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Interpersonal Circumplex Descriptions of Psychosocial Risk Factors for Physical Illness: Application to Hostility, Neuroticism, and Marital Adjustment

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Abstract

Personality risk factors for physical illness are typically studied individually and apart from risk factors reflecting the social environment, potentially fostering a piecemeal understanding of psychosocial influences on health. Because it can be used to describe both personality and social relationship processes, the interpersonal circumplex (IPC) provides an integrative approach to psychosocial risk. In 301 married couples we examined IPC correlates of three risk factor domains: anger, hostility, and aggressiveness; neuroticism; and marital adjustment. Risk factors displayed IPC locations ranging from hostile dominance (e.g., verbal aggressiveness, marital conflict) to hostility (e.g., anger) to hostile submissiveness (e.g., anxiety, depression); protective factors (marital satisfaction and support) reflected warmth or friendliness in the IPC. Similar descriptions were found using self-reports and spouse ratings of IPC dimensions, indicating that interpersonal styles associated with risk factors do not simply reflect common method variance. Findings identify interpersonal processes reflecting low affiliation or high hostility as a common component of risk and indicate distinctions among risk factors along the dominance dimension.

A substantial body of research suggests that several personality traits confer risk of physical illness, with two domains providing much of the evidence (Smith & MacKenzie, 2006). First, often described together under the label *hostility*, individual differences in anger, cynical or suspicious attitudes, and antagonistic or quarrelsome behavior predict development of coronary heart disease (CHD), other cardiovascular diseases, and reduced longevity (Smith, Glazer, Ruiz, & Gallo, 2004). Second, other aspects of negative affect (i.e., depression, anxiety) also confer risk (Suls & Bunde, 2005), indicating negative health consequences of the personality domain of Neuroticism (Costa & McCrae, 1992) or negative affectivity (Watson & Clark, 1984).

The literature on personality and health is limited by conceptual and methodological issues, including some involving personality measurement. A wide variety of traits have been studied, and in many instances it is unclear whether measures assess specific traits implied by the scale labels rather than other, perhaps better established traits. Further, traits are typically studied individually, creating the possibility that observed associations might reflect a different but correlated personality dimension. Hence, a smaller number of better

established personality traits might account for the many observed associations (Smith & MacKenzie, 2006). Evaluations of similarities and differences among personality risk factors are therefore important and should examine associations with well-established traits in order to identify both common, broad dimensions of risk and sharper descriptions of unique components of risk.

A second concern stems from the common separation of personality traits and risk factors involving the social environment in epidemiologic research (Gallo & Smith, 1999). Several robust social-environmental risk factors have been identified, notably isolation, low social support, job stress, and strain in close relationships (Everson-Rose & Lewis, 2005; Smith & Glazer, 2006). Risk factors are often grouped as characteristics of individuals (e.g., personality traits) versus social circumstances (e.g., isolation), even though these sets of constructs are interrelated. For example, hostility and negative affectivity are associated with low social support and high interpersonal conflict (Joiner & Coyne, 1999; Smith et al., 2004). Further, social-environmental risk factors often display characteristics similar to personality traits. For example, social support is stable across time and locations (e.g., before vs. after moving) and partially heritable (Pierce, Lakey, Sarason, & Sarason, 1997). As when studying traits individually, separating personality and social factors could preclude identification of more basic dimensions of psychosocial risk, as associations between these classes of risk factors could indicate that their influences on health are overlapping. Therefore, frameworks that permit integrative analysis of personality and social risk factors may be quite useful.

The Interpersonal Approach to Psychosocial Risk Factors

Elsewhere, we have advocated the interpersonal perspective in personality psychology (Horowitz et al., 2006; Kiesler, 1996; Pincus & Ansell, 2003) as a framework for integrative analysis of personality and social risk factors (Gallo & Smith, 1998, 1999; Smith, Gallo, & Ruiz, 2003; Smith et al., 2004). Sullivan (1953, p. 111) defined personality as “the relatively enduring pattern of interpersonal situations which characterize a human life.” Rather than separating characteristics of persons and social environments as distinct classes of constructs, this perspective conceptualizes them as inherently interrelated through reciprocal influences. Through their internal experiences (e.g., affect, appraisals) and expressive behavior, individuals influence experiences and expressive behaviors of others, creating and maintaining social environments that are consistent with their own personality characteristics. Agreeable persons foster warm social relations, whereas antagonistic persons foster cold or quarrelsome interactions (Sadler & Woody, 2003). This dynamic reciprocal association between personality and the social environment describes the *interpersonal* or *transactional cycle* in interpersonal theory (Kiesler, 1996) and is consistent with perspectives in developmental, personality, and social psychology that view individuals as shaping and shaped by their social environments (e.g., Buss, 1987; Caspi, 2000; Mischel & Shoda, 1995; Snyder, 1983).

Another key component of this perspective is more relevant to our present purpose: the interpersonal circumplex (IPC; Kiesler, 1983; Pincus & Ansell, 2003). The IPC (Figure 1) comprises two broad dimensions of social behavior, affiliation (i.e., warmth or friendliness

vs. coldness or hostility) and control (i.e., dominance vs. submissiveness). These dimensions can describe personality traits and features of the social environment, such as relationship qualities and social support (Gallo & Smith, 1999; Trobst, 2000), making the IPC particularly useful in the integration of psychosocial risk factors for disease. The IPC and several well-validated circumplex-based measures represent a “nomological net” (Cronbach & Meehl, 1955) for comparing, contrasting, and integrating psychosocial measures (Gurtman, 1992). In the interpersonal perspective, the principle of complementarity links the IPC and the reciprocal or transactional view of behavior such that one individual’s behavior invites or evokes responses from others that are similar in affiliation axis (e.g., warmth invites warmth) and opposite on the control axis (e.g., dominance invites submissiveness). Hence, the IPC descriptions of risk factors permit theory-driven predictions regarding related interpersonal experiences or exposures.

To illustrate this approach (Gallo & Smith, 1998), we examined correlations of the Buss and Perry (1992) Aggression Questionnaire (AQ) subscales with self-reported trait affiliation and control (Trapnell & Wiggins, 1990). Each subscale was inversely related to affiliation, but varied in associations with control (Gallo & Smith, 1998). Verbal aggression was associated with greater dominance whereas the hostility subscale was associated with submissiveness; physical aggression and anger subscales were less closely related to control. A subsequent study replicated these results (Ruiz, Smith, & Rhodewalt, 2001). These IPC analyses clarify similarities and differences among aspects of this trait domain and suggest common and specific social processes through which they might influence health. Anger, hostile attitudes, and aggressiveness all would be expected to involve recurring patterns of antagonistic interactions with others and few warm exchanges. However, some variants such as verbal aggressiveness reflect expressions of hostile dominance toward others and communicate expectations that others will comply whereas cynicism and mistrust reflect hostile submissiveness and communicate expectations that others are likely to be critical and to exert unwelcome control (Horowitz et al., 2006).

The Present Study

Our prior studies illustrate the utility of the IPC as an integrative framework for the study of psychosocial risk factors but were limited in several respects. First, they examined only the hostility domain. As noted above, other aspects of negative affect (e.g., anxiety, depressive symptoms) predict poor health (Suls & Bunde, 2005). Although typically seen as intra-individual rather than interpersonal dimensions, anxiety, depressive symptoms, and neuroticism are associated with hostile submissiveness in the IPC (Schmidt, Wagner, & Kiesler, 1999a; Wiggins & Broughton, 1991). Thus, we attempted to replicate our prior findings for the hostility domain and extended this approach to other negative affects that predict poor health.

Also, our prior work also relied exclusively on self-reports of personality in young adults. As a result, it is unclear whether IPC correlates of risk factors simply reflected common method variance and whether associations would be similar for older adults at greater risk of disease. Toward this end, we examined associations of AQ subscales, facets of neuroticism, and related traits with both self-report and spouse-rating measures of the IPC among middle-

aged and older married couples. Correlations between self-reports of personality risk factors and IPC-based ratings by spouses provide a stronger test of interpersonal styles associated with these risk factors, given the separate measurement sources. Finally, our prior studies examined only personality. The integrative value of the IPC would be enhanced considerably if it were also relevant to social-environmental risk factors. Therefore, we also examined marital adjustment. Marital disruption (i.e., separation, divorce) and strain (i.e., low satisfaction, conflict) have been linked to several negative health outcomes, including the development and course of cardiovascular disease (CVD; Matthews & Gump, 2002; Orth-Gomer et al., 2000).

We anticipated that in the IPC low affiliation would represent a common correlate of psychosocial risk across both personality traits and aspects of marital quality, suggesting a central role for interpersonal processes involving low affiliation or high hostility or both in the development of disease. Further, we anticipated that the specific risk factors we assessed would differ in associations with control. This integrative IPC-based description of common and specific elements of risk across characteristics of personality and relationships has the potential to provide a more parsimonious but still detailed view of psychosocial influences on health.

METHOD

Participants—Participants included 147 middle-aged (wives, $M = 43.9$ years old, $SD = 3.8$, husbands, $M = 45.8$ years old, $SD = 4.0$) and 154 older married couples (wives, $M = 62.2$ years old, $SD = 4.5$, husbands, $M = 64.7$ years old, $SD = 4.3$). Most were Caucasian (wives, 96.6%; husbands, 95.8%) from the Salt Lake City, Utah, area. Eligibility included (1) married for at least 5 years, (2) one member who was either between 40 and 50 years old or between 60 and 70 years old, and (3) no more than a 10-year age difference. Couples were married for an average of 28 years ($SD = 7.6$).

Measures—Participants completed portions of self-report (Form S) and spouse-rating (Form R) versions of the NEO-PI-R (Costa & McCrae, 1992), specifically three 8-item facet scales from the Neuroticism domain (Anxiety—N1; Angry Hostility—N2; Depression—N3) and items from the Extraversion and Agreeableness domains. Wiggins and Trobst (1998) identified 48 items from the Extraversion and Agreeableness domains to measure IPC octants. Wiggins and Trobst established the internal consistency and circumplex structure of these scales, and we confirmed the circumplex structure of the self-report and spouse rating versions of these octant scales as well as the convergent and discriminant validity of octant scales and the control and affiliation dimension scores derived from the octant scales (Traupman et al., 2009). Hence, although the control and affiliation scales are based on NEO-PI-R extraversion and agreeableness scales items, they are combined in such a way as to reflect the primary IPC axes rather than the five-factor model traits.

The AQ (Buss & Perry, 1992) comprises 29 self-report, Likert-type items, measuring verbal aggression, physical aggression, hostility, and anger with adequate internal consistency ($\alpha = .80$), stability, and construct validity (Buss & Perry, 1992; Gallo & Smith, 1998). An eight-item version of the Cook and Medley (1954) Hostility (Ho) Scale developed by Barefoot,

Dodge, Peterson, Dahlstrom, and Williams (1989) was used, assessing cynicism and mistrust, with high internal consistency ($\alpha = .86$). Participants also completed the Center for Epidemiological Studies Depression Scale (CES-D), a self-report scale designed to measure depressive symptomology (Radloff, 1977) with good reliability ($\alpha = .85$; Radloff & Teri, 1986). The Locke-Wallace Marital Adjustment Test (MAT) is a self-report measure of marital satisfaction (Locke & Wallace, 1954), with good reliability ($\alpha = .90$) and extensive evidence of construct validity (Snyder, Heyman, & Haynes, 2005). The Quality of Relationship Inventory (QRI; Pierce, Sarason, & Sarason, 1991) measures positive and negative qualities of relationships. We used the Support and Conflict subscales (α s = .80, .89, respectively). Finally, the Impact Message Inventory (IMI-C; Schmidt, Wagner, & Kiesler, 1999b) assesses perceptions of the target individual's behavior on the IPC dimensions. In this shortened version (Nealey-Moore, Smith, Uchino, Hawkins, & Olson-Cerny, 2007) participants rated their agreement with 32 statements describing their general experiences with their spouse. Items include, "In general, interacting with my husband/wife makes me feel bossed around" and "In day-to-day interactions, my husband/wife makes me feel that I can lean on him/her for support." The items form octant scales, combined to obtain IPC affiliation and control scores. This scale demonstrates good reliability across all dimensions ($\alpha = .69$ or greater for all scales), and several studies with this version demonstrate construct validity (e.g., Nealey-Moore et al., 2007).

Procedures—Participants were recruited through a telephone polling firm, advertisements placed in local newspapers, workplace newsletters, flyers distributed to health and fitness centers, and presentations at community outreach programs. Husbands and wives attended multiple sessions together. Prior to the first session, husbands and wives received separate survey packets that included a consent form, a demographic questionnaire, and the IMI, CESD, QRI, and MAT. Participants later completed a second packet of questionnaires, including the NEO PI-R (Forms S and R) and AQ.

Statistical Analyses—Several statistical approaches utilize the IPC to compare and contrast measures of interest. We regressed risk factor scales on the IPC affiliation and control dimension scores. The multiple R with the IPC dimensions is interpreted as an index of the "interpersonalness" of the measure (Gurtman, 1992; Wiggins & Broughton, 1991), and associations with affiliation and control indicate the "interpersonal style" for each measure (cf. Gallo & Smith, 1998). When the scales assessing the IPC dimensions of control and affiliation are orthogonal as intended, using the standardized betas from the regression and the univariate correlations of a given scale with the affiliation and control scales will produce identical angular locations within the IPC. However, because the affiliation and control scales for the IMI were modestly correlated, $r(300) = -.30, p < .001$, we used the standardized betas in all analyses reported below. It should be noted that because the affiliation and control dimensions from the self-report and spouse rating forms of the NEO-PI-R were not correlated, the IPC locations derived from betas and univariate r values were essentially identical. Results varied slightly for these two approaches for analyses using the IMI, but we used the standardized betas from the simultaneous regressions because the resulting independence of the effects for affiliation and control corresponds to the

circumplex assumptions of orthogonal axes. Minor variations in degrees of freedom reflect missing data.

RESULTS

IPC Analyses of Personality Risk Factors

Associations with self-reported dominance and affiliation: Results for multiple regressions are presented in Table 1, where the dependent variables considered individually are the AQ subscales, the Ho Scale, the CESD, and the neuroticism facets of the NEO-PI-R, and the predictors are self-reported affiliation and control scores from the IPC scoring of the NEO-PI-R. These results are also depicted in Figure 2, where distance from the origin of the circumplex for each risk factor scale in the figure corresponds to multiple R values from the individual regressions, and the angular placement in the circumplex is based on the standardized betas for affiliation and control in each analysis. Results indicate that these risk factors are consistently associated with low levels of self-reported affiliation. However, their associations with dominance vary from hostile dominance in the case of verbal and physical aggressiveness to hostile submissiveness in the case of anxiety and depressive symptoms.

Associations with spouse-rated dominance and affiliation: To reduce the role of common method variance in the IPC descriptions of these risk factors, we repeated the analyses using IPC ratings by spouses. Results are presented in Table 2 and Figure 3. Elimination of common method variance produced somewhat weaker effects, indicated by smaller multiple R values compared to results obtained with self-report IPC scales. However, findings remain significant and follow the same pattern. Each risk factor is associated with low spouse ratings of affiliation, and individual scales show the same pattern of varying associations with dominance.

IPC Analyses of Marital Characteristics

Associations of self-reports of marital quality with ratings of spouse's dominance and affiliation: Results for multiple regressions of husbands' and wives' MAT, QRI-Support, and QRI-Conflict scores using their NEO-IPC dominance and affiliation ratings of spouses are presented in Table 3 and Figure 4a. For both husbands and wives, higher MAT scores were associated with ratings of their spouse as higher in affiliation; this aspect of marital quality was unrelated to dominance. QRI-Support scores were associated with higher ratings of spouses' affiliation for both wives and husbands; for wives only, higher support was also associated with ratings of the partner as more dominant. QRI-Conflict scores were associated with ratings of the spouse as lower in affiliation and higher in dominance for both wives and husbands.

These associations of participants' reports of marital functioning with their ratings of spouses' levels of trait affiliation and dominance do not necessarily indicate the extent to which marital functioning is related to perceptions of spouses' affiliation and dominance in the specific context of marital interactions. To provide a more direct IPC description of marital quality, we regressed participants' relationship quality reports on their descriptions of spouses' usual behavior during marital interactions on the IMI-C. Results are also

presented in Table 3 and Figure 4b. Higher MAT scores were strongly associated with higher IMI-C ratings of affiliation and somewhat inversely associated with dominance. The inverse association with dominance was somewhat larger for husbands than wives. QRI-Support scores were positively associated with affiliation for both wives and husbands; for husbands only, higher support was also associated with ratings of their spouse as less dominant. Higher QRI-Conflict scores were associated with ratings of spouses as low in affiliation and high in dominance.

Associations of self-reports of marital quality with dominance and affiliation ratings by spouses:

The transactional and complementarity tenets of the interpersonal perspective lead to the prediction that participants' self-reported marital quality would be associated with their own levels of affiliation and dominance as rated *by* their spouses, as spouses' behavior is reciprocally determined. That is, those who report high levels of marital adjustment, support from the spouse, and low conflict should be rated by their spouse as higher in affiliation. Therefore, we regressed participants' MAT, QRI-C, and QRI-S scores on their spouses' NEO-IPC ratings of the participants' trait dominance and affiliation; results are presented in Table 4 and Figure 5a. Both husbands and wives who reported higher marital satisfaction on the MAT were rated by their spouses as higher in affiliation. Participants who reported more support from partners were rated by their spouse as higher in affiliation, and, in the case of wives' support scores, their husbands also rated them as somewhat lower in dominance. Finally, both husbands and wives who reported higher marital conflict were rated by their spouses as lower in affiliation.

As noted above, such associations with trait affiliation and dominance are not precisely relevant to an IPC description of marital interactions. Hence, we repeated these analyses using IMI-C scores; results are presented in Table 4 and in Figure 5b. Husbands and wives who reported higher marital satisfaction were rated by their spouses as displaying greater warmth during marital interactions; wives who reported greater marital satisfaction were also rated by husbands as less dominant. Similarly, both husbands and wives who reported more support from their spouse were rated by spouses as higher in affiliation during marital interactions, and husbands also rated these wives as less dominant. Finally, both husbands and wives who reported greater marital conflict were rated by spouses as displaying lower affiliation.

Analyses of Complementarity—Although not a primary focus, we examined associations between husbands' and wives' ratings of their spouses' affiliation and dominance using both the IMI and NEO-IPC. Husbands' and wives' IMI ratings of their spouses' affiliative behavior during marital interactions were positively related, $r(300) = .44$, $p < .001$, consistent with the principle of complementarity. The expected inverse association between husbands' and wives' IMI ratings of control during marital interaction only approached significance, $r(300) = -.10$, $p = .097$. For NEO-IPC-based ratings of spouses' trait affiliation and control, both associations were significant and in the expected direction, affiliation $r(300) = .19$, $p < .001$; control $r(300) = -.18$, $p = .002$.

DISCUSSION

These findings illustrate the utility of the IPC as a framework for integrative description of psychosocial risk factors for poor health outcomes. As in our prior studies (Gallo & Smith, 1998; Ruiz et al., 2001), anger, hostility, and aggressiveness assessed by the AQ—as well as the CM Ho scale and the NEO-PI-R angry hostility scale—were similar in their associations with low affiliation but also demonstrated differing associations with control or dominance. Verbal aggression was unique in its strong and consistent association with a hostile-dominant interpersonal style. Importantly, these IPC correlates of anger, hostility, and aggressiveness were similar—albeit somewhat weaker—when affiliation and control were assessed through spouse ratings rather than self-reports. Hence, the interpersonal styles associated with these risk factors do not simply reflect common method variance. Other individual differences in negative affect (i.e., anxiety, depressive symptoms) were associated with hostile submissiveness. These results confirm prior studies of aspects of negative affect (e.g., Schmidt et al., 1999a; Wiggins & Broughton, 1991; Zuroff, Fournier, & Moskowitz, 2007) but extend that work by using both self-reports of IPC dimensions and ratings of interpersonal style provided by a separate source.

Further, measures of marital quality were strongly related to the IPC, suggesting that this framework is also relevant for risk factors traditionally seen as aspects of the social environment. Participants who reported high marital satisfaction and support also rated spouses as high in affiliation and somewhat lower in dominance. Those who reported high conflict consistently rated their spouses as hostile and controlling. Further, self-reports of better marital quality were also consistently associated with higher affiliation as rated by the spouse. Hence, as in the case of personality risk factors, the interpersonal correlates of marital quality are not simply a reflection of common method variance. These findings extend prior theory and research demonstrating the utility of the IPC in conceptualization and assessment of social support (Trobst, 2000), another well-established risk factor typically construed as a characteristic of the social environment.

Overall, the psychosocial risk factors examined here were associated with a common interpersonal characteristic in the individual's own social behavior and in the quality of their marital relationship: low affiliation or high hostility or both. In interpersonal theory regarding affiliation, expression and exposure are closely linked through transactional processes. Specifically, the principle of complementarity predicts that expressions of low warmth or high hostility invite or evoke similar reactions from others (Horowitz et al., 2006; Kiesler, 1996), a prediction that was supported in the present study. As a result, whether intended as assessments of personality traits or aspects of the social environment, many risk factor measures may tap the same reciprocal interpersonal process related to disease risk: a recurring pattern of interactions reflecting low affiliation or high hostility or both. Low affiliation and high hostility can be conceptually and empirically distinguished and could influence health through distinct pathways (Uchino, Holt-Lunstad, Uno, & Flinders, 2001). However, these behaviors are closely related; activation of one end of this dimension inhibits the other (Moskowitz, 2005). The fact that a variety of well-established but conceptually distinct risk factors are associated with the affiliation dimension of the IPC underscores the

centrality of this fundamental aspect of social life as an important influence on physical health.

However, the psychosocial risk factors examined here also varied in their associations with dominance. Hence, within the broad reciprocal pattern of increased antagonistic encounters and decreased warmth, specific risk factors vary in interpersonal control. Some risk factors (e.g., verbal aggressiveness, marital conflict) combine unfriendliness with increased expression of effortful assertion of control or dominance. Others (e.g., cynicism, anxiety, depressive symptoms) combine unfriendliness with submissive behavior and experiences, such as unwelcome dominance asserted by others. These interpersonal patterns could be related to both overlapping and distinct psychophysiological mechanisms linking social experience to disease. For example, effortful agonistic striving typical of hostile dominance is likely to be associated with increased cardiovascular and neuroendocrine stress responses when individuals attempt to exert control over others (Smith, Nealey, Kircher, & Limon, 1997; Smith, Ruiz, & Uchino, 2000). In contrast, hostile submissiveness may be associated with physiological responses involving vigilance and perceptions of threat (Blascovich & Tomaka, 1996; Dickerson, Gruenwald, & Kemeny, 2004; Smith et al., 2000), and delayed physiological recovery stemming from worried, bitter, or resentful rumination about prior mistreatment (Brosschot, Gerin, & Thayer, 2006). Both dominant and submissive forms of disaffiliation could also be associated with physiological correlates of more frequent and severe anger as well as less frequent and complete physiological dampening otherwise accompanying social support (Smith et al., 2003; Uchino, 2006).

Expressions of dominance and submissiveness are also influenced by situation-specific roles (e.g., supervisor vs. coworker) and the relative status they confer (Fournier, Moskowitz, & Zuroff, 2002; Moskowitz, 2005). Therefore, susceptibility to dominant versus submissive aspects of risk could reflect individual differences in social behavior, status-related contextual factors, and their potentially synergistic interaction. Such interactional risk forms the basis of an important animal model of coronary artery disease (CAD); socially dominant male macaques develop CAD more readily in response to chronic social instability than do submissive males, but dominance is unrelated to CAD in stable social conditions (Manuck & Kaplan, 1998).

It is important to note that seemingly intra-individual traits such as facets of neuroticism are also associated with a specific interpersonal style, consistent with prior analyses of anxiety and depression that emphasize hostile submissive traits and processes (Gilbert, 2001; Gilbert & Allen, 1998; Zuroff et al., 2007). Hence, more complete understanding of the ways in which individual differences in negative emotionality contribute to health likely requires consideration of interpersonal processes. For example, neuroticism might be associated not only with heightened emotional reactivity to stressful interpersonal events, but also increased exposure to such stressors and decreased availability of or benefit from affiliative experiences (Bolger & Schilling, 1991; Smith et al., 2004; Suls & Martin, 2005). Also, increased exposure to conflict and reduced support could maintain and exacerbate negative emotionality (Joiner & Coyne, 1999). Other traits presumed to reflect intra-individual characteristics such as conscientiousness (Costa & McCrae, 1992) are associated with reduced risk of serious illness (Smith & MacKenzie, 2006) and an affiliative interpersonal

style in the IPC (Schmidt et al., 1999a). Conscientiousness is also associated with increased likelihood of establishing stable personal relationships, which in turn promote increases in conscientiousness (Roberts & Bogg, 2004). Hence, the interpersonal perspective may be useful in the integrative analysis of psychosocial risk, even for traits that have limited initially apparent interpersonal content.

Limitations—Some research on health consequences of anxiety and depression has used subclinical symptom measures similar to those used here, whereas other studies examine emotional disorders. Interpersonal correlates of symptoms of anxiety and depression may be relevant to related emotional disorders, but generalization requires additional research. Further, given the multiple *R* values when risk factors were regressed on IPC dimensions, there is substantial reliable variance in these measures not accounted for by affiliation and dominance. Hence, the IPC dimensions probably do not exhaust their relevance to health, and intrapersonal processes are also likely to be involved in those associations. Future research should examine the extent to which affiliative and controlling interpersonal behavior and experiences account for associations between specific risk factors and subsequent health. Additional research is also needed with non-Caucasian ethnic groups and nonmarried individuals.

Finally, the present results describe general interpersonal styles and interaction patterns associated with risk factors, but do not provide detailed accounts of related social processes. Studies of specific elements of the transactional cycle are required to move beyond description to explanations of interpersonal processes in which individuals influence—and are influenced by—social environments in ways that create psychosocial risk or resilience (Smith et al., 2004). For such efforts, well-validated instruments and analytic techniques based in interpersonal theory are available, including measures of interpersonal perception and reactions to others (Moskowitz & Zuroff, 2005; Schmidt et al., 1999b), goals or values (Locke, 2000), capabilities (Hofsess & Tracey, 2005; Locke & Sadler, 2007), interpersonal problems (Alden, Wiggins, & Pincus, 1990), interpersonal behavior and representations of relationships (Benjamin, Rothweiler, & Critchfield, 2006), and patterns of complementarity (Sadler & Woody, 2003; Tracey, 2005). Such methods could help to explicate dynamic patterns of transaction between persons and social environments that contribute to psychosocial risk and ultimately guide risk-reducing interventions.

Conclusions and Future Directions—The dimensions of the IPC are directly relevant to the study of psychosocial risk, as trait dominance and (low) affiliation are both associated with cardiovascular disease (e.g., Smith et al., 2008). The results presented here suggest that the interpersonal framework is also useful in comparing and contrasting personality risk factors and integrating them with immediate or “local” social risk factors, such as low support and conflict in close relationships. Further, the framework is useful for integrating personality and social relationship risk factors with more distal risk factors such as job stress or socioeconomic status (SES). For example, low SES is associated with greater IPC-assessed exposure to social interactions involving low affiliation/high hostility and high dominance expressed by others (Gallo, Smith, & Cox, 2006). Hence, the IPC framework and the broader perspective in which it is embedded could guide conceptual and empirical

integration across a full range of psychosocial risk factors from personality traits to social relationships and beyond to aspects of broader social environments.

In this general interpersonal view, we hypothesize that (a) psychosocial risk is conferred, at least in part, through recurring patterns of social experience involving low affiliation, high antagonism, effortful exertion of influence or control over others, and/or exposure to unwelcome dominance and control from others; (b) resilience is conferred by the converse of these patterns; and (c) such recurring patterns of interpersonal experience, in turn, reflect the dynamic and reciprocally determined contributions of personality, qualities of personal relationships and social networks, and larger social, organizational, economic, and perhaps cultural processes. In pursuing these hypotheses, the concepts and methods of the interpersonal tradition will be useful in articulating, testing, explicating, and integrating the multiple levels of analysis in which psychosocial factors influence physical health.

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Figure 1.
The interpersonal circumplex.

Figure 2. Plots of associations of personality risk factor measures with affiliation and control in the self-report IPC. a: Wives. b: Husbands. Radius of circumplex corresponds to multiple $R = .5$.

Figure 3.

Plots of associations of personality risk factor measures with affiliation and control in IPC ratings by spouses. a: Wives' risk factor measures as predicted by husbands' ratings of wives. b: Husbands' personality risk factor measures as predicted by wives' ratings of husbands. Circumplex radius corresponds to multiple $R = .5$.

Figure 4. Plots of associations of the self-report marital functioning measures with affiliation and control in the IPC ratings of spouses. a: NEO-IPC. b: IMI-C. Radius of circumplex corresponds to multiple $R = 1.0$.

Figure 5.

Plots of associations of the self-report marital functioning measures with affiliation and control in the IPC ratings by spouses. a: NEO-IPC. b: IMI-C. Radius of circumplex corresponds to multiple $R = 1.0$.

Table 1

Multiple Regression Results for Wives' and Husbands' Personality Risk Factor Measures Predicted by Their NEO Self-Reports of Dominance and Affiliation

Variable	Wives				Husbands			
	<i>R</i>	<i>F</i> (2,299)	<i>stdβ</i>	<i>t</i> (299)	<i>R</i>	<i>F</i> (2,299)	<i>stdβ</i>	<i>t</i> (299)
<i>AQ: Physical Aggression</i>	0.27	11.35**			0.30	14.31**		
Affiliation			-0.26	4.62**			-0.28	4.92**
Dominance			0.12	2.01*			0.16	2.80**
<i>AQ: Verbal Aggression</i>	0.41	29.36**			0.49	46.31**		
Affiliation			-0.29	5.28**			-0.37	7.16**
Dominance			0.35	6.45**			0.38	7.42**
<i>AQ: Hostility</i>	0.50	49.84**			0.46	40.37**		
Affiliation			-0.48	9.30**			-0.44	8.42**
Dominance			-0.09	1.83			-0.10	1.85
<i>AQ: Anger</i>	0.33	17.90**			0.37	23.33**		
Affiliation			-0.34	5.98**			-0.37	6.78**
Dominance			0.06	1.00			0.10	1.86
<i>Cook Medley</i>	0.41	29.19**			0.31	15.75**		
Affiliation			-0.39	7.17**			-0.29	5.22**
Dominance			-0.07	1.26			-0.07	1.32
<i>NEO: Anxiety</i>	0.33	18.65**			0.38	24.96**		
Affiliation			-0.20	3.52**			-0.23	4.31**
Dominance			-0.24	4.25**			-0.27	4.90**
<i>NEO: Angry Hostility</i>	0.42	32.41**			0.47	41.04**		
Affiliation			-0.43	8.04**			-0.47	9.05**
Dominance			0.06	1.06			0.04	0.83
<i>NEO: Depression</i>	0.47	41.43**			0.46	40.81**		
Affiliation			-0.28	5.26**			-0.26	5.08**

Variable	Wives			Husbands		
	<i>R</i>	<i>F</i> (2,299)	stdβ	<i>t</i> (299)	<i>R</i>	stdβ
Dominance			−0.33	6.31**		−0.35
<i>CESD</i>	0.25	9.76**			0.40	
Affiliation			−0.11	1.87		−0.30
Dominance			−0.21	3.58**		−0.23

* $p < .05$,
** $p < .01$.

Table 2
Multiple Regressions for Individual's Risk Factor Measures Predicted by Spouse's NEO Ratings of Their Dominance and Affiliation

Variable	Wives				Husbands			
	R	F(2,299)	stdβ	t(299)	R	F(2,299)	stdβ	t(299)
<i>AQ: Physical Aggression</i>	0.23	8.46**			0.14	2.82 ^a		
Affiliation			-0.20	3.59**			-0.11	1.96*
Dominance			0.12	2.07*			0.09	1.52
<i>AQ: Verbal Aggression</i>	0.33	18.51**			0.34	18.87**		
Affiliation			-0.22	4.02**			-0.20	3.64**
Dominance			0.26	4.65**			0.29	5.28**
<i>AQ: Hostility</i>	0.33	18.23**			0.27	11.34**		
Affiliation			-0.31	5.61**			-0.22	3.90**
Dominance			-0.12	2.11*			-0.13	2.35*
<i>AQ: Anger</i>	0.22	7.78**			0.17	4.24**		
Affiliation			-0.22	3.94**			-0.15	2.58*
Dominance			0.02	0.37			0.09	1.58
<i>Cook Medley</i>	0.23	8.13**			0.22	7.48**		
Affiliation			-0.20	3.87**			-0.20	3.53**
Dominance			-0.07	1.22			-0.07	1.23
<i>NEO: Anxiety</i>	0.22	7.19**			0.28	12.84**		
Affiliation			-0.20	1.19			-0.11	2.00**
Dominance			-0.20	3.58**			-0.25	4.94**
<i>NEO: Angry Hostility</i>	0.28	12.57**			0.25	10.28**		
Affiliation			-0.28	5.01**			-0.25	4.44**
Dominance			0.02	0.37			-0.03	0.51
<i>NEO: Depression</i>	0.31	15.23**			0.36	22.54**		
Affiliation			-0.19	3.40**			-0.14	2.58*
Dominance			-0.24	4.28**			-0.32	5.93**

$$^* p < .05,$$

$$^{**} p < .01,$$

$$^a p = .06.$$

Table 3

Multiple Regression Results for Self-Reports of Marital Functioning Predicted by NEO and IMI-C Ratings of Spouses' Dominance and Affiliation

Variable	Wives				Husbands			
	<i>R</i>	<i>F</i> (2,299)	<i>stdβ</i>	<i>t</i> (299)	<i>R</i>	<i>F</i> (2,299)	<i>stdβ</i>	<i>t</i> (299)
<i>NEO-PI-R</i>								
<i>MAT</i>	0.49	45.98**			0.36	22.42**		
Affiliation			0.48	9.35**			0.36	6.56**
Dominance			0.06	1.26			-0.08	1.47
<i>QRI: Support</i>	0.47	41.49**			0.36	22.03**		
Affiliation			0.43	8.29**			0.36	6.56**
Dominance			0.16	3.00**			0.05	0.87
<i>QRI: Conflict</i>	0.54	60.44**			0.43	33.21**		
Affiliation			-0.54	10.90**			-0.39	7.47**
Dominance			0.12	2.44*			0.18	3.40**
<i>IMI-C</i>								
<i>MAT</i>	0.72	161.04**			0.75	186.29**		
Affiliation			0.69	16.70**			0.61	14.45**
Dominance			-0.12	2.99**			-0.25	5.94**
<i>QRI: Support</i>	0.76	207.73**			0.73	172.79**		
Affiliation			0.75	19.60**			0.68	15.82**
Dominance			-0.06	1.57			-0.11	2.61*
<i>QRI: Conflict</i>	0.75	194.97**			0.66	113.86**		
Affiliation			-0.61	15.69**			-0.49	10.32**
Dominance			0.34	8.63**			0.28	5.96**

* $p < .05$,** $p < .01$.

Table 4

Multiple Regression Results for Self-Reports of Marital Functioning Predicted by NEO and IMI-C Dominance and Affiliation Ratings by Spouses

Variable	Wives				Husbands			
	<i>R</i>	<i>F</i> (2,299)	<i>stdβ</i>	<i>t</i> (299)	<i>R</i>	<i>F</i> (2,299)	<i>stdβ</i>	<i>t</i> (299)
NEO-PI-R								
<i>MAT</i>	0.35	20.30**			0.36	21.86**		
Affiliation			0.34	6.19**			0.34	6.20**
Dominance			−0.09	1.63			0.09	1.71
<i>QRI: Support</i>	0.30	14.55**			0.29	13.18**		
Affiliation			0.28	5.07**			0.28	5.03**
Dominance			−0.11	1.93 ^a			0.03	0.55
<i>QRI: Conflict</i>	0.31	16.08**			0.35	20.49**		
Affiliation			−0.31	5.65**			−0.34	6.21**
Dominance			0.03	0.61			−0.05	0.98
IMI-C								
<i>MAT</i>	0.48	44.15**			0.50	48.53**		
Affiliation			0.40	7.14**			0.50	9.74**
Dominance			−0.15	2.74**			0.03	0.56
<i>QRI: Support</i>	0.35	21.20**			0.35	20.13**		
Affiliation			0.27	4.5**			0.33	5.88**
Dominance			−0.15	2.51*			−0.06	1.14
<i>QRI: Conflict</i>	0.47	42.38**			0.52	55.58**		
Affiliation			−0.43	7.70**			−0.51	10.05**
Dominance			0.09	1.55			0.05	1.06

*
p < .05,**
p < .01,^a
p < .06.