves as a threat to internal validity. The original questionnaire was mailed out at the time that the now famous Rodney King trial verdict was released and the 1992 L.A.

riots ensued. This historical event affected respondents to different degrees.

#### Discussion of Primary Hypotheses

**Hypotheses One** -- The first hypothesis explored the existence of gender bias for the 'sense of humor.' Results revealed only a statistically significant humor difference in favor of males, however the practical significance was questionable.

These findings neither prove nor disprove the theory of Wilson and Molleston (1981) that males are more likely than females to be socialized into believing that being humorous is sex appropriate. What research indicates instead, is that humor matures across the lifespan, possibly resulting in a more androgynous role attitude towards humor with age. Vitulli and Tyler (1988) propose that any sex-linked conditioning that may have occurred during childhood and adolescence likely has been neutralized by the college experience. The data support this theory, as a majority of the survey respondents (81%) have had some college education, and 78% are already 30 or more, and beyond the typical college age.

**Hypothesis Two** -- The results presented in hypothesis two on the stress moderating effects of humor were as confounding as the sum of previous humor research. Theory has it that the active form of humor is responsible for reducing anxiety when initiated by the anxious individual (Martin & Lefcourt,

1983; Syebak, 1982). Nonetheless, the findings from this survey suggest that active humor production actually is associated with increased physical stress for men.

Recent research has emphasized the *situational determinants* of coping efforts. Arousal changes alone do not determine whether laughter, humor, or some other response occurs (McCrae, 1984). Control is a second factor in individual coping differences. For example, persons are more likely to employ defensive or emotion-focused coping in response to stressors that they appraise as uncontrollable or having little amelioration (Folkman & Lazarus, 1980; McFarlane, et.al., 1980).

Previously, chapters one and two discussed the empirical studies that have been remiss in delineating the types of stressful stimuli associated with humor. Was the situation evaluated as safe or inconsequential (presumably leading to laughter or humor), or was the arousing stimulus judged to be threatening (humor is replaced by some other negative emotional response)? Furthermore, one must explore the target of the humorous response, that is, is it healthier to direct our arousal in the form of humor toward another (passive aggression), at ourselves (self-deprecation), or neutrally toward the situation? Although perception of the arousing stimulus, and target of the humorous production were not the central focus of this thesis, they merited further analyses and discussion.

Scenario One - "You are dining in a nice restaurant with friends when a waiter accidentally spills a bowl of soup in your lap" - describes a situation in which the threat against the respondent is initiated by another, although its accidental nature is only moderately arousing. There is little to control as the accident has already occurred. Results indicate that dissipating the arousal of an external threat with an overtly hostile response possibly is not as emotionally stress reducing as responding with neutral or **hostile humor**.

Similarly, Scenario Two - "You trip and fall down on your rear end. Nothing is hurt, but you hear someone laughing behind you" - also describes a threat that has already taken place, and is moderately arousing (the respondent is not hurt, only embarrassed). However, the initiator of the threat is oneself. Here, **self-deprecating** humor may accomplish emotional arousal reduction more effectively than a neutral, non-humorous response.

Scenario Three - "Your dentist is about to drill a tooth" - differs from the first two situations in that an element of control exists. The threat of future pain is equally in the hands of the dentist with the drill as the patient who can choose to leave. In this situation, **neutral humor** and hostile, other-directed humor are associated with significantly lower measures of physical stress than an overtly hostile response.

While the findings above do not offer conclusive evidence for Freud's arousal reduction theory of humor, they do suggest the importance of salience in the power of humor production to affect stress symptoms. When the source of arousal is another, then other-directed hostile humor may be healthier than other types of humor, or non-humorous responses. When we are the source of our own stressors, self-deprecating humor could be more effective, and when stressors are neither self, nor other initiated, neutral humor might work better to reduce stress symptoms than non-humorous responses.

In order for the salience theory of humor to hold fast, however, humor must be initiated by the individual for whom the stressor is meaningful (Goldstein & McGhee, 1972). For example, Scenario Five - "Your best friend's spouse has run off with another person" - is a situation in which the level of arousal is high, although the individual directly experiencing threat is not the respondent but another person. Under these circumstances, the response of hostile humor is associated with higher levels of physical stress than neutral humor or a neutral response. An expression of overt hostility by the respondent is more appropriate than the passive aggression of hostile humor. Such humor coming from an external source might be perceived by the anxious individual as threatening or ridiculing, inappropriate and incompatible with their present emotional state, thereby

raising the emotional tenor of the situation.

Finally, the rules of salience are violated when the level of arousal or threat is high and humor aimed at the source of threat is not as effective in reducing arousal as a neutral attempt at problem solving. For instance, if a person's initial arousal to a stimulus is very high, the response is likely to be avoidance, whereas, if the arousal is perceived as challenging, attempts at problem solving or exploration may follow rather than laughter. It is only when a relatively benign stimulus is judged to be neither dangerous nor challenging that humor results and laughter achieves the function of dissipating tension (Gavanski, 1986; Lafal, 1953; Rothbart, 1973). For example, McCrae (1984) reports correlations between humor and type of stressors as .20 for loss, .42 for threat, and .60 for challenge.

Such is the dilemma in Scenario Six - "Your boss tells you someone else received the promotion that you thought you had a very good chance of getting." Should one stay calm under pressure, or does humor act as the safety valve that would save one from the consequences of their natural reasoning when it would get them into trouble? The salience theory of humor would predict that a hostile (other-directed), humorous response is associated with lower measures of stress than other types of humor, or overt hostility. The mean physical stress score for individuals

responding with hostility is, in fact, much higher than for individuals responding with hostile humor (12.55 vs. 8.69). However, results of the Tukey-HSD test supports the theory that a neutral attempt at problem solving is the most effective approach for reducing the threat of high arousal, low control stressors.

Data analyses that result in such equivocal findings (including two scenarios where the type of verbal responses do not differ significantly) must bring us around again to a discussion of the differences between mature and immature coping strategies. Freud referred to these efforts to cope with arousal as defense mechanisms. According to Vaillant (1977), immature defenses serve to deny the occurrence of the threat and transfer responsibility. Alternatively, the mature defenses recognize the threat but control the pain until the threat can be dealt with.

The form of humor labelled jest will present itself in an objectively stressful situation in which effective flight and fight are both relatively impossible. The individual caught in the 'Freudian humor situation' then reacts to this inescapable stress with neither resignation nor overt hostility but with a humorous retort. Freud was never certain whether this mechanism was essentially pathological or adaptive, although Vaillant (1977) claims that humor is a mature ego defense.

Results from this study suggest that humor production serves both capacities. Wit, as Freud refers to immature humor, always involves distraction. Emotional affect is displaced or concealed. In contrast, the mature sense of humor does not imply pleasure in pain, but reflects a regard for oneself and one's limits **despite pain**. It matters not so much who or what the target of the humorous retort is. This humor exposes a mature capacity to acknowledge inner conflict and yet accept oneself with that knowledge, even when it is the knowledge of one's narcissistic limits (Poland, 1990). It is an effort to gain some control in a situation where control is largely in the hands of another person.

Humor production is indeed a complex linguistic, affective, and psychological phenomenon, and simply is not amenable to the type of laboratory manipulation that researchers favor. It is situation-bound. Like all speech acts, humorous statements must be decoded and comprehended in the context of rules of language, rules of conversations, and other dimensions of the social situation. Yet, research has failed to observe and control for the speaker's intentions.

The results of the supplemental data analysis further illustrate the need to study humor production in its natural settings. The source and intensity of arousal, as well as the humorist's appraisal of the arousal dictate when, and

what type of humor is appropriate to serve the function of stress reduction. In Scenario One, for instance, hostile humor successfully aids the humorist in moderating the potentially stressful arousal, whereas hostile humor in Scenario Five effectively exacerbates the stressfulness of the situation. It is not surprising then, that research studies have found support for both the mature and immature applications of humor, and for the mediating and augmenting affect of humor production on stress outcomes.

**Hypothesis Three** -- The third set of hypotheses tested the interaction effects of the humor variables with other defense strategies on moderating stress. The logical interpretation of the data from Hypothesis Three is that humor appreciation moderates the experience of both affective and physical stress symptoms, regardless of one's capacity to respond to stressors with mature or immature coping strategies. There is no interaction between humor and efforts to moderate stress, therefore, the effect of humor on stress is approximately the same both for individuals who are high or low in immature defense responses.

The findings in the supplemental data analysis to Hypothesis Three highlight the complex nature of humor and its role in coping with stress. In addition, the results of the regression equations illustrate how individual patterns of coping responses are recruited to manage arousal. As

might be anticipated, the response patterns are most clearly differentiated by gender. Although men and women may be exposed to comparable levels of stressors, such stressors will affect them differently.

Functioning among men, for example, is strongly related to negative life events, children's illness and spouses' symptoms, and work stressors. Function among women is more strongly affected by family strains and a negative home environment. The coping responses of men and women are generally similar, although women make more frequent use of emotional-discharge coping, such as crying. (Billings and Moos, 1984) Quite possibly, women perceive their stressors as more uncontrollable than do men. Similarly, the supplemental data reveal that the male pattern of coping for physical stress includes none of the measures of negative affect (anxiety, anger, or depression); however, anxiety and depression, along with stressors, are the only predictors for female physical symptoms. This suggests that the female coping pattern for moderating physical stress is ineffective.

It soon becomes apparent that individual coping is multifaceted. Stressors encountered in the naturalistic environment are met by a dynamic constellation of coping activities interacting with relatively static moderator variables, such as personality traits, demographics, or historical events in a person's life. In general, persons

are characterized more by variability than stability in coping patterns (Folkman & Lazarus, 1980). One person might laugh and another cry in the same situation, while each person may use both laughter and tears across situations.

It is these combinations and/or interactions of implementing several strategies that determines the intensity and duration of physical and affective stress symptoms. This explains why the significance of the interaction effects was not apparent until all the relevant characteristics of the individual, such as gender, age, education, and occupation were included in the analysis.

Although many of the interaction effects have proven to contribute significantly to the explained variance for emotional and physical stress, the results still do not support Hypothesis Three as it was stated--those with higher scores on humor and higher scores on immature defenses will show increased scores affective and physical stress; those with higher scores on humor and lower scores on immature defenses will show decreased scores for affective and physical stress. Several inconsistent patterns emerged instead. Often, high and low levels of humor (combined with high levels of stress mediators), appear to be equally effective in moderating stress symptoms, while moderate scores on the humor variables are associated with higher stress scores.

There are a couple of possible explanations for these unpredictable interaction effects. First, humor, as measured in this study, may have both a direct effect on stressors, and an indirect effect of mitigating the relationship between stressors and stress. Social humor, for instance, has the quality of warmth, and a tendency to exchange extraneous pleasantries in the accompaniment of smiles or laughter. It is used to express approval or disapproval, develop common attitudes, indicate safety or friendship (Stephenson, 1951), thereby reducing the likelihood of further stressful arousal. To the contrary, an insulting, sadistic joke will effectively act as a stressor to increase arousal.

At the same time, humor can be an adaptive mechanism that enables one to cope with stressors. According to Freud, it represents a victory of the ego in the face of a severe objective stress situation. Like hope, humor permits one to bear, and yet to focus upon what is too terrible to be borne. Psychologically, humor helps us to achieve a second, non-serious perspective about a serious subject, without discarding the first viewpoint.

A second reason for the inconclusive results in Hypothesis Three is that causality is probably a reciprocal proposition. Humor affects stressors but stressors may also affect humor, just as tickling often leads to uncontrollable laughter. Humor can be a defensive, emotion-focused coping

response to stressors appraised as inescapable (Folkman & Lazarus, 1980). Likewise, the propensity to initiate a humorous retort usually occurs in response to a stressful arousal. This propensity however, if continued during an event of extreme stressors, becomes maladaptive.

The primary data analyses seem to present more questions than answers. The components of humor do appear to affect the stress response, yet we can not say with any authority what combinations and in which situations this is true. The efficacy of humor to lower arousal is situation-bound, and depends on the personal attributes of all involved parties, as well as the historical factors related to the specific situation.

#### Discussion of Secondary Hypotheses

**Hypotheses Four and Five** -- Stress research generally studies the relationship between the cause (stressors), the effect (stress), and variables that moderate that relationship. Traditionally, stressors have been measured with self-reported evaluations such as daily hassles (Kanner, et.al., 1981) or major life events (Lazarus, 1981). The fourth and fifth hypotheses attempt to establish the validity and usefulness of the Stress Mediators Inventory (SMI) in stress research. In particular, the seven question Defenses subscale of the SMI is an appealing alternative to measures of stressors because it is short in length.

Although both coping and defenses proved to affect

stress, it is regrettable that neither predicts physical or emotional stress better than stressors. The regression analyses in Tables 4.9 clearly demonstrated that stressors, even when entered last into the equations, continue to carry the largest Beta weights. In fact, the SMI was only significant in regressions on emotional stress (for group and female results), but not for physical stress. While the SMI can not replace standard measures of stressors, the instrument performs well, both as a supplement to measures of stressors and as a solitary measure of coping patterns.

**Hypothesis Six** -- The sixth hypothesis examines occupational stress and burnout. Results suggest that Executive/administrator/Faculty (E/A/F) are the most 'well adjusted' group in the survey sample, while the Secretary/clerical (S/C) staff appear to be the least. For example, S/C have the highest mean scores on affective and physical stress, the highest level of stressors, the lowest mean scores for two of the three humor variables, and the lowest level of coping skills (stress mediators). The profile for E/A/F is just the opposite. These personnel have the lowest mean stress scores, the highest level of coping skills, and display the highest propensity for humor appreciation.

These findings are consistent with theories on occupational stress, which maintain that burnout occurs most often in professions high on demands and low on control. Burnout is an adverse work stress reaction with

psychological, psychophysical, and behavioral components, including a diminished sense of humor or inability to laugh at daily, on-the-job situations (Eldridge, et.al., 1983). Psychosocial stressors in the work environment that are related to stress and burnout include: 1) quantitative overload--too much to do, time pressure, repetitious work flow in combination with one-sided job demands and high demands on attention; 2) qualitative underload--too narrow and one-sided job content, lack of stimulus variation, no demands on creativity or problem-solving, or low opportunities for social interaction; 3) lack of control, especially in relation to work pace and working methods; and 4) lack of social support, at home and from fellow workers (Frankenhauser & Gardell, 1976).

The National Institute on Workers Compensation (1988) cites secretaries and office managers as being two of the ten most stressful jobs. The descriptions of psychosocial work stressors match the S/C profile of the survey sample. Individuals from this laborforce display high demand (stressors), low control (stress mediators), diminished sense of humor (appreciation and laughter), and adverse reactions (emotional and physical stress). Conversely, while the sample of E/A/F staff experience above average stressors, they generally have a greater degree of control and more resources, such as education and income, to draw upon than most other personnel.

The S/C profile is distinct from those of the other occupations in one other important way. Workers in S/C jobs are 92% female, compared to 28-30% E/A/F staff and to a male majority of Skilled/Service/maintenance (S/S/M) workers (51-98%). Like E/A/F, S/S/M staff scored low on both measures of stress and high on stress mediators. Unlike E/A/F, S/S/M personnel have very low scores on the sense of humor variables and the lowest level of stressors. Although S/S/M jobs are low demand/moderate control while S/C jobs are high demand/low control, the dichotomy in stress symptomology is due, in part, to different capacities for coping with stress. Females use significantly more immature defenses than males ( $p < .05$ ).

These findings reinforce what was said earlier, that women may perceive their stressors as more uncontrollable than do men, thereby resulting in greater emotional-focused and less problem-focused coping. Emotional-focused coping is linked to greater dysfunction (Billing & Moos, 1984).

Finally, the fact that S/S/M workers have the lowest scores on stressors may explain why they also have less humor. For example, what we laugh at or even if we laugh depends on the situation in which laughter occurs. This may be due to the need for heightened arousal and tension, while at the same time there is a judgement that the situation is safe or inconsequential (Rothbart, 1973). Likewise, Lefcourt, et.al. (1974) claim that arousal is the motivating

force behind humor appreciation. Without sufficient arousal, therefore, S/S/M may not be inspired to respond with humor.

### Conclusion

To summarize, the primary goals of the survey were 1) to explore the possible existence of gender differences for the 'sense of humor,' 2) to compare the effectiveness of humor appreciation, humor production, and laughter in predicting stress symptoms, 3) to compare the effectiveness of humor responses (hostile, self deprecation, or situational) with non-humorous responses (hostile or neutral) in predicting stress symptoms, and 4) to examine the interaction of mirth and humor with other coping techniques in reducing stress-related disorders.

The survey data does appear to support the notion of gender differences with regard to the sense of humor. Males displayed significantly higher scores on measure of all three humor components, although the differences were not large. Gender differences in humor are more pronounced, however, when we examine the efficacy of humor to moderate stress in relation to other coping and defense strategies.

The effectiveness of humor to predict stress was generally significant for two of the three components. Humor appreciation probably exerts its effects on stress, at least in part, by modifying cognitive mediational processes. An evaluation of the context surrounding a stressor as safe

or inconsequential can sustain the arousal at a lower level. Laughter most likely affects stress on the physical level by dissipating arousal, comparable to the effects of exercise on stress. However, one must not ignore the ways in which smiles and laughter act as interpersonal mechanisms that evoke positive responses in others.

Humor production, on the other hand, was not able to predict emotional or physical stress symptoms for either men or women. Again, the efficacy of humor production to affect stress is influenced by an individual's total coping profile. For instance, the effect that our own behaviors have on others, such as humorous hostile remarks, has indirect consequences on our own experience of stress.

Furthermore, the creation of humor may or may not be a significant predictor of stress depending on the nature of the situation, how it is interpreted by the individual and the target of the humor production. Results of the supplemental data analysis suggest that it is not necessarily the target of the humorous response (self, other, or situational) that determines mature humor from immature humor. For example, projection and passive aggressive behavior expressed through humor serve to deny the occurrence of threat and transfer responsibility. Alternatively, the mature coping defenses of sublimation and suppression, as expressed through the creation of humor control pain until a more appropriate time.

We can not study humor in isolation. Rather, one must determine the level and types of stressors at work, what other mature and immature coping strategies are used in conjunction to humor production, as well as gender differences. It is the combination and/or interaction of implementing several coping strategies that determines the intensity and duration of the stress response.

The supplemental data analysis for Hypothesis Three demonstrates how the influence of all stress-related variables on affective and physical symptoms change the relationship of humor to stress. Previously, the interaction of humor with other coping strategies was not significant, yet when other demographic factors such as age and occupation are controlled for, then the interactions become important.

The study results help to define what is mature humor. The ability to laugh at oneself does not refer to self-deprecating humor but to cognitive recognition of our own contradictions and their relationship to our self. Maturity in coping and in humor presupposes an ability to stand apart from ourselves and observe our own successes and failures and to be able to understand ourselves better.

Dixon (1980) proposed that the capacity to enjoy humor is the outcome of a development of an alternative mechanism to the primitive stress response. Gerald Grumet (1989, p 1059) beautifully articulates this theory

Laughter is a mechanism for maintaining emotional homeostasis amidst the repressions and demands of an increasingly complex world. The psychodynamic and neurodynamics of humor and laughter seem to be rooted in a need to discharge basic impulses and tensions no longer relevant to survival in modern society. While our brains still harbor generalized programs for survival in the wild, civilization demands that the neural scripts for the ferocious struggles of yesteryear be largely repressed and allowed gratification only in derivative forms such as athletic competition, political contests, literature, theater, and other sublimations or fantasized outlets for aggressive and sexual energies. Amidst the crowding, alienation, mobility and assorted dangers and frustrations of life as we know it, laughter emancipates the lower brain centers momentarily from inhibitory cortical control.

### Implications

The non-academic literature on humor and stress is growing--for example, Bernie Siegel's 1993 article in Health magazine, "Laugh! It's good for body and soul," or the 1992 article, "The Good Humor Man," by Pam Grout in USAir Magazine. So too, are humor programs and workshops on the increase, such as Bob Ross' "Laugh your way to a ripe old age," and 'humor carts' in hospitals. There still needs to be rigorous scientific research to substantiate the health benefiting claims of humor. This study does lend some credibility to the effectiveness of humor to moderate stress, **but not without caution.**

More studies are needed to confirm the findings from this study, particularly as they relate to the male, minority, and lower socio-economic groups. The techniques used to develop the Emotional Coping Scale can be replicated

specifically with these populations in mind. Care must be taken in generalizing the results of this study to other than white, middle class, educated adults.

With these limitations in mind, health educators can incorporate humor in their stress reduction programs. However, they must understand the differences between mature and immature humor. Teaching individuals to cope with stress using humor will not increase personal adjustment and self-esteem. Rather, a well-developed sense of humor, the ability to enjoy what is funny and to laugh at ourselves, are signs of personal adjustment and self-esteem, of individuation, and of being human.

It seems that our ability to appreciate and create humor grows as our ability to maturely respond to stress grows. Individuals should learn to rely more on problem-focused strategies rather than the emotion-focused techniques such as humor. Humor, in conjunction with problem solving, time management, diet and exercise, cognitive reappraisal, social support, and other well established stress management techniques will be the most effective strategy.

APPENDIX A

Survey Questionnaire Cover Letter

(Original letter was printed on  
Department of Health Education Letterhead)

**Does this semester seem more stressful than last Spring?**

Dear Colleague:

The Department of Health Education, in cooperation with the Office of Personnel Services, is sponsoring a study on job-related stress that is resulting from current state budget conditions. Your voluntary participation is essential to the completion of this study. The enclosed questionnaire will provide us with information with which we can plan better programs and work-related policies to assist your needs during these times.

What's in it for you? We will send the results of your questionnaire to you. Learn how you compare to other University of Maryland employees on sources of stress, as well as mental and physical stress symptoms. We will also provide some helpful suggestions on how to cope more effectively with the increasing demands and responsibilities you are facing.

The questionnaire is painless, and will take about 15-20 minutes to complete. Only group results will be made public, as about you will be kept strictly confidential. Nothing could ever appear in your personnel file. If you have any questions regarding this study, please feel free to call Coral Carey at 405-2567 or 946-4784.

Thank you for your assistance and support.

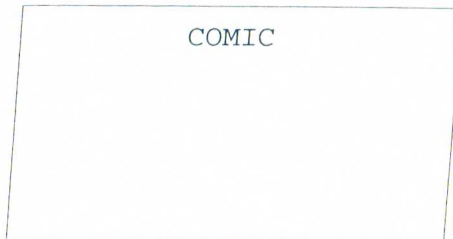
Coral S. Carey  
Survey Coordinator

Glen G. Gilbert, Ph.D.  
Professor and Chairperson

APPENDIX B

Survey Questionnaire Follow-up Letter

Do you still have that UMCP STRESS SURVEY questionnaire in your stack of things to do?



PLEASE PLEASE PLEASE send it in !!

We will gladly accept all questionnaires that are returned by 6/20/92.

It is important for us to know how UMCP STAFF are coping with stress. Return the completed questionnaire and learn how you are personally coping as well. Relieve your stress and our anxiety. PLEASE, send your completed questionnaire now.

QUESTIONS?? Call Coral Carey at 439-4349

If you do not have a questionnaire, fill in your name and address below. A copy will be forthcoming.

Name:

Address:

Fold this letter so the return address is on the outside, staple or tape it closed, and return it via campus mail. Thank you very much.

APPENDIX C

Pilot Questionnaire Cover Letter

Dear \_\_\_\_\_:

Thank you for "volunteering" to complete the enclosed questionnaire. You were specially selected as a participant in this pilot study because you are charming, warm, bright, and giving, (and because no complete stranger would give me the time of day, let alone an hour of their time).

Surveys, such as this one, help researchers to measure certain abstract personality traits that may help explain our behavior. It is often necessary to create new 'measures' for traits that have not been studied before. This questionnaire and my dissertation deal specifically with the ways that people cope emotionally with stress.

The final version of this questionnaire will use only about one third of the questions. Your assistance in completing the longer version will help me to determine which questions are appropriate and which are not. In approximately six weeks, you will be asked to fill out a second, much shorter questionnaire (36 items--15 minutes to complete). These questions will be repeats of some from the previous survey. The purpose of this duplication is to see how stable people answers are over time. If most of your answers have changed, then I am not asking very good questions.

When you have finished answering all questions, return everything except this cover letter to me in the attached envelope. Please remember to include the last four digits of your social security number on the questionnaire so that it can be matched later with the second questionnaire. Thank you again for your help. You can rest better tonight, knowing that you have made a major contribution to science and the pursuit of knowledge.

Sincerely,

Coral Carey

APPENDIX C, cont.

Original Version of the Emotional Coping Scale

(The same questions were included in both Pilot Questionnaires 1 & 2)

What is the current time? \_\_\_\_\_

Items 1-9 are descriptions of situations, each followed by two questions. For each question, please choose the response that is closest to what you might do or say in a similar situation (not how you would like to respond). Circle the letter of your choice.

1. You are at the funeral of a someone close and you hear people laughing and telling funny stories about the deceased.

Your reaction might be to...

- a. cry
- b. groan or make an unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. "Excuse me, may I join you? I knew [the deceased] since childhood; we went from babyfat to acne together."
- b. "Can't you people show a little respect?"
- c. "We shouldn't be telling stories when [the deceased] can't defend him/herself, but as long as we are... [you begin a story]."
- d. Say nothing and leave.
- e. "You must be in the wrong place; they buried Chuckles the Clown over there."

2. You trip and fall down on your rear end. Nothing is hurt, but you hear someone laughing behind you.

Your reaction might be to...

- a. cry
- b. groan or make an unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. "Could you help me up please."
- b. "Wow! What an interesting view from down here."
- c. "It's pretty damn rude to laugh at someone else's misfortune."
- d. "Don't worry, I'm not hurt. I have plenty of padding."
- e. "What are you laughing at me for, here comes a frail little old lady."

APPENDIX C, cont.

3. You are dining in a nice restaurant with friends, when the waiter accidentally spills a bowl of soup in your lap.

Your reaction might be to...

- a. cry
- b. groan or make an unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. "If this is what I get just for ordering soup, what are you going to do to me when I don't leave a big tip?"
  - b. "You clumsy idiot--you've ruined my clothes."
  - c. "This is great soup; anyone else care to try it?"
  - d. "How many people do you think will misinterpret this wet spot when I go to the restroom?"
  - e. "Excuse me while I go to clean up."
4. You are in a hurry to get to work. Traffic is being directed into one lane and a car comes up from the shoulder of the road to cut in front of you.

Your reaction might be to...

- a. cry
- b. groan or make an unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. Say nothing and let the car in.
  - b. "Hey you jerk, wait your turn like everybody else."
  - c. "Do I really look that nice; maybe I should wait until I get to work to shave (put on makeup) and comb my hair."
  - d. "Hmmm, necessity really is the mother of invention."
  - e. "Hey, the bumper sticker says 'I hunt for animals,' not 'I brake for animals'."
5. You unexpectedly receive a prestigious award at work for being the most successful in your division during the past year.

Your reaction might be to...

- a. cry
- b. groan or make an unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- e. no reaction

APPENDIX C, cont.

Your response might be...

- a. "And I thought it was going to be just another average, boring, uneventful day."
- b. "Thank you, this is quite an honor."
- c. "My fortune cookie was right, you can fool all of the people all of the time."
- d. "It's about time I got this, I work harder than anyone else here."
- e. "I just want to say to all my peers who thought I would never amount to much of anything, HA, HA, HA!"

6. Your best friend's spouse has run off with another person.

Your reaction might be to...

- a. cry
- b. groan or make an unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. "What are you going to do?"
- b. "It will be OK. Look at me, I hold the record for being dumped and I still come back for more."
- c. "Should we hire a professional killer, or would you like to shoot the two of them yourself?"
- d. "That bastard (bitch), how could s/he do this to you?"
- e. "I guess this means we will need to find a fourth for bridge on Saturday."

7. Your boss tells you that you were turned down for a promotion because you didn't have right kind of experience.

Your reaction might be to...

- a. cry
- b. groan or make an unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. "You are crazy. You know what you can do with this job."
- b. "Thank you for the information, I'll try again next year."
- c. "Tell me the truth, is it because you don't like the way I dress or wear my hair. I can change!"
- d. "Well, the bright side is that I won't be needing any new tax shelters."
- e. "What kind of experience were you looking for; sexual perhaps!"

APPENDIX C, cont.

8. Your dentist is just about to drill a tooth.

Your reaction might be to...

- a. cry
- b. groan or make an unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. "Go ahead."
- b. "You hurt me and I will find a new dentist!"
- c. "Would you just turn the volume down on that drill? I'm sure it won't hurt as much if I can't hear it."
- d. "I'm not too good with pain. Why don't we just pretend this happened and you can send me the bill."
- e. "I want to see how well this thing works first. Open up doc, and let me drill one of your teeth!"

9. A co-worker teases you about being late for work.

Your reaction might be to...

- a. cry
- b. groan or make an unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. "Lay off, you're not so punctual yourself."
- b. Say nothing and ignore them.
- c. "In a thousand years, what will it matter?"
- d. "You're right, I could get out of bed earlier if I had a boring night life like yours."
- e. "I bought my watch from a guy on the subway, wearing a trench coat in July."

What are the last four digits of your social security number?

What is the current time? \_\_\_\_\_

Subtracting time for interruptions, approximately how long did it take you to complete this questionnaire? \_\_\_\_\_ minutes.

APPENDIX D

Emotional Coping Scale  
(New Instrument-Carey, 1992)

Items 1-7 are descriptions of situations, each followed by two questions. For each question, please choose the response that is **closest** to what you might do or say in a similar situation (not how you would like to respond). Circle the letter of your choice.

1. You are dining in a nice restaurant with friends, when the waiter accidentally spills a bowl of soup in your lap.

Your reaction might be to...

- a. get watery eyes or cry
- b. make a surprised or unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. "Excuse me, I'd rather eat from the bowl."
- b. "Look at what you've done. You're not charging me for this meal."
- c. "The soup looks great. Anyone else care to try it?"
- d. "How many people do you think will misinterpret this wet spot when I go to the restroom?"
- e. "That's OK," or say nothing at all.

2. You trip and fall down on your rear end. Nothing is hurt, but you hear someone laughing behind you.

Your reaction might be to...

- a. get watery eyes or cry
- b. make a surprised or unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. Ask for help, or say nothing
- b. "Wow! What an interesting view from down here."
- c. "It's pretty damn rude to laugh at someone else's misfortune."
- d. "Don't worry, I'm not hurt. I have plenty of padding."
- e. "Are there any other tricks you would like me to perform for your pleasure and amusement."

Emotional Coping cont.

3. Your dentist is just about to drill a tooth.

Your reaction might be to...

- a. get watery eyes or cry
- b. groan or make an unpleasant expression
- c. smile
- d. giggle nervously
- e. laugh
- f. no reaction

Your response might be...

- a. "Go ahead, get it over with."
- b. "You hurt me and I will find a new dentist!"
- c. "Turn the volume down on that drill; I'm sure it won't hurt as much if I can't hear it."
- d. "I'm not too good with pain. Why don't we just pretend this happened and you can send me the bill."
- e. "I want to test this thing first. Open up doc!"

4. You are at the funeral of a someone close and you hear people laughing and telling funny stories about the deceased.

Your reaction might be to...

- a. get watery eyes or cry
- b. make a surprised or unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. "Excuse me, may I join you? I knew [the deceased] since childhood; we went from babyfat to acne together."
- b. "Can't you people show a little respect?"
- c. "We shouldn't be telling stories when [the deceased] can't defend him/herself, but as long as we are... [you begin a story]."
- d. Say nothing.
- e. "Laughing at [the deceased] before they're even in the ground is as tacky as sending balloons instead of flowers."

5. Your best friend's spouse has run off with another person.

No reactions for this question

Your response might be...

- a. "How are you feeling about all of this?"
- b. "It will be OK. Look at me, I hold the record for being dumped and I still come back for more."
- c. "Should we hire a professional killer, or would you like to shoot the two of them yourself?"
- d. "That bastard (bitch), how could s/he do this to you?"
- e. "At least you're free now to roll or squeeze the toothpaste tube any way you like."

Emotional Coping cont.

6. Your boss tells you someone else received the promotion that you thought you had a very good chance of getting.

No reactions for this question

Your response might be...

- a. "Are you crazy? Do you know what a mistake you have made?"
- b. "I would like to discuss this further with you."
- c. "What does [the person who got the promotion] have that I don't have? I could change if the price is right."
- d. "Well, the bright side is that I won't be needing any new tax shelters."
- e. "I guess I don't 'pucker up' quite as well as some around here. Did I mention what a nice suit that is you're wearing?"

7. You have a bad morning and then a co-worker playfully teases you about being late for work.

Your reaction might be to...

- a. get watery eyes or cry
- b. groan or make an unpleasant expression
- c. smile
- d. chuckle, giggle, or laugh
- e. laugh heartily
- f. no reaction

Your response might be...

- a. "Lay off, you're not so punctual yourself."
- b. "You won't believe what has happened to me...[you begin to explain]."
- c. "OK, I'll leave early to make up for it."
- d. "You're right, I could get out of bed earlier if I had a boring night life like yours."
- e. "I bought my watch on the subway, from a guy in a trench coat."



Stress Mediators Inventory  
(New Instrument-Carey, 1992)

The following items are a list of common activities that people use when they are feeling pressured or tense. For each item, circle the number that best indicates how much you generally use that strategy to cope with problems or unpleasant tasks.

0=Not at all 1=Somewhat 2=Moderately so 3=Very much so

- 0 1 2 3 +1) I work out my frustrations with exercise or sports.
- 0 1 2 3 -2) I turn to food, alcohol, tobacco, or medications for comfort.
- 0 1 2 3 +3) I take time to plan and prioritize my activities.
- 0 1 2 3 +4) I breathe deeply and try to smooth away the tension.
- 0 1 2 3 +5) I gather all the information available, decide on the best possible solution and take action.
- 0 1 2 3 -6) I put off doing the unpleasant tasks and do whatever is easiest or most rewarding first.
- 0 1 2 3 -7) I have a difficult time making decisions and often let fate or my emotions decide for me.
- 0 1 2 3 -8) I get overwhelmed and watch T.V., sleep, shop, or find some other form of escape.
- 0 1 2 3 +9) I try not to panic because there is always a solution. One only has to think clearly and logically.
- 0 1 2 3 -10) I tend to have negative thoughts and see everything going wrong.
- 0 1 2 3 +11) I try to view problems and unpleasant tasks as challenges rather than threats.
- 0 1 2 3 -12) I tend to do two or more tasks at a time in order to get things done, such as eating while driving the car.
- 0 1 2 3 -13) I find it difficult to say "No" to the unnecessary demands of others for my time and energy.

Items marked with (+) are part of the Mature Coping Subscale

Items marked with (-) are part of the Immature Defenses Subscale

Physical Stress Symptom Scale  
(Allen and Hyde, 1983)

The following items are symptoms that people sometimes have. For each item, circle the number that best describes how much that symptom or problem has bothered you during the past month.

0 = Not at all    1 = Somewhat    2 = Moderately so    3 = Very much so

- 0 1 2 3    1) Heart racing, pounding, or beating erratically.
- 0 1 2 3    2) Cold, sweaty hands.
- 0 1 2 3    3) Headaches (steady pain or throbbing pain).
- 0 1 2 3    4) Breathing is short, rapid, erratic, or shallow.
- 0 1 2 3    5) Asthma attack.
- 0 1 2 3    6) Difficulty in speaking because of poor breathing control.
- 0 1 2 3    7) Upset stomach, nausea, or vomiting.
- 0 1 2 3    8) Constipation.
- 0 1 2 3    9) Diarrhea.
- 0 1 2 3    10) Sharp abdominal pains.
- 0 1 2 3    11) Skin rashes.
- 0 1 2 3    12) Back or shoulder pains.
- 0 1 2 3    13) Muscle tremors or hands shaking.
- 0 1 2 3    14) Arthritis.
- 0 1 2 3    15) Acne.
- 0 1 2 3    16) Excessive dryness of skin or hair.
- 0 1 2 3    17) Allergy flare-up.
- 0 1 2 3    18) Catching colds or the flu.

Multiple Affective Adjective Checklist  
(Zuckerman, 1960; Zuckerman, et.al., 1964)

Place a check mark next to **all** of the following adjectives that describe how you have been feeling **generally** during the past month.

ANXIETY ITEMS

- |                                   |                                 |                                   |                                      |                                   |
|-----------------------------------|---------------------------------|-----------------------------------|--------------------------------------|-----------------------------------|
| <input type="checkbox"/> +Afraid  | <input type="checkbox"/> -Calm  | <input type="checkbox"/> +Fearful | <input type="checkbox"/> +Frightened | <input type="checkbox"/> +Nervous |
| <input type="checkbox"/> +Panicky | <input type="checkbox"/> +Shaky | <input type="checkbox"/> +Tense   | <input type="checkbox"/> +Upset      | <input type="checkbox"/> +Worried |

DEPRESSION ITEMS

- |                                   |                                  |                                    |                                       |                                    |
|-----------------------------------|----------------------------------|------------------------------------|---------------------------------------|------------------------------------|
| <input type="checkbox"/> +Alone   | <input type="checkbox"/> -Active | <input type="checkbox"/> -Alive    | <input type="checkbox"/> +Awful       | <input type="checkbox"/> +Blue     |
| <input type="checkbox"/> -Fine    | <input type="checkbox"/> +Lost   | <input type="checkbox"/> +Forlorn  | <input type="checkbox"/> +Discouraged | <input type="checkbox"/> -Gay      |
| <input type="checkbox"/> +Gloomy  | <input type="checkbox"/> +Low    | <input type="checkbox"/> -Merry    | <input type="checkbox"/> +Miserable   | <input type="checkbox"/> +Hopeless |
| <input type="checkbox"/> +Lonely  | <input type="checkbox"/> +Sunk   | <input type="checkbox"/> +Rejected | <input type="checkbox"/> +Suffering   | <input type="checkbox"/> +Terrible |
| <input type="checkbox"/> -Healthy | <input type="checkbox"/> +Wilted | <input type="checkbox"/> +Unhappy  | <input type="checkbox"/> +Tormented   |                                    |

HOSTILITY ITEMS

- |                                       |   |                                       |                                   |                                  |
|---------------------------------------|---|---------------------------------------|-----------------------------------|----------------------------------|
| <input type="checkbox"/> +Cruel       | <input type="checkbox"/> +Mad           | <input type="checkbox"/> -Agreeable   | <input type="checkbox"/> -Amiable | <input type="checkbox"/> -Kindly |
| <input type="checkbox"/> -Polite      | <input type="checkbox"/> -Tender        | <input type="checkbox"/> +Angry       | <input type="checkbox"/> -Devoted | <input type="checkbox"/> -Warm   |
| <input type="checkbox"/> -Cooperative | <input type="checkbox"/> -Understanding | <input type="checkbox"/> -Sympathetic |                                   |                                  |

(+) Score 1 point if checked. (-) Score 1 point if not checked.

Hassles Scale-abridged

The following categories are sources of possible irritants that can range from minor annoyances to fairly major pressures, problems, or difficulties. They can occur few or many times. For each category, circle the number that best describes how much of a hassle that item has been for you in the past month.  
0=None or not applicable 1=Somewhat 2=Moderately so 3=Very much so

- |   |   |   |   |  |
|---|---|---|---|--|
| 0 | 1 | 2 | 3 | 1) Your health and/or appearance.  |
| 0 | 1 | 2 | 3 | 2) Your friend(s) and/or social obligations.   |
| 0 | 1 | 2 | 3 | 3) Your family and/or significant relationships.   |
| 0 | 1 | 2 | 3 | 4) Enough money for necessities, emergencies, extras, etc.   |
| 0 | 1 | 2 | 3 | 5) Home maintenance, such as cleaning, car repairs, cooking, yard work, etc.                                 |
| 0 | 1 | 2 | 3 | 6) Things outside your immediate home or work environment, such as politics, pollution, crime, weather, etc. |
| 0 | 1 | 2 | 3 | 7) Unemployment or job insecurity (yours or someone in your household).                                      |
| 0 | 1 | 2 | 3 | 8) Work, such as the demands of your job, relationships at work, commuting, etc.                             |

Demographic Information

- 1) What is your age? \_\_\_\_\_
- 2) What is your gender? Male\_\_\_\_\_ Female\_\_\_\_\_
- 3) Please indicate which occupational category your position at UMCP fits into.
  - a. Faculty
  - b. Graduate Assistant
  - c. Administrative
  - d. Professional
  - e. Secretarial/Clerical
  - f. Technical
  - g. Skilled Crafts
  - h. Service/Maintenance
- 4) Please indicate your current living arrangement.
  - a. Live with one other adult
  - b. Live with one adult and child/ren
  - c. Live with more than one adult
  - d. Live with more than one adult and child/ren
  - e. Live alone
  - f. Live with child/ren only
- 5) Please indicate the highest level of education that you have completed.  
  
(Give highest grade or degree completed) \_\_\_\_\_
- 6) Please indicate your level of combined household income.
  - a. Under \$5,000
  - b. \$5,000 to \$9,999
  - c. \$10,000 to \$14,999
  - d. \$15,000 to \$24,999
  - e. \$25,000 to \$34,999
  - f. \$35,000 or more
- 7) Please indicate your race.
  - a. Asian/Pacific Islander
  - b. Black, not of Hispanic Origin
  - c. White, not of Hispanic Origin
  - d. Hispanic
  - e. American Indian/Native Indian
  - f. Other

APPENDIX E

Psychosomatic Model of Stress  
(Allen & Hyde, 1983)

Stimulus



Perception



Cognitive Evaluation



Emotional Reaction



Physical Reaction



Disease

APPENDIX F

Table 1

CROSSTABS OF STRESSOR--PHYSICAL HEALTH AND/OR APPEARANCE BY OCCUPATION

	Executive Faculty Adminis- tration	Profes- sionals	Secretary Clerical	Technical	Skilled Crafts Service Maintenance	Graduates	Row Total
Never	28	16	6	17	25	23	115
Seldom	55	36	30	36	33	59	249
Occasionally	45	48	43	25	29	47	247
Frequently	20	18	39	17	13	27	134
Column Tot.	148	118	118	95	100	156	735

175

Chi-Square	Value	DF	Significance
Pearson	45.81	18	.000
Likelihood Ratio	45.77	18	.000
Mantel-Hanszel	.98	1	.32

APPENDIX F, cont.

Table 2

CROSSTABS OF STRESSOR--FRIENDS AND/OR SOCIAL OBLIGATIONS BY OCCUPATION

	Executive Faculty Adminis- tration	Profes- sionals	Secretary Clerical	Technical	Skilled Crafts Service Maintenance	Graduates	Row Total
Never	7	7	10	7	22	11	64
Seldom	43	36	30	31	28	45	213
Occasionally	62	47	46	33	26	63	275
Frequently	36	28	33	24	23	37	181
Column Tot.	148	118	119	95	99	156	735

176

<u>Chi-Square</u>	<u>Value</u>	<u>DF</u>	<u>Significance</u>
Pearson	33.43	18	.015
Likelihood Ratio	28.04	18	.061
Mantel-Hanszel	3.17	1	.075

APPENDIX F, cont.

Table 3

CROSSTABS OF STRESSOR--FAMILY AND/OR SIGNIFICANT RELATIONSHIPS BY OCCUPATION

	Executive Faculty Adminis- tration	Profes- sionals	Secretary Clerical	Technical	Skilled Crafts Service Maintenance	Graduates	Row Total
Never	3	2	5	4	18	14	46
Seldom	27	20	15	13	16	39	130
Occasionally	62	43	30	37	34	58	264
Frequently	56	51	69	41	31	45	293
Column Tot.	148	116	119	95	99	156	733

177

Chi-Square	Value	DF	Significance
Pearson	66.73	18	.000
Likelihood Ratio	61.86	18	.000
Mantel-Hanszel	19.16	1	.000

APPENDIX F, cont.

Table 4

CROSSTABS OF STRESSOR--MONEY FOR NECESSITIES, EMERGENCIES, EXTRAS, ETC. BY OCCUPATION

	Executive Faculty Adminis- tration	Profes- sionals	Secretary Clerical	Technical	Skilled Crafts Service Maintenance	Graduates	Row Total
Never	51	21	13	15	13	41	154
Seldom	41	26	31	21	18	40	177
Occasionally	30	35	38	24	22	37	186
Frequently	25	34	37	34	44	37	211
Column Tot.	147	116	119	94	97	155	728

178

<u>Chi-Square</u>	<u>Value</u>	<u>DF</u>	<u>Significance</u>
Pearson	55.44	18	.000
Likelihood Ratio	54.93	18	.000
Mantel-Hanszel	3.14	1	.076

APPENDIX F, cont.

Table 5

CROSSTABS OF STRESSOR--HOME MAINTENANCE BY OCCUPATION

	Executive Faculty Adminis- tration	Profes- sionals	Secretary Clerical	Technical	Skilled Crafts Service Maintenance	Graduates	Row Total
Never	8	2	2	3	7	11	33
Seldom	29	23	19	15	16	46	148
Occasionally	59	41	26	29	38	55	248
Frequently	52	52	72	48	38	44	306
Column Tot.	148	118	119	95	99	156	735

179

<u>Chi-Square</u>	<u>Value</u>	<u>DF</u>	<u>Significance</u>
Pearson	48.45	18	.000
Likelihood Ratio	49.46	18	.000
Mantel-Hanszel	6.93	1	.008

APPENDIX F, cont.

Table 6

CROSSTABS OF STRESSOR--THINGS OUTSIDE YOUR IMMEDIATE HOME OR WORK ENVIRONMENT

BY OCCUPATION

	Executive Faculty Adminis- tration	Profes- sionals	Secretary Clerical	Technical	Skilled Crafts Service Maintenance	Graduates	Row Total
Never	10	6	8	7	21	4	56
Seldom	23	22	25	19	31	21	141
Occasionally	48	47	52	33	28	62	270
Frequently	67	43	32	36	19	68	265
Column Tot.	148	118	117	95	99	156	733

180

<u>Chi-Square</u>	<u>Value</u>	<u>DF</u>	<u>Significance</u>
Pearson	68.42	24	.000
Likelihood Ratio	62.44	24	.000
Mantel-Hanszel	.98	1	.321

Table 7

APPENDIX F, cont.

## CROSSTABS OF STRESSOR--UNEMPLOYMENT OR JOB INSECURITY BY OCCUPATION

	Executive Faculty Adminis- tration	Profes- sionals	Secretary Clerical	Technical	Skilled Crafts Service Maintenance	Graduates	Row Total
Never	56	27	26				
Seldom	44	34	35	24	36	58	227
Occasionally	28	39	24	30	32	44	219
Frequently	19	18	34	23	23	30	167
Column Tot.	147	118	119	18	8	24	121
				95	99	156	734

Chi-Square	Value	DF	Significance
Pearson	38.24	18	.004
Likelihood Ratio	37.14	18	.005
Mantel-Hanszel	1.07	1	.300

APPENDIX F, cont.

Table 8

CROSSTABS OF STRESSOR--WORK BY OCCUPATION

	Executive Faculty Adminis- tration	Profes- sionals	Secretary Clerical	Technical	Skilled Crafts Service Maintenance	Graduates	Row Total
Never	36	15	20	18	28	44	161
Seldom	54	52	47	39	36	63	291
Occasionally	42	38	37	25	20	30	192
Frequently	16	12	14	13	15	19	89
Column Tot.	148	117	118	95	99	156	753

182

<u>Chi-Square</u>	<u>Value</u>	<u>DF</u>	<u>Significance</u>
Pearson	30.86	18	.030
Likelihood Ratio	30.84	18	.030
Mantel-Hanszel	2.49	1	.114

## APPENDIX G

### Human Subjects Approval

Department of Health Education  
Application For Review of Research Using Human Subjects

You should submit four copies of all information to the Chair of the Departmental Committee. Your application will be reviewed by this committee. If the application is part of a proposed project for Federal funding, you must submit 10 copies of the full University IRB application to the Chair of the Departmental Committee.

Principal Investigator or Faculty Advisor Dr. Kenneth Beck Tel 52527

Name of Student Investigator Coral S. Carey Tel. No. 54192

Project Title: Laughter, Humor, and Stress: Can too much of a good thing be bad?

Project Duration: Fall '91 and Spring '92 terms

Has this project been approved by any other Human Subject Review Committee? Yes  No

Provide an abstract of the proposed research in the following space:

What role does a sense of humor play in moderating stress? A failure to distinguish a mature from immature humor coping style may have confounded the results of prior research studies, resulting in the weak validation of humor as a strategy for coping with stress. The purpose of this study is to identify the characteristics of a mature/immature sense of humor and compare the efficacy of these two coping styles as stress mediators.

Questionnaire instruments to be used in the pilot study and survey of 1200 employees of Allstate Insurance Co. include Lazarus and Folkman's "Combined Hassles and Uplifts Scale," Spielberg's "State-Trait Anxiety Inventory," Schiraldi's "Depression Check-up," Novaco's "Anger Inventory," and Allen's "Physical Stress Symptom Scale." In addition, three instruments ("Coping Strategies Inventory," "Humor Appreciation and Production Scale," and "Emotional Coping Scale") have been developed, will be tested for validity and reliability, and used in the study. The use of Multi-Matrix sampling design will permit randomly selected subjects to receive, by mail, a partial questionnaire (1/3 the length of the original) and cover letter briefly explaining the purpose of the study. Participation is voluntary. Survey data will be processed anonymously and analyzed with the most appropriate multivariate statistical techniques, such as canonical correlation and discriminate analysis.

Do you believe this research should be exempt or non-exempt for human subjects review?  
Exempt  Non-Exempt

If exempt, please indicate specific reasons for exemption (see page 3 for exemptions):

Exemption #3: research involves survey procedures, subjects cannot be identified directly or through identifiers linked to the subjects

Date: 9-25-91 PI Signature: Kenn Beck  
Date: 9-25-91 Student Investigator Signature: Coral S. Carey  
Date: 1-10-92 Dep't. Comm. Chair Signature: Jerald S. Greenberg

SEE PAGE TWO FOR OTHER REQUIRED ATTACHMENTS

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