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Relationships among perceived stress, trait anger, modes of anger expression and health status of college men and women

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ABSTRACT

Relationships among perceived stress, trait anger (general propensity to become angry), modes of anger expression, and health status were examined in a sample of 720 college students, using Caplan's conceptualization of stress as the study's framework. Propensity toward anger was assessed by the 10-item form of the Trait Anger Scale (Spielberger et al.), modes of anger expression were assessed by the Framingham Anger Scales, perceived stress was operationalized by the Perceived Stress Scale (Cohen, Kamarck, and Mermelstein), and current health status was assessed by Ware's 9-item Current Health Scale. As hypothesized, stress was a positive correlate of trait anger and all four modes of anger expression. To clarify the relative contributions of anger and stress to the variance in current health status, stepwise regression analyses were used. Trait anger, anger-in and anger-out failed to meet inclusion criteria. The final model explained 14% of the variance in health status with three variables: perceived stress, anger-discuss, and anger symptoms. Thus, trait anger was not as important to health as were the modes chosen to express anger after its arousal by stressful events. Discussion of anger appeared to be a health-promoting expression mode, while expressing anger through somatic symptoms was inversely related to health. (Author/NB)

Relationships Among Perceived Stress, Trait Anger, Modes of Anger Expression and Health Status of College Men and Women

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Running head: STRESS AND ANGER

Abstract

Relationships among perceived stress, trait anger (general propensity to become angry), modes of anger expression, and health status were examined in a sample of 720 college students using Caplan's conceptualization of stress as the study's framework. As hypothesized, stress was a positive correlate of trait anger and all 4 modes of anger expression. To clarify the relative contributions of anger and stress to the variance in current health status, stepwise regression analyses were used. Trait anger, anger-in and anger-out failed to meet inclusion criteria. The final model explained 14% of the variance in health status with 3 variabl s: perceived stress, anger-discuss and nger symptoms. Thus, trait anger was not as important to health as the modes chosen to express anger after its arousal by stressful events. Discussion of anger was a health-promoting expression mode, while expressing anger through somatic symptoms was inversely related to health.

Relationships Among Perceived Stress, Trait Anger, Modes of Anger Expression and Health Status of College Men and Women

Trait anger (one's general propensity to become angry across situations) and anger expression modes have been examined primarily in relation to specific diseases such as coronary heart disease, rather than in relation to health indicators in nonclinical samples. Many investigations have taken place after disease onset, making assessment of premorbid personality factors impossible and providing no clues for prevention of pathology. Further, the focus of research has been on maladaptive forms of anger expression, supplying health professionals with little information regarding health-promoting modes of anger expression. Although stress can logically be considered an anger precipitant, little research has been done on the connection of stress and anger. Therefore, the purpose of the present study was to examine relationships among trait anger, anger expression modes, stress, and general health status in college men and women. This study builds on and extends previous work by the first author with subjects in middle adulthood (Thomas, 1989).

The study includes several dimensions of anger. The overall concept of anger is defined here in the ordinary language sense. Berkowitz (1990) stated that "I view irritation, annoyance, and anger as members of the same class of feelings, and I use the term anger to refer to all of them" (p. 495). Trait anger, a principal dimension of anger, is defined as a relatively stable personality trait comprising one's proneness to perceive situations as anger-provoking and to respond with subjective feelings of

annoyance, irritation or fury (Spielberger, Jacobs, Russell, & Crane, 1983).

Inasmuch as anger produces significant physiological alterations, including increases in both cardiac output and peripheral vascular resistance (Schwartz, Weinberger, & Singer, 1981), one might expect individuals who frequently experience anger to eventually suffer adverse health consequences. Several previous studies support this expectation. For example, trait anger was positively related to blood pressure of black and white women while at work, at rest, and during performance of laboratory tasks (Durel, Carver, Spitzer, Llabre, Weintraub, Saab, & Schneiderman, 1989). Anger was also a key component of the generic disease-prone personality described by Friedman and Booth-Kewley (1987). Among the diseases in which anger is implicated are hypertension, coronary heart disease, cancer, (Appel, Gorkin, & Holroyd, 1983), arthritis, and asthma (Friedman & Booth-Kewley, 1987). Ease of anger arousal, argumentiveness and irritability predicted mortality among men with a history of heart disease in Finland (Koskenvuo et al., 1988).

Anger can be suppressed (anger-in), directed outwardly in a healthy way (anger discuss), directed outwardly in a manner that attacks or blames others (anger-out), or expressed somatically through symptoms like headache (anger symptoms). Suppressed anger is generally considered more deleterious to health than expressed anger. For example, a number of studies have linked anger-in to elevated systolic and diastolic blood pressures (e.g., Gentry, Chesney, Gary, Hall, & Harburg, 1982; Spielberger, Johnson, Russell, Crane, Jacobs, & Worden, 1985). Suppressed anger was

also the culprit in the Framingham study of heart disease (Haynes, Feinleib, & Kannel, 1980). Waldstein, Manuck, Bachen, Muldoon and Bricker (1990) found reluctance to acknowledge or express anger associated with lower high density lipoprotein (HDL) concentration in healthy young males.

Expressed anger may also have damaging health consequences. For example, outwardly expressed anger was correlated with adverse health outcomes in a national sample of black Americans (Johnson & Broman, 1987). The coronary-prone Type A behavior pattern includes overt hostility as its key element (Williams, Haney, Lee, Kong, Blumenthal, & Whalen, 1980). Dembroski and MacDougall (1983, 1985) identified the potential for hostility construct as a risk factor for CHD, independent of global Type A. The structured interview used to assess potential for hostility elicits overt behaviors such as use of obscenity and emotionally laden words, arrogance, rudeness, and condescension (Musante, MacDougall, Dembroski & Costa, 1989).

Researchers have devoted less attention to the other modes of anger expression: anger-discuss and anger symptoms. In the Framingham Study, (Haynes et al., 1978) both anger-discuss and anger symptoms were measured, as well as anger-in and anger-out. The anger-discuss items included getting anger "off your chest" and talking to a friend or relative about anger. Among the four modes of anger expression, only this one has health-promoting connotations. However, most other anger instruments omit this adaptive mode of anger expression. For example, the AX Scale (Spielberger et al., 1985) and the Multidimensional Anger Inventory (Siegel, 1985) include only anger-in and anger-out expression modes. In a recent factor

analysis of several anger measures, the Framingham Anger-Discuss Scale loaded on the factor titled Verbal/Adaptive Anger Expression (Riley & Treiber, 1989).

Despite the general neglect of somatic expression in the anger research, Thomas (1989) found this variable to be the only mode of anger expression related to health status. Classically, somatization has been viewed as a means of communicating when more direct forms of emotional expression are blocked. However, women in the Thomas study who scored high on somatic anger symptoms were also inclined to vent anger outwardly. It is possible that anger symptoms are a concomitant or residual of intense ventilation of anger. For example, Armstead et al. (1989) found that black college students who coped with racism by expressing anger outwardly scored higher on the Framingham Anger Symptoms subscale than students who held their anger in when responding to racism.

Because of common sex role stereotypes regarding anger, one might expect men and women to experience anger in very different ways. However, some research suggests that such expectations are not well founded. For example, Averill's (1983) investigation of anger in a community sample revealed that women got angry as often as men, as intensely as men, for much the same reasons as men, and that women expressed anger as openly as did the men. The only gender difference found by Averill was that women were more likely to cry while angry. No differences were found between Canadian male and female college students in anger-in, anger-out, or frequency of anger expression (Greenglass & Julkuner, 1989). Although females had higher trait anger scores than males in a study of university

students in Israel, there was no gender difference when trait anxiety was partialed out with ANCOVA (Ben-Zur & Zeidner, 1988).

In contrast to the previously cited studies, other studies point to significant gender differences in anger responses. In a study of over 1,000 high school students, Spielberger et al. (1985) found that females had substantially higher total anger expression scores than males. Males, not females, scored higher on anger-in. Some studies have suggested that women are more likely than men to make a constructive behavioral response when anger is generated. Harburg, Blakelock and Roeper (1979) described a reflective coping style that was more characteristic of the women in their sample than of men. On the Framingham Anger-Discuss Scale, which assesses socially appropriate verbalization of anger, women scored higher than men in studies by Thomas (1989) and Riley and Treiber (1989). In those studies where the somatic anger expression mode has been assessed, women have consistently reported higher levels of somatic anger than have men (Durel et al., 1989; Haynes et al., 1978; Thomas, 1989).

Caplan (1981) views dysphoric emotional arousal as an inevitable response to stress. The present study proposes that anger is one of the emotions that may be generated. The Framingham study found daily stress to be significantly correlated with all four modes of anger expression, being most strongly related to anger symptoms (Haynes et al., 1978). In a study of black college freshmen, perceived stress was significantly correlated with trait anger for both men and women (Adams, LaPorte, Matthews, Orchard, & Kuller, 1986).

In view of the previous research, the present study was designed to test the following hypotheses: (a) perceived stress is positively related to trait anger and anger expression modes; (b) trait anger is positively related to all four anger expression modes; (c) males and females differ from each other only in anger-discuss and anger symptoms; (d) trait anger, anger-in, anger-out and anger symptoms are negatively related to current health status; and (e) anger-discuss is positively related to current health status.

Methods

Subjects and procedure

Participants in the study were 720 volunteers from a large state university (n = 411), a community college (n = 253) and a small church-affiliated college (n = 56) in the southeastern United States. Most were white (93%), unmarried (67%), undergraduate full-time students under the age of 35. There were 502 women and 216 men. The research was approved by the University of Tennessee IRB.

After participation in the study was explained to students by their teachers or by research assistants, students who wished to participate signed an informed consent statement and then completed the test battery on a take home basis. Participants were promised and given individual written feedback (via individually generated ID numbers) as to the meaning of their scores on the instruments. Some students also received course credit for participation in the study. A high percentage of students in the various classes solicited elected to participate in the study.

Instrumentation

Propensity toward anger was assessed by the 10-item form of Spielberger's Trait Anger Scale (Spielberger et al., 1983). Items are rated on a 4-point scale with response options ranging from "almost never" to "almost always;" thus, scores can range from 10-40. There are two subscales termed "angry temperament" (e.g., "I am a hot-headed person") and "angry reaction" (e.g., "I get angry when I'm slowed down by others' mistakes"). Extensive normative data are available from studies of high school and college students as well as from military recruits and working adults. Concurrent validity was demonstrated by correlations with hostility measures, and internal consistency reliability coefficients ranged from .81 to .92 for various groups. For the present sample, Cronbach's alpha was .85 for the total scale, .87 for the angry temperament subscale and .73 for the angry reaction subscale.

Modes of anger expression were assessed by the Framingham Anger Scales used in the well-known study of CHD (Haynes et al., 1978). This instrument was selected because it is the only tool including both adaptive and nonadaptive expression modes. The anger-in scale is comprised of 3 items, the anger-out scale of 2 items, the anger-discuss scale of 2 items, and the anger-symptoms scale of 5 items. Respondents are asked to indicate how likely they are to behave in each of the specified ways "when really angry or annoyed." Although there is a 3-point response format "not too likely," "somewhat likely," "very likely," scores between 0 and 1 were assigned in the Framingham Study. In the present study, values of 1, 2, 3 were assigned to responses; therefore, mean scores are not directly

comparable to those obtained in Framingham. In the development of the scales, pooled items that had been generated by an expert panel had been subjected to item and factor analysis, and Nunnally's formula was used to calculate internal consistency for the scales (Haynes et al., 1978).

Recent work on the validity of three of the Framingham Scales by Riley and Treiber (1989) revealed that each was a valid measure of the mode of anger expression it purported to measure, with the exception of the Anger-out Scale. The researchers questioned the validity of the Anger-out scale because it correlated with other measures of anger experience and hostility, but not with other measures of anger expression. Further validity examination would be useful. Reliability of the scales was not entirely satisfactory across subgroups of black and white men and women in the recent study by Durel et al. (1989); therefore, coefficient alphas for the present sample were scrutinized closely and judged to be generally acceptable. These coefficients were: .66 for anger-in, .62 for anger-out, .49 for anger-discuss, and .78 for anger-symptoms. The lower reliability of the anger-discuss scale is probably caused by the small number of items, as item content is clearly homogeneous.

Perceived stress was operationalized in this study by the Perceived Stress Scale (PSS) developed by Cohen, Kamarck, and Mermelstein (1983), a 14-item scale with 5-point Likert-type response format (items scored 0-4). The instrument measures the extent to which individuals perceive their lives to be unpredictable, uncontrollable, and overloading. Quantity of objective life events is not assessed, consistent with the emphasis on subjective appraisal in our conceptual framework. Possible range of scores

is 0-56. Cohen (1986) has demonstrated that the PSS provides a better measure of appraised stress than the Hassles Scale used in the previous study by Thomas (1989). The PSS was normed on 3 samples, two of which were students, and has yielded coefficient alpha reliabilities of .84, .85 and .86 and good evidence of concurrent and predictive validity (Cohen, Kamarck, & Mermelstein, 1983). For the present sample, Cronbach's alpha was .84.

Current health status was assessed by the 9-item Current Health Scale from Ware's (1976) Health Perceptions Questionnaire (HPQ). Reliability and validity of the HPQ scales were established through field testing of over 2000 adults prior to subsequent administration of the instrument to the 8000 people participating in Rand's Health Insurance Study. Construct validity of the HPQ has been demonstrated by confirmatory factor analyses (Ward & Lindeman, 1978), and concurrent validity was established by correlations between HPQ scales and conceptually related variables. One-year test-retest reliability of the HPQ was .88 (Ware, 1976). Internal consistency reliability for the Current Health Scale in the present sample was .72. The range of possible scores on the scale is 9-45.

Analyses

Univariate descriptive statistics for all variables were examined for skewness and the presence of outliers. All variables displayed relatively normal distributions. To examine relationships among variables, correlational and regression analyses were used. To examine group differences, *t* tests were used. An alpha level of .05 was used as the criterion of statistical significance.

Results

Means and standard deviations for continuous variables are presented in Table 1. The full range of possible scores was obtained for all of the anger variables, and there was considerable variability in scores for current health and perceived stress.

Insert Table 1 about here

Correlation and regression analyses

Relationships among anger, stress and health status are depicted in Table 2. As hypothesized, stress was a positive correlate of trait anger and all 4 modes of anger expression, most notably the anger symptoms mode, for both men and women. Of the two trait anger subscales, angry reaction was correlated with stress more highly, regardless of gender (r = .33 for men, r = .32 for women, $p < .0001$). Although trait anger had been hypothesized to positively correlate with scores on all four anger expression modes, this was true only for women. Trait anger was most strongly related to anger-out ($p < .0001$) for both men and women. Consistent with Thomas's (1989) mid-life study, the anger symptoms mode was most salient to health status (r for women = -.26, $p < .0001$; r for men = -.24, $p < .001$). As predicted, anger-discuss was the only expression mode positively related to health (r for women = .17, $p < .001$; r for men = .15, $p < .05$).

Insert Table 2 about here

To clarify the relative contributions of anger and stress to the variance in current health status, regression analyses were used. Since all correlations among variables were below .65 (with the exception of correlations of trait anger subscales with total trait anger), multicollinearity was not anticipated. Nonetheless, collinearity diagnostics were performed. In both forward and backward stepwise multiple regressions, trait anger, anger-in and anger-out failed to meet inclusion criteria. The final model explained 14% of the variance in current health status with 3 variables: perceived stress (Beta = -0.28, $p < .0001$), anger-discuss (Beta = 0.11, $p < .001$) and anger symptoms (Beta = -0.08, $p < .03$); the model was significant at the .0001 level ($F = 37.24$).

Gender differences

Results of t tests examining gender differences revealed that college men and women did not differ in trait anger, perceived stress, or current health, nor did they differ in likelihood of suppressing anger or venting it outwardly. Significant gender differences ($p < .0001$) were obtained in only two modes of anger expression, anger-discuss and anger symptoms, with women scoring higher on both.

Anger expression modes preferred by students high and low in trait anger

To determine differences in preferred anger expression modes of students scoring high on trait anger (upper 25%, i.e. scores ≥ 24 for females, ≥ 25 for males) and low on trait anger (lower 25%, i.e. scores $\leq$

16 for both females and males), t tests were used. Females high in trait anger were less likely than females low in trait anger to hold anger in, and more likely to express their anger outward, discuss anger and exhibit anger symptoms (all p's $< .05$). Significant differences between males high and low in trait anger emerged only on anger-out and anger symptoms; high scorers were significantly more likely to use these two anger expression modes than were males low in trait anger.

Discussion

These findings partially support the hypothesized relationships among stress, anger variables, and health status. However, general propensity for anger arousal (trait anger) does not appear to be as important to health as the modes chosen to express anger after its arousal by stressful events or other precipitants. Consistent with previous research, discussing anger appears to be a health-promoting choice, whereas expressing anger via physical symptoms is negatively related to health. Further research is needed on the anger-discuss mode and its possible associations with the mobilization of social support.

According to Frijda's (1988) Law of Situational Meaning, emotions are dictated by the way a person perceives the situation. As predicted, individuals with higher scores on perceived stress scored higher on anger variables, most notably those anger variables that relate negatively to health. These results are supportive of previous research linking stress and anger (Haynes et al., 1978; Smith & Frohm, 1985). Julius et al. (1986) suggest that anger generated by external stressors could well become an additional stressor to the body. If future studies support these findings,

researchers need to devote more attention to healthy strategies for ameliorating stress-related anger.

Gender differences found in this college sample were consistent with Thomas's (1989) study of men and women in middle adulthood and refute widely held assumptions that women repress anger while men vent it outwardly. These findings also underscore the necessity of gender-specific analyses in this research area. Although both studies were cross-sectional, the consistency of findings across an age span of so many years (18-60) suggests that there is stability in patterns of anger for men and women across phases of life. Longitudinal studies regarding acquisition and reinforcers of emotional habits would be useful. The meaning of greater somatic anger in women is unclear and generates questions for future research. Are women simply more aware of bodily concomitants of anger than are men? Do women experience anger more intensely? Consistent with previous findings that women are more verbally articulate about their emotions, college women scored higher on likelihood of discussing their anger than did men.

The apparent incompatibility between women's greater facility in discussing anger while concomitantly scoring higher on somatic anger symptoms is partially addressed by Ben-Zur and Zeidner (1988); they proposed that processing emotional information in <u>verbal</u> terms may make emotional episodes more <u>prominent</u> i.e., females may experience emotion more intensely than males because of the greater contribution of the verbal component. Longevity of somatic anger symptoms would be an importa

consideration in future research. Does discussion of anger lead to dissipation or exacerbation of symptoms?

Conceptual analysis is needed to clarify the construct of trait anger. In this study, trait anger appeared to be an anger-out phenomenon, i.e., a personality trait characterized by ready expression of anger to others when provoked. The construct does not appear to be inclusive of individuals who are anger suppressors. Delineation of a broad dispositional propensity to anger is needed for future research on anger-health linkages.

Although this study contributes to our understanding of anger-stress-health linkages, mediating cognitions and external events were not assessed. The sample, although large, was relatively homogeneous; replication of the study with a more heterogeneous sample is recommended. Mean scores for certain variables (i.e. trait anger and perceived stress) were also slightly higher than those obtained by other researchers (Cohen, 1983; Spielberger, 1983), further suggesting that the sample may be somewhat atypical. Correlations among variables, although highly significant, were often modest and should be interpreted cautiously. Also, only a small amount of variance was accounted for by the regression analysis, and three anger variables (trait anger, anger-in, anger-out) failed to enter the regression equation.

Improved instrumentation for assessing modes of anger expression is needed. The Framingham Scales, although used in the highly regarded prospective study of CHD, were not developed within a theoretical framework and may not have sufficient items to fully capture the richness of the

phenomena. Finally, observation studies should be undertaken to corroborate self-reports of anger expression styles.

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Table 1. Demographic Characteristics of Original Sample

VARIABLE	NUMBER	PERCENTAGE
GENDER		
Females	945	63.9
Males	534	36.1
AGE		
13-18	99	9.0
19-24	515	46.8
25-30	200	18.2
31-35	156	14.2
36-45	90	8.2
46-55	33	3.0
56-65	4	0.4
over 65	3	0.3
EDUCATIONAL LEVEL		
Below High School	20	1.4
High School Graduate	745	50.9
Technical/vocational	169	11.5
BS/BA College Graduate	355	24.2
MS/MA Degree	141	9.6
Ed.D/Ph.D./M.D./J.D. Degrees	35	2.4
INCOME LEVEL		
$5,000 or less	609	43.3
$5,001-$10,000	218	15.5
$10,001-$15,000	150	10.7
$15,001-$25,000	210	14.9
> $25,001	218	15.5
MARITAL STATUS		
Never Married	701	47.7
Married	599	40.7
Divorced/separated	159	10.8
Widowed	12	0.8
REPORTED HEALTH STATUS		
Excellent	597	50.2
Good	530	44.5
Fair	56	4.7
Poor	7	0.6
OCCUPATIONAL CLASSIFICATION		
Sales	100	9.2
Unskilled	146	13.4
Skilled	119	10.9
Managerial	127	11.7
Professional	414	38.1
Clerical	102	9.4
Homemaker	72	6.6
Military	8	0.7

Note: Variability in number of subjects assessed on each characteristic is due to missing data.

Table 2. Correlation Matrix of Anger, Stress and Health Status in a Student Sample (N = 720)

	Anger-In	Anger-Out	Anger Discuss	Anger Symptoms	Trait Anger	Perceived Stress	Current Health
Anger-In	___	-0.03	-0.44****	0.20****	-0.14**	0.20****	-0.13**
Anger-Out	0.05	___	0.00	0.27****	0.41****	0.25****	-0.12**
Anger Discuss	-0.34****	-0.04	___	-0.13**	0.17****	-0.17***	0.17***
Anger Symptoms	0.23***	0.31****	-0.11	___	0.33****	0.51****	-0.26****
Trait Anger	-0.09	0.51****	0.08	0.19**	___	0.37****	-0.14**
Perceived Stress	0.14*	0.32****	-0.16*	0.44****	0.35****	___	-0.36****
Current Health	-0.15*	-0.11	0.15*	-0.24***	-0.03	-0.30****	___

NOTE: Correlations for women are above the diagonal, for men are below the diagonal.

* $p < 0.05$
** $p < 0.01$
*** $p < 0.001$
**** $p < 0.0001$