Hostility and Cardiovascular Reactivity During Marital Interaction

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Objective: Prior studies demonstrate that hostile persons respond to social stressors with heightened cardiovascular responses. This study examined the effects of individual differences in hostility and two experimentally manipulated social stressors on cardiovascular reactivity during marital interaction. Methods: Sixty couples participated in a discussion task under conditions of high or low evaluative threat and while either agreeing or disagreeing with each other. Individual differences in hostility were assessed with the Buss-Perry Aggression Questionnaire. Participants’ appraisal of their spouses’ behavior during the interaction task was assessed with a standardized measure. Systolic and diastolic blood pressure and heart rate responses were recorded. Results: Among husbands, hostility was associated with greater systolic blood pressure reactivity under high, but not low, threat. Appraisals suggested that this might be due to husbands’ efforts to assert dominance in the interaction. Wives’ hostility scores were unrelated to cardiovascular reactivity, but wives disagreeing with hostile husbands showed greater heart rate reactivity. Conclusions: Heightened cardiovascular reactivity to stressful marital interactions among hostile men provides additional evidence of the viability of this psychophysiologic mechanism as a link between hostility and health. The lack of effects among wives suggests sex differences in the social psychophysiology of hostility. Interpersonal concepts and methods are useful in the study of psychosocial risk factors and mechanisms. Key words: hostility, cardiovascular reactivity, marital interaction, dominance.

INTRODUCTION

The personality traits of anger, hostility, and aggressiveness confer an increased risk of CHD and premature mortality (1). Although anger, hostility, and aggressiveness specifically refer to emotional, cognitive, and behavioral processes, respectively, these traits are often collectively identified as hostility (2). Conceptual models of the association between hostility and health identify heightened CVR to interpersonal stressors as a mechanism linking these traits with disease (2, 3). Consistent with this view, hostile individuals respond to provocation (4), conflict (5), and disagreement (6) with larger increases in blood pressure and heart rate than do more agreeable persons. Such responses might hasten the development of coronary atherosclerosis and precipitate the expression of symptoms of coronary disease. Perhaps because these personality traits are closely tied to social processes, hostility is not related to CVR in response to nonsocial stressors (7, 8).

Most studies of hostility and cardiovascular responses to social stimuli have involved interactions between previously unacquainted persons, such as subjects and experimenters (4, 5) or two subjects (6). Although quite informative, such research contains a potential threat to generalizability. Established relationships are a central context for social interactions, especially interactions that involve stress and conflict (9). Furthermore, the interpersonal factors that provoke heightened cardiovascular responses among hostile persons interacting with strangers might differ from those that influence their responses to coworkers, friends, or family members. In the absence of studies of close relationships, we cannot assume that the results of previous research on hostility and cardiovascular response to social stressors can be generalized to these important social domains. Thus, a complete understanding of the social psychophysiology of hostility requires research on interactions among members of actual social networks.

Hostility and Marital Interaction

Marriage is a key context in this regard (10, 11). Marital relations are related to risk of CHD and premature mortality (12, 13), and negative marital interactions can evoke large physiologic responses (14–16). Also, individual differences in hostility are associated with marital conflict in both cross-sectional (17, 18) and prospective studies (19, 20). That is, the personality trait of hostility is associated with greater exposure to marital stressors. If hostility and related traits influence health through physiologic responses to social stressors, then the all-too-common stressor of conflictual marital interactions would be an important context for examining the association between hostility and physiological reactivity to interpersonal events.

Previously, we examined hostility as measured by
the Cook and Medley Ho Scale (21) and cardiovascular responses to an interaction task in which husbands and wives disagreed (11). Half of the couples simply presented opposing sides in a discussion, whereas the other half were given an incentive to influence each others’ opinions on the topic. Among husbands attempting to influence their wives, hostility was associated with greater blood pressure reactivity. This was not the case among husbands who merely disagreed with their wives. Hostile husbands displayed heightened HR reactivity in both conditions. Disagreement is generally a sufficient evocative stimulus for blood pressure reactivity among hostile persons interacting with strangers (5, 6). Thus, the motive to influence the spouse may have been a more important social determinant of hostile husbands’ reactivity during marital interaction than was simple disagreement. However, because we did not manipulate disagreement experimentally, it is difficult to identify the specific effects of this social variable on the association between hostility and cardiovascular response.

Interestingly, hostility was not related to reactivity among wives in this study (11), although hostility is related to reactivity when women interact with strangers (22–24). Again, this underscores the potential importance of studying the social psychophysiology of hostility in the context of established relationships. In the previous study, their husbands’ level of hostility was positively related to wives’ blood pressure response in both conditions. Thus, another advantage of the marital interaction paradigm is the opportunity to observe the effects of hostility on reactivity across as well as within individuals.

Present Study

A second recent study (25) provided an opportunity to examine further the association of CVR and hostility during specific types of marital interaction. Recent theory and research suggests that social motives and stressors vary along two basic dimensions, agency and communion (26, 27). Agency is a broad motive complex involving the pursuit of achievement, status, and interpersonal control, whereas communion involves interpersonal relatedness, caring, attachment, and concern for others. These two motivational dimensions correspond, respectively, to the dominance vs. submissiveness and friendliness vs. hostility dimensions of personality and social behavior that comprise the interpersonal circumplex (28, 29), which is depicted in Figure 1. A growing body of evidence suggests that men are disproportionately vulnerable to the negative emotional and physical consequences of stressors that engage agentic motivation, whereas women are more vulnerable to the negative consequences of excessive pursuit of communal goals and motives (27, 30). The differing vulnerabilities reflect the operation of the traditional masculine and feminine sex roles, respectively. These two general motivational correlates of sex roles are often apparent in marital and other close relationships.

Fig. 1. Interpersonal circumplex (adapted from Ref. 28).
relationships, and stress in relationships often involves conflicts surrounding issues of agency and communion (31, 32). Husbands’ and wives’ differing concern with agency and communion is also evident in the specificity of their psychophysiological response to various marital interaction patterns (16, 33).

Given the centrality of these two classes of stressors in marriage, in our recent study we experimentally manipulated both evaluative threat and disagreement in a current events discussion to evaluate the distinct effects of agentic and communal stressors on CVR. Disagreement provoked heightened reactivity among wives but not husbands. In contrast, evaluative threat produced increased reactivity among husbands but not wives. Measures of spouse appraisal based on the interpersonal circumplex (29) indicated that disagreement led wives to construe their husbands as less friendly but did not affect husbands’ construal of wives. In contrast, evaluative threat led husbands to view their wives as less submissive but did not affect wives’ construal of husbands. Thus, disagreement appeared to arouse affiliative or communal concerns among wives, whereas evaluation raised concerns about status or agency in the relationship among husbands. These concerns, in turn, apparently evoked heightened cardiovascular responses. In this report, we present additional analyses from this study. Specifically, we examine the associations of individual differences in anger, hostility, and aggressiveness with CVR during marital interaction.

We attempted to replicate and extend our previous work on hostility and reactivity during marital interaction (11) in several ways. First, the experimental manipulation of two distinct aspects of the interaction context (ie, agreement vs. disagreement; high vs. low evaluative threat) permitted us to determine whether social stressors reflecting the broad interpersonal concerns of agency and communion elicit heightened reactivity among hostile spouses. As noted previously, our prior results (11) suggested that disagreement would not evoke heightened reactivity among hostile husbands. However, to the extent that evaluative threat led husbands to construe wives as a challenge to their status, interpersonal dominance, or control (25) in the interaction, our prior findings (11) suggest that such a threat would evoke heightened reactivity among hostile husbands. Effortful assertion of interpersonal control has its largest effect on SBP (34, 35), presumably because this interactional equivalent of active coping evokes a predominantly myocardial effect (36). Thus, we expected the effects of husbands’ hostility to be most apparent on SBP responses to evaluative threat. As in our previous study on hostility and marital interaction, we expected that husbands’ hostility would be related to wives’ reactivity, but primarily in the condition involving disagreement.

We extended our prior work in two additional ways. First, we used a well-validated measure of interpersonal appraisal (29), which permitted us to determine whether the manipulations altered the ways in which hostile and nonhostile spouses construed each other. Such effects would clarify how aspects of the social context might evoke CVR in hostile spouses. Second, we used an individual difference measure that provides a total score but also subscale scores for anger, hostility, and aggressive behavior (37). Therefore, we examined the composite individual difference (ie, combined anger, hostility, and aggressive behavior) and its specific components as predictors of reactivity during marital interaction (38).

METHODS

Participants

As described in our prior report from this sample (25), 60 couples were recruited from introductory psychology classes, married student housing, and the surrounding community. Participants averaged 25.4 (SD = 6.2) years of age and 14.6 (SD = 5.7) years of education. Couples had been married for an average of 3.2 years (SD = 4.6), and 43% had one or more children. Most of the participants (83%) were white; the remaining 17% were Hispanic or Asian American. Couples received $30 for their participation, and students also received partial course credit.

Procedure

Baseline Period. Participants were told that the purpose of the study was to examine the cardiovascular effects of conversation. Husbands and wives were seated facing one another at a table in one room of a two-room laboratory. A removable partition separated the rooms. An inflatable blood pressure cuff was attached to each participant’s nondominant arm, and prerecorded baseline instructions were delivered through headphones. To maintain consistent involvement in a minimally demanding task (39), participants separately viewed a pair of photographs (eg, landscapes and wildlife) during each minute of a 10-minute baseline period and separately indicated which photograph they preferred.

Evaluative Threat and Agreement Manipulations. At the conclusion of the baseline period, couples randomly assigned to the high-threat condition were informed that their responses during the discussion task would be recorded on audiotape and evaluated for the level of verbal intelligence evident in their answers. Participants assigned to the low-threat condition were told that the recording of their responses would be evaluated simply for the clarity and volume of their speech; content was explicitly deemphasized. Spouses were also randomly assigned to present either the same (ie, agreement) or opposing (ie, disagreement) sides of two current events issues, the imposition of rent controls in the area surrounding campus and the adoption of stricter admissions standards for the university. All participants were given notes about possible discussion points and instructed to use their own words during the task. Couples then individually prepared their remarks for 4 minutes.

The partition was then removed, and prerecorded instructions led the participants through an 8-minute discussion. In a counterbalanced order, spouses alternated speaking and listening to their
Measurements

Manipulation Checks and Interpersonal Appraisals. At the conclusion of the task, participants completed 10 five-point Likert scales concerning the extent to which the experimenter’s ratings would focus on various aspects of their speeches. Five verbal competence items (ie, knowledge of the topic, vocabulary, and organization) were summed to form one index, as were five speech clarity items (eg, speaking rate and volume).

Also, after the task, participants rated their spouse’s behavior during the discussion on a 32-item version of the Interpersonal Adjective Scales (IAS-R) (29), a widely used and extensively validated (28) measure of the interpersonal circumplex. As depicted in Figure 1, the circumplex consists of two dimensions, friendliness vs. hostility and dominance vs. submissiveness. Participants completed four items for each of the circumplex octants depicted in Figure 1. Weighted composites of the octant scores are derived to form independent scores for the friendliness and dominance dimensions. For the resulting standardized scores, positive values reflect varying degrees of friendly or dominant ratings, whereas negative values reflect hostile or submissive behavior. In our prior work, this measure has demonstrated high internal consistency and sensitivity to manipulations of the friendliness and dominance of social interactions (22, 34).

Individual Differences. Before the baseline period began, participants completed the Buss-Perry Aggression Questionnaire (AQ) (37). This measure consists of 28 Likert items, assessing physical aggressiveness (eg, “I have threatened people I know”), verbal aggressiveness (eg, “I often find myself disagreeing with people”), hostility (eg, “Other people always seem to get the breaks”), and anger (eg, “Some of my friends think I’m a hothead”). These four subscales are summed to form a total score. Prior research has supported the factor structure of the measure (37, 40), the internal consistency and temporal stability of the subscales and total score (37, 40), and their construct validity (37, 41).

CVR. Two Dinamap automated oscillometric blood pressure monitors (model 8100, Critikon Inc., Tampa, FL) were used to assess blood pressure and HR. The experimenter operated the monitors in an adjacent room, beyond the view of the participants. One measurement was taken during each minute of the baseline period and during each 1-minute speaking and listening period. Baseline values were calculated as the mean of the final three readings during that period. Task values were the mean of the values during that period. Consistent with prior recommendations (42), the dependent variables were task minus baseline change scores. Inclusion of baseline values as an additional control variable in the first step of multiple regression analyses did not alter any of the results reported below.

RESULTS

Baseline Characteristics

As depicted in Table 1, husbands’ and wives’ total AQ scores were consistent with prior norms (37). Also consistent with prior research on sex- and sex role differences—related traits (43, 44), husbands reported higher levels of hostility than did their wives (paired \( t(60) = 2.4, p < .05 \)). However, husbands’ and wives’ AQ scores were equivalent in variability(i.e, SD and range). Also consistent with prior research (45), wives, compared with their husbands, displayed lower SBP and DBP and higher HR during the baseline period.

Manipulation Checks and Task Effects

As described in our prior report (25), both husbands and wives in the high evaluative condition rated the verbal intelligence-related items as more relevant to the experimenter’s ratings than did participants in the low-threat condition (for both, \( t(55) > 9.0, p < .0001 \)). Similarly, husbands and wives in the low-threat condition rated the clarity-related items as more relevant than did participants in the high-threat condition (\( t > 2.9, p < .002 \)). Thus, participants understood the evaluative threat instructions.

Also, as described previously, husbands in the high-threat condition rated their wives as significantly less submissive when compared with husbands in the low-threat condition (mean = +0.15 vs. –0.59, \( t(55) = 2.35, p < .01 \)). The evaluative threat manipulation had no effect on husbands’ ratings of their wives’ friendliness or on wives’ ratings of their husbands on either dimension.

The agreement manipulation had no effect on husbands’ ratings of their wives’ behavior. However, wives in the disagreement condition rated their husbands as less friendly than did wives in the agreement condition (mean = –0.72 vs. +0.21, \( t(55) = 2.66, p < .01 \)). The agreement manipulation did not affect wives’ ratings of their husbands’ dominance. Thus, the manipulations did alter participants’ appraisals of their spouses’ behavior during the discussion, but, consistent with prior theory and research on sex differences in agency and communion (27, 31), the nature of this effect differed for husbands and wives.

For both husbands and wives, the task evoked significant cardiovascular responses. Mean task period changes among wives were 12.7 mm Hg SBP, 10.2 mm Hg DBP, and 6.0 bpm HR. Among husbands, the task period changes were 12.3 mm Hg SBP, 10.1 mm Hg DBP, and 4.1 bpm HR.

| Table 1. AQ Mean Scores and Baseline Cardiovascular Levels for Husbands and Wives |
|----------------------------------|------------------|------------------|
|                                  | Wives            | Husbands         |
|                                  | Mean  | SD   | Mean  | SD   |
| AQ Range                         | 67.4  | 15.5 | 73.4  | 14.3 |
| Baseline SBP, mm Hg              | 109.0 | 9.0  | 116.2 | 8.6  |
| Baseline DBP, mm Hg              | 60.7  | 6.9  | 63.4  | 6.5  |
| Baseline HR, bpm                 | 77.2  | 8.6  | 71.6  | 9.5  |

Effects of Individual Differences

CVR. The primary analyses were hierarchical multiple regressions in which dummy codes for the agreement and evaluative threat main effects were entered first, followed by continuous, centered (ie, mean = 0) total AQ scores, and then the two-way interactions of AQ scores with agreement and evaluative threat (46). In the first set of analyses (ie, within-spouse effects), participants’ AQ scores were used to predict their own cardiovascular responses. In the second (ie, across-spouse effects), participants’ AQ scores were used to predict their spouses’ responses. Preliminary $2 \times 2$ (evaluative threat $\times$ agreement) analyses of variance of husbands’ and wives’ AQ scores indicated that the experimental conditions were equivalent on the individual difference variable used in the regression analyses (for all, $p > .1$).

In analyses of husbands’ SBP reactivity, the AQ–evaluative threat interaction accounted for 15.4% of the variance in husbands’ SBP reactivity ($F(1,51) = 10.6, p < .005$). As depicted in Figure 2, husbands’ AQ scores were negatively but nonsignificantly related to SBP reactivity in the low-threat condition ($r(30) = -0.24, p > .10$). In the high-threat condition, AQ scores were significantly and positively related to SBP reactivity ($r(30) = +0.45, p < .02$, two-tailed). Thus, consistent with our prediction, evaluative threat evoked greater cardiovascular responses from hostile husbands than from friendly husbands, whereas disagreement did not. This effect cannot be easily attributed to the effects of speech artifacts on SBP (47), such as more vigorous speech by hostile husbands in the high-threat condition, because the AQ–evaluative threat interaction was significant both while husbands spoke ($F(1,51) = 7.67, p < .01$) and while they listened to their wives ($F(1,51) = 9.56, p < .01$). No other effects on SBP involving AQ scores approached significance (for all, $F < 1.7$).

Parallel analyses of husbands’ DBP reactivity revealed only one effect approaching significance, a similar but nonsignificant AQ–evaluative threat interaction ($F(1,51) = 2.42, p > .10$, change in $R^2 = 0.042$). Analyses of husbands’ HR reactivity revealed no effects approaching significance involving their AQ scores (for all, $F < 1.4$). Analyses of wives’ CVR revealed no effects approaching significance involving their own AQ scores.

To determine which components of husbands’ AQ scores were most responsible for the interactive effect of evaluative threat on blood pressure responses, correlations were computed between the AQ subscales and SBP and DBP reactivity within the high- and low-threat conditions. None of the correlations approached significance in the low-threat condition (for all, $p > .10$). Correlations in the high-threat condition are presented in Table 2. Only the correlations of hostility with SBP and DBP responses were significant. In the high-threat condition, hostile husbands displayed larger blood pressure responses during the discussion than did their more agreeable counterparts.

In the cross-spouse analyses, there were no effects of wives’ AQ scores on husbands’ CVR (for all, $F < 1.6$). In analyses of the effects of husbands’ AQ scores on wives cardiovascular responses, the interaction of husbands’ AQ scores with the agreement manipulation accounted for 6.3% of the variance in wives’ HR responses ($F(1,51) = 4.12, p < .05$). As depicted in Figure 3, husbands’ AQ scores were positively related to wives’ HR reactivity in the disagreement condition but negatively related in the agreement condition. No other effects of husbands’ AQ scores on wives’ CVR

![Fig. 2. Association between AQ total scores and SBP response among husbands in the high and low evaluative threat conditions.](image)

**Table 2. Correlations Between AQ Scales and Blood Pressure Reactivity Among Husbands in the High Evaluative Threat Condition**

<table>
<thead>
<tr>
<th>Trait Scale</th>
<th>SBP</th>
<th>DBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical aggressiveness</td>
<td>0.31</td>
<td>0.12</td>
</tr>
<tr>
<td>Verbal aggressiveness</td>
<td>0.34</td>
<td>0.27</td>
</tr>
<tr>
<td>Hostility</td>
<td>0.46*</td>
<td>0.37*</td>
</tr>
<tr>
<td>Anger</td>
<td>0.24</td>
<td>0.19</td>
</tr>
<tr>
<td>Total AQ score</td>
<td>0.45*</td>
<td>0.31</td>
</tr>
</tbody>
</table>

* $n = 30$.

* $p < .05$ (two-tailed).
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approached significance. To determine which component of husbands’ AQ scores were accounting for the effect on wives’ HR reactivity, correlations of the AQ subscales with wives’ HR responses were computed for the agreement and disagreement conditions separately. None of the correlations were significant in the agreement condition. In the disagreement condition, only husbands’ hostility scores were significantly related to wives’ HR reactivity (r(30) = 0.42, p < .03, two-tailed). Interestingly, husbands’ hostility scores were also related to wives’ SBP reactivity in the disagreement condition (r(30) = 0.40, p < .03, two-tailed). Thus, wives interacting with hostile husbands displayed heightened CVR, but only when disagreeing.

Interpersonal Appraisals. Participants’ appraisals of their spouses’ behavior during the discussion were analyzed in the same type of hierarchical multiple regressions used in the analyses of CVR. Again, both within- and across-spouse effects were examined. That is, participants’ AQ scores were used to predict their own appraisals and their spouses’ appraisals.

The analyses using husbands’ AQ scores revealed a significant main effect on husbands’ appraisals of their wives’ friendliness (F(1,51) = 8.73, p < .01), accounting for 13.9% of the variance in this measure. Hostile husbands rated their wives as less friendly (r(60) = -0.39) regardless of experimental condition. Husbands’ AQ scores were unrelated to their perceptions of their wives’ dominance. Husbands’ AQ scores accounted for a marginally significant 4.8% of the variance in wives’ ratings of their husbands’ friendliness (F(1,51) = 3.0, p < .09). Wives tended to rate husbands with higher AQ scores as less friendly during the discussion. Husbands’ AQ scores also interacted with evaluative threat to account for 11.4% of the variance in wives’ ratings of their husbands’ dominance (F(1,51) = 6.04, p < .01). In the low-threat condition, wives’ ratings of their husbands’ dominance were negatively but not significantly related to husbands’ AQ scores (r(30) = -0.27). In contrast, in the high-threat condition, wives’ ratings of their husbands’ dominance were significantly and positively related to their husbands’ AQ scores (r(30) = 0.38, p < .05, two-tailed). That is, the high, but not low, evaluative threat condition, wives perceived hostile husbands as expressing more dominance than did wives appraising less hostile husbands.

Wives’ AQ scores interacted with agreement to account for 6.7% of the variance in their own ratings of their husbands’ friendliness (F(1,51) = 4.2, p < .05). In the agreement condition, wives’ AQ scores tended to be positively related to their own ratings of their husbands’ friendliness (r(30) = 0.23), whereas in the disagreement condition this association tended to be negative (r(30) = -0.31). However, the association was not significant in either condition. Wives’ AQ scores were unrelated to their ratings of their husbands’ dominance. Wives’ AQ scores interacted with agreement to account for 6.5% of the variance in husbands’ ratings of their wives’ friendliness (F(1,51) = 3.9, p < .05). In the disagreement condition, husbands’ ratings of their wives’ friendliness were unrelated to wives’ AQ scores (r(30) = 0.10). In contrast, in the agreement condition, husbands rated wives with high AQ scores as significantly less friendly (r(30) = -0.52, p < .01). Wives’ AQ scores were not related to husbands’ ratings of wives’ dominance.

DISCUSSION

These results replicate and extend our prior work on hostility and CVR during marital interaction (11). Consistent with predictions, husbands’ AQ total scores were positively associated with their SBP reactivity in the high, but not low, evaluative threat condition. The fact that this effect was most pronounced for SBP as opposed to DBP reactivity is consistent with the hypothesis that hostile husbands responded to evaluative threat with efforts to assert their status or dominance in the interaction. Such effortful attempts to assert interpersonal dominance, status, and control typically have larger effects on SBP than DBP responses (34, 35), presumably because this social response evokes an interpersonal equivalent of the predominantly myocardial effects of active coping (36).

Fig. 3. Association between husbands’ AQ total scores and wives’ HR reactivity in the agree and disagree conditions.
The effects of husbands’ AQ scores on interpersonal appraisals provide additional support for this interpretation. Hostile husbands appraised their wives as unfriendly regardless of the situation, and wives of hostile husbands tended to view them as generally unfriendly. However, the association between husbands’ AQ scores and wives’ views of their husbands’ dominance during the discussion mirrored the SBP results. In the high-threat condition, wives appraised hostile husbands as expressing more dominance than was the case for nonhostile husbands. In the low-threat condition, this association was negative and nonsignificant. It is important to note that in mediational analyses (48), wives’ appraisals of their husbands’ dominance were not related to husbands’ SBP reactivity and did not account for the interactive effect of AQ scores and evaluative threat on husbands’ SBP response. Nonetheless, the general pattern of psychophysiologic responses and appraisals suggest that hostile husbands responded to evaluative threat with efforts to assert dominance in the interaction, perhaps causing their heightened SBP reactivity.

However, the lack of a significant mediational effect might indicate that the association between husbands’ hostility and SBP reactivity in the high-threat condition reflects a different process. For example, nonhostile husbands may have been less responsive to evaluative threat because they experienced the presence of their spouse as a source of social support in this otherwise stressful circumstance. In contrast, given their more negative appraisal of their wives, hostile husbands may not have found the presence of their spouse to be supportive and as a result displayed heightened cardiovascular reactivity. This interpretation is consistent with other recent findings in which nonhostile men responded to support with attenuated cardiovascular reactivity but hostile men did not (49). However, it is important to note that husbands’ appraisals of their wives’ friendliness (i.e., supportiveness) were not associated with husbands’ SBP reactivity and did not account for the hostility by evaluative threat interaction on SBP. Regardless of whether it reflects assertion of dominance or a failure to benefit from spouse support, the increased reactivity of hostile husbands would be expected to confer increased risk of cardiovascular disease.

Consistent with our prior findings (11), wives’ AQ scores were unrelated to their cardiovascular responses. This null result is not likely due to limitations in measurement of individual differences in anger, hostility, and aggressive behavior in women, because previous research (41) and the present association of wives’ AQ scores with their own and their husbands’ interpersonal appraisals suggest that the measure is valid. Similarly, a restriction in range of hostility scores cannot account for the lack of associations among wives, because the range and variances of AQ scores were equivalent for husbands and wives. Thus, the fact that hostility and CVR are reliably related among women interacting with strangers (22–24) but not among women interacting with their husbands suggests a possible limiting condition on the effect of hostility on women’s reactivity.

The cross-spouse effects on reactivity were also consistent with our prior research (11). Wives’ AQ scores had no effect on their husbands’ responses. However, in the disagreement condition, wives interacting with hostile husbands displayed heightened HR reactivity. When coupled with the fact that hostile persons are likely to view their spouses as unfriendly and to be viewed by their spouses as unfriendly, these results are consistent with prior research in which hostility is associated with maladaptive marital processes (17, 18) and outcomes (19, 20). Thus, marital interactions may be an important component of psychosocial vulnerability (50), which might also contribute to the health consequences of hostility. In both the within- and cross-spouse effects of AQ scores, hostility was the subscale most closely related to CVR. It is important to note that the effects of the hostility subscale were not significantly greater than the effects of other subscales. Nevertheless, this result can be seen as consistent with a growing body of research demonstrating the unhealthy effects of hostile, mistrusting, and suspicious social cognition (51, 52).

Limitations and Qualifications

Several limitations of the present methodology warrant qualifications of these conclusions. First, the AQ has not been used in studies of cardiovascular morbidity or mortality; therefore, the health relevance of this measure is not established. However, a variety of prior studies (32, 40, 41) have indicated that the scale is a valid measure of the individual differences that have been established elsewhere as risk factors (1). Second, we did not collect behavioral data during the marital interaction. Therefore, it is impossible to determine whether the participants’ appraisals of their spouse were accurate. Our prior research suggests that hostility is related to maladaptive overt behavior during marital interaction (18), but it is also possible that the interpersonal appraisal correlates of hostility observed here instead reflect biased or distorted hostile cognition (53).

Third, although the pattern of hostile husbands’ SBP reactivity and interpersonal appraisals is consistent with the interpretation that effortful assertion of status or dominance produced the typical cardiac response evoked by active coping (34), more direct evi-
evidence of this conclusion would require a replication using impedance cardiographic techniques. Such a study would permit explication of the determinants of the cardiovascular responses we observed (54). Fourth, although a growing body of research supports the hypothesis that CVR contributes to the development of cardiovascular disease (55, 56), this element of the general conceptual model of the health consequences of hostility is not firmly established.

Our experimental approach to marital interaction is the source of at least two additional limitations. Although our manipulations of disagreement and threat provided experimental control, it is likely that they differ from naturally occurring interactions. Psychophysio
gic studies of couples’ self-identified conflicts and disagreements could provide an even more ecologically valid test of the association between hostility and CVR to interpersonal stressors (16, 33). Our approach also limits the opportunity to examine processes through which hostility contributes to increased exposure to marital stressors. Behavioral coding, related cognitive and affective assessments, and appropriate sequential analyses of more realistic interactions could shed light on the processes through which hostile persons come to experience greater marital distress (57), thereby providing the opportunity to study the association of hostility with both exposure and reactivity to marital stressors.

Conclusions and Implications for Future Research

These limitations notwithstanding, the present results provide additional information about the social psychophysiology of hostility. In the context of a central personal relationship, the social stressor of evaluative threat evoked heightened CVR among hostile men but not hostile women. The effect among husbands is consistent with the general model that hostility and related individual differences influence health, at least in part, through the mechanism of cardiovascular responses to social stressors. By demonstrating this effect in the context of marital interactions, evidence of the generalizability of this model is strengthened for men. Similarly, the lack of effects among wives raises some concerns about the generalizability of other findings regarding hostility and women’s CVR (22–24) to the context of close personal relationships.

The traditional social psychophysiologic paradigm for studying hostility in which participants interact with strangers continues to produce important contributions to our understanding of psychosomatic processes (58, 59), but the issue of generalizability of findings from such studies is potentially quite important. Ambulatory methodologies in which hostility and naturally occurring social stressors are measured and related to cardiovascular responses during daily life can provide a useful counterpoint to the potential limitations of controlled laboratory studies (60, 61). However, the reliance on measurement of naturally occurring stressors creates other potential limitations. Thus, the study of established relationships provides a useful intermediate strategy in a continuum of methodologies for explicating the social psychophysiologic of hostility.

To date, research on the social precipitants of CVR among hostile persons has largely focused on hostile or conflictual interpersonal stimuli (4, 5, 23, 24). Related evidence suggests that situations involving mistrust can also evoke heightened CVR among hostile persons (62). The present results and our prior findings (11) suggest that at least in the context of close relationships, stressors that threaten status or dominance are another class of social situations that might activate the psychophysiologic mechanisms linking hostility and health. Anger, hostility, and aggressive behavior are often responses to perceived threats to status, control, or independence (63). In addition, animal (64) and human research (65, 66) suggests that the expression of social dominance may be an important component of psychosocial influences on coronary disease. The interpersonal circumplex (28)(see Figure 1) makes salient the potential utility of examining the impact of social stimuli that vary along both major interpersonal dimensions, dominance vs. submissiveness and friendliness vs. hostility, on the psychophysiologic responses of hostile persons. Furthermore, circumplex-based, standardized measures of interpersonal processes can document the impact of experimental manipulations of social context. Thus, the interpersonal perspective provides conceptual and empirical tools to organize and refine our understanding of psychosocial influences on health.

REFERENCES

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ANNOUNCEMENT

ASSOCIATION FOR ACADEMIC PSYCHIATRY ANNUAL MEETING

The Annual Meeting for the Association for Academic Psychiatry will be held on October 6 to 9, 1999, at the Omni Royal Orleans Hotel, New Orleans, LA. For further information, please contact: AAP Executive Office, Department of Psychiatry, Wyman 2,Amount Auburn Hospital, Cambridge, MA 02238; (617) 449-5660.