

Stress Versus Discrete Negative Emotions in the Prediction of Physical Complaints: Does Predictive Utility Vary Across Ethnic Groups?

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Reports of stress and negative emotion are important predictors of health. However, whether discrete emotions or stress measures are more useful, whether they contribute independently to outcome, and whether they relate to health equally across ethnic groups remain unclear. In the current study, 207 US-born European American, US-born African American, Black English-speaking Caribbean, and Dominican men aged 40 years and older completed measures of somatic symptoms, trait emotions, and stress. Sadness and stress independently predicted symptom reports, even when examined concurrently, and with demographics controlled; trait anger did not predict symptoms. Moreover, the relations between trait emotions and symptoms varied across groups. Levels of sadness were associated with greater symptoms among US-born European American and Dominican men, but negatively associated among Black English-speaking Caribbean men, and the relations for anger also differed marginally across groups. The results underscore the importance of differentiating among discrete emotions and stress and considering ethnic interactions when examining reports of somatic symptomatology. We suggest that the impact of psychological characteristics on health must be considered within cultural and ethnic contexts to be fully understood.

Keywords: discrete emotions, health, stress, ethnicity, ethnic interactions

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This research was supported by grants from the National Cancer Institute (1P20 CA 91372 and 1 U54 CA 101388) and the National Institute on Aging (KO7 AG00921) to C. Magai.

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Negative emotions and stress influence health both directly (Baum & Pozluszny, 1999; Cohen, Miller, & Rabin, 2001) and indirectly (Mayne, 2001), through health behavior, symptom sensitivity (Benyamini, Leventhal, & Leventhal, 1999), and symptom reporting (Kahn, Hessling, & Russell, 2003; Leventhal & Patrick-Miller, 2000). Negative emotions relate to heart disease (Donker, 2000), cancer (Penninx et al., 1998), arthritis (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002), and the common cold (Cohen et al., 1998). Stress has been related to cancer (Eysenck, 1994), heart disease (Vitaliano et al., 2002), respiratory problems/asthma (Sarafino, Paterson, & Murphy, 1998), arthritis (Creamer & Hochberg, 1998), and the common cold (Cohen, Tyrrell, & Smith, 1993).

There is, furthermore, evidence to suggest that anger/hostility, which is typically higher among men (Matthews et al., 1992), may represent a particular threat to the health of men (Consedine, Magai, & Chin, 2004; Guyll & Contrada, 1998; Stoney & Engebretson, 2000) and African Americans (Finney, Stoney, & Engebretson, 2002; Fredrickson et al., 2000; Magai, Kerns, Gillespie, & Huang, 2003). Other research indicates that stress and anger may be particularly resistant to intervention among men (Michalsen et al., 2005). Because of these considerations, we sought to investigate the relations between negative emotion, stress, and health in an ethnically-diverse sample of 207 men aged 40 years and older.

Despite an emerging consensus regarding the importance of stress and emotions to health, at least two considerations remain unelaborated. First, stress and negative emotion are related concepts that share a degree of variance. However, they are infrequently examined within the same study, meaning that we cannot assess whether they contribute independent variance to the prediction of somatic symptomology or evaluate which is a better predictor (see Kubzansky, Cole, Kawachi, Vokonas, & Sparrow, 2006). Second, few researchers have explicitly examined whether the relations among stress, dis-

crete negative emotions, and somatic symptomology vary across ethnic groups, despite both theoretical (Consedine, Magai, & Bonanno, 2002) and empirical (Consedine, Magai, Cohen, & Gillespie, 2002; Consedine, Magai, & Horton, 2005) justifications for doing so.

Distinguishing Stress From Negative Emotion

Stress and *negative emotion* share common experiential elements, and the terms are frequently used interchangeably (Baum, Cohen, & Hall, 1993). However, the term *stress* refers to nonspecific aspects of dealing with environmental change, demand, or threat (Baum & Pozluszny, 1999) and may refer to a stimulus, the response to a stimulus, or the physiological consequences of that response (Kemeny, 2003), whereas negative emotions refer to a more precise class of adaptive phenomena (Consedine et al., 2002): Anger has evolved to organize the response to thwarted goals, sadness to loss, fear to threat, and so on. Further, although stress may be physiologically similar to emotions such as anger, it may differ from others, such as sadness. Stress is thought to have a uniform impact on physiology (Kemeny, 2003), whereas differences in the physiology of discrete emotions appear (Diefenbach, Leventhal, Leventhal, & Patrick-Miller, 1996). Because anger is an "effortful" emotion, it activates the sympathetic-adrenal medullary system, whereas sadness acts to conserve system resources (Clark & Watson, 1994) by activating the pituitary-adrenal cortex system (Mayne, 2001). We thus focused on these two negative emotions because although stress and anger appear to share similar physiological characteristics and may explain similar variance in health, measuring a more subdued, but still negative, emotion such as sadness may provide additional insight into the links between affect and health.

Conceptualizing Ethnicity in Health Research

Studies relating emotions to health have generally been based on data from European samples (Miller, Smith, Turner, Guijarro, & Hallet, 1996), and indications from those that have included tests for ethnic variation in the relations between emotions and health are that models may not readily generalize. One study of 1,118 older adults from four ethnic groups showed that although negative emotion predicted sleep disturbance in all groups, the effect was reduced among Black English-speaking Caribbeans. Other data suggest that stress is more closely associated with smoking among African American than European American women (Ludman et al., 2002), and data from a study of 1,364 women from six ethnic groups showed that although greater anger predicted reports of worse health in general, interaction terms suggested that anger was related to better health in several groups of minority women (Consedine et al., 2005).

Despite ongoing concern regarding the terms *ethnicity* and *race* (LaVeist, Nickerson, & Bowie, 2000; Phinney, 1996; Trimble, 1991), most research has used broad classifications (Myers, Kagawa-Singer, Kumanyika, Lex, & Markides, 1995), belying the heterogeneity within *White* (Bhopal & Donaldson, 1998), *Black* (LaVeist, 1994), and *Hispanic* groupings (Hayes-Bautista & Chapa, 1987). The operational problem is that ethnicity is a complex social and psychological construct that encompasses aspects of culture, religion, language, kinship, and place of origin (Helms, Jernigan, & Mascher, 2005; Phinney, Horenczyk, Lienkind, & Vedder, 2001). Ethnicity appears to tap aspects of culture, identity, and minority status (Phinney, 1996), including values, beliefs, and norms. In the context of health, we have argued that patterns of emotion and emotion regulation as well as the associated meanings are among the key proximal components of ethnic group membership (Magai, Consedine, Conway, Neugut, & Culver, 2004).

In line with this work, we operationalized our groupings using self-reported racial categorization (tapping aspects of identity and minority status) in concert with data regarding national origin. Allowing birthplace to influence the groupings increases the likelihood that participants share characteristics including exposure to historical events, developmental experiences, a common language, religious beliefs, and so forth. The current study examines men from four ethnic groups: U.S.-born African Americans, Black English-speaking Caribbeans, U.S.-born European Americans, and Dominicans.

Using Psychological Characteristics to Predict Outcome in Diverse Groups

A primary interest in the current study was examining whether discrete negative emotions and stress predicted health equally in different ethnic groups. We have previously argued that the *meaning* associated with emotions, and thus the health consequences, varies across groups (Consedine et al., 2005); it may be that reports of stress, anger, and sadness reveal different things about individuals from different groups. U.S.-born African Americans report less trait negative emotion than U.S.-born European Americans (Consedine & Magai, 2002), manifest depression somatically (Baker, 2001), or, together with Caribbean groups, in mania (Kennedy, Boydell, van Os, & Murray, 2004), rather than in depressed affect. Data from research on hostility (Jain, Dimsdale, Roesch, & Mills, 2004; Thomas, Nelsen, & Dimsdale, 2004) and stress (Adams, Aranda, Kemp, & Takagi, 2002; Ludman et al., 2002; McCabe, Yeh, Lau, Garland, & Hough, 2003) are, however, mixed. There are few emotion data among older Hispanic men. One study suggests that their trait fear is less than that of U.S.-born European Americans, on a par with Black English-speaking Caribbeans (Consedine, Morgenstern, Kudadjie-Gyamfi, Magai, & Neugut, 2006), and their rates of depression may be

lower (Lewis-Fernandez, Das, Alfonso, Weissman, & Olfson, 2005).

We have argued that low sadness (or anger) among minorities may index an avoidant personality that is deleterious to health (Consedine et al., 2005). Because African Americans (Brody & Flor, 1998; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000) and persons from the English-speaking Caribbean (Gopaul-McNicol, 1999; Payne, 1989) are socialized in ways that generate emotional restriction and appear more defended and repressive (Adams & Krasnoff, 1989; Consedine, Magai, & Neugut, 2004) and less expressive (Brantley, O'Hea, Jones, & Mehan, 2002), it may be that reports of negative emotion are indexing a more balanced emotional repertoire or an awareness of experience that predicts superior health outcomes. Based on these literature findings, we made the following predictions:

1. US-born African American men and perhaps Black men from the English-speaking Caribbean region would report lower levels of sadness but not anger or stress than U.S.-born European Americans. In the absence of a developed body of prior research, we did not make predictions about Dominican men.
2. Trait sadness and stress would independently predict physical symptomology, even when run in the same model and even when background demographics and ethnicity were controlled.
3. Trait sadness would not predict physical health symptoms among U.S.-born African American or Black English-speaking Caribbean men, but trait anger would be more strongly associated with reports of physical symptoms among African American and Black English-speaking Caribbean men than among U.S.-born European Americans. Again, the absence of prior work precluded interactional predictions regarding the Dominican men.

Method

Participants

The participants in this study were 207 men, aged 40 years and older who were part of a larger sample of community-dwelling men recruited during free prostate cancer screenings at hospitals, clinics, and health-fairs in and around greater New York City for a study of Stress and Prostate Cancer ($N = 253$). Because of the focus of the parent study on prostate screening, inclusionary criteria required that participants were male, 40 years of age or older, and self-identified as European American or White/non-Hispanic, Black or African American/non-Hispanic, or Hispanic and had no previous history of cancer.

Because of our interest in examining differences within traditional racial categories, four groupings were derived by combining (a) self-categorization based on a subset of the traditional racial categories offered in the U.S. Census (i.e., Black or African American/non-Hispanic or European or White/non-Hispanic), together with the ethnic designator "Hispanic," and (b) information regarding country of origin. Allowing a combination of self-reported racial categorization (tapping aspects of identity and minority status) in concert with shared birthplace to influence groupings increases the likelihood that participants share cultural and developmental characteristics thought to form part of ethnicity. We distinguished between Black men born in the United States (hereafter, U.S.-born African Americans) and those originating from countries in the English-speaking Caribbean region (e.g., Trinidad & Tobago, Jamaica, St. Vincent, St. Lucia, and Grenada). These men are hereafter referred to as Black English-speaking Caribbeans. These groups were contrasted with men self-identifying as "European or White/non-Hispanic" who were born in the United States (hereafter, U.S.-born European American), and with a sample of men self-identifying as "Hispanic" and reporting being born in the Dominican Republic. Because of the focus of the current

report on examining specific subpopulations of men, we excluded participants who did not fall into these four designated ethnic groups ($N = 46$).

Participants were interviewed in person by a trained interviewer fluent in their first language and were paid \$25 for their participation. The mean age of the sample was 60.94 years ($SD = 11.28$ years), the average number of years of schooling was 12.35 ($SD = 4.40$ years), the mean household income was \$43,130 ($SD = \$33,742$), and the immigrant men reported having resided in the United States for an average of 21.8 years ($SD = 11.7$ years).

Measures

DEMOGRAPHICS QUESTIONNAIRE. This questionnaire included information on age, household income, education, self-reported racial identity, and country of birth.

WAHLER PHYSICAL SYMPTOMS CHECKLIST. Participants rated how often 42 physical problems bothered them using a frequency metric ranging from 0 (*almost never*) to 5 (*nearly every day*). Coefficients reported for internal consistency ranged from .85 to .94. Unsurprisingly, given symptom onset and remission, test-retest stability ranges from .45 to .94. Validity studies were based on individuals likely to report increased symptomology, including those who are physically disabled, and on people applying for Social Security compensation (Wahler, 1968). The internal consistency alpha for the present sample was .88.

ACUTE STRESSORS SCALE. This 10-item scale, developed by the National Survey of Black Americans, is a measure of life stress (Chatters, 1993). Using 0 (*not at all*) to 3 (*very much*), individuals rate the level of stress they have experienced within the past month in 10 domains of life (e.g., money, health, and family). The scale has been used in several large studies of diverse, community dwelling adults (e.g., Consedine, Magai,

Cohen, et al., 2002). The alpha for this scale in the present study was .80.

TRAIT SADNESS AND ANGER. Trait sadness and anger emotion were measured with the anger and sadness subscales from the trait version of the Differential Emotions Scale (Izard, 1972). Each scale has three items and respondents rate, on a scale of 1 to 5, the extent to which these two emotions characterize their day-to-day experience. The scale has been used in many studies of emotion in older minority groups (Consedine & Magai, 2002) and enjoys good psychometric properties (Izard, 1972). The alphas for the two emotion subscales of sadness and anger in the current study were .73 and .75, respectively.

Procedure

All instruments were translated into Spanish and, following standard ethnographic procedures, back-translated to ensure the comparability of English and Spanish versions. U.S.-born African and European American men as well as the Black men from the English-speaking Caribbean were administered the measures in English whereas Dominican participants were administered the measures in Spanish.

Analytic Strategy

The purpose of the study was to assess whether (a) levels of self-reported stress, anger, and sadness independently predicted somatic illness in different ethnic groups and (b) these relations were consistent across four ethnic groups. To this end we first considered group-level differences in the variables of interest and then conducted a three-step multiple regression in which anger and sadness (controlling for demographics and entering dummy codes for the three non-European American groups) were entered in the first step, stress in the second, and the interactions between stress,

emotions, and the ethnic dummy codes in the final step.

Results

Sample Characteristics

Table 1 presents the demographics of the sample broken down by ethnicity and results of ANOVA. The omnibus test indicated a significant effect for ethnicity, Wilks' $\lambda = 23.48, p < .01$, with follow-up tests indicating significant ethnic differences in age, $F(3, 203) = 21.08, p < .01$, education, $F(3, 203) = 32.49, p < .01$, and household income, $F(3, 203) = 22.58, p < .01$. Games Howell tests showed that U.S.-born European Americans were older than all other groups and U.S.-born African Americans and Dominicans were older than Black English-speaking Caribbeans. U.S.-born European Americans also reported more years of education than all other groups, and U.S.-born African Americans and Black English-speaking Caribbeans more than Dominicans; U.S.-born European Americans and U.S.-born African Americans reported greater income than men from the other two groups. Given these differences, all three variables were included in subsequent descriptive MANCOVAs and regression analyses.

Group Differences in Stress, Discrete Emotions, and Health Symptomology

We next examined group differences in self-reported health symptomology, stress, anger, and sadness (see Table 2). A MANCOVA, with ethnic group as the factor, health symptoms, stress, anger, and sadness as dependent variables, and age, income, and education as covariates was run. The model was marginally significant for ethnicity, Wilks' $\lambda = 1.62, p = .08$. Age was also significant; thus, it was dichotomized and entered into a MANOVA with ethnicity and age as factors and health symptoms, stress, anger, and sadness as dependent variables.

TABLE 1 Means and Standard Deviations of Demographic Characteristics as a Function of Participant Ethnicity (N = 207)

Variable	Group				F	Post hoc comparison
	Total sample (N = 207)	U.S.-born European American (N = 74)	U.S.-born African American (N = 58)	Black English-speaking Caribbean (N = 37)		
Age	60.94 (11.27)	67.70 (10.31)	58.82 (9.55)	52.86 (7.75)	21.09**	EA > all; AA, D > BEC
Years of education	12.35 (4.40)	14.96 (3.09)	13.26 (2.78)	11.84 (3.45)	22.58**	EA > all; AA, BEC > D
Household income (\$K)	43.13 (33.74)	58.00 (33.43)	59.35 (38.70)	29.65 (26.23)	32.49**	EA, AA > BEC, D

Note. EA = U.S.-born European American, AA = U.S.-born African American, BEC = Black English-speaking Caribbean, D = Dominican.

** $p < .01$.

TABLE 2 Means and Standard Deviations of Emotion Variables, Stress, and Self-Reported Somatic Symptomology and Univariate *F*-Test as a Function of Participant Ethnicity (*N* = 207)

Variable	Group					<i>F</i>	Post hoc comparison
	Total sample (<i>N</i> = 207)	U.S.-born European American (<i>N</i> = 74)	U.S.-born African American (<i>N</i> = 38)	Black English- speaking Caribbean (<i>N</i> = 37)	Dominican (<i>N</i> = 58)		
Trait sadness	6.09 (2.61)	5.68 (2.47)	5.79 (2.30)	6.64 (2.51)	6.47 (2.93)	1.76	—
Trait anger	6.02 (2.66)	6.08 (2.42)	5.74 (2.66)	6.48 (2.89)	5.84 (2.83)	.62	—
Stress	7.75 (6.06)	5.15 (4.46)	9.37 (6.25)	10.21 (6.46)	8.43 (6.37)	8.59***	AA, BEC, D > EA
Somatic symptomology	25.02 (21.20)	21.64 (19.55)	23.39 (20.29)	24.51 (19.87)	30.74 (23.82)	2.16	—

Note. EA = U.S.-born European American, AA = U.S.-born African American, BEC = Black English-speaking Caribbean, D = Dominican.

*** *p* < .01.

Ethnicity was significant, Wilks' $\lambda = 2.05$, $p < .05$, as was age, Wilks' $\lambda = 3.68$, $p < .01$. Univariate tests indicated ethnic differences in health symptomology, $F(3, 199) = 2.81$, $p < .05$, and stress, $F(3, 199) = 2.66$, $p < .05$, with Games Howell tests showing less stress among European Americans compared with the other three groups. There was a significant age difference in stress, $F(1, 199) = 4.90$, $p < .05$, and a marginally significant age effect for sadness, $F(1, 199) = 3.67$, $p = .057$; men aged between 40 and 60 years reported more stress and marginally more sadness than men older than 60.

Regression Analysis

To test our predictions regarding the independent contribution of stress, anger, and sadness to health outcome, we conducted a three-step regression using SPSS 12.0.1. In the first step, we regressed somatic symptoms on the demographic variables (age, household income, and education), the three ethnic dummy codes (using U.S.-born European American men as a reference group), trait sadness, and anger; stress was added in the second step and the cross-products of ethnic group membership with stress, sadness, and anger were added in the third. Consistent with recommendations, emotion and stress variables as well as their product terms were centered before analysis (Aiken & West, 1991).

The Step 1 model was significant, $F(8, 198) = 5.54$, $p < .01$, and explained 18% of the variance in somatic symptoms. As expected, symptoms were predicted by greater age ($\beta = .19$) and increased sadness ($\beta = .40$), as well as by being Dominican ($\beta = .20$); contrary to expectation, however, trait anger did not predict symptom reports. Adding stress in Step 2 produced a significant model, $F(9, 197) = 8.98$, $p < .01$, with an additional 11% of the variance in health scores accounted for, $F\Delta(1, 197) = 30.00$, $p < .01$; as expected, greater stress predicted poorer health ($\beta = .40$). Furthermore, and consistent with our expectation of indepen-

dent effects, sadness continued to predict reports of health symptoms ($\beta = .32$), as did age ($\beta = .27$). Interestingly, being Dominican no longer predicted reports of health symptoms.

In the final step (see Table 3), we added a series of nine ethnicity-by-predictor cross products, three for each psychosocial variable. The model remained significant, $F(18, 188) = 5.28, p < .01$. Although this led to an increase of 5% in variance accounted for, the change was not significant $F\Delta(9, 188) = 1.41, p = .19$. Greater symptomology was still predicted by greater age ($\beta = .26$), sadness ($\beta = .39$), and stress ($\beta = .40$), and anger showed a marginally *negative* relation to symptom reports ($\beta = -.22, p = .10$). Sadness showed the predicted interaction in which although sadness generally predicted somatic symptomology, the effect was reduced among Black participants from the English-speaking Caribbean ($\beta = -.23$). Our prediction regarding a possible interaction between trait anger and being a Black man from the English-speaking Caribbean received some support with a marginal interaction ($\beta = .16, p = .12$).

To more precisely examine the ethnic interactions, we calculated separate regression slopes for each group (Aiken & West, 1991; Lansford, Deater-Deckard, Dodge, Bates, & Pettit, 2004) using the residualized somatic symptom values generated by tailored models run without the specific affective predictor or its interactions. The plot for sadness, shown on the left in Figure 1, indicates that for U.S.-born European American and Dominican men, greater sadness predicted greater symptomology. However, among U.S.-born African American men, the relation between sadness and health symptomology was attenuated—health complaints increased less systematically as sadness increased—whereas somatic complaints decreased with sadness for the Black English-speaking Caribbean men. These interpretations are fully consistent with the predicted and observed values for health symptomology for each ethnic group, calculated for low, medium, and high levels of sadness, depicted in Table 4. Conversely, the

anger plot (right hand plot, Figure 1) shows that for U.S.-born European American, U.S.-born African American, and Dominican men, greater anger predicted marginally fewer symptoms ($p = .09$) but that this effect was absent among Black English-speaking Caribbean men. Although anger may have some protective effects among older men, this did not appear to be true for Black men from the English-speaking Caribbean.

Discussion

In the current study we examined the relative and concurrent contribution of stress, trait sadness, and trait anger to somatic symptomology scores among 207 men aged 40 years and older from four ethnic groups. As expected, men from the three minority groups reported greater stress than European American men. However, there were no ethnic differences in either anger or sadness. As predicted, trait sadness and stress independently predicted somatic symptomology when examined concurrently and even when age, income, education, and ethnicity were controlled; in contrast, anger did not predict greater symptomology and showed a marginally significant trend in the opposite direction. Finally, our prediction regarding ethnic differences in the extent to which sadness would predict symptomology received some support. Specifically, whereas sadness predicted greater symptomology overall, its effect was reduced among Black men from the English-speaking Caribbean, for whom greater sadness predicted fewer symptoms (see Figure 1). Conversely, the marginally negative relation between trait anger and somatic complaints did not appear to hold for Black men from the English-speaking Caribbean.

Ethnic Variation in Stress and Affect Levels

One aim of the current study was to consider the thesis that affective phenomena would be manifest in different measures for

TABLE 3 Raw and Standardized Coefficients From the Regression of Somatic Symptomology on Demographic Variables, Ethnic Dummy Codes, Trait Anger and Trait Sadness (Step 1), Stress (Step 2), and the Interactions Between Anger, Sadness, Stress, and Ethnicity (Step 3)

Independent variables	Step 1				Step 2				Step 3							
	F	B	SE B	β	s^2	F	B	SE B	β	s^2	F	B	SE B	β	s^2	
Step 1			5.54**					8.98**						5.28**		
Age	0.359		0.147	.19*	.02	0.50	0.50	0.14	.27**	.05	0.49	0.49	0.14	.26**	.04	
Income	-0.00		0.00	-.07	.00	-0.00	-0.00	0.00	-.06	.00	-0.00	-0.00	0.00	-.06	.00	
Education	0.21		0.39	.04	.00	0.05	0.05	0.37	.01	.00	0.07	0.07	0.38	.02	.00	
AA	5.01		4.22	.09	.01	-0.12	-0.12	4.05	-.00	.00	-1.42	-1.42	4.17	-.03	.00	
BEC	4.53		4.92	.09	.00	0.14	0.14	4.67	.00	.00	0.50	0.50	4.80	.01	.00	
D	9.52		4.78	.20*	.02	5.75	5.75	4.51	.12	.00	5.01	5.01	4.62	.11	.00	
Trait sadness	3.21		0.72	.40**	.08	2.56	2.56	0.68	.32**	.05	3.18	3.18	1.08	.39**	.03	
Trait anger	0.01		0.70	.00	.00	-0.72	-0.72	0.66	-.09	.00	-1.77	-1.77	1.07	-.22†	.01	
Step 2								0.26	.40**	.11	1.39	1.39	0.37	.40**	.05	
Stress						1.41	1.41	0.26								
Step 3																
Stress × AA											0.34	0.34	0.68	.04	.00	
Stress × BEC											0.31	0.31	0.66	.04	.00	
Stress × D											-2.45	-2.45	6.19	-.03	.00	
Sad × AA											-2.57	-2.57	2.61	-.12	.00	
Sad × BEC											-4.61	-4.61	1.89	-.23*	.02	
Sad × D											1.21	1.21	1.64	.09	.00	
Anger × AA											1.49	1.49	2.35	.08	.00	
Anger × BEC											2.74	2.74	1.75	.16 ^a	.01	
Anger × D											0.83	0.83	1.70	.06	.00	
Constant	-1.96		12.94			-6.37	-6.37	12.11			-5.59	-5.59	12.35			

Note. Ethnicity dummy-coded such that 1 = U.S.-born African American (AA), Black English-speaking Caribbean (BEC), and Dominican (D); $R^2 = .34$, $R^{2*} = .27$ for Step 3. s^2 = squared part correlation.

† $p < .10$. * $p < .05$. ** $p < .01$. ^a $p = .12$.

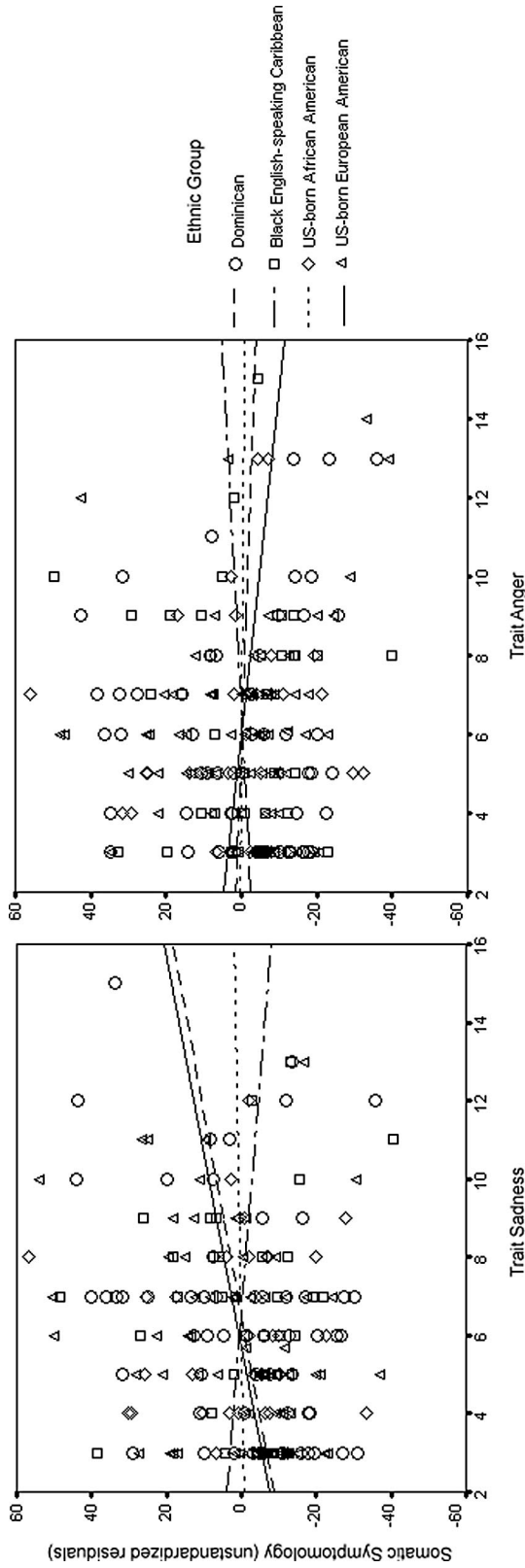


Figure 1. Fitted regression lines showing prediction of residualized somatic symptomology for trait sadness (left panel) and trait anger (right panel) as a function of ethnic group. ○, Dominican; □, Black English-speaking Caribbean; ◇, U.S.-born African American; △, U.S.-born European American.

TABLE 4 Observed and Predicted Somatic Symptomology at Low, Medium, and High Levels of Sadness by Ethnic Group

<i>Ethnic group</i>	<i>Value</i>	<i>Trait Sadness</i>		
		<i>Low</i>	<i>Medium</i>	<i>High</i>
U.S.-born European American	Observed	14.66	30.00	33.73
	Predicted	16.44	25.76	32.73
U.S.-born African American	Observed	20.52	21.17	30.09
	Predicted	20.07	21.27	30.91
Black English-speaking Caribbean	Observed	16.75	30.08	26.25
	Predicted	20.65	27.51	25.14
Dominican	Observed	19.68	31.65	47.85
	Predicted	19.45	31.26	48.94

Note. Predicted values are in boldface.

men from the four ethnic groups. Based on developmental (Gopaul-McNicol, 1993, 1999; Pinderhughes et al., 2000) and emotions data (Baker, Espino, Robinson, & Stewart, 1993; Mills & Henretta, 2001), we had expected that U.S.-born African American and Black English-speaking Caribbean men would report less sadness and anger but greater stress than U.S.-born European American men. However, there were no differences in sadness and anger among men from the three ethnic groups and affective scores were generally low. Our suspicion is that the low scores result from the exclusively male composition of the sample, their age, and their recruitment at free medical screenings. Participants in our earlier work (Consedine & Magai, 2002) were more than 60% female and were recruited on the basis of a stratified cluster-sampling plan. Men typically report fewer negative emotions than women (Kring & Gordon, 1998; Searle & Meara, 1999), and it may be that ethnic differences in negative emotion are obscured among older male samples because of their generally restrictive emotional styles.

Minority men reported greater stress, in this case even when age, income, and education were controlled. Some researchers have reported lower stress among minorities (Adams et al., 2002; McCabe et al., 2003), whereas others suggested no difference (Ludman et al., 2002). Such differences may

reflect the source of stress. Lower stress among African Americans has been most consistently found in caregiver studies (Connell & Gibson, 1997; McCabe et al., 2003), whereas results in other domains are more mixed. A prior study of 1,118 older adults using the same stress measure as the present report showed greater stress in African Americans (Consedine, Magai, Cohen et al., 2002). These authors argued that minority older adults may be more comfortable or capable of reporting "stress" than negative emotions (Consedine, Magai, Cohen et al., 2002), and the possibility that different ethnic groups are more comfortable reporting "feeling stressed" versus "feeling afraid" is interesting and clearly worthy of further study.

Distinguishing Stress from Discrete Negative Emotions

A second aim of our study was to ascertain the degree to which stress, anger, and sadness would contribute independent variance in the prediction of health symptoms when examined concurrently. We found that stress (Cohen et al., 1993; Friedman, Brooks, Bliwise, Yesavage, & Wicks, 1995; Huyser & Parker, 1998; Sarafino et al., 1998) and trait sadness (Donker, 2000; Musselman, Evans, & Nemeroff, 1998) predicted symptomology, even when examined con-

currently and with demographics and ethnicity controlled. As expected, adding stress in a second step explained an additional 11% of variance in health over the model containing the two discrete emotions. However, in contrast to a large body of literature (Kubzansky & Kawachi, 2000; Schum, Jorgensen, Verhaeghen, Sauro, & Thibodeau, 2003), trait anger did not predict greater health symptoms in this model and, in fact, showed a marginally significant negative relation in the full model.

With some few exceptions, health research has not typically examined stress and discrete negative emotions concurrently despite the possibility that they may relate to health through similar physiological, health behavior, or reporting channels (although see Cohen et al., 1993). In the previously noted study of 1,118 community-dwelling older adults, trait negative emotion was inconsistently related to symptom reports when stress was controlled (Consedine, Magai, Cohen et al., 2002), and it was suggested that stress may have consumed variance that might otherwise be associated with negative affect. This "shared variance" argument may explain why trait sadness, but not trait anger, continued to predict symptoms once stress was controlled. The arousal associated with stress (Kemeny, 2003) appears more analogous to the effects of anger on physiology and less similar to the sadness response (Mayne, 1999). It is worth reporting that anger was only weakly related to symptom reports in zero-order relations ($r = .22$, $p = .01$) in comparison to stress ($r = .41$, $p = .01$) and sadness ($r = .37$, $p = .01$). Moreover, an examination of the coefficients across the different steps of the model in Table 3 shows that anger was marginally and negatively related to symptom reports ($p = .09$) in the final step.

Using Psychological Characteristics to Predict Outcome in Diverse Groups

We expected that although trait sadness would be more weakly related to symptom reports among Black men from the English-

speaking Caribbean and U.S.-born African American men, trait anger would be more strongly related. The hypothesis regarding anger was upheld for Black English-speaking Caribbean men but not U.S.-born African American men. Conversely, trait sadness was less closely related to symptoms among Black English-speaking Caribbean men; stress did not interact with ethnicity in the prediction of symptom reports. In considering these findings, it is worth recalling that this is not the first study to show that psychological characteristics may relate to health differentially in diverse groups and that models may not readily generalize (Miller et al., 1996). We have previously found that the relation between negative affect and sleep disturbance was stronger among U.S.-born African American and English-speaking Caribbean adults (Consedine, Magai, Cohen et al., 2002), and several studies suggest that the consequences of anger/hostility are more severe and long-lasting among African Americans (Durel et al., 1989; Fredrickson et al., 2000; Jain et al., 2004; Jorgensen, Johnson, Kolodziej, & Schreer, 1996; Magai et al., 2003).

One approach that has the potential to begin the process of reconciling these data lies in considering whether the presence or absence of an emotion is telling us the same thing about individuals from different groups. Given that African Americans are socialized in ways that generate the restriction of certain affects (Brody & Flor, 1998; Gopaul-McNicol, 1999; Pinderhughes et al., 2000), it may be that less sadness among African Americans is indexing an affectively-biased personality style that is deleterious to health (Consedine et al., 2005). Conversely, reports of emotions that are less frequent within an individual's ethnic or gender context (e.g., sadness for men) may be indexing openness to experience or a more balanced affective repertoire that predicts superior health.

Consistent with this interpretation, prior studies that have shown stronger relations between affective characteristics and self-reported health among African Americans have done so with stress (Ludman et al.,

2002), anger (Durel et al., 1989; Fredrickson et al., 2000; Magai et al., 2003), or global negative affect (Consedine, Magai, Cohen et al., 2002), all arousing experiences. In the current study, although anger was marginally associated with fewer symptoms, the Black English-speaking Caribbean interaction term was also marginal, suggesting that the possible positive benefits of reporting anger was reduced among these men. The exception to this trend of a more negative/less positive impact for arousing affects, particularly anger, among African Americans is a study in which anger was related to better health in several groups of minority women (Consedine et al., 2005). As noted, however, women report less anger than men and expressions are strictly controlled (Kring, 2000; Kring & Gordon, 1998; Searle & Meara, 1999). As such, it may be that greater anger was related to better health in this study because the sample was exclusively female, and reports of greater anger signify a better affective balance among women.

Limitations and Conclusions

Although they represent a further contribution to our understanding of how affective experiences may predict health symptomology in diverse groups, the current data are not without their weaknesses. First, although our data describe men from four well-defined ethnic groups, they are cross-sectional and nonrepresentative; replication of these effects using more rigorously sampled populations and alternate designs is clearly warranted. Second, effect sizes for the affective variables are small, although their magnitude was on a par with well-established predictors of somatic symptomology, such as age. Importantly, however, whereas age is effectively immutable for intervention purposes and is better suited to identifying at risk populations, psychological characteristics may be amenable to change (Consedine, Magai, Cohen et al., 2002).

These limitations notwithstanding, the present data highlight the importance of differentiating among discrete types of emo-

tional experiences and stress as well as their interactions with ethnicity when one is examining health-related outcomes. Although reports of characteristic experiences of negative emotions and stress appear to share some variance, they also seem to capture slightly different aspects of the individual, cultural, and environmental characteristics that place persons at risk for the experience of health impairment. Perhaps moreover, differential patterns of self-reported stress and trait negative emotion were differentially associated with reports of health symptoms in Black English-speaking Caribbeans, but not U.S.-born African American or Dominican men. As such, these data contribute to a growing literature indicating that the impact of psychological characteristics on health must be analyzed and interpreted within specific cultural and ethnic contexts before they are fully understood.

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