

Chapter 7: Editor's note

Decker has long been associated with a longitudinal, ethnographic, and medically sophisticated study (see Flinn, this volume) of human immune function in a particular cultural context quite far removed from the American university or hospital contexts in which many psychoneuroimmunological studies have been carried out. Working in the Dominican village of Bwa Mawego, Decker combined ethnographic and laboratory-analytic methods to isolate a physiological marker of stress – HPA activation – and associate it with four primary socio-cultural variables. Among these, the first – participation in culturally approved activities (which have no direct health impact) – might seem an unlikely candidate for affecting stress, HPA activation, and thus (indirectly) immune function. But Decker succeeds in presenting a coherent model to explain the correlations he uncovered between cortisol levels, social status, and cultural consonance (Dressler and Bindon 2000).

Chapter 7

Cultural congruity and the cortisol stress response among Dominican men

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Introduction to the research problem: social status and stress

A growing body of research contributes to new conceptions of stress and immune responses – physiological axes which have traditionally been regarded as separate – as elements in an integrated life-history resource allocation process. According to this new understanding of mind and body, biology and culture, physiology and symbol, “systems” which have previously been regarded as being relatively autonomous aspects of human experience (e.g. stress-response, worldview, emotion, decision-making, immune function, social identity, and power) are being redefined as integrated but dynamically interacting elements in the complex human biocultural phenotype. The give and take in this process occurring between evolved predispositions and sociocultural opportunities are poorly understood.

For example, among nonhuman primates, social dominance (measured as frequency of victories in competitive bouts) associates negatively with baseline HPA activation and immunosuppression (Coe *et al.* 1979; Cohen *et al.* 1992; Cunnick *et al.* 1991; Golub 1979; Keverne 1990; Manogue 1975; Sapolsky 1982, 1983a; Sapolsky and Mott 1987). In other words, animals who are subordinate – those with less competent behavioral styles, who win less, are harassed more, and have less predictable and lower-quality access to food, mates, nesting sites, and other “resources” – show evidence of higher chronic stress response, and immunosuppression. In contrast, two studies of humans indicate that military and/or socioeconomic rank associate *positively* with HPA activation (Bourne *et al.* 1968; Brandstadter *et al.* 1991; Seeman and McEwen 1996). These differences demonstrate that, at present, we have a poor understanding of the degree to which homologous aspects of psychosocial intelligence, emotionalsensitivity, and responsiveness among humans and nonhuman primates account for human social experience, psychosocial stress, and psychoneuroimmunological function compared to more evolutionarily novel cultural factors particular only to humans. Moreover, cultural factors may influence psychosocial stress not only by shaping differences in

social status structure and thus mediating exposure to stressors, but also because of how cultural models are integral to individual psychological appraisal of stressors (Brown *et al.* 1998). As such, one of the most important gaps in understanding the social lives of psychoneuroimmunological (PNI) systems is a lack of information on the psychosomatic effects of relative differences in culturally defined power, social rank, or dominance.

Cultural consensus and stress

Hypothetically, the most basic cultural effects on psychosomatic processes involve inter-group or inter-individual differences emerging through different interpretations of similar experience because of differences in cultural models or worldview (Baratta *et al.* 1990; Jacobson 1987). One of the most exciting recent themes in biocultural anthropological investigations is the role that cultural consensus or sociocultural congruity plays in psychosomatic processes such as stress-response, immune function and other aspects of well being (e.g. depression or other forms of psychopathology). Congruity or consensus is typically conceived of as a continuously varying quantitative phenomenon, i.e. not as a threshold on/off or yes/no effect. Congruity can be conceived in at least three rather different ways.

First, because of acculturation, migration, or simply cultural evolution, individuals may experience degrees of incongruity or poor-fit among specific cultural models or schema which they have mentally-internalized or enact. For example, Brown (1982) found that Filipino immigrants to Honolulu with an intermediate degree of acculturation to modern urban Hawaiian culture had higher 24-hour urinary catecholamine output than did immigrants who were either more-acculturated or less-acculturated. In other words, internalizing roughly equal mixtures of traditional Filipino and opposing modern Hawaiian cultural models was associated with greater stress. The idea is that, believing in, or otherwise following, opposing schema produces internal psychosomatic tension manifested as higher stress.

In a somewhat different view of cultural consensus as an intervening variable in social experience and, in particular, in the experience of social support and affiliation, congruity has been operationalized as "the degree of cultural sharing (or consensus) among informants" or members of an interacting social group (Dressler 1995: 3; Dressler and Bindon 2000; Romney *et al.* 1986). In this conceptualization, the tension leading to higher stress and immunosuppression emerges from how well an individual's worldview fits with that of others in the group. A third alternative to cultural incongruity is an operationalization of the degree of disparity in actual resource control, or means of resource control, and expectations of resource control (Bindon *et al.* 1997: 7), i.e. having higher status expectations than one can actually achieve, which has typically been referred to as status incongruity. Several studies have successfully established empirical associations between physio-

logical measures of stress (e.g. blood pressure, catecholamine secretions, or cortisol secretions) and these various conceptualizations and operationalizations of cultural congruity, consensus, or inconsistency.

Summary of the study

We investigated these questions with data on salivary cortisol, and various social status measures from 30 adult male Dominican villagers. Products of the hypothalamic–pituitary–adrenal axis (HPA), including cortisol, comprise one strand in a web of neuroendocrinological forces which mediate immunoregulation in humans (Falaschi *et al.* 1994; O’Leary 1990; Ursin 1994). Actions of the central nervous system, the autonomic nervous system, and the sympathetic–adrenal–medullary axis are also known to mediate immune function. However, HPA secretions – cortisol in particular – have received considerable attention as immunoregulators. (Ahmed *et al.* 1974; Arnetz *et al.* 1991; Coe 1994; Cohen 1994; Cohen *et al.* 1993; Cunnick *et al.* 1991; Cupps and Fauci 1982; Fauci and Dale 1975; Dale *et al.* 1974; Flinn and England 1996, 1997; Gatti *et al.* 1987; Gillis *et al.* 1979; Glaser *et al.* 1994; Gordon and Nouri 1981; Herbert and Cohen 1993; Kiecolt-Glaser *et al.* 1984; Kimzey 1975; Kimzey *et al.* 1976; Meuleman and Katz 1985; Onsrud and Thorsby 1981; Panter-Brick *et al.* 1996; Schleifer *et al.* 1984; Weidenfeld *et al.* 1990). As such, baseline salivary cortisol is a highly salient and efficient proxy measure of PNI function.

Circadian variation in salivary cortisol values was standardized using residuals from a curvilinear regression by time of day. Mean cortisol residuals for each individual were used in a multivariate linear regression analysis to examine associations between individuals’ chronic level of HPA activation and various social status measures including indicators of cultural congruity.

Results indicate that individuals’ mean level of HPA activation associates negatively with the following four social characteristics: (i) engaging in culturally sanctioned religious and political institutions as opposed to illicit activities; (ii) infrequent reports of distressed mood; (iii) being rated highly by peers on affiliative or cooperative characteristics; and (iv) having grown up with a father who was present as a caretaker more often than he was absent. These findings support two hypotheses, (i) that affiliational or cooperative social status associates negatively with HPA activation, and (ii) that social or behavioral incongruity with the predominant representational models in a culture associates positively with HPA activation. No clear association was found between other measures of social status (education, income, property, age, number of dependents, or children) and HPA activation. These findings are congruent with a large body of theory and evidence in developmental psychobiology in which a harsher childhood environment canalizes individual life-history toward more short-term allocational tendencies with

elevated long-term costs (e.g. relatively greater immunosuppression; see Mann, this volume).

Study site and sample

The data used in this research were collected during two brief ethnographic surveys in the remote rural village of Bwa Mawego¹ on the Caribbean island of Dominica. Dominica is an underdeveloped Caribbean nation economically dependent on small-scale agriculture and informal work arrangements (Gomes 1985; Hunte 1972; Trouillot 1988). The village comprises 600 inhabitants, grouped into about 100 households where Flinn and colleagues have conducted more than 31 months of longitudinal research on childhood, family organization, and stress since 1988 (Flinn 1999; Flinn *et al.* 1995; Flinn and England 1996, 1997, and in this volume; Flinn *et al.* 1996). Bwa Mawego lies at the end of a poor-quality road at the most remote corner of the southeastern coast of Dominica. Small-scale agriculture, fishing, and migrant labor are the primary means of subsistence in the village. Modern infrastructure and associated social reorganizations are incipient, “about 60 percent of homes have electricity, 23 percent have telephones, 11 percent have refrigerators, and 7 percent have televisions” (Flinn and England 1996).

The study involves 30 adult males, aged 17 to 49 years, residing in 28 different households. This is a nearly complete sample of adult men living permanently in two adjoining hamlets of the village during the period of fieldwork. Field research was conducted during June and July, 1992 and December and January of 1993–94. Laboratory analyses were conducted at the University of Michigan, Department of Pathology, Ligand Research Laboratory during November 1992, and at Emory University, Department of Anthropology, Laboratory for Comparative Human Biology in 1994. Details of the radioimmunoassay protocol for measurement of salivary concentrations of cortisol have been published in Decker (2000).

Cultural context

Many of the predominant cultural themes in Bwa Mawego derive from Dominica’s colonial past and intensive missionization by various Christian denominations. Christian values of temperance, monogamy, nuclear family coherence, hard work, and piety are the most powerful models in the society, though alternative models such as Rastafarianism exist. Many families are matrifocal, but there appears to be an unspoken distinction associated with intact nuclear families, and members of such families seem to possess a distinct form of cultural capital. Illicit drug use is not uncommon, but again, the sanctioned representational models in the village are set in opposition to drug use, and other non-Christian behaviors such as gambling, drinking, or “partying” at local pubs.

The village was particularly well suited for this research because subjects comprise a long-term social group in which direct reciprocal relations are paramount for economic and social success (Decker 1993). Wage labor comprises a largely supplementary economic role to small-scale cash crop production and subsistence gardening executed through reciprocal work arrangements.

Methods

Results reported here derive from three sets of interviews with all 30 subjects, and two sets of multiple-day longitudinal ambulatory observations of salivary cortisol levels and mood. Salivary cortisol is considered a superior measure of adrenal function compared to serum cortisol, and is far easier to collect, store and analyze (Bolufer *et al.* 1989; Reid *et al.* 1992; Shinkai *et al.* 1993). These methods were supplemented with information gained through regular participant observation during five months of field research, and with insights of two key informants who were members of the research cohort.

The first interview was a semi-structured interview of about one hour in length, conducted in each subject's home. During this interview we collected information about a variety of institutional and material status dimensions, as well as information on differences in social roles, for example, whether a man was married or not; the presence of co-residing children and other kin; each man's occupation; estimated yearly income; a checklist of material property and livestock, and estimates of the quantity and quality of agricultural land controlled; number of years of education or vocational training, and special skills; roles of religious and political institutional power; and a brief life history focused on residential and work history and other salient life events. These data formed the basis for several scales of social status.

Following completion of the first round of interviews, a second round of unstructured interviews was conducted with all 30 subjects to investigate the cultural models of status in Bwa Mawego. Subjects were asked to discuss what sort of characteristics in other men were preferential for friendships or cooperative affiliations. After this interview, facial photographic prints were taken of all 30 subjects. Responses to these interviews were used in concert with key-informant responses to devise a four-item peer-rating scale of social status: trustworthiness; agreeableness; influence; and helpfulness, shown in Table 7.1. Ratings on these four scales were obtained for all subjects from all 29 of their peers during the final interviews.

During the final round of interviews all 30 subjects rated all 29 other subjects on the 4-item scale of social status using a five-point Lickert scale with the facial photographs as prompts. These interviews were conducted in complete privacy in the researchers' living quarters. First, subjects were told that they would be asked how well they liked other men in the village and that they could respond using a Lickert-scale with five potential responses,

Table 7.1 Four item peer-rating of social status scale.

- How much do you trust this man?
- How much do you agree with this man?
- How much influence does this man have on you?
- How much help does this man give you?

Five-point Lickert scale for response to four peer-rating items:

1	2	3	4	5
None	Not much	Average	A lot	The most

shown in Table 7.1. Next subjects were told the four questions on which they would rank other men, also shown in Table 7.1.

Using the facial photographs taken of each man, each of the four peer-rating questions was addressed to all 30 research subjects once for each of his 29 peers who were also participants in the study. Using these peer ratings, mean social ranks were calculated for each of the 30 subjects. Calculation of Cronbach's Alpha equal to 0.948 indicated a high internal consistency for this four-item scale of social status. This instrument appears to be a reliable measure, and based on qualitative information gathered through participant observation and key informant discussions, this scale is a valid indicator of individuals' overall social power in Bwa Mawego. Men rated highly by peers tended to have more stable economic and social relationships, and had reputations for integrity and industriousness. In contrast, low-rated men often had little or no income, infrequent opportunity for work, and in some cases limited access to garden products which complicated their daily subsistence. Low-rated men had reputations for failed social relationships (for example divorces, breakups, and disagreements), frequent fighting or arguing, criminal activity, excessive drug-use, and/or indolence.

Each individual's baseline HPA activation was assessed by collecting saliva samples twice daily for eight contiguous days in 1992 and for four contiguous days in 1993. Radioimmunoassay analyses were conducted on the 471 saliva samples collected from the 30 subjects in this study. Each salivary cortisol value was standardized by time of day using a linear model of diurnal decline shown in Figure 7.1. Details of the RIA procedure, as well as the linear regression analysis are described in Decker (2000) (see also Appendix to Flinn chapter in this volume). The intercept for this model was 0.766 micrograms per deciliter; the time slope coefficient was -0.072 ; and the time squared slope coefficient was 0.002. This linear model accounts for 53.1 percent of the observed variation in cortisol. Using the intercept and slope estimates, we calculated a residual score for all 471 cortisol samples. These residuals are indicative of individuals' cortisol levels above or below the mean level at a specified time of day given the mean circadian decline in

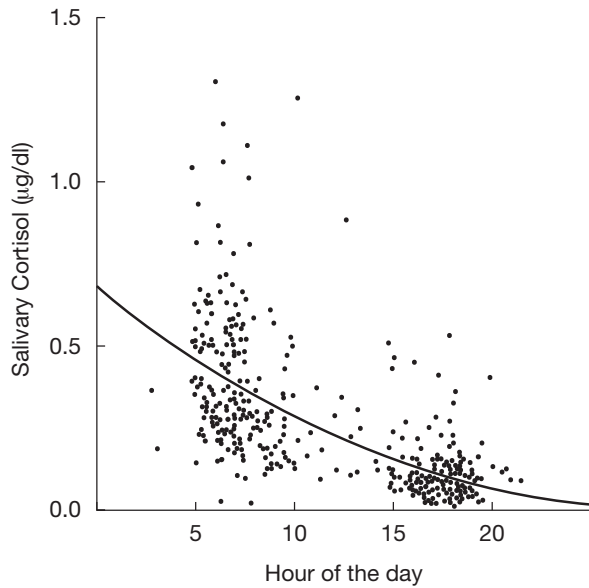


Figure 7.1 Salivary cortisol [$\mu\text{g}\cdot\text{dL}$] by time of day ($n = 471$). The linear model shown ($\text{Cortisol} = 0.766 + (-0.072*\text{Time}) + (0.002*\text{Time}^2)$) is derived from a regression using only the 219 samples prior to which no alcohol or tobacco had been consumed, health and mood status were reported to be positive, and – for PM samples – no naps had occurred. Adjusted $R^2 = 0.531$; $P(F > 124.299) = 0.0009$ with $F \approx F_{2,216}$

cortisol level for the entire sample. In the next step of analysis, individuals' mean HPA levels were estimated using each subject's mean cortisol residuals from this regression analysis.

The research hypotheses were tested by examining associations between subjects' mean cortisol residuals, and various measures of peer-rated affiliative, cultural congruity, and socioeconomic status (income, land ownership, education) in a backward stepwise multivariate linear regression. We also examined associations of cortisol with cultural consensus using two categorical variables derived from life-history interview responses. Table 7.2 describes the criterion for categorization in each of these two dichotomous variables.

Based on interview data, individuals were coded into the "more absent" (Fathpres_1) category if, at minimum, their father had been absent as a caretaker during a roughly equal portion of their childhood as he was present. Subjects were coded into the "more present" (Fathpres_0) category if their father had been present as a caretaker during the majority of their childhood. Individuals who had reputations for engaging in illicit behavior, for example,

Table 7.2 Two dichotomous measures of childhood developmental environment and social role

Variable	Category	Description
Father presence	> Absent	Subject's biological father was absent as a caretaker for a roughly equal duration of childhood as he was present
	> Present	Subject's biological father was present as a caretaker during the majority of childhood
Social conduct	Illicit	Reputations for criminality, drug-abuse, polygyny, and no participation in culturally-sanctioned religious or political institutions
	Sanctioned	no reputation for criminality, drug-abuse, polygyny, and active participation in culturally-sanctioned religious and/or political institutions

theft, gun-running, drug-abuse, polygyny, and no participation in sanctioned religious or political institutions, were coded in the "illicit" (Conduct₁) social conduct category. Individuals were coded in the "sanctioned" (Conduct₀) social conduct category if they did not have reputations for such illicit behaviors, and were involved in sanctioned religious or political institutions. Variables were removed in a stepwise fashion, with alpha levels of 0.05 as criterion for entry and removal and tolerance minimums of 0.5. This stepwise procedure resulted in the following final model: $\text{Cortisol} = 0.239 + (0.103 * \text{Mood}) - (0.067 * \text{Peermean}) + (0.035 * \text{Fathpres}_1) + (0.042 * \text{Conduct}_1)$ as detailed in Table 7.3.

Results

Table 7.3 is the ANOVA table with regression statistics and model estimates for the final multivariate model resulting from this backward stepwise process. The final model includes frequency of distressed mood, mean peer rating, father absence, and illicit social conduct as linear predictors of mean cortisol residual. Overall, this model is highly statistically significant; we can be 99.99 percent confident in predicting at least 56.1 percent of an individual's variation in mean cortisol level using this model. Each of the independent variables in the model is also separately a statistically significant predictor of cortisol, with frequency of distressed mood accounting for 18.1 percent of the variance in cortisol, mean peer rating accounting for 10.3 percent, father absence accounting for 9.2 percent and social conduct accounting for 18.5 percent of the observed variation in cortisol. Variance inflation indices, tolerance values, and condition indices indicated no

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Table 7.3 Final ANOVA table for a backwards stepwise multivariate linear regression model of mean cortisol with nine psychosocial variables

Adjusted R² = 0.561; N = 31; Overall F-ratio: P (F > 8.30) < 0.001 with F ≈ F_{4,26}

Source	Sum of squares	DF	Mean square	Partial F-ratio	Partial P-value	Partial R ²
Mood	0.049	1	0.049	10.745	0.003	0.181
Peermean	0.028	1	0.028	6.171	0.020	0.103
Fathpres	0.025	1	0.025	5.492	0.027	0.092
Conduct	0.050	1	0.050	10.850	0.003	0.185
Error	0.119	26	0.005	—	—	0.439
Total	0.271	30	—	—	—	—

Final model: Cortisol = 0.239 + (0.103*Mood) - (0.067*Peermean) + (0.035*Fathpres₁) + (0.042*Conduct₁)

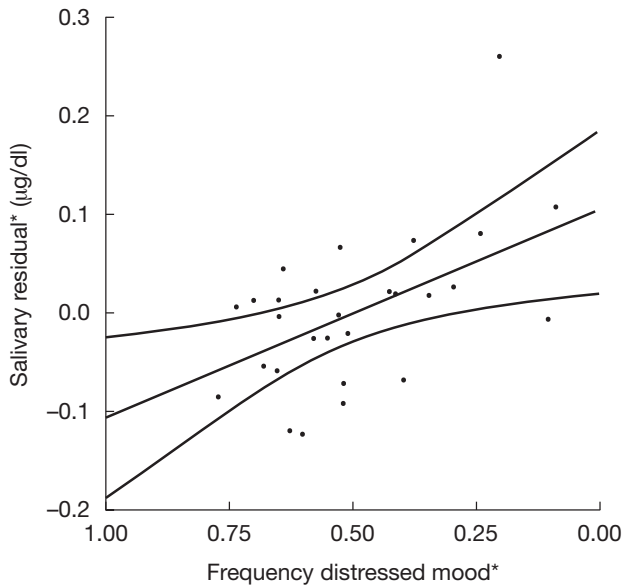


Figure 7.2 Partial regression residual plot of subjects' mean cortisol residuals and frequency of distressed mood with 95 percent confidence intervals. Men who reported distressed mood more frequently had significantly higher cortisol: P (F > 10.745) = 0.003 with F_{1,26}.

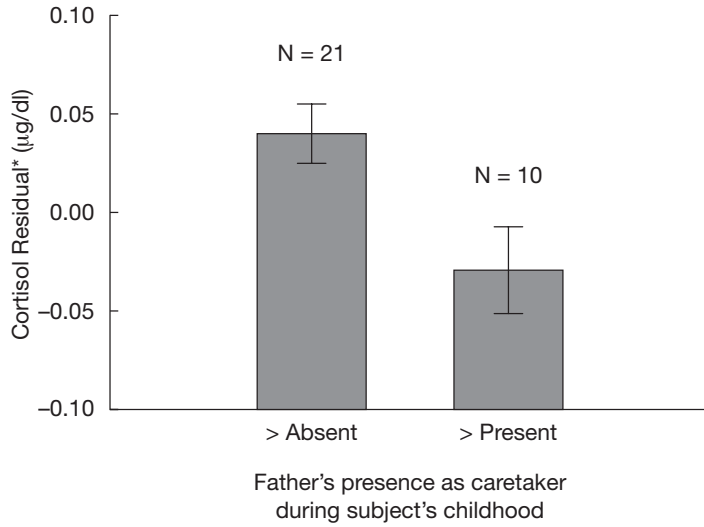


Figure 7.4 Least squares means and standard errors of subjects' mean cortisol residuals [$\mu\text{g/dL}$]. Men whose fathers were present as caretakers for the majority of their childhood have significantly lower cortisol than do men whose fathers were absent: $P(F > 6.171) = 0.020$ with $F \approx F_{1,30}$, Tukey's HSD Multiple Means Comparison.

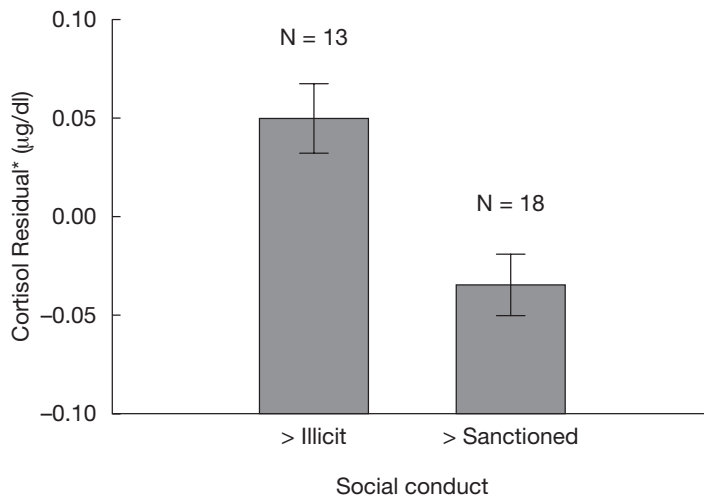


Figure 7.5 Least squares means and standard errors of subjects' mean cortisol residuals [$\mu\text{g/dL}$]. Men with reputations for illicit behavior (criminality, drug-abuse, polygyny, and/or no role in sanctioned religious and political institutions) have higher cortisol than men with reputations for more sanctioned social behavior: $P(F > 10.85) = 0.003$ with $F \approx F_{1,30}$, Tukey's HSD Multiple Means Comparison.

subjects' mean cortisol residuals for the "illicit" (Conduct₁) and "sanctioned" (Conduct₀) groups of social conduct. Men with reputations for illicit behavior, that is, criminality, drug-abuse, or polygyny, and no role in culturally-sanctioned religious and political institutions, have 0.085 micrograms per deciliter higher cortisol than men with reputations for culturally-sanctioned social behaviors.

Conclusions

The results of this study support the hypothesis that high status in affiliative or cooperative social domains (as measured by the peer-rating instrument described here) associates negatively with chronic HPA activation whereas status in income, education, and land ownership exhibited no associations with salivary cortisol. This lack of association with traditional measures of SES and cortisol differs from findings in some studies which found higher cortisol among men with higher income or higher military rank (Bourne *et al.* 1968; Brandstadter *et al.*, 1991; Seeman and McEwen 1996). Dominican men who were considered by their peers to be more helpful, influential and, in particular, more trustworthy and agreeable by other men have significantly lower chronic HPA levels as evidenced by mean salivary cortisol residual. Results are also supportive of the hypothesis that social and behavioral congruity with the predominant cultural models in a society associates negatively with stress. Men with reputations for engaging in socially accepted behaviors, and refraining from illicit behaviors also have lower cortisol. Results provided no support for the hypothesis that status in income, education, material wealth, or institutional rank associates with stress. Measures of education, income, and material wealth did not associate with chronic HPA level in a linear or any evident non-linear fashion in this study. Only two other studies have found a positive association between SES measures and chronic levels of salivary cortisol (Bourne *et al.* 1968; Brandstadter *et al.* 1991). Because of the distinct importance of cultural factors in shaping the meaning of these forms of status, our findings must be regarded as highly tentative and potentially varying across cultures (see McDade, this volume).²

Although pursuit of greater education, income, or material wealth may be associated with increased competitiveness and individualism in Western industrial societies (Bourdieu 1984; Durkheim 1951; Willis 1977) this may not be so true in cultures such as Dominica where extended families sometimes work together to concentrate resources into one high-potential family member (Burton 1990; Gonzalez 1969; Smith 1988; Trouillot 1988). It is quite likely that the relationship between these status domains and stress varies dramatically from one cultural context to the next. There may, indeed, be a strong contrast between the Dominican Bwa Mawego and Samoan contexts in regards to the relationship of status and stress.

Among monkeys changing, unstable, or conflictual social organization associates with elevated HPA activation among *both* dominant and subordinate animals (Coe *et al.* 1994; Cunnick *et al.* 1991; Keverne 1990; Sapolsky 1983b, 1986). This may reflect the fact that lower cortisol among more powerful individuals – both in this study and in past nonhuman primate research – ultimately originates from feelings of control, and predictability among higher status individuals (Breier *et al.* 1987; Ursin 1994). Indeed, Sapolsky marshaled evidence that negative associations between status and stress among wild baboons resulted from differences in central nervous system functioning, namely more sensitive hypothalamic negative feedback sensitivity and faster pituitary response to CRF among dominants compared to subordinants (Sapolsky 1983a, 1989, 1996; Sapolsky and Plotsky 1990).

The physiological mechanisms underlying these psychobiological differences are suggested by the fact that dominant animals exhibited more physiological flexibility in their responses to stress. Although they have lower basal levels of HPA secretions, dominant animals exhibit faster, larger, and more ephemeral increases in HPA secretions in response to acute stressors, such as anesthesia-induced disorientation, live snakes, and physical restraint (Manogue 1975; Sapolsky 1982, 1983a).³ Chronically elevated levels of glucocorticoids damage hippocampal receptors integral to the negative feedback down-regulation of the HPA system (Sapolsky and Plotsky 1990: 946). Such neuronal damage results in dysregulation of HPA function manifested as chronically elevated cortisol levels, but also in relatively dampened response to acute stressors. Thus, past work among nonhuman primates indicates that permanent hippocampal receptor down-regulation resulting from particularly intense, or chronic stressors, in part accounts for differences in stress-response between dominant and subordinate animals. A similar effect could result from chronic stress-response among humans, and could in part explain the association between low affiliative status and elevated cortisol observed in this study. In other words, chronic stress, low affiliative social status, damaging effects of stress, and resultant diminished ability to respond adaptively to social challenges may well be engaged in an interactive and self-perpetuating feedback loop. Sapolsky's work among baboons (1990, 1996) also indicates that personality differences, or social affiliational capabilities influence the social-stress association both by predisposing individuals to different status attainment and by directly affecting HPA responsiveness (Coe *et al.* 1994; Cohen *et al.* 1992; Sapolsky 1990). Among most cercopithecines, individuals' status within group dominance hierarchies fluctuate to some degree during their adult lives, and not surprisingly, the status-stress association is not perfect. Sapolsky (1990) found that animals who were more frequently dominant tended to have certain personality characteristics, including: skill at forming alliances; differentiating between neutral and threatening behaviors by others; infrequent

unprovoked aggression; and high rates of affiliative behaviors. Similar conclusions have been reached by other investigators (Coe *et al.* 1994; Cohen *et al.* 1992).

It appears that it is not simply the experience of being high-status, and the differential daily life that goes with such status. Individuals who are gregarious and socially skilled tend to occupy high-status positions more than those with more aggressive, anxious, antisocial, and hostile personalities (Jones *et al.* 1986; Lundberg *et al.* 1991; Spangler 1995). Even when they have been temporarily displaced from their high-status role, gregarious and socially skilled animals seem to be buffered against high stress by a placid behavioral style, and presumably more placid internal emotional state. Thus, how primates perceive or appraise stressors is as important to stress-response as the objective quality of stressors, a point which bears great significance for understanding stress among a profoundly cultural animal such as humans (Baratta *et al.* 1990; Brown 1981, 1982; D'Andrade 1992; Dressler 1984: 268; Dressler 1991, 1992; Jacobson 1987; Spradley and Phillips 1972).

Despite cultural prescriptions and symbolic value linked to forms of social status such as high income or rank, the social experience of high military or socioeconomic rank may exceed the threshold of human social predispositions derived from evolved psychological mechanisms (Tooby and Cosmides 1992). That is, despite the material and symbolic benefits of such status, it may be that such high-intensity roles are intrinsically stressful to human beings because they involve habitual social experiences that differ too much from our environment of evolutionary adaptedness. Bowlby suggested that such a conceptualization may help in understanding problematic mother–infant relations in post-industrial social settings by noting that “no system can be expected to operate effectively except in its environment of adaptedness” (Bowlby 1969: 58).

Among humans, individuals who pursue institutionalized power may have more competitive behavioral styles associated with higher physiological arousal (Jones *et al.* 1986: 699), and higher risk for coronary heart disease. Some have characterized such individuals as having a “Type A personality” comprising: “a success-oriented, challenge-induced, action-emotion complex with hostility, achievement striving and time urgency” and also “extremes of competitive achievement-striving, a strong sense of time urgency, impatience, easily aroused anger, and aggression” (Spangler 1995: 303).

In contrast to these psychosocial characteristics, dominant monkeys tend to have less competitive behavioral styles, styles that, among humans, have been characterized as “Type B personality.”⁴ During most of human natural history, social success, and evolutionary fitness may not have been increased by the behavioral styles that contribute to high SES or military rank in modern industrial society (Axelrod 1984; Konner 1972, 1982; Lee 1979; Shostak 1983; Tooby, and Cosmides 1989, 1990, 1992). Thus, the individualistic and competitive social organizations typical of post-Neolithic and post-industrial

societies may represent a departure from the social environment to which our evolved allostatic load distributing systems are adapted.

A more traditional notion of culture suggests that stress will derive from individuals' unwillingness or inability to adhere to the predominant cultural values in their society. The growing field of practice theory has benefited from increasing conceptual complexity such as the distinction between representational and operational models. Representational models cover "what actors say about the nature of social reality, whereas operational models refer to the way they respond or act" (Karp and Kent 1983: 483). This distinction allows consideration of the vast interindividual disparity in interpretations of how things should be, and how to behave. Thus, practice theory leads us to recognize that cultures are not unitary sets of information embraced harmoniously, nor smoothly interacting hives of individuals. Rather, social structure is a set of rules and resources that actors can use to affect others (Karp 1986:135). Thus, an individual's congruity, or degree of fit within the predominant or hegemonic cultural models of his or her society appears to be an important source of stress among humans (Dressler 1988, 1991). Yet another interpretation is that the higher physiological arousal found by Brandstadter and Bourne among high SES and high ranking men is not actually stress in the sense of a maladaptive, chronically destructive response, but is actually adaptive arousal among individuals occupying a dynamic microniche (Pollard 1994; Napier, this volume).

Our findings are in line with a large body of theory and evidence in which quality of childhood developmental environment canalizes individual life-history trajectory (Mann, this volume; Belsky *et al.* 1991; Chisholm 1993, 1999; Gottlieb 1991; Greenough *et al.* 1987; LeVine 1990; MacDonald 1988; Robins 1994; Rutter 1994; Valsiner 1989; Wallace 1970), resulting in more short-term focused responses throughout the lifespan by those who experience harsh early environments. Absence of father during childhood may be a reliable proxy measure of harsh or inconsistent developmental environments (Flinn, this volume; Flinn *et al.* 1996; Flinn and England 1997). Such environments may cause lingering effects on individuals' psychosocial capacities through a number of "Carry Forward effects which may represent a combination of persistence of psychopathological consequences and a resulting increased vulnerability to later stress and adversity" (Rutter 1994: 374). Potential mechanisms of these carry forward effects include: (1) neural effects such as those known from studies of visual deprivation in infancy; (2) neuroendocrine effects; (3) predisposition of one type of social adversity to others; and (4) cognitive features such as self-esteem, self-efficacy, and cognitive models of relationships (*ibid.*).

At the proximal level, at least two distinct processes may be at work linking social status to elevated HPA activation. First, low social status individuals may experience objectively distinct socioecologies. That is to say, their social world is objectively more harsh and stressful. Second, higher HPA activation

among low social status men may not reflect objective differences in their socioecologies relative to high social status men as much as it results from different sensitivities and responsiveness to social life. Psychosocial deficiencies stemming in part from harsh developmental environments may cause not only lower capacities to affiliate, cooperate, and reciprocate but also hypersensitivity to social interactions and false appraisal of neutral interactions as threatening. Support for this mechanism is found in findings of strong linear associations between frequency of distressed mood and chronic HPA activation.

A very different interpretation is also possible. The elevated HPA activation observed among some men may not be “stress” in the sense that it represents a failure of the organism to adapt. Despite the costs to long-term well-being which are probably imposed by chronically elevated HPA activation on immune system and other long-term physiological processes, compromise of these long-term goals in order to redirect resources toward short-term demands may actually be the best possible response to a bad situation.⁵ For those whose social lives are harsh, inconsistent, and lack in support, higher stress and decreased immunocompetence may be the only viable option for adapting to frequent acute psychosocial crises. In order to answer this question, future studies must account for the cognitive, emotional, and social options available to individuals in different psychosocial contexts, and how stress processes relate to these options.

Notes

- 1 A pseudonym used to help protect the anonymity of research subjects.
- 2 McDade (this volume) finds SES moderating the impact of stress.
- 3 The possibility that homologous forces in late capitalism favor flexibility both at work and in immune responsiveness has long been a theme in the work of Emily Martin (Cone and Martin, this volume, and Martin 1994).
- 4 A meta-analytic review of research on hostility and physical health by Miller et al. (1996) problematizes the more global personality distinction postulated in the Type A/Type B model. T. W. Smith and collaborators find that, among the features thought to constitute “Type A” personality, both coronary heart disease (CHD) and all-cause mortality are significantly associated with only one in the main – hostility, especially “cynical hostility” according to co-author Smith’s findings (Smith and Allred 1989, Christensen and Smith 1993).
- 5 Ed. Such a re-examination of “stress” occupies much of Napier’s chapter in this volume, though in his description of intense he envisions something other than the trade-off between short-term victories and long-term sacrifice of immunocompetence.

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