Introduction

This is the third in a series of reports describing current research in Brazil. My aim in writing these reports has been to provide an accessible account of this research in two senses: (a) to provide a link to these reports via the internet for people interested in the research; and, (b) to describe the research in sufficient detail that people wanting to apply these methods in their own research can do so.

The aim of this research has been to continue work on the theory of the health effects of cultural consonance (Dressler and Bindon 2000; Dressler and Santos 2000). Cultural consonance refers to the degree to which individuals, in their own beliefs and behaviors, approximate the shared cultural models that serve as prototypes for those beliefs and behaviors within their society. The concept of cultural consonance provides a needed link in culture theory between the concept of culture as a property of human society that transcends the individual, and the expression of culture in individual thought and behavior. My aim has been to be both theoretically explicit in the derivation of the concept, and to develop a measurement model to operationalize the concept. Ultimately, the utility of the concept and method is evaluated by examining the role of cultural consonance in individual adaptation, as that is assessed by psychological and physical health.

The research design guiding the research is relatively straightforward, although logistically complex. At its broadest level, the research design is a mixed, qualitative-quantitative design that is a hallmark of anthropological research. The first phase of the research, described in detail in Research Report I, used methods of cultural domain analysis and cultural consensus analysis to examine the distribution of cultural models in five cultural domains in a Brazilian city.

* This research is funded by research grant BCS-0090193 from the National Science Foundation, William W. Dressler, Principal Investigator, José Ernesto Dos Santos, Co-Principal Investigator. The members of the research team include: Mauro Campos Balieiro, Rosane Pilot Ribeiro, Camila Dellatores Borges, Emilia Maria Paulina Campos Chayamiti, Débora De Bortoli, Mislene de Camarga Molina and Daniela Vieira Pallos. Dr. Manoel Antônio dos Santos offers helpful advice and guidance, and without the help and support of Dr. Kathryn S. Oths, none of this would be possible.
These methods were employed to develop an understanding of the elements of cultural models for these domains, and to discover principal dimensions of meaning that organize those cultural models. The second phase of the research, the initiation of which is described in Research Report I and its continuation in more detail in Research Report II, was an epidemiological survey of four socioeconomically diverse neighborhoods in the city. The aim of this phase was to generate data at the individual level to operationalize cultural consonance and to examine the relationship between cultural consonance and psychological distress, and metabolic and physiologic outcomes (blood pressure, serum lipids). In Research Report II, partial data were available on all of the variables in the study and these were used to examine alternative measurement models for cultural consonance. In the mixed qualitative-quantitative design, we employed techniques of focused group interviews and unstructured individual interviews to add descriptive depth to our more structured data collection. These techniques and the analysis of qualitative data (especially the focused group interviews) were introduced in Research Report II.

The current research report is different in form. Data collection for the testing of the main hypotheses of the study was completed in August of 2003. During a sabbatical leave in the fall of 2003 I was able to complete three journal-length manuscripts based on the research. These manuscripts are reproduced here and form the substance of Research Report III. The first of these, entitled “What’s Cultural About Biocultural Research,” explores the theoretical background to the research, and addresses one of the principal aims of the research, which was to expand the cultural domains in which cultural consonance and its health effects were examined. The second manuscript, “Measuring Cultural Consonance,” describes in some detail how data from cultural domain analyses are linked to social survey data to operationalize cultural consonance. In addition, I use these data to suggest the outlines of a formal measurement model in anthropology. The third manuscript, “Cultural Consonance and Arterial Blood Pressure in Urban Brazil: A Replication and Extension,” presents another main aim of the research, which was to replicate our findings from our research in 1991 on cultural consonance and blood pressure. This manuscript examines in some detail the similarities and differences in the findings between the 1991 study and the 2001 study.

And, the research continues. First, there is much more of the data analysis to be written up. Foremost among these upcoming projects is an analysis of cultural consonance and the psychological outcome variables included in the study. It has become apparent in initial analyses of these data that the configuration of cultural consonance variables that is associated with arterial blood pressure is different from the configuration of cultural consonance variables that is associated with psychological outcomes. These differing patterns of association can be interpreted in the framework of a theory of biocultural evolution.

Second, with the completion of the main part of the research, we are faced with an enormous amount of textual data (20 transcripts of focus groups and 40 transcripts of individual interviews). Even using a qualitative data analysis package, this is a great deal of material to be analyzed. The analyses of this text data will require a considerable amount of work.

Third, we have embarked on a prospective component of the research. The plan for this part of the project emerged from very preliminary analyses of the complete data in the summer of 2003. As reported in the second of the following manuscripts, there is a positive correlation between several of the cultural consonance variables and the psychological variable “locus of control.” This variable assesses the belief that one is in control of the major occurrences in one’s life (the high end of the scale as we use it), versus the belief that what happens is mainly controlled by forces outside of oneself. In psychology this is viewed as a dimension of personality, but it can equally be viewed as a set of beliefs regarding the possibility of voluntary
action. What intrigued us in the research group in Brazil was the seeming paradox in this association. On the one hand, cultural consonance measures an individual’s success in achieving what are culturally constructed, or conventional, goals in life. Yet, these same persons appear to view life as a function of their own individual choices. We resolved to explore this association further, primarily by collecting more data, using additional measures of beliefs in personal agency.

As we discussed the best way to design this follow-up, we decided to interview the same persons as in the main part of the study. The lag time between interviews will be at least one year and at most two years. While this is a short follow-up, it should give us some indication both of the stability of the measures of cultural consonance, and of the utility of these measures as true predictors of psychological outcomes.

Most attention in these reports has been focused on our productivity as a research group with respect to data collection and results. This research project has also been productive with respect to what economists might call “human factors.” One Brazilian research assistant, Camila D. Borges, is working on her master’s degree using data from the study and has already generated a draft of her master’s thesis. Another Brazilian research assistant, Daniela V. Pallos, has been accepted into a master’s degree program in public health nutrition and will be using the data from both the 1991 and 2001 studies for her thesis. Mauro C. Balieiro, who is one of the Brazilian project directors, has been accepted into the Ph.D. program in psychology at the University of São Paulo-Ribeirão Preto, and he will be using the prospective data we are currently collecting for his doctoral dissertation. Finally, a master’s degree student from The University of Alabama, Christine Newkirk, spent the summer of 2003 in Ribeirão Preto collecting data for her master’s thesis. She did a follow-up study to the cultural domain analysis of food presented in Research Report I. So, in addition to the value of the project in terms of data generated, there is a value-added component in terms of the education of students, both in Brazil and in the United States.
What's *Cultural* About Biocultural Research?

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Acknowledgments: The research reported here was supported by research grant BCS-0091903 from the National Science Foundation. The project would not have been possible without the close collaboration over many years of Dr. José Ernesto Dos Santos. Mauro C. Balieiro, Camila D. Borges, and Dr. Manoel António Dos Santos also provided insight and assistance, and Dr. Kathryn S. Oths has provided continuing support and critique. Daniel Lende and Dan Hruschka provided valuable comments on an earlier draft of the paper. I alone am responsible for errors.

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ABSTRACT

There has been a resurgence of interest in anthropology in the development of a biocultural perspective. Advances have, however, been limited by the lack of conceptual and methodological progress on a culture theory that can be truly useful in biocultural research. In this paper I trace the development of just such an orientation, and demonstrate the utility of that orientation with data recently collected in research in Brazil. In this approach, culture is conceptualized as a collection of cultural models of specific cultural domains that have empirically-verifiable distributions within a social group. Individuals use these models as guides for their own behavior and to evaluate the behavior of others. Individuals are, however, variably able to approximate these models in their behavior, a concept I refer to as “cultural consonance.” Variation in cultural consonance is then hypothesized to be associated with psychophysiologic outcomes such as arterial blood pressure and depressive symptoms. In past research cultural consonance in lifestyles and social support have been found to be associated with these outcomes. In this paper, the cultural domain of family life is used to illustrate both the conceptualization of, and methodological innovations in the measurement of, cultural consonance. Cultural consonance in family life is associated with both arterial blood pressure and depressive symptoms, controlling for standard covariates and potential alternate explanatory variables. It is argued that this theoretical orientation can define more precisely the cultural in the biocultural.
The idea of developing a biocultural perspective in anthropology is enjoying somewhat of a renaissance. The volume edited by Goodman and Leatherman (1998) is a major contribution to these developments as its authors seek to “build a new biocultural synthesis.” Within the topical area of medical anthropology, which is a fairly obvious choice for examining how culture shapes and is shaped by human biology, a biocultural perspective is recognized as one of the major theoretical orientations (P. Brown 1998; Joralemon 1999; McElroy and Townsend 2003). And, there are a number of graduate departments of anthropology that have developed explicit biocultural degree programs (notably Emory and The University of Alabama).

While these developments bode well for furthering an understanding of the intersection of culture and human biology, there are critical needs, especially in terms of the elaboration of theory and the development of related research methods. Some years ago I argued that biocultural researchers need to take the concept of culture seriously (Dressler 1995). I meant that biocultural research needs to keep up with relevant developments in culture theory, rather than relying on the term culture simply as a broad descriptive concept. Similarly, at that time I suggested that there were new developments in research methods that could be of special utility to biocultural researchers. Now, based on accumulated empirical examples, the outlines of an approach that is both theoretically and methodologically precise are more clear. In the remainder of this paper, I will describe such an orientation based on recent research carried out in Brazil. This is a perspective that can make explicit the cultural in the biocultural.

The orientation that I will describe is being developed within my own area of research, which is the social patterns of cardiovascular disease risk in diverse societies (Dressler 2003). The discussion that follows will be placed in that empirical context, but I believe that the theory and method developed here can be applied in a variety of biocultural research programs.

**Background to a Culture Theory for Biocultural Research**

The need for an explicit biocultural theory is apparent in what is the most comprehensive treatment of a biocultural approach now available, the volume edited by Goodman and
Leatherman (1998). While titled “building a biocultural synthesis,” there is no theory of culture discussed in the book. Rather, the aim of the book is clarified in the subtitle, which is “political-economic perspectives on human biology.” My aim here is not to criticize the valuable contribution that Goodman, Leatherman and their contributors make. Their work demonstrates that a political-economic perspective is essential to a biocultural orientation, because the unequal distribution of resources in society leads to poor health, through a variety of pathways (see Dressler, Ribeiro, Balieiro, Oths and Santos (2004) for a recent example). What I seek to do instead is to add to a political-economic perspective through the development of biocultural theory and method, in order to be precise about what is or is not cultural about the process.

The concept of culture that guides most of what biocultural anthropologists do is the same concept that guides the research of most working cultural anthropologists. This is in essence a Tylorian concept of culture, in which culture is everything that people make, do, say or think as they learn it as members of society (see, for example, Thomas 1998: 58). This can be a valuable approach, as evidenced by its persistence for more than a century. It is important to remember why we developed such a perspective in the first place. While there are of course many anthropological sins to be confessed regarding the concept of race, the concept of culture developed as an anti-racist alternative to explaining world-wide variation in human behavior. If everything that humans did was learned by virtue of their membership in society, then a vulgar biological determinism could not explain societal differences (unfortunately, biological reductionists have been anything but vulgar in their determination over the years to argue for the biological roots of behavior, but that is another story, see Montagu 1997). Instead, it was this broad design for living called culture that, transmitted inter-generationally through extrasomatic mechanisms, could account for the observed diversity in human belief and behavior (Kuper 1999:227-228).

Given the generality of this perspective, cultural anthropology paradoxically becomes easy to do without actual reference to the concept of culture. An ethnographer’s job is to
describe specific manifestations of belief and behavior in specific settings, and pointing out that these are a function of culture is redundant. To describe all of these specific manifestations of belief and behavior is to describe culture. So, culture can be thought of as a broad context within which its specific manifestations can be observed in specific settings. While theoretical disputes can rage about whether or not culture is best thought of as public symbols or patterned behavior or something else, these have not necessarily hindered researchers’ abilities to go about their business.

Within biocultural research, and more specifically within research aiming to describe how disease risk is shaped, this “culture as context” orientation has proven useful, especially in conjunction with theories of psychosocial stress (Lazarus 1966). Theories of the stress process provide a part of the explanation for societal differences in cardiovascular disease risk (Dressler 2003). Elevated blood pressure is a major risk factor for cardiovascular disease, and decades of research have shown that average blood pressures increase among, for example, migrants from more traditional to more industrialized settings, and persons in communities undergoing economic development. Broadly conceived, it is the stress of culture change that is thought to contribute in part to this increase, beyond the influence of diet and physical activity (ibid).

A number of researchers have drawn inspiration from theories of the stress process to specify more precisely this general hypothesis. For example, in my early work in the West Indies, I argued that the inevitable result of development efforts was a stressful incongruence between new status aspirations derived from exposure to the Euroamerican middle class and expressed through a medium of material lifestyles, and the economic means to achieve those aspirations, which in turn was related to higher blood pressure. But contemporary stress theory suggests that the stresses associated with such status incongruence can be moderated by a number of factors, not least of which is the availability of both instrumental and emotional support from persons in one’s social network. Where this social support is high, persons are protected from the deleterious effects of stressors, and where support is low, stress effects are
enhanced (Cassel 1976). From the standpoint of biocultural theory and method, the important point is getting from a broad view of cultural difference to specific operational indicators of stressors and supports. This requires linking the intensive descriptive methods of ethnography to more extensive, quantitative methods for hypothesis testing. In my case, I did what traditional ethnographers always do: I participated in and observed daily life, and I interviewed key informants to arrive at an understanding of the culture. More specifically, I tried to understand what were, in the definitions of the persons in that setting, important status aspirations, avenues for economic mobility and social relationships within which individuals could anticipate support. I operationalized my variables in epidemiologic survey work to be consistent with that ethnographic understanding, and then analyzed the distribution of blood pressure relative to variation in those culturally-defined stressors and supports (Dressler 1982).

Essentially this same overall theoretical orientation and research design have been used by McGarvey to study blood pressure in Western and American Samoa (McGarvey and Schendel; 1986; Chin-Hong and McGarvey 1996); by Bindon to study blood pressure in American Samoa (Bindon, Knight, Dressler and Crews 1997); by Janes to study blood pressure among Samoan migrants to northern California (Janes 1990); by Dressler to study blood pressure and depressive symptoms in an African American community in the rural Southern U.S. (Dressler 1991a; 1991b); and, more recently, by McDade (2001) to study immune function among Samoan adolescents. A couple of points stand out when these studies are compared. First, in each context, basic theoretical constructs (i.e., status incongruence, social support) are operationalized with different measures, because the aim is to understand as precisely as possible what represents, for example, social status or social support in each setting, and then to measure those constructs as sensitively as possible in terms of those local representations. Second, the local ethnographic context can also alter the patterns of associations among the variables because of intracultural diversity in the meaning of the factors. For example, Bindon, et al. (1997) found the association of status incongruence and blood pressure to be
concentrated within certain household types, arguing that issues of status were differentially salient or meaningful for different kinds of families.

My aim is less to review this specific set of studies than it is to elucidate the nascent biocultural theory that underlies them. Clearly meaning is central. While stress theory has long been guided by the assumption that personal or idiosyncratic meaning is an important part of the process, the studies reviewed above have aimed at understanding what is collectively meaningful with respect to status or social support, and then measuring factors in those terms. Similarly, when introducing additional factors (e.g. family structure) into the process, the emphasis has been on the collective meaning of that factor and why, given that meaning, it might alter the relationships among the variables. An understanding of these collective meanings have been arrived at through conventional ethnographic field methods.

A second major feature of these studies is the explicit effort to link collective meaning to individual behavior. A biocultural perspective demands this, because a biocultural perspective is a study of embodiment in a very specific sense. It is the study of how experience gets written on the body in terms of measurable physiological, psychological and even morphological outcomes (see Dos-Santos, Oths and Dressler 2001), and to do so it must trace culture to the individual.

These two issues—the study of collective meanings and the relationship of culture to the individual—are fundamental in culture theory. In fact, these form a part of a basic conundrum in culture theory that has continued to the present from its articulation in the 19th century (Keesing 1974; Boudon 1988; Shore 1991). That is, how can we sensibly retain a theory of culture as collective meaning and at the same time reconcile that with locating culture and behavior in individuals? The danger here is reducing culture to the beliefs and values of individuals in order to connect the cultural to the individual. To some it may seem unproblematic to require that we avoid a social-psychological reductionism, yet it would seem to be essential to adequately represent the phenomenon for, as Keesing (1974: 84) notes: “Social meanings transcend, by
some mysterious alchemy of minds meeting, the individuation of private experience.” Making culture a function of individual beliefs and values would make social or collective meaning an epiphenomenon of individual belief, which is something we need not avoid in principle, but which seems not to square with experience. The relationship of culture to the individual simply seems more complicated than that. At the same time, if we cannot trace the cultural to the individual, a biocultural project is doomed. Without linking the cultural to known psychophysiologic mechanisms mediating long-term problems of individual adaptation such as high blood pressure, then the process of how culture shapes biological response will remain unspecified.

The studies reviewed above point the way to such a model, but await a more explicit development of theory and method. In the next section, I will introduce just such a development.

Culture as Consensus – Behavior as Consonance

Theoretical development here requires a better way of understanding culture as collective meaning and a better way of understanding how that collective meaning connects to individuals. Actually, Keesing (1974) first sketched a solution to this conundrum, although an empirical means to operationalize that view would not be available for another twelve years. Keesing drew on a conventional cognitive anthropological definition of culture as the knowledge that one must possess in order to adequately function as a member of society, but then he expanded upon that definition. He suggested that this knowledge, far from being encoded in the mind in the form of lists of definitions (as some believe conventional ethnoscience implied), is in the form of an individual’s personal theory of how his society works. In essence, it is an individual’s personal theory about other individuals’ personal theories about society. To the extent that these individual theories are collectively shared, one may speak of culture. Furthermore, it is possible to locate this culture to a degree in individuals, because some persons may be more, and other persons may be less, knowledgeable with respect to that
theory. Borrowing very loosely from linguistics, Keesing (ibid. 88-89) suggested the term "cultural competence" to describe the degree to which individuals share in that culture.

This basic view has been elaborated in cognitive anthropology over the past thirty years (Holland and Quinn 1987; D'Andrade 1995; Shore 1996). While agreement is far from complete, there is a basic working theory of culture in cognitive anthropology that can provide a foundation for building a biocultural theory. In this working theory, culture cannot be regarded as an integrated whole, but is rather made up of a set of "cultural models" that apply to various cultural domains (e.g., a cultural model of the family, a cultural model of leisure activities, a cultural model of success in life, etc.). These models (also sometimes called "schemas," but I prefer the term model) are skeletal outlines of the elements of the domain and basic processes within the domain, but they leave many variables within the model unspecified; these can be specified within particular instances. These models are made up of two components: one is a function of individual biography and can be thought of as a personal model; the other is a function of what the individual learns about that domain as a member of society, and hence can be thought of as the cultural model, because it is shared with other members of society (Shore 1996: 49).

The notion of sharing or, as we will refer to it, "consensus," is vital in this theory of culture, as has been recognized for well over a century in the social sciences (Tylor 1871; Berger and Luckman 1967). Many (although probably not all) cultural models define things in the world in an essentially arbitrary way. What gives these arbitrary definitions causal force in the world is that people agree that this is, indeed, the way things are (D'Andrade 1984). They are the rules of the game, so to speak, and without at least a degree of respect for those rules (although we can try to bend them) there would be no game (Crossley 2000).

Understanding the importance of consensus is indispensable; defining consensus empirically is another thing. Most theories that give prominence to consensus in cultural models seem to imply that consensus is a dichotomy, which must certainly not be the case. People will
agree on the nature of cultural things to a degree, leaving room for some models to be highly contested, while others are accepted with little dispute. Romney, Weller and Batchelder (1986) introduced the cultural consensus model which accomplishes the task of quantifying consensus. Working from the pattern of agreement among key informants, the cultural consensus model determines precisely the degree of sharing in a domain. The degree of consensus in a domain enables the analyst to infer within certain confidence limits that these informants are, or are not, operating from a shared cultural model. Additionally, the cultural consensus model can operationalize the concept of cultural competence (first introduced by Keesing 1974) as the correlation between an individual’s understanding of the domain and the consensus understanding of the domain (see also Handwerker 2000).

Finally, the cultural consensus model enables the analyst to estimate the “culturally best” set of responses within a particular domain, and it does so in a particularly sophisticated way. The responses are estimated by giving higher weight to the informants who have higher cultural competence (or, in other words, who can replicate more closely the group-level responses, Romney, et al. 1986). This latter characteristic of the model is particularly important, not only because it allows these responses to be estimated in the most culturally unbiased way, but also because with those estimates that elusive aggregate quality of culture can sensibly be grasped. The culturally unbiased responses estimated from the model are not some simple average, but rather take into account the way in which meaning is distributed among the informants. It is a function not of what any individual knows, but rather of how that knowledge is distributed (see Jaskyte and Dressler 2003 for an extended discussion of this property).

In short, a theory of cultural models, coupled with the analytic power of the cultural consensus model, enables us to go beyond a purely qualitative conception of collective meaning, and it frees us from simply assuming that we are discovering shared models of how the world works within a society. With this approach these constructs can be made operational.
But, a biocultural theory demands that we take another step. Bourdieu, perhaps more than anyone else in recent years, has reminded us that people do not simply think about things, they do things (Crossley 2000). These models of how the world works get translated into behaviors (see also D’Andrade 1984), and there are a variety of good reasons why, with respect to human biology, it is this behavior that may be critical. Therefore, we need a concept and an operational procedure for identifying what is cultural about the behavior of an individual. This is a question that Sapir addressed some years ago. In discussing what was “social” in the totality of individual behavior, he suggested that:

If…we prefer to eliminate certain aspects of such individual behavior from our consideration and to hold on only to those respects in which it corresponds to certain norms of conduct which tend to perpetuate themselves by tradition, we speak of “social behavior.” In other words, social behavior is the …arrangement of such aspects of individual behavior as are referred to culture patterns…(Sapir, 1949: 545).

What Sapir refers to as social behavior is a particular profile of individual behavior that corresponds to cultural patterns. The term “social behavior” seems too general and imprecise for my purposes. I have suggested instead the concept of “cultural consonance,” defined as the degree to which individuals in their own behaviors approximate the guidelines for behavior encoded in a cultural model (Dressler and Bindon 2000). The hypothesis then is that the degree of cultural consonance in a domain will be related to biological outcomes. This theory and method provide an explicit way of tracing the cultural as an aggregate property of human social groups, to the cultural as a behavioral property of individuals, to the biological.

**Cultural Consonance and Adaptive Outcomes**

This general orientation was developed in the context of two research projects, both of which are conceptualized as studies of human adaptability, broadly conceived. Without getting into all of the discussions regarding the concept of “adaptation” (see Goodman and Leatherman 1998), I think of humans as engaged in a more-or-less daily effort to adjust to competing
demands, including those imposed via social structure and cultural models. Individuals can be successful (in the sense of reaching defined goals) or not in dealing with those demands, and a lack of success may mean that adjustive efforts continue inappropriately, resulting in excessive demands on biological systems and measurable effects on those systems (see McGarvey 1999 and Sapolsky 1999 for a discussion of the psychophysiologic concomitants of these persistent adjustive efforts). These measurable effects can be diverse, but in my research I have concentrated principally on arterial blood pressure and depressive symptoms.

In research in Brazil, we examined the degree of cultural consensus in two domains: lifestyles, defined as the accumulation of consumer goods and the adoption of behaviors that signify being a "success in life;" and, social supports, defined as the perception that help and assistance in times of felt need will be forthcoming within one’s social network (see Dressler and Bindon 2000 for a discussion of why these particular domains are important). In this research we were working with scales that had already been developed to measure these constructs, so we applied cultural consensus analysis to the scales to determine if individuals agreed in general within these domains. We were careful also to examine consensus across contexts of intracultural diversity (mainly social class). We found fairly strong consensus in both domains, and then measured cultural consonance in each domain in survey research. In each domain we developed what was in essence a measure of profile similarity, which is a calculation of the degree to which an individual's profile of behaviors corresponded to the consensus profile. We then found that these two measures of cultural consonance were associated with lower arterial blood pressure and fewer symptoms of depression (Dressler and Santos 2000; Dressler, Balieiro and Santos 2002).

We used a similar approach in research in the African American community in Alabama. Again working in the domains of lifestyles and social supports, and with scales developed in previous research, we examined cultural consensus in a sample of key informants that was designed specifically to assess intracultural diversity in cultural models (if any existed). We
again found fairly strong consensus in each domain, and, in an epidemiologic survey, we measured cultural consonance in each domain. As in Brazil, higher cultural consonance in each domain was associated with lower blood pressure, although the effects were slightly more complex. We found a curvilinear association of cultural consonance in lifestyle that was enhanced among persons with lower cultural consonance in social support (Dressler and Bindon 2000).

These studies were extremely useful in developing a theory of cultural consonance. There are, however, a couple of shortcomings. First, the cultural models were developed in a rudimentary way. We relied mainly on our general ethnographic understanding of the communities to develop the scales in the first place, and then employed cultural consensus analysis simply to confirm sharing. There is much more that could be done to refine an understanding of a cultural model in any domain, and hence improve the measurement of cultural consonance in that domain. Second, cultural consonance is a very general concept. An individual can be more-or-less consonant in any number of cultural domains. While there are good reasons for thinking that lifestyles and social supports are important domains (detailed in Dressler and Bindon 2000), there are also good reasons for thinking that cultural consonance in other domains might be important as well.

In 2001, we began a new research project in Brazil. This project was designed specifically to address these two questions. In the remainder of this paper, I will describe the results that are just emerging from this study. Specifically, I will describe how we examined a cultural model of family life in Brazil, how we measured cultural consonance in family life, and the relationship of cultural consonance in family life to the adaptive outcomes of arterial blood pressure and depressive symptoms.

Building a Cultural Model of Family Life

In the current context of presenting these results, I will take it as given that family life is an important cultural domain in general, and that in the context of Brazilian society it is a
particularly salient cultural domain (DaMatta 1985). This research takes place in a moderately-sized (pop. > 500,000) city in the state of São Paulo named Ribeirão Preto. Therefore, our attempt to understand the cultural model of family life here demands that we be sensitive to the potential for intracultural diversity, and, given that Brazil is one of the more highly stratified countries in the world, a possible source of the diversity is social class. Because initial stages of the work involved key informants, we required that the selection of key informants vary by educational attainment, age and gender.

To first explore the cultural model of family life, we employed the techniques of systematic data collection described by Weller and Romney (1988), beginning with free-listing. Free-listing is a means for eliciting the terms that individuals within a particular social context use to talk about a domain. We used a free-listing task in which we asked respondents to first think of a family that they admired and to tell us the characteristics of that family. We then asked them to think of a family that they did not admire and to tell us the characteristics of that family. In a sample of forty-three respondents this task generated a list of over 100 terms. From that list of terms, we selected twenty-four for future investigation. The terms selected were those used by more informants and placed higher in each list (a criterion referred to as salience), although we were careful to also include some terms that were not as highly salient, so that we had a broad sampling of the semantic space.

We then turned to a constrained pile sort to explore the meaning of the terms. We used a constrained pile sort because there was built into the terms a distinction between positive and negative characteristics. We therefore imposed a constraint in which we asked the informants to first sort the terms into one pile of positive characteristics and one pile of negative characteristics. Then, within each of those two piles they were to sort them into however many piles they wanted, putting characteristics similar to one another in one pile and characteristics different from those (but similar to one another) in other piles. Thirty-four informants completed this task. The sorting of the terms was converted to an aggregate proximity matrix and
analyzed using nonmetric multidimensional scaling (MDS) and hierarchical cluster analysis in the program ANTHROPAC (Borgatti 1993). Fig. 1 shows the results of the MDS in two dimensions (stress=.04), with the circled terms indicating clusters. The terms appear to be arrayed along a single evaluative dimension running from bottom to top, such that all of the terms at the bottom of the figure are positive and all at the top are negative. At each end of this continuum there are category differences. In the figure I have labeled the category differences among positive characteristics as “family organization” (terms such as “organized” and “hard working”) versus “affective climate” (terms such as “love,” “comprehension” and “understanding”). Among negative characteristics, one category refers to what in Portuguese would be glossed as *mal educada* and refers to impolite or boorish behavior, while the other category refers to extreme family dysfunction as manifest in violence and addiction.

Property fitting (PROFIT) analysis (Kruskal and Wish 1978) confirmed the evaluative dimension. Informants were asked to rank the twenty-four family characteristics from the most positive to the most negative, and the multiple R from the PROFIT analysis indicated that the interpoint distances from the constrained pile sort were strongly associated with this evaluative dimension (R=.94).

At this point we felt comfortable going ahead and testing for cultural consensus on this evaluative dimension, so we asked another sample of informants (n=66) to rank order a subset of 13 concepts in order of the importance of these characteristics “in order to have a family” (*para ter uma família*). We selected out a subset because we were concerned that the dichotomy between positive and negative characteristics might so dominate the ranking that consensus could be spuriously produced simply by agreement on the ends of the continuum and not on what was in between. We completely eliminated the most negatively evaluated characteristics (violence, addiction) and sampled from within the other clusters. We found very high agreement on this ranking (ratio 1st/2nd eigenvalue = 7.42; mean cultural competence = .82 ± .09). There was no evidence of variation by educational attainment or by age in cultural
competence scores; however, women had slightly higher mean competence than men (.85 vs. .79, p<.01). From a perspective of cultural models, this likely means that women exchange concepts from the model of family life more frequently than do men (who are likely exchanging concepts from the domains of sport and politics). This is also an indicator of the sensitivity of the technique of consensus analysis, in that it is able to detect subtle variation in even a highly shared cultural model. In the consensus ranking of the importance of the items, affective terms such as “love” and “comprehension” received the highest rankings. These were followed by terms referring to family organization and mutual support. The lowest ranked items were terms referring to disrespect, lack of support and fights in the family.

While we can now estimate the “culturally best” ranking of family characteristics, it should not be construed that we believe that we have discovered the cultural model. Rather, these rankings are generated out of the cultural model, and to understand it better requires other forms of data collection and analysis. The systematic data collection techniques give us the skeleton of the model, so to speak, but to figure out where the organs go and how they work, we need other data. To do this, and to provide a check on the reliability of the results obtained above, we turned to the focused group interview (Schensul 1999). We conducted a total of twenty focus groups, with four devoted to the family. One focus group on the family was held in each of four neighborhoods that were used as sampling blocks in the survey component of the research (see below). This is a particularly good technique for sorting out the internal logic of a cultural domain, because it provides informants an opportunity for exchange within a discussion setting. Under the best circumstances, informants can challenge one another, thereby revealing the differential uses to which the model can be put. Unfortunately, it would be far beyond the scope of this article to present the results of the focus groups in any detail. For our purposes here, four points are of major importance: (a) the use of the terms for the domain generated by free-listing were replicated in spontaneous discourse; (b) the evaluative dimension discovered in the pile sort and ranking tasks dominated the discussion; (c) the major contested
feature of the cultural model was the relative importance given to family organization versus affect by different informants; and (d) the discussion revolved around the process by which good families become bad families, and vice-versa.

Using this combination of techniques and analyses, we can conclude that within this community there is a broadly shared cultural model of family life, and that we understand both the general outline of and the dynamics of this model.

Measuring Cultural Consonance in Family Life

The next step in the process is the development of a measure of the degree to which individuals in their own lives approximate (or see themselves as approximating) the cultural model of family life. Guiding our thinking in this regard is the observation of Sapir quoted earlier; that is, we seek to identify those aspects of individual behavior that correspond to the cultural model. At the outset, in the domain of family life there is a certain complication in measurement at the individual level. For lifestyle, for example, it is fairly straightforward to ask a direct question about behavior (e.g., if it is important in the cultural model to own a house, then you ask the respondent if he/she owns a house). Direct questions about the concepts important in the domain of the family seem more difficult. Therefore, we used a time-honored tradition in the social sciences: we asked respondents about their perceptions, phrased in terms of statements with which they could agree or disagree. For example, for the concept of compreensão or understanding within the family, we posed the following statement: “In my family we understand one another completely.” Respondents were then asked if they agreed or disagreed with that statement. If they agreed, they were asked if they simply agreed or if they agreed completely. If they disagreed, they were asked if they simple disagreed or disagreed completely. This generated a 4-point Likert response scale that was scored from 0 (disagree completely) to 3 (agree completely). Some items were reverse coded. At least one statement was created for each of the thirteen concepts, and for the more important concepts (such as
“love”) we created two items. A total of eighteen items was written by myself and two research assistants.

These items assessed the respondent’s perception of his or her family in terms of each of the concepts thought most important in the cultural model. We then took one more step. The culturally best estimate of the ranking of the items derived from cultural consensus analysis was used to weight the responses to each item. For example, “love” in the family was regarded in the consensus rankings as more important than the family being “well organized.” We therefore gave a response to this item a weight proportional to its rank in the consensus analysis, a weight higher than that received by the item pertaining to organization. In this way, the measure of cultural consonance in family life utilizes virtually all of the information available in the consensus model, and identifies those aspects of family life perceived by the respondent to correspond (or not) to those aspects of family life thought to be important in the cultural model.

In summary, to create the scale of cultural consonance in family life, all items were recoded so that agreement indicated being closer to the cultural model, and disagreement indicated being farther from it. Each item was multiplied by its rank of importance in the consensus model, and then these weighted responses were summed to arrive at a total score. The higher the score, the more a respondent perceives his or her family as having those characteristics of a family culturally defined as important. At this point, the measure of cultural consonance in family life can be examined in relation to adaptive outcomes, relative to other (psychological, anthropometric) factors thought to be important.

Survey Methods and Results

Social survey methods were used to collect data suitable for statistically testing hypotheses about the association of cultural consonance and adaptive outcomes, controlling for potential confounding variables or standard control variables. To sample the range of intracultural diversity in the city, we selected four neighborhoods varying in socioeconomic status. These are the same four neighborhoods used in our research ten years ago and are
carefully described in other papers (Dressler, Balieiro and Santos 1997;1998). In the current study households were randomly selected from complete listings of occupied addresses within each neighborhood. Both heads of household (if present) and one child over the age of eighteen were invited to participate in the research. In 60% of households contacted at least one individual agreed to participate, and 71.2% of households contributed more than one respondent. The final sample size was 271 individuals (267 with complete data).

Each individual was interviewed four times: an initial interview collecting cultural and psychological data; two 24-hour dietary recalls, one always on a Monday and the other indifferently on one other day of the week (but not the weekend); and, a clinical interview in which a fasting blood sample was collected, along with blood pressure and anthropometric data.

For the purposes of this analysis, the following control variables will be employed: age (in years); sex (female=0; male=1); and, in relation to blood pressure (but not depressive symptoms), the body mass index (weight in kilograms/height in meters squared).

As potential alternative explanatory variables, total family income (collected as number of minimum salaries per month, converted to reais) and locus of control (Lefcourt 1991) are included. Locus of control is measured specifically in the domain of health, using the scale reported by Coreil and Marshall (1982). The scale shows acceptable reliability (alpha=.71).

Cultural consonance in family life is measured using the scale described above. It too shows acceptable reliability (alpha=.89).

Two outcome variables are employed: arterial blood pressure and depressive symptoms. Arterial blood pressure was measured using the Dinamap Vital Signs Monitor Model 845XT. This is an automated digital system that reduces observer bias. Systolic and diastolic blood pressure were measured five times during the interview and then averaged. For the purposes of this paper, only systolic blood pressure is used as a dependent variable (to save space, the same associations are found for diastolic blood pressure). Depressive symptoms are assessed with a version of the Center for Epidemiologic Studies Depression Scales (CES-
D) that had previously been adapted and validated in Brazil (Silveira and Jorge 2000). The CES-D has acceptable reliability in this sample (alpha=.88).

Table 1 shows descriptive statistics for all of the variables for the total sample and for each neighborhood. The socioeconomic diversity is apparent.

Multiple regression analysis was employed as the analytic tool. As noted, in an earlier study a curvilinear association was found between cultural consonance and blood pressure (Dressler and Bindon 2000), so this was examined here as well. Testing for a curvilinear association is fairly straightforward, requiring the inclusion of a term that is the square of the variable of interest. In this case, that meant including both cultural consonance in family life and the square of cultural consonance in family life in a regression analysis. If the squared term is statistically significant, the combination of the two terms describes the shape of the association (any standard text on regression describes this analysis, e.g., Pedhazur 1982). At the outset, therefore, two regressions (one for systolic blood pressure and one for depressive symptoms) were calculated, including the terms just described and all other variables. In each case, the terms indicating a curvilinear association were statistically significant (p < .05).

While testing for the presence of curvilinearity is straightforward, actually estimating the regression coefficients to describe the curve is quite complicated (the interested reader is referred to Pedhazur 1982: 420-433 or Jaccard, Turisi, and Wan 1990 for a discussion). Simply put, where there is a curvilinear association, there are actually separate linear regressions for different segments of the curve. In these data, there are two such regressions, because there is one bend in the line. The simplest way to estimate these coefficients is to find the point on the distribution of the variable (in this case cultural consonance in family life) at which the line bends, divide the sample at that point, and then calculate separate regressions for those two groups of cases (this form of analysis is described non-technically by Jaccard, et al. 1990). It turned out that the line bent at the median of the distribution of cultural consonance in family life, so I could simply divide the sample into two halves and run regression analyses within each half.
The pattern of the results is shown clearly in Table 2 (all of the variables were standardized for this analysis, so the regression coefficients represent the difference in blood pressure and depressive symptoms associated with a one standard deviation difference in the independent variables). Up to the median of cultural consonance in family life, both blood pressure and depressive symptoms decline as cultural consonance in family life increases. Above the median, however, the shape of the relationship changes. In that range of values, blood pressure increases as cultural consonance in family life increases, and the association with depressive symptoms flattens out.

The shape of the curvilinear association is shown in Fig. 2 for blood pressure and Fig. 3 for depressive symptoms. For blood pressure, the difference between the linear association and the curvilinear association is shown. For depressive symptoms, the association is shown separately for lower class women versus the rest of the sample, because there was an unanticipated, but robust (p<.02), moderating effect within this demographic subgroup. For the sample in general, depressive symptoms decline with increasing cultural consonance, while for lower class women, depressive symptoms increase at the highest level of cultural consonance.

**Discussion**

The question posed at the outset of this paper was a simple one: what is cultural about biocultural research? I argued that culture theory has remained underdeveloped within the context of biocultural research, especially relative to other theoretical orientations such as a political-economic approach. To progress as a field of research, and indeed to demonstrate that culture (as opposed to psychological stress or economic inequality) matters in the processes of human adaptability, requires an explicit culture theory and an explicit way of making that culture theory operational.

The theory of cultural consonance offers just such an orientation. This theory has clear roots in a history of theoretical progress in anthropology dating back to the 19th century. It grapples with two vexing theoretical issues: how to understand collective meaning in a sensible
way, and how to link collective meaning to individual behavior. A theory of cultural consonance offers a solution to these conceptual problems, relying on some of the most recent thinking in the field, notably the growing agreement regarding a theory of cultural models in cognitive anthropology (D’Andrade 1995). Drawing on Sapir’s (1949) insights, it offers a theoretically and methodologically explicit way of linking these cultural models to the behavior of individuals, and ultimately to their biology. The theory of cultural consonance has developed as part of a cumulative growth of knowledge in anthropology, not as a dramatic break with the supposedly flawed theory and misguided thinking of the past.

Empirically, cultural consonance in family life is associated with blood pressure and depressive symptoms, after controlling for known correlates of these variables. Cultural consonance in family life accounts for 2-3% of the variance in blood pressure and about 5% of the variance in depressive symptoms. Some might object that the associations are rather small, and in a purely statistical sense they are. But a small amount of explained variance does not necessarily imply a lack of importance. It is unlikely that, in measures of human adaptability like blood pressure and depressive symptoms that are influenced by such a wide range of factors, a single measure of cultural consonance will have very large effects. It is more likely that multiple cultural models serve to structure the space of meaning in which an individual lives his or her life, and hence variation in consonance along several dimensions will influence adaptive outcomes.

There are also specific properties of the data that can limit explained variance, including the reliabilities of the variables (correlations cannot exceed reliabilities), the range of variation of a variable, and measurement levels (to name a few, the interested reader is referred to O’Grady 1982 for a cogent discussion of explained variance as a criterion of importance). Where the variable actually sits in the causal sequence may also limit variance explained (see Dressler, et al. 2004 for an explicit example of this). And finally, the goal of research is not necessarily accurate prediction (a goal for which variance explained looms large); rather, in the research
presented here, the goal is theory building, to understand better the characteristics of a particular variable (cultural consonance) measured in a particular way, and not to try to account for as much variability as possible.

The regression coefficients presented in Table 2 provide a better way to evaluate the relative importance of the variables. For example, for the sample as a whole, a standard deviation difference in the body mass index is associated with a difference of 4.5 mm Hg in blood pressure. The coefficient for cultural consonance in family life is slightly smaller than this in the lower half of its distribution, and slightly larger in the upper half. Therefore, in relation to blood pressure, the association of cultural consonance in family life is about the same as a variable (BMI) generally accepted as an important cause of high blood pressure (although for cultural consonance, the pattern is more complicated). Similarly, for depressive symptoms, in the lower half of the distribution cultural consonance in family life has about the same association with symptoms as locus of control does for the sample as a whole, and locus of control is widely regarded as an important precursor of mental health problems (Lefcourt 1991). We can conclude, then, that cultural consonance in the domain of family life is generally as important as other variables widely regarded as of consequence for these adaptive outcomes.

As we have argued elsewhere (Dressler and Bindon 2000), a person with low cultural consonance is seen to be, and sees herself as, unable (or perhaps unwilling) to act on the widely shared understanding of how life ought to be lived in this particular domain. If a person is prevented from acting on this understanding (due, for example, to economic marginality), this could be a profoundly stressful experience personally, which our data show in the association of cultural consonance and depressive symptoms. Even if a person would choose to live in a way outside of shared understanding, she could be subject to social sanctions in mundane interactions that would also be stressful, despite her conscious effort to live differently (see G. Brown 1974 for an early, thoughtful discussion of the differences between personal meaning and collective meaning in research on stressful life events). That the association of cultural
consonance and depressive symptoms flattens out can be predicted from theories of person-environment fit (Frensh, Cobb, and Rogers 1974). This theory suggests that a lack of person-environment fit (in this case, the fit of the person to the cultural environment) is stressful for that person, but that increasing fit has declining benefits. Again, this interpretation is congruent especially with the findings for cultural consonance and depressive symptoms.

Theories of family dynamics (Olson 1994; Rothbaum, Rosen, Ujiie and Uchida 2002) predict a different kind of curvilinear effect. Family theorists have long argued that members of families can become overly “enmeshed” in familial relationships, which in turn creates difficulties. An individual offering a representation of his or her family as close to ideal (ideal in terms of local cultural models) may be investing so much effort to create such a family that this in turn is associated with greater cardiovascular response. There is a large literature on the physiologic effects of effortful action, based on laboratory research (see Smith, Nealy, Kircher, and Limon 1997). It is entirely plausible that the family is a cultural domain and social field within which such effortful action would be found, given the overall salience of the family in Brazilian society (DaMatta 1985), and that, to put it bluntly, trying to be too culturally perfect as a family takes an adaptive toll on its members.

It is striking, however, that people with the highest levels of cultural consonance in family life seem to be doing well on one measure of adaptation (depressive symptoms), while at the same time doing worse on the other (blood pressure). It should be noted at the outset that this is not an isolated finding. A lack of consistency between measures of mood and measures of cardiovascular reactivity have been observed even under tightly controlled laboratory conditions (Cohen, Hamrick, Rodriguez, Feldman, Rabin, and Manuck 2000). It may be that the conscious mind “knows” one thing and the body “knows” something else. Given that humans and non-human species share similar physiologic reactions to similar variations in the social environment (Sapolsky 1999), it is plausible that an embodied knowledge of that social environment is phylogenetically old, and that culturally constructed descriptors of mood states
like depression, and the ways in which mood states and the social environment covary, have been layered on top of that embodied knowing. Simply put, the fit between an embodied knowledge of variations in cultural consonance (blood pressure), and a culturally constructed and conscious knowledge of variations in cultural consonance (depressive symptoms), may be imperfect because these ways of knowing were not necessarily linked in evolution.

The measure of cultural consonance appears to be sensitive as well to the social dynamics of the community, as evidenced by the unanticipated interaction of cultural consonance with gender and social class. We are at an advantage here, because we have survey data from the same neighborhoods from ten years ago, and I have visited the community at least once a year for the past twelve years. While a complete discussion of the changes in Brazilian society would be beyond the scope of this presentation, it can be noted that the composition of the poorest neighborhood, in which for women the association of cultural consonance with depressive symptoms is different from the rest of the sample, has changed dramatically. Ten years ago this neighborhood was created so that the municipality could move the residents of, and then physically destroy, a favela or squatter settlement. The municipality created a kind of housing project (conjunto habitacional) of four-room, cinder block houses complete with municipal services (water, electricity, sewage). The relocated favelados were then required to pay rent (which could go toward purchase) on the houses, as well as for services. Many were without the economic wherewithal to do so. Gradually over the past ten years, many of the original favelados have moved out, to be replaced by persons who could afford to purchase the houses. It turns out, however, that the persons with the means and the motivation to buy houses in an area that, as a result of its past association with the favela, has an unsavory reputation in terms of crime and drug trafficking, are persons caught in a process of downward social mobility. Furthermore, we have ethnographic evidence that women in this process have perceived it to be a traumatic life event for a variety of reasons. For example, in a focus group one woman noted that her old friends refuse to visit her because she now lives in
that neighborhood. So, the association between cultural consonance and depressive symptoms within this neighborhood may be different for those persons for whom a move to the neighborhood has been a traumatic life event.

In the final analysis, this model of culture, behavior, and biology describes theoretically and methodologically explicit links among these levels of system organization. As such, it offers clear avenues of investigation to determine the cultural influences on a variety of outcomes of individual adaptation, and within a variety of cultural domains. As always, theoretical progress is most likely to come from further research.

I began with the question: what’s cultural about biocultural research? To answer my own question: the cultural in the biocultural is a process by which shared and distributed knowledge defines a cultural space in which that knowledge is acted upon by individuals. That enactment can in turn have profound implications for individual adaptation.

Endnotes
1. The English translations of these thirteen concepts are: love, dialogue, good relationship, comprehension, happiness, workers, organized, help one another, confronts problems, critical, fights, egoism, and disrespect.

2. There are a large number of variables that could be included as alternate explanatory variables with either blood pressure or depression. Since the aim of this article is more an exposition of theory and method, as opposed to a stringent test of a specific model, I am including these primarily as examples. Family income needs no explanation as a control variable, given the associations of socioeconomic status and health. Locus of control is a variable that assesses a part of a larger psychological construct known as “generalized self-efficacy,” or the degree to which individuals see themselves as able to exercise control over their environment. A greater sense of control is thought to enhance an individual’s capacity to cope with stressors, and hence avoid their deleterious effects (Lefcourt 1991).
3. Regression diagnostics were examined for both analyses. There were two cases that had high leverage values and three cases that had relatively high studentized residuals. Deletion of these cases from the analyses, however, made no difference in the results.

4. As noted, this was an unanticipated effect and it was discovered in preliminary analyses of the data. It can be modeled either by defining a grouping variable (lower class women vs. all others, as shown in Fig. 3) and calculating an interaction term between that variable and the linear and first-order polynomial terms for cultural consonance in family life, or it can be modeled as a three-way interaction of gender, family income and cultural consonance in family life.

References


DaMatta, Roberto (1985) *A Casa e a Rua*. São Paulo, Brasil: Editora Brasiliense.


Table 1: Descriptive sociodemographic, psychological, cultural, and physiologic data for the four sampled neighborhoods – Ribeirão Preto

<table>
<thead>
<tr>
<th></th>
<th>Lower class neighborhood (n=63)</th>
<th>Working class neighborhood (n=64)</th>
<th>Middle class neighborhood (n=71)</th>
<th>Upper-middle class neighborhood (n=69)</th>
<th>Total sample (n=267)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age**</td>
<td>36.8 (± 10)</td>
<td>43.5 (± 12)</td>
<td>41.8 (± 11.9)</td>
<td>41.5 (± 12)</td>
<td>40.9 (± 12)</td>
</tr>
<tr>
<td>Sex (% male)</td>
<td>30</td>
<td>38</td>
<td>44</td>
<td>43</td>
<td>39</td>
</tr>
<tr>
<td>Body mass index</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-women*</td>
<td>24.7 (± 5.2)</td>
<td>26.4 (± 5.3)</td>
<td>25.6 (± 4.9)</td>
<td>24.0 (± 4.9)</td>
<td>25.2 (± 5.3)</td>
</tr>
<tr>
<td>-men</td>
<td>24.6 (± 5.9)</td>
<td>26.3 (± 6.3)</td>
<td>25.8 (± 4.7)</td>
<td>22.8 (± 3.9)</td>
<td>24.9 (± 4.4)</td>
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<tr>
<td>Cultural consonance in family life</td>
<td>107.8 (± 23.8)</td>
<td>104.4 (± 23.3)</td>
<td>107.9 (± 26.1)</td>
<td>107.4 (± 25.1)</td>
<td>106.9 (± 24.5)</td>
</tr>
<tr>
<td>Locus of control**</td>
<td>25.8 (± 5.3)</td>
<td>28.9 (± 5.1)</td>
<td>27.3 (± 5.9)</td>
<td>29.9 (± 5.4)</td>
<td>28.0 (± 6.5)</td>
</tr>
<tr>
<td>Family income**</td>
<td>939.4 (± 522)</td>
<td>1301.5 (± 533)</td>
<td>1346.5 (± 576)</td>
<td>1914.5 (± 237)</td>
<td>1381.2 (± 596)</td>
</tr>
<tr>
<td>Depressive symptoms**</td>
<td>15.5 (± 9.7)</td>
<td>11.5 (± 9.1)</td>
<td>13.6 (± 12.0)</td>
<td>9.2 (± 8.3)</td>
<td>12.5 (± 10.1)</td>
</tr>
<tr>
<td>Systolic BP</td>
<td>122.9 (± 17.6)</td>
<td>124.2 (± 16.6)</td>
<td>122.9 (± 15.3)</td>
<td>121.6 (± 16.5)</td>
<td>122.9 (± 16.4)</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>76.5 (± 13.2)</td>
<td>76.8 (± 12.1)</td>
<td>76.7 (± 11.4)</td>
<td>77.2 (± 11.8)</td>
<td>76.8 (± 12.1)</td>
</tr>
<tr>
<td>Elevated BP (%)</td>
<td>19.1</td>
<td>26.5</td>
<td>19.7</td>
<td>15.9</td>
<td>20.2</td>
</tr>
</tbody>
</table>

*p<.05; **p<.01 for differences between neighborhoods (chi-square for categorical variables and one-way analysis of variance for continuous variables)
Table 2: Regression of systolic blood pressure and depressive symptoms on cultural consonance in family life, covariates, income, and locus of control, showing regression coefficients for different segments of the curvilinear association between cultural consonance and outcome variables (unstandardized coefficients, see text for further explanation) – Ribeirão Preto (n=267)

<table>
<thead>
<tr>
<th></th>
<th>Lower half of the distribution of CCFL</th>
<th>Upper half of the distribution of CCFL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SBP</td>
<td>DEP</td>
</tr>
<tr>
<td>Age</td>
<td>4.569**</td>
<td>-.587</td>
</tr>
<tr>
<td>Sex</td>
<td>10.007**</td>
<td>-1.546</td>
</tr>
<tr>
<td>BMI</td>
<td>6.018**</td>
<td>--</td>
</tr>
<tr>
<td>LOC</td>
<td>1.497</td>
<td>-2.487**</td>
</tr>
<tr>
<td>INC</td>
<td>-2.460*</td>
<td>-1.084</td>
</tr>
<tr>
<td>CCFL</td>
<td>-3.231*</td>
<td>-3.041**</td>
</tr>
<tr>
<td>Intercept</td>
<td>116.386</td>
<td>11.771</td>
</tr>
<tr>
<td>R</td>
<td>.612**</td>
<td>.435**</td>
</tr>
<tr>
<td>R²</td>
<td>.375</td>
<td>.189</td>
</tr>
</tbody>
</table>

Note: Variable abbreviations are as follows: SBP = systolic blood pressure; DEP = depressive symptoms; BMI = body mass index; LOC = locus of control; INC = family income; CCFL = cultural consonance in family life. All of the independent variables have been standardized.

*p<.05  **p<.01
Fig. 1: Nonmetric multidimensional scaling representation of constrained pile sort of terms for the domain of family life (circled items are derived from cluster analysis) – Ribeirão Preto (n=16)
Fig. 2: Linear and curvilinear associations of systolic blood pressure (adjusted for age, sex and the body mass index) and cultural consonance in family life.
Fig. 3: Association of depressive symptoms and cultural consonance in family life for lower class women and all other sample members – Ribeirão Preto (n=267)

Closed squares/dashed line = lower class women (n=43)
Open squares/solid line = all others (n=225)
Measuring Cultural Consonance:
Examples with Special Reference to Measurement Theory in Anthropology

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Acknowledgements: This research was supported by the National Science Foundation (BCS-0091903). Manoel António Dos Santos and Kathryn S. Oths offered invaluable assistance in all stages of this work. Cyleste Collins, Lance Gravlee, and Kathryn S. Oths offered helpful comments on an earlier draft of the paper. The authors alone are responsible for any errors.
Abstract

Research in anthropology has been hampered by the lack of a clear measurement model. Above all, a valid and reliable anthropological measurement must be culturally appropriate for a particular social setting. Making the case that a measurement is culturally appropriate usually depends on the skill of the ethnographer in describing that setting, so that the sensibility of a measurement can be intuited by the reader of the study. While this has resulted in much valuable research, it has been difficult to systematize and it lacks transparency. In this paper, we present a measurement model for anthropology that links a more explicit set of ethnographic methods—cultural domain analysis and cultural consensus analysis—to the assessment of individual behavior and personal beliefs. These procedures are illustrated with the concept of “cultural consonance,” which is the degree to which an individual approximates in his or her own behavior or belief the shared cultural model in some domain. Cultural consonance has been found to be associated with health outcomes. The concrete steps taken to develop four different measures of cultural consonance (in the domains of lifestyle, social support, family life and national characteristics) are described in some detail. The reliability and validity of these measures is also evaluated. We suggest that this may represent a useful and general measurement strategy in anthropology.

Key Words: cultural consonance; cultural consensus analysis; cultural models; measurement theory
A part of what anthropologists do is to test hypotheses regarding the associations among variables, and usually at least one of those variables is intended to represent something of cultural relevance. Formal hypothesis testing employs the procedures of inferential statistics, and these require numeric data collected over a range of sampled entities (be they people or some kind of aggregate unit of analysis). The assignment of numbers to sampled entities can be referred to as measurement. A measurement model is a set of formal rules for deciding how to assign numbers to sampled entities to represent their positions relative to one another in terms of some attribute (this is a variant of a widely-used definition, see Bernard 1994: 24-25).

The aim of this paper is to present an example of the development of a specific set of measures of “cultural consonance” in current research in Brazil. This illustrates what may prove to be a useful formal measurement model for anthropology (briefly outlined by Dressler 1996, and developed more extensively by Handwerker 2002).

Measurement in Anthropology and Other Social Sciences

Of the social sciences, it is psychology that is most explicit in its theory of measurement (Guilford 1954; Nunnally 1978). Methodological texts in anthropology borrow heavily from psychometric theory (e.g., Pelto and Pelto 1978: 33-34; Bernard 1994: 38-43; Handwerker 2001: 188-189). The central issue in psychometric theory is how to array individuals along a continuum that represents varying levels of some attribute, usually a personality trait or cognitive ability. Psychometric theory provides an explicit set of procedures to evaluate two essential criteria of this arrangement of persons: (a) can individuals be arrayed along this continuum consistently?; and (b) when individuals are arrayed along this continuum, does this arrangement match alternate assessments of the attribute in question? The first of these criteria is referred to as reliability and the second is referred to as validity. Reliability is routinely assessed in research via measures of internal consistency. Validity is a more difficult, and hence less frequent, assessment.
It is not uncommon to find examples of research in which measures of some attribute are objected to by anthropologists when they are applied in some specific group, even though these measures meet psychometric requirements of reliability and at least face validity. Why? Typically, the notion of “meaning” is invoked. Take for example a measure of psychological dysfunction that includes a question referring to hearing voices. In a society in which visits by unseen entities are regarded as part and parcel of normal life, at least for some people (such as spirit mediums in *candomblé* in Brazil), this item could be questioned as a measure of dysfunction, since the experience is culturally regarded as normal. In other words, it means or signifies something different in that society, and that meaning is not well-represented by that item (see Cohen and Naroll 1973: 16).

In conventional psychometric theory, this would be a question of sampling the universe of items intended to measure some attribute. This universe of items in psychology is usually defined by psychological theory. But the example given above clearly demonstrates that in sampling the universe of items that can serve as indicators of some attribute, anthropologists have two concerns that have to be juggled. One of these is of course theory. The constructs and variables chosen for study must be relevant to a particular theoretical orientation. The other concern, however, is local meaning. What, in terms of local meaning, is an appropriate indicator of the variable in question? Dressler (1995) suggested that the researcher must engage in an “ethnographic critique of theory,” or the careful examination of how a theory is instantiated within a specific cultural context. This manifestation begins with locally meaningful indicators of relevant variables.

Traditionally anthropologists have approached this question with the conventional tools of ethnography: participant-observation and intensive interviewing of key respondents. Janes’s (1990) study of social stress and blood pressure among Samoan migrants to northern California is a good example. Janes’s theoretical orientation led him to examine both how Samoans aspire to higher social status in their community, and the limitations placed on achieving that
status (this incongruence being hypothesized to be stressful). One avenue of status aspiration is receiving a title as *matai*, which is a form of political leader. To make his case, Janes had to demonstrate the importance of the *matai* status in ethnohistorical materials for Samoa, and then, via key respondent interviews and participant-observation, to show that this status position had successfully been transplanted to the American urban context. At that point, he chose to use achievement of a chiefly status (along with other indicators of leadership ambition) as one measure of status aspiration.

Assessing the adequacy of this measure is not simply a matter of its internal consistency or validity in a psychometric sense; rather, it depends on the reader of the research being convinced that, indeed, this measure “makes sense” in terms of Samoan migrant culture. In part, it becomes a rhetorical issue for the researcher to artfully embed his measure in the cultural context (which, it should be added, Janes does admirably). Of course, there is then also the issue of construct validity, or the association of the measure with other indicators and with antecedent or outcome variables with which it is hypothesized to be associated (and again, Janes’s measure performs very well in this respect).

There is, however, a certain lack of transparency in the measurement process, along with a certain lack of formalization. That is, it might be difficult for another ethnographer, perhaps lacking Janes’s skill in that particular cultural context, to replicate his procedures. There are also a couple of untested assumptions. First and foremost, this involves the issue of shared knowledge or meaning (which we regard as the appropriate definition of culture, see D’Andrade 1995). The approach to measurement illustrated by Janes’s study essentially assumes that the relevant items regarding status aspirations are widely (perhaps uniformly) understood to be such by members of the Samoan community. Second, it is assumed that the indicators of status aspiration are more-or-less equal in their cultural importance, since each received an equivalent weight in measurement. (Using Janes’s study as an example here
should not be construed as a lack of admiration for it. Many other works (e.g., Dressler 1991) could be subjected to precisely the same critique with respect to measurement issues.)

The value of anthropological research might be enhanced by the development of a more formal measurement model; however, considerable effort must be taken not to lose the very thing that makes hypothesis-testing in anthropological research useful at all, which is the sensitivity to local meaning and context in measurement.

**A New Anthropological Measurement Model**

The approach advocated by and illustrated in this paper was suggested briefly by Dressler (1996) and developed more extensively by Handwerker (2002). Basically, this approach involves using recent innovations in anthropological theory and methods to formally demonstrate that an understanding of a particular domain is shared within a social context and that this understanding is structured along specific dimensions. This information can then be used to construct measures of individual behavior within that domain, and those measures can then be evaluated using conventional psychometric criteria.

Another way of thinking about this measurement model is to borrow Bourdieu's (1984; Crossely 2000) Euclidean model for culture and social structure. Bourdieu uses the term “cultural space” to describe the culturally constructed world as it is understood by its inhabitants. In one sense, conventional psychometric approaches to evaluating measurement only examine the adequacy of a measure within a cultural space. These approaches do not tell you if you are in the right space. What Handwerker (2002) has suggested is, in essence, a way of figuring out if you are in the right space.

To begin requires a more precise explication of culture as shared meaning. Such a perspective has been elaborated in cognitive anthropology over the past fifty years (Holland and Quinn 1987; D'Andrade 1995; Shore 1996). While agreement is far from complete, a basic working theory of culture can be delineated. In this working theory, culture cannot be regarded as an integrated whole, but is rather made up of a set of “cultural models” that apply to various
cultural domains (e.g., a cultural model of the family, a cultural model of leisure activities, a cultural model of success in life, etc.). These models (also sometimes called “schemas”) are skeletal outlines of the elements of the domain and basic processes within the domain, but they leave many variables within the model unspecified; these can be specified within particular instances. These models are made up of two components: one is a function of individual biography and can be thought of as a personal model; the other is a function of what the individual learns about that domain as a member of society, and hence can be thought of as the cultural model, because it is shared with other members of society (Shore 1996: 49).

The notion of sharing or, as we will refer to it, “consensus,” is essential in this theory of culture, as has been recognized for well over a century in the social sciences (Tylor 1871; Berger and Luckman 1967). Many (although probably not all) cultural models define things in the world in an essentially arbitrary way. What gives these arbitrary definitions causal force is that people agree that this is, indeed, the way things are. They are the rules of the game, so to speak, and without at least a degree of respect for those rules (although we can try to bend them) there would be no game (Crossley 2000).

Understanding the importance of consensus is essential; defining consensus empirically is another thing. Some discussions of consensus in cultural models seem to imply that consensus is a dichotomy, which must certainly not be the case. People will agree on the nature of cultural things to a degree, leaving room for some models to be highly contested, while others are accepted with little dispute. Romney, Weller and Batchelder (1986) introduced the cultural consensus model, which accomplishes the task of quantifying consensus. Working from the pattern of agreement among key informants, the cultural consensus model determines precisely the degree of sharing in a domain. The degree of consensus in a domain enables the analyst to infer within certain confidence limits that these informants are, or are not, operating from a shared cultural model. Additionally, the cultural consensus model can operationalize the degree to which individuals in a sample share in the overall consensus. This is the concept of
“cultural competence,” which is the correlation between an individual’s understanding of the domain and the consensus understanding of the domain.

Finally, the cultural consensus model enables the analyst to estimate the “culturally best” set of responses within a particular domain. The responses are estimated by giving higher weight to the informants who have higher cultural competence (or, in other words, who can replicate more closely the group-level responses, Romney, et al. 1986). This latter characteristic of the model is particularly important, not only because it is a culturally unbiased estimate, but also because with those estimates that elusive aggregate quality of culture can sensibly be grasped. The culturally unbiased responses estimated from the model are not some simple average, but rather take into account the way in which meaning is distributed among the informants. It is a function not of what any individual knows, but rather of how that knowledge is distributed.

Something that is not always very well appreciated about the cultural consensus model is that these procedures by themselves represent a well-developed measurement theory for assessing cultural meaning at the aggregate level. That is, using these procedures one can reliably identify cultural similarities and differences among social groups in the degree of sharing of and in the meaning of specific elements of cultural domains, and then use those differences to test hypotheses about between-group differences in culture or in the association of cultural factors and other variables (see Kempton, Boster and Hartley 1996; Caulkins 2001; Jaskyte and Dressler 2004 for examples).

By itself, however, the cultural consensus model provides only one link from the aggregate level of measurement to the individual level of measurement—the cultural competence coefficient—and for testing certain kinds of hypotheses, this measure will suffice; however, people don’t just know or think things, people do and believe things, and assessing the degree to which individuals conform in their behaviors and their personal beliefs to cultural prototypes for those behaviors and beliefs is an important question (Crossley 2000). We have
found the expression of the cultural in the individual to be important in research in medical anthropology. In previous research in Brazil, we suggested that “cultural consonance,” or the degree to which individuals in their own behaviors approximate the prototypical behaviors encoded in a cultural model, might be related to personal adjustment and health outcomes. We found, in fact, that higher cultural consonance in two different domains (lifestyle and social support) was associated with lower arterial blood pressure, lower perceived stress, fewer symptoms of depression and a higher sense of one’s own efficacy (Dresser and Santos 2000; Dressler, Balieiro and Santos 2002).

This question immediately confronts the issue of measurement. How is it that we can consistently and accurately array individuals along a continuum of some culturally-relevant attribute in such a way that we can evaluate hypotheses about the importance of cultural factors at the individual level?

**Measuring Cultural Consonance**

Our previous approach to measuring cultural consonance in a single domain (lifestyles) is described succinctly in Dressler (1996). This was, admittedly, a kind of rough-and-ready approach, in that it built on years of previous research in which a scale to measure lifestyle (the accumulation of material goods and the adoption of behaviors representative of having become a success in life) had been developed using much the same procedures as described above for Janes’s (1990) study. That is, over several years of participant-observation and key respondent interviewing, we felt comfortable that local understandings of what a successful life meant included the behaviors we refer to as lifestyle and that these items could adequately locate individuals along that continuum. With the development and availability of the cultural consensus model, we took the further step of formally testing for the degree of sharing of that understanding, and used as a measure of cultural consonance in lifestyle those items ranked as most important within the consensus model.
Our current research seeks to extend, refine, and formalize this approach, specifically in three ways. First, drawing on the strongest qualitative and quantitative methods in cognitive anthropology, we have attempted to improve our description of the cultural models for behavior. Second, we have attempted to make better use of this description of cultural models in developing the measures of cultural consonance. And third, we have expanded the cultural domains examined, which will help us to understand better how to approach the measurement of cultural consonance in domains with different kinds of characteristics. The domains that we have examined include: lifestyles; social support; family life; and, national characteristics. The measurement of cultural consonance will be described for each of these domains.

To examine more carefully these cultural domains, the tools of cognitive anthropology for collecting data were employed (Weller and Romney 1988). The specific approach in each domain will be described below. In general, we used an iterative approach of collecting data about the domain with free lists, pile sorts and rating and ranking tasks. Specific steps depended on the domain under study. After we felt that we understood the outline of the cultural domain well enough, we proceeded to a final step in the domain analysis to collect data for testing for cultural consensus. This interview was designed to be maximally appropriate for measuring cultural consonance in the survey that followed.

We did not rely exclusively on these semi-structured interview techniques. To triangulate our understanding of these domains, we also employed focused group interviews and individual unstructured interviews. The aim of data collection in these interviews was to determine if a similar set of terms to describe each domain, and the semantic relations among those terms, emerged from these minimally-directed interviews. Discussion of these data are beyond the scope of this paper; however, in general the results are consistent with the results from the more structured cultural domain analysis.

Before proceeding to a discussion of each domain a few comments about sampling are in order. In two papers, Handwerker and his associates (1997a; 1997b) have offered quite
convincing evidence that in the kind of cultural domain analysis carried out here, strict canons of statistical sampling to achieve independence of cases do not apply, primarily because the underlying assumption is that these cases are not independent in any event, since they share cultural models. This view was adopted here, with the caveat that, especially in a society as diverse and complex as Brazil, attention must be paid to sampling potential intracultural diversity. Therefore, when respondents were recruited for various phases of cultural domain analysis, a kind of quota sampling approach was adopted. Equal groups of men and women for each sample were recruited, as were equal groups of persons younger than and older than 45 years of age. Finally, and perhaps most importantly, as a way of sampling from socioeconomic strata, we strove to include equal groups of persons with primary, secondary and university levels of education. The sample sizes for the various steps are as follows: free lists (n=43); pile sorts (n=16); pile sorts/rankings (n=34); rankings (n=22); and, cultural consensus analysis (n=66).

For evaluating the conventional psychometric characteristics of the measures developed to assess individual behaviors and personal beliefs, data are drawn from an epidemiologic survey that followed the cultural domain analysis. To sample the range of intracultural diversity in the city, we selected four neighborhoods varying in socioeconomic status. These are the same four neighborhoods used in our research ten years ago and are carefully described in other papers (Dressler, Balieiro and Santos 1997). In the current study households were randomly selected from complete listings of occupied addresses within each neighborhood. Both heads of household (if present) and one child over the age of eighteen were invited to participate in the research. In 60% of households contacted at least one individual agreed to participate, and 71.2% of households contributed more than one respondent. The final sample size was 271 individuals.

Lifestyle – As noted above, lifestyle refers to the material accouterments and behavioral manifestations of being a success in life (Bourdieu 1984). Our approach to understanding the
cultural model of lifestyle began with our decision to break the domain into two sub-domains: material goods and leisure activities. This was a decision made by the researchers, in order to facilitate the interview process. In the free list respondents were asked to list material goods or possessions that people need to live a good life. For leisure activities, they were asked simply to list the activities that people typically engage in in their free time.

The free list sample generated eighty material goods and sixty-six leisure activities. From those lists, 21 items from each sub-domain were selected for further study. Items were selected in discussions within the research staff, and it is typical to select only those items that occur higher in the lists of more respondents (a criterion referred to as “salience”). We generally followed this rule, although we thought it important to include some items lower in the lists simply to be certain that the full range of semantic variation within the domains was being sampled.

To understand better the meaning of the terms, within each domain another sample engaged in an unconstrained pile sort of the terms. Each of the terms was written on an index card², and respondents were asked to group the terms together, putting terms in groups that were similar in meaning. They were instructed that they could make as many piles as they wanted. Throughout the task the spontaneous comments of the respondents were noted, and at the end of the task each respondent was asked to explain why he or she had made those particular groupings. Then, using ANTHROPAC 4.05 (Borgatti 1993) the pile sorts were converted to an aggregate proximity matrix and analyzed using using nonmetric multidimensional scaling (abbreviated MDS) (Kruskal and Wish 1978, again in ANTHROPAC) so that similarities and differences in meaning among the terms could be visualized in two dimensions. Adequate fit was obtained in two dimensions in each sub-domain (stress = .15). (Unfortunately, space limitations preclude reproducing the visual representations of the pile sorts.)
For material possessions, respondents' pile sorts were dominated by ideas of what you really need for a good life versus what is superficial. This indicated that they attended to a single evaluative dimension, with “need” being the operative attribute. For leisure activities, respondents seemed to attend to a couple of attributes of the activities. One referred to a sense of personal development that would result from the activity (e.g., something like reading or studying). The other attribute of an activity was how it contributed to social interaction (e.g., going to bars, conversing with friends). These hypothesized dimensions were explored in the next couple of rounds of interviews, and were found to account for much of the similarities and differences in meaning of the elements in each sub-domain using property fitting analysis (PROFIT, described by Kruskal and Wish 1978 and available in ANTHROPC).

At this point we were comfortable enough with our understanding to go ahead and examine cultural consensus on the principal dimension of lifestyle that would be essential for calculating cultural consonance in lifestyle. This is the importance of the items “to live,” a phrase that almost sounds ironic in English, but it works well in Portuguese to describe what are regarded as those elements of a lifestyle that no one should have to live without to have a decent life. In the final consensus interview respondents were asked to rate, on a 4-point scale from not at all important to very important, the importance of an item for having a life. Also, at no point were respondents asked about their own lifestyles. They were instructed to evaluate these items in terms of what was generally thought to be important in the community.

A combined list of 33 material goods and leisure activities was rated, and there was relatively high consensus among the respondents (eigenvalue ratio = 6.59, mean competence = .71 ± .12). When intracultural variation was examined in the distribution of competence, significant differences were found between the education groups (p<.01), with the least well-educated respondents having the highest competence. Interestingly, the more well-educated respondents were less convinced of the importance of certain items than were the less well-educated, but the differences were not substantial enough to infer that there was more than one
cultural model at work. It should also be noted that when combined as a single group of items, our respondents had no trouble at all thinking of the material goods and leisure activities along a single evaluative dimension. These items did, in other words, describe a coherent domain of lifestyle.

To assess the degree to which individuals correspond to the model in their own behavior, in the survey individuals were asked to indicate whether or not they owned each material good. On the leisure activities, individuals were asked to report on a 4-point scale (from never to several times per week) the frequency with which they engaged in those behaviors. Two ways of calculating cultural consonance in lifestyle can be used with these data. The first is to use all 33 items, and to weight the reporting of that item by the consensus ratings provided by the answer key in cultural consensus analysis. Literally, this involves multiplying each individual’s answer by the consensus rating of importance (1 through 4) derived from consensus analysis (differences in response formats in the survey for material goods and leisure activities can be easily dealt with). Doing this returns a nearly normally distributed scale with an internal consistency reliability of alpha = .82.

The other way to calculate cultural consonance in lifestyle is to limit the selection of behavioral items to only those items that are rated in the cultural model as being at least “important” in having a life. This reduces the number of items to 19. Then, the reporting of these items can simply be counted, and the proportion of items of importance reported by the respondent can be calculated. This scale is also approximately normally distributed, although the internal consistency reliability is lower (alpha = .67, in part a function of the fact that many persons possess these more important items). This is an adequate reliability, and, it turns out, this reduced scale has slightly higher correlations with outcome variables (see below). Therefore, this latter measure was retained, and it is shown in Table 1.

Social Support – For social support, two free lists were collected. The first was a list of problems for which people typically seek out the help of others (55 terms). The second was a
list of the kinds of people to whom one might turn for help (35 terms). We reduced this to 8 problems and 7 potential supporters.

As the free lists were being collected, it was apparent that people thought in terms of social support as a hierarchy of resort within each problem type, i.e., when confronted with the problem of debt, people would first ask one type of person, proceeding next to another, and so on. This appeared so uniform in the interviews that we decided no further exploration of the domain was necessary. We therefore did not return to the domain of social support until the final cultural consensus analysis.

In the interview for cultural consensus analysis, each respondent was presented with seven cards on which were written the names of potential supporters. They were then presented with a problem and asked to rank the order in which they thought it was typical for people to ask different kinds of people for help. When analyzed for consensus, there was substantial agreement on these rankings (eigenvalue ratio = 6.53, mean competence = .67 ± .14). The consensus rankings are shown in Table 2.

To measure cultural consonance in social support, respondents in the survey sample were provided with the same set of cards for potential supporters and the same problems, but they were asked to rank only the first three or four choices for support. This was done purely for practical reasons, because in pretesting the survey interview we found that this task could slow down the flow of the interview substantially. To calculate cultural consonance in social support, we first transposed the data matrix so that each respondent became a column and each row was that respondent’s ranking of a particular supporter for a particular problem. Supporters not ranked by the respondent were assigned the value of 7. A column was added that was the consensus ranking of a particular supporter in relation to a particular problem. We could then calculate a simple correlation coefficient between the rankings by each respondent and the rankings from the consensus analysis. This correlation is used as the measure of cultural
consonance in social support. This measure ranges from -.25 to .81, with a mean of .49 (± .19). The distribution is slightly skewed to the right, but not substantially so.

*Family Life* – In the free list phase of the research, we posed two questions to respondents. First, we asked them to imagine a family that they admired and then to tell us all of the characteristics of that family. Second, we asked them to imagine a family that they did not admire and to tell us the characteristics of that family. This resulted in lists of 89 and 92 terms, respectively. We consolidated and reduced this list to 24 terms.

We asked our next sample for a constrained pile sort. They were instructed to first make two piles, those terms characteristic of good families and those terms characteristic of bad families, since this difference was already incorporated in the lists of items. Within each pile they were free to create as many piles as they wished, the only requirement being that they had to create at least two piles. The MDS (stress = .04) and cluster analysis of these data suggested a single evaluative dimension separating characteristics of good versus bad families (and this was confirmed in a PROFIT analysis using a rankings collected later). There are category differences at either end of the continuum. The category difference among positively-evaluated terms separated terms that referred to family structure (e.g. “organized”) from terms that referred to the affective climate of the family (e.g. “love,” understanding”). The category difference among the negatively-evaluated terms separated characteristics that are more like bad manners (e.g. “disrespect,” “egoism”) from characteristics like violence and substance abuse (e.g. “violence,” “addiction”).

In the consensus interview we reduced the number of items to 13, primarily because of lingering concerns about the influence of the ends of the evaluative continuum; that is, we were concerned that consensus could be generated primarily by agreement about what goes at the ends of the continuum (e.g., people agreeing that “love” is good but “violence” is bad) and not about how elements are arrayed in between. Therefore, we eliminated the most negatively evaluated items and sampled from the most positively evaluated items. In the consensus
sample, respondents were asked to rank these in terms of their importance “in order to have a family.” There was a high degree of consensus on this ranking (eigenvalue ratio = 7.42, mean competence = .82 ± .09). In spite of the very high overall consensus on the ranking of these family characteristics, we can still detect a small but statistically reliable difference in competence between men and women (.80 vs. .85, p<.01). This indicates that women exchange and share the meaning of family concepts more than men.

The challenge at this point is locating individuals in the space of meaning defined by these terms. In the other cultural domains it was a straightforward matter to translate the culturally-salient items into questions about individual behavior. The domain of family life presented a different challenge. Is it possible to simply ask people if, e.g., their family is well-organized? Or, if their family members really love each other? We believed responses to such questions would be dominated by social desirability. So, we decided to assess perceptions of family life.

To do this we presented individuals with a statement about the family, phrased explicitly in terms of their own family, and asked them to agree or to disagree with that statement. For each concept we generated a statement describing the family that would be acceptable in everyday speech. We generated a minimum of one sentence for each concept, although we doubled up on a couple of the more important concepts. For some of the concepts, acceptable phrasing in Portuguese enabled us to use simple statements, e.g. “In my family we feel close to one another.” For some concepts, linguistically it worked out better to phrase the statement in terms of a wish or desire, e.g. “At times I wish my family was more organized.”

Ultimately, to arrive at the total scale score, we weight an individual’s responses by the importance of that particular concept estimated from the cultural consensus analysis. So, for example, if a person strongly agrees that there is a great deal of love in their family, they receive more points for this than if they strongly agree that their family firmly confronts life’s problems, because in the consensus analysis ‘love’ was seen as more important than the concept of
firmeza’ (or ‘firmness’). The weights were adapted from the consensus rankings of the importance of the items. We reduced the 13 ranks to 5 weights due to the fact that some similar items had little distance from one another in the consensus ranks. The scale has quite high internal consistency reliability (alpha = .89) and is shown in Table 3.

National Characteristics – The free list for national characteristics started with the question “What characteristics are most important in defining a Brazilian?” This query generated 133 distinct terms, of which 26 were retained for further analysis. Analysis of the pile sorts of these characteristics had a good fit in two dimensions (stress=.05) and clearly distinguished items that are regarded as negative characteristics of Brazilians from those considered positive. Discussions by respondents during the pile sorts quickly indicated that this would be a highly contested cultural domain, since some Brazilians marveled at how succinctly and accurately we had captured the Brazilian character, while others were adamant that many of these items were scurrilous stereotypes. This impression was borne out in the ranking tasks. Positive characteristics included terms like “hard workers,” “happy,” and “receive others well,” while negative terms included things like “take advantage,” “lazy,” “ignore the poor,” and “corrupt.”

In the final consensus interview, we asked respondents to rate the terms on a 4-point scale from total disagreement that this represented a characteristic of Brazilians to total agreement that this represented a characteristic of Brazilians. There was a modest consensus on this rating (eigenvalue ratio = 3.97, mean competence = .57 ± .19). Furthermore, the items rated as most characteristic of Brazilians included a mix of the positive and negative items.

As in the domain of family life, we wrote items that could represent personal beliefs in this domain, and then in the survey asked respondents to agree or disagree with the statements. With the survey data we first experimented with a unidimensional scale of all of the items, but this had very low internal consistency. Then, a series of exploratory factor analyses (principal components analysis with varimax rotation) were carried out, successively deleting
items that had low communalities. It became quickly apparent that the items referring to the most positive characteristics of Brazilian life had such low variability that they did not co-vary with other items (i.e., people believe strongly in the most positive things). There was, however, a consistent factor that combined most of the more unfavorable aspects of Brazilian life. These items are shown in their entirety in Table 4. These eight items have an acceptable internal consistency reliability (alpha = .69) and represent what we have come to think of as a “cultural cynicism.” That is, those individuals who endorse more of the items have a more cynical view of Brazilians and Brazilian life, but it is a distinctly culturally constructed cynicism.

**Construct Validity**

Without going into a lengthy discourse on the issue of validity, beyond face validity (or the degree to which a measure appears to measure what it is intended to measure), assessing validity involves exploring the patterns of co-variation of the measure with other variables. One way of approaching this is to evaluate what is referred to as “construct validity.” This can be thought of in two senses. First, on the basis of theory, it might be hypothesized that the measure will be associated with other variables, either because they influence the measure of interest, or because they are influenced by the measure of interest. Obviously, there is a fine line between testing the methodological hypothesis of construct validity and testing a substantive hypothesis. Second, the term “construct” is often used to refer to a more abstract (or higher-order, or latent) theoretical term. A measure may, in conjunction with other measures, be hypothesized to form or create such a higher-order construct. Examining the pattern of correlations with other variables in this sense, especially using the tool of factor analysis, can also help to evaluate the construct validity of a measure (see Nunnally 1978: 94-113 for an extended discussion of construct validity).

The construct validity of these measures of cultural consonance can be examined in three ways. The first is to examine the differences across the four neighborhoods, varying as they do in socioeconomic status. It is reasonable to anticipate that all of these measures will
vary by socioeconomic status. These results are shown in Figs. 1 and 2. In Fig. 1, both cultural consonance in social support and cultural consonance in lifestyle differ significantly across the four neighborhoods, with the wealthiest neighborhood showing the highest consonance (p < .001). In Fig. 2, cultural cynicism differs across the four neighborhoods (p < .001), but cultural consonance in family life does not. Persons in the wealthiest neighborhood harbor the least culturally cynical views, and there is no socioeconomic level in which persons perceive their families as more (or less) consonant with the prototypical model.

The second approach to construct validity is to examine the correlations of cultural consonance with several psychological variables generally thought to be a part of the process of psychosocial stress. The cultural consonance model, as noted earlier, was developed specifically in the context of research on health, and, in very general terms, we can regard low cultural consonance as a chronically stressful experience. Therefore, we can examine the correlations of cultural consonance with three variables that are a part of the stress process. Globally perceived stress and depressive symptoms are measures of the subjective experience of stressful circumstances. Locus of control is a measure of the sensation that one is in control in one's life (internal locus of control) versus buffeted by external forces (external locus of control), and may be considered an intermediate step in the subjective experience of stressful circumstances. All of these measures have adequate reliability in this sample (alphas > .70).

The correlations of the cultural consonance variables with each other, and with these psychological variables, are shown in Table 5. With the exception of cultural consonance in social support, all of the consonance measures are associated with the psychological variables in a predictable direction. That is, higher cultural consonance is associated with less stress and depression, and greater internal locus of control. The exception to this is cultural cynicism, which is associated with an external locus of control and more stress and depression.

Finally, the pattern of correlations among the cultural consonance variables can be thought of as a measure of the construct validity. In general, being higher on one measure is
indicative of being higher on another measure, again with the understandable exception of cultural cynicism. Higher cultural cynicism is associated with a lower cultural consonance on all other variables. These four cultural consonance variables load together on a single principal component that accounts for 46% of the variance shared among the measures. The loadings on the principal component are as follows: cultural consonance in lifestyle (.781); cultural consonance in social support (.617); cultural consonance in family life (.513); and, cultural cynicism (-.765). There is, in other words, a single continuum along which individuals can be arrayed that represents a kind of “general cultural consonance.” At one end are persons with higher cultural consonance in lifestyle, social support and family life, and a lower cultural cynicism; at the other end are people with a higher cultural cynicism and lower cultural consonance in lifestyle, family life and social support. This general cultural consonance factor also is significantly associated with the psychological outcome variables (Table 5).

Discussion

The aim of this paper was to present and evaluate a measurement model for anthropology. This model draws on and incorporates criteria for evaluating measures as those criteria have been developed in related fields, principally psychometric theory. Primarily, however, this model depends on a more systematic and transparent set of procedures for getting from an assessment of the collective knowledge that individuals share, to the measurement of individual behavior and personal belief.

As we argued earlier, adequate measurement in anthropology depends on the degree to which measurement is seen to reflect that collective meaning. In large part, the demonstration that a measurement is appropriate within a specific context has depended on the rhetorical skill of the researcher. Drawing on the insights of Romney, Weller and Batchelder (1986) and Handwerker (2002), the measurement model presented here clarifies that process. Collective meaning can be evaluated using the methods of cognitive anthropology and especially the technique of cultural consensus analysis. An explicit theory—in this case, a theory of the health
effects of cultural consonance—then requires that the instantiation of that collective meaning in individual behavior be assessed. The set of procedures outlined here draws a clear line from collective meaning to individual behavior. A claim that the measures of cultural consonance presented here are measuring that which they are intended to measure is less ambiguous.

The measurement model presented here is also flexible. In the cultural domains examined, three relatively different assessments of cultural consonance have been obtained. The first, and in many respects the most straightforward, is exemplified by cultural consonance in lifestyle. The cultural model of lifestyle incorporates an evaluation of those lifestyle items that are regarded culturally as important in having a good life. It is then a simple step to assess the extent to which an individual's (reported) behavior matches that collective evaluation.

The measurement of cultural consonance in social support presents a slightly different approach. Again, individuals are reporting their behavior, but in this case it is more clearly hypothetical behavior. Then, their consonance is measured as a correlation of their individual profile with the collective profile. This in many respects is very close to a cultural competence coefficient, except that individuals are reporting their own behaviors, not their knowledge of patterned behavior. This might be thought of as almost a hybrid measure of competence and consonance.

The measurements of cultural consonance in family life and cultural cynicism diverge most from previous measures of cultural consonance, because here we are clearly evaluating the degree to which individuals in their personal beliefs about the world correspond to collective meaning. Some researchers use the terms “knowledge” and “belief” as virtually interchangeable, but for our purposes it is better to distinguish these concepts. In the scheme presented here, it is more effective to use knowledge in Searle's (1964) sense of a constitutive rule. This is a rule that defines an ‘x’ as an ‘x’, and not as a ‘y’ or a ‘z’ or a ‘q’. Therefore, to “know” what marriage is in the American kinship system is to know something to the effect that one man and one woman form a lifelong commitment sanctioned by codified laws involving
exclusive sexual access, pooling of economic resources, and socialization of common children. To “believe” something about American marriage involves more an acceptance (or rejection) of that definition or parts of it, in whatever senses “acceptance” can be construed (Goodenough 1990). Therefore, the measurement of cultural consonance in family life and cultural cynicism assess what individuals personally believe about those domains, not what they know.

As suggested earlier, cultural domain analysis and cultural consensus analysis enable the researcher to discover and to describe with some precision the various cultural spaces that their respondents inhabit. The tools of psychometric theory then enable to researcher to evaluate how well he or she can locate individuals in those cultural spaces. The various measures of cultural consonance appear to work pretty well in this regard. All of the measures for which conventional criteria of reliability can be calculated have adequate reliability. Three approaches to the assessment of construct validity suggest that these measures of cultural consonance do indeed measure what they purport to measure.

In future work with this measurement model, it would be useful to evaluate its applicability in the evaluation of various hypotheses. In this regard, the concept of cultural consonance may be sufficiently general to be applied outside of medical anthropology, in which it was developed. It may be that the instantiation of the cultural in individual behavior and personal belief can be a useful measure for other questions (see, for example, Chick’s 1981 work on the civil-religious hierarchy in Mesoamerica). The only way to further evaluate and to extend this measurement model, however, is replication.

Endnotes
1. Unfortunately, space precludes a careful description of the community, which would help the reader to appreciate better the measurement process (note that we are not leaving traditional ethnography behind). Detailed descriptions of the community can be found in Dressler, Balieiro and Santos (1997) and Dressler, Ribeiro, Balieiro, Oths and Santos (2004).
2. We became embroiled in a long discussion about the use of written materials because of the potential low literacy levels at the lower end of the socioeconomic continuum. We finally decided that our least well-educated respondents were sufficiently literate to recognize words, at least with assistance from the interviewer. Our confidence in this procedure was bolstered by the fact that one of the research staff also taught adult literacy classes. Respondents did not have to be very literate to carry out this task, in other words.

References


Table 1: Cultural consonance in lifestyle

<table>
<thead>
<tr>
<th>Item</th>
<th>Proportion*</th>
<th>Rating of item importance in consensus model**</th>
<th>Rank of importance in consensus model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. House</td>
<td>.80</td>
<td>3.92</td>
<td>1.5</td>
</tr>
<tr>
<td>2. Stove</td>
<td>1.00</td>
<td>3.92</td>
<td>1.5</td>
</tr>
<tr>
<td>3. Personal study</td>
<td>.43</td>
<td>3.86</td>
<td>3.0</td>
</tr>
<tr>
<td>4. Money for school</td>
<td>.55</td>
<td>3.84</td>
<td>4.0</td>
</tr>
<tr>
<td>5. Refrigerator</td>
<td>.99</td>
<td>3.81</td>
<td>5.0</td>
</tr>
<tr>
<td>6. Time to rest</td>
<td>.61</td>
<td>3.79</td>
<td>6.0</td>
</tr>
<tr>
<td>7. Talk with friends</td>
<td>.79</td>
<td>3.70</td>
<td>7.0</td>
</tr>
<tr>
<td>8. Telephone</td>
<td>.88</td>
<td>3.69</td>
<td>8.0</td>
</tr>
<tr>
<td>9. Time to read</td>
<td>.65</td>
<td>3.62</td>
<td>9.0</td>
</tr>
<tr>
<td>10. Play sports</td>
<td>.37</td>
<td>3.61</td>
<td>10.0</td>
</tr>
<tr>
<td>11. Sofa</td>
<td>.90</td>
<td>3.44</td>
<td>11.5</td>
</tr>
<tr>
<td>12. Dining table</td>
<td>.96</td>
<td>3.44</td>
<td>11.5</td>
</tr>
<tr>
<td>13. Go to church</td>
<td>.48</td>
<td>3.36</td>
<td>13.0</td>
</tr>
<tr>
<td>14. Money for extras</td>
<td>.53</td>
<td>3.32</td>
<td>14.0</td>
</tr>
<tr>
<td>15. Car</td>
<td>.70</td>
<td>3.16</td>
<td>15.0</td>
</tr>
<tr>
<td>16. Television</td>
<td>.96</td>
<td>2.98</td>
<td>16.0</td>
</tr>
<tr>
<td>17. Computer</td>
<td>.42</td>
<td>2.98</td>
<td>17.0</td>
</tr>
<tr>
<td>18. Washing machine</td>
<td>.67</td>
<td>2.90</td>
<td>18.0</td>
</tr>
<tr>
<td>19. Web access</td>
<td>.40</td>
<td>2.75</td>
<td>19.0</td>
</tr>
</tbody>
</table>

*For items 1,2,4,5,8,11,12,14,15,16,17, 18 and 19 this refers to the % possessing the item. For items 3,6,7,9,10, and13 this refers to the proportion reporting that they engage in these activities at least once/week.

**Based on rating of not at all important = 1 to very important = 4.
Table 2: Consensus rankings of the importance of each source of social support in relation to each problem (numbers in parentheses are the rank of the consensus ranks)

<table>
<thead>
<tr>
<th>Problem:</th>
<th>Friends</th>
<th>Family</th>
<th>Health prof.</th>
<th>Church member</th>
<th>Colleague</th>
<th>Other specialist</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unemployment</td>
<td>2.06 (1)</td>
<td>2.37 (2)</td>
<td>6.51 (7)</td>
<td>5.05 (6)</td>
<td>3.58 (3)</td>
<td>3.77 (4)</td>
<td>4.64 (5)</td>
</tr>
<tr>
<td>2. Need a ride</td>
<td>1.88 (1)</td>
<td>2.28 (2)</td>
<td>6.63 (6)</td>
<td>5.54 (6)</td>
<td>2.74 (3)</td>
<td>4.48 (4)</td>
<td>4.56 (5)</td>
</tr>
<tr>
<td>3. Problems at work</td>
<td>2.56 (1)</td>
<td>2.91 (2)</td>
<td>5.27 (5)</td>
<td>5.44 (6)</td>
<td>3.25 (4)</td>
<td>3.12 (3)</td>
<td>5.45 (7)</td>
</tr>
<tr>
<td>4. Psychological problem</td>
<td>2.93 (2)</td>
<td>2.48 (1)</td>
<td>4.57 (4)</td>
<td>5.20 (5.5)</td>
<td>5.20 (5.5)</td>
<td>3.57 (3)</td>
<td>6.31 (7)</td>
</tr>
<tr>
<td>5. Family problems</td>
<td>2.11 (1)</td>
<td>2.84 (2)</td>
<td>4.42 (5)</td>
<td>3.78 (3)</td>
<td>4.39 (4)</td>
<td>4.62 (6)</td>
<td>5.84 (7)</td>
</tr>
<tr>
<td>6. Illness</td>
<td>3.99 (4)</td>
<td>2.31 (2)</td>
<td>2.25 (1)</td>
<td>4.92 (5)</td>
<td>5.50 (6)</td>
<td>2.53 (3)</td>
<td>6.45 (7)</td>
</tr>
<tr>
<td>7. Relationship problems</td>
<td>2.07 (1)</td>
<td>2.54 (2)</td>
<td>4.44 (5)</td>
<td>4.63 (6)</td>
<td>4.37 (4)</td>
<td>3.98 (3)</td>
<td>5.97 (7)</td>
</tr>
<tr>
<td>8. Problems with children</td>
<td>3.04 (2)</td>
<td>1.69 (1)</td>
<td>3.37 (3)</td>
<td>4.46 (5)</td>
<td>5.05 (6)</td>
<td>3.81 (4)</td>
<td>6.21 (7)</td>
</tr>
<tr>
<td>9. Need money</td>
<td>2.20 (2)</td>
<td>1.49 (1)</td>
<td>6.46 (7)</td>
<td>5.39 (6)</td>
<td>3.63 (4)</td>
<td>3.59 (3)</td>
<td>5.28 (5)</td>
</tr>
</tbody>
</table>
Table 3: Scale of cultural consonance in family life

<table>
<thead>
<tr>
<th>Item:</th>
<th>Weight from consensus model&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Item mean from survey data&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Item-total correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In my family we feel close to one another.</td>
<td>4</td>
<td>2.50</td>
<td>.45</td>
</tr>
<tr>
<td>2. Sometimes I wish my family was more organized.&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
<td>2.15</td>
<td>.32</td>
</tr>
<tr>
<td>3. At times when I need it there is no one to help resolve problems.&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2</td>
<td>1.04</td>
<td>.35</td>
</tr>
<tr>
<td>4. People in my family are hard workers.</td>
<td>3</td>
<td>2.70</td>
<td>.32</td>
</tr>
<tr>
<td>5. At times we avoid one another.&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4</td>
<td>0.86</td>
<td>.69</td>
</tr>
<tr>
<td>6. At times in my family I wish we felt more love for one another.&lt;sup&gt;c&lt;/sup&gt;</td>
<td>5</td>
<td>1.62</td>
<td>.49</td>
</tr>
<tr>
<td>7. We are as well adjusted as a family could be.</td>
<td>3</td>
<td>2.05</td>
<td>.66</td>
</tr>
<tr>
<td>8. When I do something I don’t think about my family.&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1</td>
<td>0.76</td>
<td>.22</td>
</tr>
<tr>
<td>9. I think my family criticizes too much.&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1</td>
<td>1.08</td>
<td>.54</td>
</tr>
<tr>
<td>10. My family firmly confronts problems.</td>
<td>2</td>
<td>2.26</td>
<td>.46</td>
</tr>
<tr>
<td>11. Normally mine is a happy family.</td>
<td>3</td>
<td>2.31</td>
<td>.61</td>
</tr>
<tr>
<td>12. We understand each other completely.</td>
<td>4</td>
<td>2.17</td>
<td>.71</td>
</tr>
<tr>
<td>13. We help each other with problems.</td>
<td>2</td>
<td>2.33</td>
<td>.61</td>
</tr>
<tr>
<td>14. We don’t have time to listen to each other.&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4</td>
<td>1.05</td>
<td>.46</td>
</tr>
<tr>
<td>15. At times we don’t have sufficient respect.&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1</td>
<td>0.82</td>
<td>.66</td>
</tr>
<tr>
<td>16. I can talk about important things in my family.</td>
<td>4</td>
<td>2.32</td>
<td>.62</td>
</tr>
<tr>
<td>17. We feel love for one another.</td>
<td>5</td>
<td>2.38</td>
<td>.67</td>
</tr>
<tr>
<td>18. At times I wish my family didn’t fight so much.&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1</td>
<td>1.45</td>
<td>.41</td>
</tr>
</tbody>
</table>

<sup>a</sup>In the consensus model, items were ranked 1-13, but the consensus ranks could be reduced to 5.

<sup>b</sup>In the survey, respondents responded from disagree totally (=0) to agree totally (=3).

<sup>c</sup>Indicates items that were reversed in direction prior to scoring.
<table>
<thead>
<tr>
<th>Item:</th>
<th>Rating from cultural consensus analysis&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Item mean from survey data&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Item-total correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am ashamed of the government of Brazil.</td>
<td>3.11</td>
<td>1.65</td>
<td>.41</td>
</tr>
<tr>
<td>2. It is impossible to live without the Brazilian jeitinho.</td>
<td>3.49</td>
<td>1.49</td>
<td>.33</td>
</tr>
<tr>
<td>3. In life today it is extremely difficult to receive support of others.</td>
<td>3.26</td>
<td>1.59</td>
<td>.40</td>
</tr>
<tr>
<td>4. Always when business is concerned, I try to take advantage.</td>
<td>3.08</td>
<td>1.07</td>
<td>.31</td>
</tr>
<tr>
<td>5. It seems like it is impossible for an honest person to get ahead in life.</td>
<td>2.69</td>
<td>1.39</td>
<td>.42</td>
</tr>
<tr>
<td>6. Many people are too lazy to get ahead in life.</td>
<td>1.80</td>
<td>1.64</td>
<td>.41</td>
</tr>
<tr>
<td>7. There are many poor people in Brazil because many people don’t want to work to change their lives.</td>
<td>2.97</td>
<td>1.72</td>
<td>.38</td>
</tr>
<tr>
<td>8. The best life is one in which you gain the most with the least effort.</td>
<td>2.33</td>
<td>1.23</td>
<td>.35</td>
</tr>
</tbody>
</table>

<sup>a</sup>In the consensus model, items were rated on a 4-point scale of disagree totally (=1) to agree totally (=4) that the core concept of the item was characteristic of Brazilians.

<sup>b</sup>In the survey, respondents responded from disagree totally (=0) to agree totally (=3).
Table 5: Correlations of cultural consonance variables, general cultural consonance factor, and psychological variables

<table>
<thead>
<tr>
<th>Variables:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cultural consonance in lifestyle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Cultural consonance in social support</td>
<td>.343**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cultural consonance in family life</td>
<td>.141*</td>
<td>.186*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Cultural cynicism</td>
<td>-.485**</td>
<td>-.202**</td>
<td>-.269**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. General cultural consonance factor</td>
<td>.781**</td>
<td>.617**</td>
<td>.513**</td>
<td>-.765**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Locus of control</td>
<td>.397**</td>
<td>.104</td>
<td>.244**</td>
<td>-.413**</td>
<td>.444**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Perceived stress</td>
<td>-.293**</td>
<td>.015</td>
<td>-.261**</td>
<td>.242**</td>
<td>-.255**</td>
<td>-.356**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Depressive symptoms</td>
<td>-.316**</td>
<td>-.150*</td>
<td>-.214**</td>
<td>.316**</td>
<td>-.375**</td>
<td>-.382**</td>
<td>.641**</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05  **p < .01
Fig. 1: Distribution of cultural consonance in lifestyle and cultural consonance in social support by neighborhood

Solid lines = cultural consonance in lifestyle
Dashed lines = cultural consonance in social support
Fig. 2: Distribution of cultural consonance in family life and cultural cynicism by neighborhood

Solid lines = cultural consonance in family life
Dashed lines = cultural cynicism
Cultural Consonance and Arterial Blood Pressure in Urban Brazil:

A Replication and Extension

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Acknowledgements: This research is funded by research grant BCS-0090193 from the National Science Foundation. We are grateful to the members of our research team, including Camila Dellatores Borges, Emilia Maria Paulina Campos Chayamiti, Débora De Bortoli, Mislene de Camarga Molina and Daniela Vieira Pallos. Manoel António dos Santos offered helpful advice and guidance, and without the help and support of Kathryn S. Oths, none of this would have been possible. George Davey Smith, Cyleste Collins and Kathryn S. Oths provided helpful comments on an earlier draft of this paper. The authors alone are responsible for errors.
Abstract

In previous research in Brazil, we developed and tested the hypothesis that cultural consonance is associated with health outcomes, including arterial blood pressure. Cultural consonance is the degree to which individuals are able to approximate in their own beliefs and behaviors the prototypes for belief and behavior encoded in shared cultural models. In previous research, it was found that individuals who had higher cultural consonance in the domains of lifestyle and social support had lower blood pressures. The aim of the current research was to replicate and extend these findings. First, a more extensive cultural domain analysis was carried out in order to improve the description of the cultural models of lifestyle and social support. Second, this made possible more sensitive measures of the degree to which individuals are consonant with these models in their own beliefs and behaviors. And third, data were collected in the same community that had been studied previously, in order to examine the stability of these associations. The following findings structure this paper: (a) cultural domain analysis using both structured ethnographic techniques and unstructured interviewing was consistent with the hypothesis that cultural models for these domains were widely shared within the community; (b) the associations of cultural consonance in lifestyle and cultural consonance in social support with arterial blood pressure were replicated; and, (c) the pattern of the associations differed slightly from that observed in the earlier research, but the difference is substantively meaningful. This differing pattern of associations can be explained in part on the basis of macrosocial influences in the specific neighborhoods in the community that served as sampling clusters. The results support the importance of long-term fieldwork in anthropology in testing biocultural hypotheses.

Key words: cultural consonance, blood pressure, cultural models
Since the early work of Scotch (1963) there has been an enduring interest in medical anthropology in the social and cultural dimensions of cardiovascular disease risk (Dressler 2004). The aim of this paper is to present a replication and extension of one set of findings regarding these influences on health, employing data collected in an urban area in southern Brazil. Dressler and his associates (Dressler and Santos 2000; Dressler and Bindon 2000) suggested that blood pressure differences within a community are in part a function of the degree to which individuals are able to approximate in their own behaviors those prototypical behaviors that are encoded in widely shared cultural models. This cultural dimension of individual behavior is referred to as “cultural consonance.” In previous research, higher cultural consonance in two domains, lifestyle and social support, was associated with lower arterial blood pressure. In the research reported here, these findings were examined further, employing more precise methods for the analysis of the cultural domains of lifestyle and social support, in order to improve the measurement of cultural consonance at the individual level. Also, the data were collected in the same neighborhoods in urban Brazil in which data had been collected on these topics ten years earlier. The association of cultural consonance and blood pressure was replicated. There were, however, some differences in the pattern of associations, differences that can be accounted for by changes occurring in Brazil over the past ten years. In addition to replicating previous findings, these results offer an opportunity to reflect on how anthropological explanations are embedded in the specific contexts of macro- and microsocial processes affecting individuals at the local level.

Culture and Arterial Blood Pressure

The observation that in some societies average community blood pressures are low by standards of the industrialized world, and that blood pressures in those societies tend not to increase with age, dates back to the 1920’s (Henry and Cassel 1969). The best available evidence indicates that community average blood pressures tend to increase along a continuum that can be glossed variably as “industrialization,” “modernization,” or “sociocultural complexity”
(Waldron, Nowotarski, Freimek et al. 1982). Intensive studies of diet and body composition have shown that changes in these factors can account for part of this increase, but not for all of the difference (McGarvey 1999).

Cassel, Patrick, and Jenkins (1960) offered an early hypothesis regarding the influence of social and cultural factors in this process. They focused on one specific observation: the increase in blood pressure that accompanies migration from a more traditional to a more modernized setting. They suggested that a migrant arrives in the new setting with a set of expectations and an understanding of the social world consistent with her culture of orientation, and that the confusion and frustration experienced in attempting to socially and culturally adapt to the novel setting is stressful and increases the risk of high blood pressure. In essence, the migrant is frustrated in her attempts to live in a way consistent with her beliefs and values, because those beliefs and values are not modal in this new community.

Scotch (1963) drew on this thinking in interpreting the results of his study of hypertension among the Zulu of South Africa. He examined two Zulu communities, one urban and one rural. He found that if individuals living in the urban area persisted in beliefs and behaviors that were more characteristic of the rural area, they had higher blood pressure. Similarly, if individuals living in the rural area adopted beliefs and behaviors more characteristic of the urban area, they also had higher blood pressure. Again, the key feature appeared to be the degree to which individuals diverged in their beliefs and behaviors from those considered to be modal in that community.

Henry and Cassel (1969) employed a similar line of reasoning to account for age-related increases in blood pressure in the industrialized world. Drawing on the observation of little increase in blood pressure with age in traditional societies, they suggested that in the industrialized world the pace of social change is so rapid that as individuals (or, more accurately, an age cohort) grows older, the beliefs and values in which they were socialized become progressively less relevant to the world around them. They nevertheless persist in
those beliefs and values, leading to stress and frustration as the world around them comes to make less sense.

In research on culture and blood pressure, emphasis on the stress-producing quality of culture change or migration led many researchers to draw on the growing body of theory and research, generated especially in psychology (Lazarus 1966), regarding processes of psychosocial stress. This emphasis also had the effect of reducing researchers’ reliance on vague (and increasingly discredited) terms like modernization. The aim in these studies was to use anthropological theory and ethnographic methods to identify and measure the stressors important in communities progressively drawn into the world system (either through change in local communities or migration). A variety of studies found a potent stressor to be the incongruity between lifestyle aspirations (centered on accumulating material goods and adopting related leisure time activities seen to be characteristic of Euroamerican middle classes) and the economic means to achieve those aspirations. As predicted by theories of psychosocial stress, however, the health effects of this lifestyle incongruity could be moderated by access to culturally constructed social supports (Janes 1990; Dressler 1991a; Chin-Hong and McGarvey 1996; Bindon, Knight, Dressler, and Crews 1997). The specification of statistical models and variable measurement in all of these studies depended on the sensitivity of the researchers to the particular cultural context.

In a review paper, Dressler (1995) suggested that for this research to progress, investigators needed to take the concept of culture more seriously, both theoretically and methodologically. From a theoretical perspective, he argued that the relationship between local knowledge and meaning and the selection and measurement of variables entering into models needed to be made more explicit. From a methodological perspective, he suggested that there were innovative methods that could be used to study that local knowledge and meaning, which in turn would help biocultural anthropologists to better specify their models of individual psychophysiological adaptation.
This perspective informed two subsequent research projects, one a continuation of work in an urban area of Brazil (Dressler and Santos 2000; 2001), and the other a continuation of work in an African American community in the Southern United States (Dressler and Bindon 2000). These studies were carried out from a much more explicit theoretical perspective, drawn from cognitive anthropology (Holland and Quinn 1987; D’Andrade 1995; Shore 1996). While agreement is far from complete, a basic working theory of culture in cognitive anthropology can be delineated. In this working theory, culture cannot be regarded as an integrated whole, but is rather made up of a set of “cultural models” that apply to various cultural domains (e.g., a cultural model of the family, a cultural model of leisure activities, a cultural model of success in life, etc.). These models (also sometimes called “schemas”) are skeletal outlines of the elements of the domain and basic processes within the domain. These models are made up of two components: one is a function of individual biography and can be thought of as a personal model; the other is a function of what the individual learns about that domain as a member of society, and hence can be thought of as a cultural model, because it is shared with other members of society (Shore 1996: 49).

The notion of sharing or, as we will refer to it, “consensus,” is essential in this theory of culture, as has been recognized for well over a century in the social sciences (Tylor 1871; Berger and Luckman 1967). Many (although not all) cultural models define things in the world in an essentially arbitrary way. What gives these arbitrary definitions causal force is that people agree that this is, indeed, the way things are (D’Andrade 1984). It is this consensus that also gives culture its aggregate properties.

Consensus is not a dichotomy. People will agree on the nature of cultural things to a degree, leaving room for some models to be highly contested, while others are accepted with little dispute. Romney, Weller and Batchelder (1986) introduced the cultural consensus model, which accomplishes the essential task of quantifying consensus. Working from the pattern of agreement among key informants, the cultural consensus model determines precisely the
degree of sharing in a domain. The degree of consensus in a domain enables the analyst to infer within certain confidence limits that these informants are, or are not, operating from a shared cultural model. Additionally, the cultural consensus model can operationalize the degree to which individuals in a sample share in the overall consensus. This is the concept of “cultural competence,” which is the correlation between an individual’s understanding of the domain and the consensus understanding of the domain. Finally, the cultural consensus model enables the analyst to estimate the “culturally best” set of responses within a particular domain (“best” in the sense that these are more likely to reproduce more individuals’ responses). The responses are estimated by giving higher weight to the informants who have higher cultural competence (or, in other words, who can replicate more closely the group-level responses, Romney, et al. 1986). This estimate is not a simple average, but rather it takes into account the way in which meaning is distributed among the informants. In other words, it is a function not of what any individual knows, but rather of how that knowledge is distributed.

One criticism of a cognitive view of culture is that it tends to deal only with the way things are thought to be, and not with action. Put differently, people don’t just know or think things, people do and believe things, and assessing the degree to which individuals conform in their behaviors and their personal beliefs to cultural prototypes for those behaviors and beliefs is an important question (Crossley 2000). This may be especially important in studies of health outcomes. Therefore, we have proposed an additional theoretical construct and measure that can link the cultural to the individual. This is the concept of “cultural consonance,” defined as the degree to which an individual approximates in his or her own behavior or belief the collective representation of behavior in a particular domain encoded in a cultural model (see Sapir 1949 for an early discussion of a related theoretical construct).

The association of cultural consonance and arterial blood pressure has been examined in two studies. In Brazil, Dressler and his colleagues (Dressler, Balieiro and Santos 1997; 1998) examined cultural consonance in two cultural domains: lifestyle and social support. They
argued that lifestyle (consisting of the accumulation of material goods and the adoption of related behaviors) could be viewed as a way in which claims to social status in mass society are expressed in mundane social interaction (see Bourdieu 1984). Lifestyle is, in essence, a performative dimension of socioeconomic status. Persons who are seen to be closer in their approximation to cultural models of a successful lifestyle are accorded higher social status, which in turn is associated with more satisfying mundane social interactions. Social support, on the other hand, is an essential social resource for dealing with the inevitable crises, large and small, of everyday life. But, social support systems are not constructed solely out of voluntary relationships; rather, there are categories of persons to whom it is more (or less) appropriate to appeal for assistance in particular situations (Dressler 1994). Therefore, it is likely that cultural models of social support guide individuals’ choices in this regard, and closer approximation to these models may in turn lead to more satisfying social interactions.

In carrying out cultural consensus analysis, Dressler, et al. (1997; 1998) worked with inventories of lifestyle items, and with combinations of everyday problems and potential social supporters, that had been developed using traditional ethnographic methods. They found consensus on lifestyle items deemed indicative of being a success in life, and on the pattern of resort to types of persons in relation to specific problems. Both of these consensus models were tested in a sample of key informants (n=20) designed specifically to detect intracultural diversity (if such diversity was important). They then collected data on these same items in a survey sample (n=304) on which they also collected blood pressures and other data. They found that those individuals who more closely approximated the cultural consensus model in their own behaviors in these two domains—that is, persons who were higher in cultural consonance—also had lower blood pressures (after controlling for a variety of known and suspected correlates of blood pressure).

The model was also tested in a study in an African American community in the Southern U.S. (Dressler and Bindon 2000) using essentially the same methods outlined above. Virtually
the same results were obtained, although there was a statistical interaction effect between the
two measures of cultural consonance in the U.S. study, while these were simple main effects in
the Brazil study.

A theory of cultural consonance offers a useful orientation for studying the relationship
between culture and health for several reasons. First, as Dressler (1995) suggested, it takes
the concept of culture seriously in theoretical terms. The importance of cultural models in
specific cultural domains occupies a prominent place in the theory, rather than serving only as
background or context. Second, it takes advantage of recent innovations in research methods
in the study of cultural models, notably the cultural consensus model. And third, it returns to a
focus on sociocultural processes in the study of health outcomes that was curiously, if not lost,
at least de-emphasized. The original work of Cassel and his colleagues represented quite
sophisticated thinking about the link of the cultural at the aggregate, to the cultural at the
individual, to the biological. But Cassel and his colleagues were stuck with conventional
epidemiologic methods in investigating these associations, and hence could locate culture in
their models only inferentially, and those inferences were quite large. It is no wonder that, in his
later writings, Cassel (1976) de-emphasized sociocultural processes himself in favor of a closer
adherence to a psychosocial model of stress processes. In many respects, the concept of
cultural consonance is precisely what Cassel was driving at.

There is, however, more work to be done on this theory, which is precisely why the
research reported here was undertaken. First and foremost, the findings from prior research
must be replicated to determine if these are genuine findings or are a function of sample-
specific characteristics in the original study. Second, methods for deriving the measures of
cultural consonance in lifestyle and cultural consonance in social support can be strengthened.
As noted above, the specific items for which consensus was examined were derived from
general ethnographic observations and had been used in prior research. Given that there are a
number of structured and unstructured ethnographic research techniques that can lead to a
much better description of the cultural domains under study, it seems prudent to start from the beginning in examining these cultural models. And third, a replication provides an opportunity to see how changing conditions in a community affect the associations observed in previous research. In the remainder of this paper, such a replication and extension of this research will be reported.

The Research Site

The city serving as the site of the research, Ribeirão Preto, sits in the middle of the richest agricultural region in Brazil. Much of the land surrounding the city is devoted to the cultivation of sugar cane, which in turn is refined into sugar or used in the production of alcohol fuel for automobiles. Significant amounts of land are also devoted to the cultivation of coffee and citrus. The city was founded in the late nineteenth century as a market center for the large farms (fazendas) in the region. Later, it became important as a rail center, and for light manufacturing such as the brewing of beer. The city grew dramatically in the years following the second world war as a financial service center and a regional center for health care, which accounts for its current affluence. (In the following we will refer to the first study in the community as “the 1991 study,” in which active data collection spanned 1991-1993, and the current study as “the 2001 study,” in which active data collection spanned 2001-2003.)

One of the challenges of this research was to adequately sample the full range of socioeconomic variation in the city. In the 1991 study we identified four neighborhoods to represent that range (Dressler and Santos 2000). Households were then sampled within those neighborhoods for more intensive study. The poorest neighborhood has a complicated history. In 1991, this neighborhood was a favela. Favelas are squatter settlements made up both of migrants seeking to partake of the affluence of the region, and of the socially marginal who have not been able to attain economic stability. Persons “invade” a piece of empty land and hammer together housing out of whatever materials are at hand. Favelas tend to be notorious as centers of illegal activity, especially drug trafficking. In 1993, roughly at the end of our first
study, the local municipality created what could be referred to as a public housing project, consisting of tiny, 3-room cinder block houses. Members of the *favela* were moved to this housing project. Over the intervening ten years we followed the development of this new neighborhood. While it continues to have an unsavory reputation with respect to crime, due in part to its roots in a *favela*, its composition has changed. Many of the original *favelados* had difficulty dealing with new demands of a neighborhood with legal status (e.g., paying rent, paying municipal service bills). Some returned to other *favelas*, paradoxically to be replaced by people of slightly higher means who could afford to purchase houses in the neighborhood. These persons of slightly higher means tended to be caught in a process of downward social mobility, so that a house in a rough neighborhood was all they could afford. This, along with macroeconomic changes in Brazil (to be discussed later), has meant that mean monthly family incomes have increased significantly in the neighborhood, from an of average of R$764 in 1991 (expressed in Brazilian *reais* standardized to the 2003 value of the currency) to R$939 (p<.05).

Persons from the *favela* tended to be exclusively employed as unskilled laborers and domestics, and while many in the new neighborhood continue in these kinds of jobs, variability in occupational status has increased substantially, with some persons working as skilled laborers and in lower-level white collar jobs. In the following we will refer to this as the lower class neighborhood.

The second neighborhood sampled was a *conjunto habitacional*. A *conjunto* is a different kind of public housing project. In partnership with the local city government, a builder will develop houses on a tract of land on the edge of the city; the *conjunto* studied here was begun in 1988 and consisted of several hundred 3-4 room concrete houses. The houses are then sold to buyers who qualify for low-cost loans on the basis of stable employment. Persons in the *conjunto* tend to work in semi-skilled jobs such as driving a bus or in construction or low-status service jobs. The key, however, is the stability of the employment. A *conjunto* passes from nondescript sameness to variation in housing styles very quickly, as people add rooms
(sometimes stories), garden walls, garages, and architectural details to their basic houses. As the *conjunto* evolves, more basic services are added, such as small grocery stores, drug stores, and other shops. In this way, the *conjunto* takes on the feeling of a small independent community attached to the larger city, and the *conjunto* studied here has grown substantially in this way. As a *conjunto* evolves and its character emerges, it can become attractive to persons employed in higher-status occupations (e.g., teachers). In the following we will refer to this as the working class neighborhood. In the past ten years, comparing our 1991 and 2001 samples, family monthly incomes have increased from R$1041 to R$1301 (p<.01).

The third neighborhood sampled was a traditionally lower middle class area of the city. Early in the century this was a new neighborhood created by the influx of Italian and Spanish immigrants; now it is an old neighborhood completely engulfed by the city proper. Many streets are still cobbled (rather than paved) and the houses present seamless walls to the street. There is a large praça or square with a church in the center of the neighborhood, and many shops, bars, and restaurants. In short, this neighborhood has a much more urban feel to it, although it is not in the city center proper. Houses here are larger than in a *conjunto*, and although the economic participation of residents tends to be quite varied, incomes and occupational statuses were substantially higher, at least in the past. People tend to be in business, or to work as lower level managers in factories or the public sector (we will refer to this as the middle class neighborhood). Comparing the 1991 and 2001 samples, monthly family incomes have decreased from R$1563 to R$1346 (p<.05). The basis for this decrease will be discussed below.

The fourth and last neighborhood studied was an upper middle class area (as we will henceforth refer to it) of recently constructed houses. The residents are upper level managers, prosperous businesspersons, and professionals. This happens to be an attractive neighborhood for physicians and related professionals, some of whom have studied and taken graduate and postgraduate degrees in the United States and Europe. The houses verge on
being enormous with extensive and well-tended gardens. Comparing 1991 and 2001, monthly family incomes have remained steady (R$1953 vs. R$1914, difference statistically non-significant).

So, while these neighborhoods still represent the socioeconomic continuum in Brazil (differences between the neighborhoods in 2001 in family income are highly statistically significant, p<.001), it is apparent that they have been differentially affected by macrosocial changes occurring in Brazil. Notable in this regard is that, in 1991, there was a significant difference in family income between the working class community (or conjunto) and the traditional middle-class community, and in 2001 that difference disappeared.

Methods and Results

The research proceeded in two distinct phases. The first phase consisted of cultural domain analysis, employing both structured and semi-structured ethnographic techniques. This culminated in testing for cultural consensus in the domains of lifestyle and social support, and results from that analysis were used to construct the interview schedule for an epidemiologic survey. The second phase of data collection consisted of that survey. Data collection and results of data analysis will be discussed for each phase in turn.

Cultural Domain Analysis – The cultural domain analyses followed a plan of data-elicitation and analysis techniques derived from cognitive anthropology, as outlined in Weller and Romney (1988), de Munck and Sobo (1998), and Ross (2004). Different kinds of data were elicited from successive samples of respondents, with a subsequent interview depending on the results of prior interviews. In this phase of the research greater emphasis was placed on sampling respondents who represented important dimensions of variability in Brazil than on achieving a representative sample of the population. To that end, each sample was selected to represent all levels of education (a proxy for socioeconomic status), age and sex. In what follows we will discuss the cultural domain analyses in general terms; more detail is available elsewhere (Dressler, Borges, Balieiro, and Santos n.d.).
A cultural domain is any organized conceptual sphere of discourse. The domains of lifestyle (estilo da vida) and social support (suporte social) are topics that can easily arise in spontaneous conversation in Brazil. The prominent elements of lifestyle are consumer goods (bems de consumo) and leisure activities (atividades de lazer). We therefore began our investigation of lifestyle by separating these into sub-domains. An initial sample of 43 respondents was asked to list all the material goods needed to live a good life, and then to list the leisure activities that people like to engage in. These questions resulted in eighty and sixty-six terms, respectively. After eliminating redundancy and with attention to sampling the full diversity of terms, these lists were reduced to twenty-one items each. Next, a sample of respondents (n=16) was asked to pile sort the items. In this task, the respondents simply group together items that are similar to one another, using as many groupings as they wish. These results can generate a visual display in which similarity is transformed to distance; but, what is perhaps most important is that respondents can be interviewed while doing the task to discover their criteria for allocating items to groups. For material goods, a single dimension of meaning dominated the task, which was necessity. Respondents frequently commented that some kinds of items (e.g., jewelry, a house outside of town with some land) would be nice to have, but that they are not really necessary. Rather, what are necessary are the items needed for a comfortable life, such as having a house with basic appliances and furnishings, and enough money to educate your children and for a few “extras” (e.g., to be able to go out for a pizza) on occasion. A subsequent sample (n=34) ranking the twenty-one items along a continuum of what is necessary “to have a life” confirmed this observation, and these results support our previous research (Dressler, Santos, and Balieiro 1996).

For leisure activities, in the initial pile sort respondents attended to two dimensions of the activities. One was the degree to which these activities contributed to social life (convívio social), and the other was the degree to which activities made it possible to develop oneself personally (“para adquirar cultura” or literally “in order to acquire culture”). Rankings along
these two dimensions in a later sample confirmed the importance of each, although there was some variation in the degree to which these were seen as distinct dimensions or whether social life was thought to depend on being a culturally developed person.

At this point we felt comfortable that a dimension of importance was salient for the overall domain. In the final consensus interview respondents (n=66) were asked to rate, on a 4-point scale from not at all to very, the importance of an item “to live” (a phrase that almost sounds ironic in English, but works well in Portuguese to describe those elements of a lifestyle that no one should be without to have a decent life). Also, at no point were respondents asked about their own lifestyles. They were instructed to evaluate these items in terms of what was generally thought to be important in the community.

A combined list of 33 material goods and leisure activities was rated, and there was relatively high consensus among the respondents (eigenvalue ratio = 6.59, mean cultural competence = .71 ± .12). When intracultural variation was examined in the distribution of cultural competence, significant differences were found between the education groups (p<.01), with the least well-educated respondents having the highest competence. Interestingly, the more well-educated respondents were less convinced of the importance of certain items than were the less well-educated, but the differences were insufficient to suggest that there was more than one cultural model at work. It should also be noted that when combined as a single group of items, our respondents had no trouble at all thinking of the material goods and leisure activities along a single evaluative dimension. These items did, in other words, describe a coherent domain of lifestyle.

For social support, two free lists were collected. The first was a list of problems for which people typically seek out the help of others (55 terms). The second was a list of the kinds of people (e.g., relatives, friends) to whom one might turn for help (35 terms). We reduced this to 8 problems and 7 potential supporters.
As the free lists were being collected, it was apparent that people thought in terms of social support as a hierarchy of resort within each problem type, i.e., when confronted with a specific problem, people would first ask one type of person, proceeding next to another, and so on. This appeared so uniform in the interviews that we decided no further exploration of the domain was necessary (and it was consistent with our previous results, Dressler, Balieiro, and Santos 1997). We therefore did not return to the domain of social support until the final cultural consensus analysis.

In the interview for cultural consensus analysis, each respondent was presented with seven cards on which were written the names of potential supporters. They were then presented with a problem (e.g., being in debt, a family problem) and asked to rank the order in which they thought it was typical in their community to ask different kinds of people (friends, family, colleagues, church members, counselors, other specialists in the area, others) for help. When analyzed for consensus, there was substantial agreement on these rankings (eigenvalue ratio = 6.53, mean cultural competence = .67 ± .14). In general, the hierarchy of resort for most problems was from more intimate relationships, principally family and friends, to co-workers and acquaintances, to more formal types of social support (specialists in the area, or professional counselors and physicians). The notable exception to this pattern was in the life crisis of illness, in which individuals would seek the assistance of specialists first.

The cultural domain analyses described thus far are useful for defining the elements and principal dimensions of a cultural model and, above all, for examining cultural consensus. They do, however, provide only a skeletal outline of the domain. As a check on the results, and in order to fill in the culturally prototypical processes that help to organize the domains, we conducted twenty focused group interviews, five in each neighborhood. One focus group was conducted in each neighborhood on each of the cultural domains examined in this research. Discussions were recorded and transcribed, and the transcripts were analyzed using the qualitative analysis program NUDIST. Space precludes even a cursory discussion of these
results. In general, the focus group results were consistent with the more structured cultural domain analyses in that the same elements of each domain were discussed and the principal dimensions uncovered in the cultural domain analyses also organized the discussions in the focus groups.

Survey Research – In order to measure cultural consonance at the individual level, and in order to relate those measures to arterial blood pressure, a survey was carried out in the four neighborhoods. Households were randomly selected from complete listings of occupied addresses within each neighborhood. Both heads of household (if present) and one child over the age of eighteen were invited to participate in the research. In 60% of households contacted at least one individual agreed to participate, and 71.2% of households contributed more than one respondent. The final sample size was 271 individuals. Interviewers were Brazilian post-graduate students in each area of data collection (e.g., psychology, nutrition) and were trained by the principal investigators.

Each individual in the sample was interviewed four times. The initial interview collected social, cultural, and psychological data. Then each respondent was interviewed twice using a 24-hour dietary recall interview. One of these interviews was always on a Monday, while the second was carried out indifferently at other points during the week (but not on the weekend). The final interview consisted of a clinical interview at which anthropometric measures, arterial blood pressure, and a fasting blood sample were obtained. Blood pressures were measured using a Dinamap Vital Signs Monitor Model 845XT. This is an automated digital system that reduces observer bias. Five measurements were taken and averaged.

For lifestyle, the same thirty-three items from the cultural domain analysis were included on the interview schedule. For material goods, individuals were asked if they owned the item or not. For leisure activities, individuals indicated on a 4-point scale how frequently they participated in that activity (ranging from never to more than once per week). To measure cultural consonance in lifestyle, we selected only those nineteen items that were considered to
be most important (literally, that received a consensus score of 3 or more from most respondents) in the cultural consensus analysis. Material goods were reported as dichotomies (present-absent) and we converted the frequencies of the leisure activities to dichotomies by combining “never” and “one or two times per month” to signify low participation, and “once a week” and “more than once a week” to signify high participation. We then simply counted the number of the nineteen most important items that the respondent had/did, and divided by 19, to arrive at a score that varies between 0 and 1.0. Closer to zero indicates that the respondent has/does few of the lifestyle items that are culturally regarded as important, while closer to 1.0 indicates that the respondent does/has most of the items culturally regarded as important.

For social support, precisely the same task was used in the survey as was used in the cultural consensus interview, except that individuals were asked to rank to whom they themselves would turn in response to a particular problem. Also, they were asked to rank only their first three or four options, for purely logistical reasons (the entire task proved too time consuming for the survey interview). Responses left unranked were all given a rank of 7. To calculate cultural consonance in social support, the correlation was calculated between the rankings for each individual respondent and the cultural consensus rankings. Theoretically, this measure could vary from -1.0 (which would indicate that the respondent ranked the options in precisely the opposite way as the consensus results) to a +1.0 (indicating that the respondent ranked the options in precisely the same way as the consensus results). In fact, this measure varied from -.25 to .81. (The derivation of both measures of cultural consonance is discussed more extensively in Dressler, Borges, Balieiro, and Santos n.d.).

The standard covariates employed in the analysis include: age (in years); sex (female=0 and male=1); and, the body mass index, calculated as weight in kilograms divided by the square of height in meters.

A number of alternative explanatory variables were included in the analysis. General socioeconomic status was measured by monthly household income (in Brazilian reais). A
global measure of perceived stress developed by Cohen, Karmack, and Mermelstein (1983) was included (this measure has adequate reliability in this sample, alpha = .79). The 24-hour dietary recalls were converted to nutrient intakes using DietPro 3.0 (2000), a program developed and standardized in Brazil using Brazilian food tables. The two recalls were averaged to stabilize the nutrient intake estimates. The nutrients included in this analysis were sodium and total fat, along with alcohol intake.

Results – Descriptive statistics by gender and neighborhood are shown in Table 1. To evaluate the hypotheses regarding cultural consonance, ordinary least squares multiple regression analysis was used, employing a hierarchical model. All variables except for blood pressure were standardized prior to the analysis, so that the metric regression coefficients can be read as the change in blood pressure associated with a one standard deviation change in the independent variable. First, age, sex and the body mass index were forced into the equation. Second, cultural consonance in lifestyle, cultural consonance in social support, and a term representing the interaction of the two variables were entered. This interaction term was calculated in standard fashion by multiplying the two variables together (a cross-product), and, as noted, these variables had been standardized prior to this calculation. Then, the alternate explanatory variables were allowed to enter on a step-wise basis.

These analyses are shown in Table 2. The interaction between cultural consonance in lifestyle and cultural consonance in social support is statistically significant for both systolic and diastolic blood pressure. The coefficients for the alternate explanatory variables are given in parentheses, because these are the coefficient for that particular variable if it were to enter the analysis (entry level was set at the standard default of a .05 significance level). But, after entering the standard covariates and the cultural consonance measures, none of these variables was strongly enough associated with blood pressure to enter the analysis. It is worth noting that the same results are obtained if the alternate explanatory variables are forced into
the analysis along with the standard covariates, that is, there are no significant effects among them, nor do they alter the effects of cultural consonance.

In order to display the pattern of results, cultural consonance in lifestyle and cultural consonance in social support were broken into tertiles. Fig. 1 shows systolic blood pressure in relation to these categories of cultural consonance (the results are not shown for diastolic blood pressure because there is no difference in the pattern). In general, blood pressure declines with higher cultural consonance, although there is an increase in blood pressure among persons who have both the highest level of cultural consonance in lifestyle and cultural consonance in social support.

**Additional analyses** – Because these results are a replication of those obtained ten years earlier in the same neighborhoods, it is instructive to contrast the two sets of data and to carry out some additional analyses that will help in interpretation. Fig. 2 shows the results from the 1991 study using generally the same categories of cultural consonance as shown in Fig. 1 (the categories are not precisely the same because the measures differ somewhat, but they are nevertheless close enough to make this comparison useful, at least visually). What is immediately apparent is that mean blood pressures among the persons with the lowest cultural consonance on both measures are not as high in the 2001 study as they were in the 1991 study. Next, the 1991 study displays clearly the two main effects of the cultural consonance variables, while in 2001 the interactive effects are apparent. These interactive effects result primarily from no difference between the low and moderate cultural consonance in lifestyle categories among person with low cultural consonance in social support; from no difference between the moderate and high categories of cultural consonance in social support overall; and, the slight increase in blood pressure among persons with high cultural consonance overall.

Another interesting comparison involves the proportion of variance accounted for in systolic blood pressure by the cultural consonance variables. Proportion of variance accounted for is a useful indicator of the importance of variables, although it must be interpreted cautiously,
given that it can be influenced by a wide range of factors, including the reliabilities of the variables and the overall range of variability in the data (O'Grady 1982). Therefore, it should not be regarded as some kind of absolute measure of the importance of variables, but rather as a part of the overall interpretation of the patterns described in a set of data using multiple regression analysis. In 1991, after controlling for age, sex and the body mass index, the main effects of the cultural consonance variables accounted for 9.5% of the variance in systolic blood pressure; the interactive effects of cultural consonance in lifestyle with skin color (see Dressler, Balieiro and Santos 1999) added an additional 3% variance. In 2001, the main and interactive effects of the cultural consonance variables account for 4.5% of the variance in systolic blood pressure. Restricting the analysis only to those respondents considered to be “white” Brazilians (n=236) increases the variance explained to 5.8%, and further limiting the analysis to persons aged 40 or over (n=114) increases the variance explained to 10.1% (these results will be discussed further below). This pattern of results for this subsample is shown in Fig. 3.

Discussion

The aim of this research was to replicate findings from a previous study in which the concept of cultural consonance was developed. As before, we found cultural consonance in lifestyle and cultural consonance in social support to be potent correlates of blood pressure. Overall, those persons with higher cultural consonance in both of these domains have lower blood pressure, controlling for known concomitants of blood pressure (including age, sex, and the body mass index), as well as for competing explanatory variables (including psychological stress and diet).

A replication of those findings was important for several reasons. First, the findings from the prior study could have been a function of the unique characteristics of the 1991 sample. Second, there was much room for improvement in the measurement of cultural consonance, especially in terms of describing the cultural models that provide the foundation for the measurement. Third, a study ten years after the first provided an opportunity to examine how
intervening changes in Brazilian society might affect the results. The replication of the results reduces the likelihood that the findings from the earlier study were a function of unique characteristics of that sample.

The measurement of cultural consonance in these two cultural domains in the current study contributes to confidence in the meaning of the results. That is, more explicitly than in previous studies, the measures of cultural consonance used here were developed precisely in the terms and dimensions of meaning that Brazilians use to talk about these cultural domains. Prior studies had worked with existing scales that had been developed out of the amalgam of observation and interviewing characteristic of traditional ethnographic fieldwork. The link between these kinds of observations and the resulting measurement tool can be uncertain. In the case of the derivation of measures of cultural consonance used here, there is an unbroken empirical chain that leads from the discourse of the members of the community to the quantification of individual behaviors. This derivation of the measures ensures, probably more effectively than any other approach, that the individual behaviors measured are culturally meaningful. It also decreases the likelihood that the measured variables are really indirect measures of some other factor (e.g., cultural consonance in lifestyle is not merely a complicated proxy for socioeconomic status).

The comparison of the 1991 and the 2001 results are instructive. While the association of cultural consonance in these two domains and arterial blood pressure is generally the same, there are some differences. Blood pressure is not as high in the lowest categories of cultural consonance in 2001 as it was in 1991, and, for the sample as a whole, a lower proportion of the variance is allocated to the cultural consonance variables in 2001 than in 1991. These two differences can be accounted for by changing socioeconomic circumstances in the neighborhoods in the intervening ten years. Some of these changes have already been described for the poorest neighborhood. In part, that neighborhood lost some of its poorest members who were unable to deal with life there. This opened up houses for purchase by
persons from other areas who had the resources to buy houses there (but not elsewhere). In part, however, there also has been real growth in incomes over the intervening years for poorer segments of Brazilian society. The *Plano Real*, an economic plan to stabilize the Brazilian currency and end hyperinflation, was introduced shortly after we completed data collection in 1993. By, in essence, using the U.S. dollar as the new currency’s (the *real*) standard, and by artificially maintaining a 1:1 exchange rate (which continued until the global fiscal crisis of 2000), inflation in Brazil was tamed. This meant real income growth within especially the lower-income population, not primarily as a function of rising wages, but rather because lower inflation made their incomes go farther (Averbug 2002; Rezende 1998). This in turn made more of the culturally-valued lifestyle elements available to them, as well as increased the economic resources upon which entry into systems of mutual social support can depend. In other words, becoming more culturally consonant became possible for more people.

At the same time, the success of the *Plano Real* depended on a tightening of federal spending. This meant a gradual reduction of entitlements (in employment tenure, guaranteed wage increases, and retirement benefits) that differentially affect the middle class (Luz, Mendonça, and Brandão 2002). Thus, comparing our 1991 and 2001 samples, we see increases in family incomes and cultural consonance in lifestyle across all of the neighborhoods, except in the traditionally middle class neighborhood. In addition to the decline in mean income, in that neighborhood there was a decline in the proportion of households earning a “middle class income” (as defined by 5 or more minimum salaries, the definition used by the Department of Human Rights of the State of Rio de Janeiro).

What this amounts to, in other words, is a gradual increase in economic resources for most people, but with a middle class squeeze. A result of this, in statistical terms, is a restriction in the range of variation in cultural consonance, as some people become more, and others become less, able to act on their shared cultural models (Fern and Monroe 1996: 97). Restricting the range of variation in the data in this way leads directly to a reduction in the
variance explained by the variables most affected by that range restriction (Achen 1982; O'Grady 1982). Therefore, while the associations of cultural consonance and blood pressure are highly significant in the 2001 data, and the magnitude of the blood pressure differences are quite large (on the order of 12 mm Hg of systolic blood pressure comparing the lowest and highest tertiles of cultural consonance in lifestyle and social support combined, a difference that can more than double heart disease risk), the variance accounted for is smaller as an indirect result of macrosocial processes.

The specific nature of this range restriction, involving as it does a middle class squeeze, may also help to account for another slight anomaly in the data. There is an odd increase in blood pressure among persons who are highest in cultural consonance in lifestyle and in cultural consonance in social support. The commitment to the social support system, and to the reciprocal obligations entailed in the system, is a powerful one in the middle class in Brazil. At the same time, the middle class in Brazil, like their counterparts elsewhere, is powerfully committed to its lifestyle (O'Dougherty 2002). The economic squeeze on the middle class may be making these competing motives more difficult to reconcile for some persons, leading to a particular kind of middle class stress that is evident in blood pressure.

The results of the 2001 study have been altered in a different way by changes affecting the Afro-Brazilian respondents in these neighborhoods. Brazil is a racially-stratified society, although the number of categories used and the assignment of individuals to particular racial categories is very fluid, as demonstrated in Harris's (1970) classic early work on the topic. In two previous papers, we hypothesized and confirmed that the association of darker skin color in Brazil with higher blood pressure (see James, Almeida-Filho, and Kaufman 1991) was a socioculturally-mediated, as opposed to biologically-mediated, process, in which darker-skinned persons who demonstrated greater cultural consonance in turn had blood pressures as low or lower than lighter-skinned persons (Dressler 1991; Dressler, Balieiro, and Santos 1999). These
results suggest that the association of skin color and blood pressure is an artifact of how skin color in a racially-stratified society can limit life chances.

In 1991, about 20% of the sample was Afro-Brazilian\(^2\), and all but three of these individuals lived in the *favela*. In 2001, only about 10% of the sample was Afro-Brazilian. Where did the Afro-Brazilians go? We surmise that Afro-Brazilians were overrepresented among those persons leaving the poorest neighborhood and returning to other *favelas*, due primarily to the marginal economic position of darker-skinned persons in Brazilian society, as a result of racial stratification. Afro-Brazilians would have been at greater risk with respect to attaining the measure of economic stability required to remain in the new neighborhood.

This again affects the range of variability in the data. In the 1991 data, we could estimate a component of variance associated with the interaction of cultural consonance and skin color because there was a sufficient sample of darker-skinned Brazilians for that estimate to be valid. In the 2001 data, however, due to the small number of Afro-Brazilian respondents, this component of variance cannot be estimated. Instead, the small number of darker-skinned Brazilians contribute variation in blood pressure that, in essence, cannot be accounted for in this sample. The variability associated with Afro-Brazilian ethnicity, in lieu of a specific set of variables in the regression analysis, becomes unsystematic variance in the data. For this reason, excluding Afro-Brazilians from the sample improves the fit of the statistical model (and, in fact, leads Fig. 1 to resemble Fig. 2 more closely).

Finally, the greatest amount of blood pressure variance associated with cultural consonance is found among persons over 40 years of age. The mean blood pressure differences between categories of cultural consonance are correspondingly larger (with differences nearing 20 mm Hg) in this age group. We looked at this because of Henry and Cassel's (1969) suggestion that this lack of consonance should demonstrate a larger effect over time. There are probably two aspects to the effects of cultural consonance. We argued earlier in this paper that cultural consonance in these two domains is associated with social interaction.
In essence, lifestyle represents social distinction in mundane social interactions, while social support represents affiliation, two dimensions of social interaction that are probably phylogenetically old in our species. Individuals seen by others to be more marginal on these dimensions probably enjoy less satisfying mundane social interactions, a process demonstrably associated with blood pressure responses. At the same time, individuals who are lower in cultural consonance no doubt perceive themselves to be lower in cultural consonance, a persistent feeling of being shut out in one’s own society, that is likely to be stressful. And, indeed, lower cultural consonance in lifestyle and cultural consonance in social support are associated with higher perceived stress, more depressive symptoms, and a lower sense of control in life (Dressler, Balieiro and Santos 2002). Both of these effects will be compounded over time. Arline Geronimus (1992) introduced the concept of “weathering” to describe the way in which stressful events and circumstances, persisting over time, can lead to sustained strain in psychological and physiologic systems. It is this process that is operating here. Individuals who are, in a real sense, at the fringes of the space of cultural meaning framing mundane social interactions will have that cultural marginality demonstrated to them, consciously and unconsciously, in large and small ways, over decades. It is this cultural weathering that ultimately takes its toll on health.

It is interesting, too, that this process of cultural weathering is not mediated by psychological distress (which is consistent with all of our previous findings). Neither perceived stress nor other psychological variables mediate the association of cultural consonance with blood pressure. It may be that, as far as psychophysiologic responses to cultural consonance are concerned, there is a distinct somatic mode of attention, in which the body “understands” the lack of cultural consonance in a way that the mind does not (see Csordas 1993; Oths 1999).

In concluding, these results show that the association of cultural consonance and arterial blood pressure can be replicated after a period of ten years, using more precise methods. It is worth noting once more the value of long-term fieldwork in medical anthropology, coupled with a
mixed qualitative-quantitative methodology, for testing biocultural hypotheses. Data from two points in time, coupled with a continuous presence in the field in the intervening time period, provides an opportunity both to systematically examine data with considerable precision, and to place those data in context. It is sobering to reflect on how difficult it would be to understand (as well as we do) the nature of these results were we limited to one or the other set of data. The comparison of the data across the span of ten years enables us to recognize the changes in the range of variability in the 2001 data and, more importantly, to understand the social processes that underlie that range of variability.

With this replication, we now have three examples of the combined and interactive effects of cultural consonance in lifestyle and cultural consonance in social support on arterial blood pressure (the other two examples are described by Dressler and Bindon (2000) and Dressler and Santos (2000). These studies all demonstrate the importance of cultural dimensions of everyday life for health, independent of other social, psychological and dietary factors.

Endnotes
1. The other way in which the 2001 study provided an extension as well as replication of the 1991 study is that we examined cultural consonance in other cultural domains (including family life, national characteristics, and food); however, the goal of this paper is to replicate previous findings, and the other measures of cultural consonance will be examined in other papers.
2. Space precludes an extensive discussion of race and ethnicity in Brazil. “Afro-Brazilian” is used here to describe darker-skinned Brazilians, to whom the terms moreno or pardo (both can be glossed “brown”) or preto or negro (both glossed “black”) would be applied. But, Afro-Brazilian is a term rarely encountered in everyday speech in Brazil, except among academics or the politicized. Furthermore, in some areas of Brazil, lumping morenos or pardos under the category of Afro-Brazilian would be questionable, although it makes sense in smaller Paulista cities because of the relatively smaller number of darker-skinned persons in the South of the
country. In our previous research, we used direct observer ratings by the nurse taking the blood pressures to classify persons. In each of those studies about 20% of the sample was classified as *pardo* or *preto*, a figure roughly consistent with Brazilian census data for the state of São Paulo. We used the same observer rating here, with about 10% of the sample classified as *pardo* or *preto*. But, given the ambiguity in the assignment of persons to skin color categories (Harris 1970), our immediate concern was that there was observer error. We had other research assistants re-classify respondents, and although there was substantial agreement among the ratings (Kendall's tau = .70, p < .001), this did increase the proportion of Afro-Brazilians to 14%; however, we are continuing to use the original observer ratings because using the second set made only a slight difference in the results, and because the first observer was the only one to see and rate every person in the sample. While the exact numbers may change depending on who is the observer, we believe that we have identified a basic social process influencing the results.

References


______ (1991b) Social class, skin color, and arterial blood pressure in two societies. *Ethnicity and Disease* 1: 60-77.
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Dressler, William W., Camila D. Borges, Mauro C. Balieiro, and José Ernesto Dos Santos. (n.d.) Measuring cultural consonance: An example with special reference to measurement theory in anthropology. Submitted to *Field Methods*.


Table 1: Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>Lower class neighborhood (n=66)</th>
<th>Working class neighborhood (n=65)</th>
<th>Middle class neighborhood (n=71)</th>
<th>Upper middle class neighborhood (n=69)</th>
<th>Total (n=271)</th>
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<tr>
<td>Systolic blood pressure</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Men</td>
<td>122.9(±17.6)</td>
<td>124.2(±16.6)</td>
<td>122.9(±15.3)</td>
<td>121.6(±16.5)</td>
<td>122.9(±16.4)</td>
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<td>Women</td>
<td>124.3(±9.9)</td>
<td>132.2(±17.3)</td>
<td>126.6(±12.9)</td>
<td>128.1(±13.3)</td>
<td>127.9(±13.7)</td>
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<td>Men</td>
<td>122.4(±20.1)</td>
<td>119.3(±14.4)</td>
<td>120.0(±16.5)</td>
<td>116.6(±17.1)</td>
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<td>Diastolic blood pressure</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>76.5(±13.2)</td>
<td>76.7(±12.1)</td>
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<td>72.9(±10.4)</td>
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<td>74.4(±11.4)</td>
<td>74.4(±12.0)</td>
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<td>42.3(±12.4)</td>
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<td>36.5(±9.9)</td>
<td>42.9(±11.4)</td>
<td>43.2(±11.4)</td>
<td>41.0(±11.8)</td>
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<td>Sex (% men)</td>
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<td>43.7</td>
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<td>39.1</td>
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<td>26.4(±5.7)</td>
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<td>24.6.5.9</td>
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<tr>
<td>Cultural consonance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In lifestyle**</td>
<td>.53(±.10)</td>
<td>.67(±.11)</td>
<td>.64 (±.15)</td>
<td>.82(±.08)</td>
<td>.67(±.15)</td>
</tr>
<tr>
<td>Women</td>
<td>.54(±.10)</td>
<td>.68(±.11)</td>
<td>.64 (±.13)</td>
<td>.81(±.08)</td>
<td>.68(±.14)</td>
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<tr>
<td>Men</td>
<td>.53(±.11)</td>
<td>.67(±.11)</td>
<td>.63 (±.16)</td>
<td>.83(±.07)</td>
<td>.66(±.15)</td>
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<td>Cultural consonance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In social support**</td>
<td>.41(±.18)</td>
<td>.43(±.20)</td>
<td>.52(±.18)</td>
<td>.57(±.15)</td>
<td>.48(±.19)</td>
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<tr>
<td>Women</td>
<td>.46(±.16)</td>
<td>.39(±.23)</td>
<td>.56 (±.14)</td>
<td>.58(±.18)</td>
<td>.51(±.19)</td>
</tr>
<tr>
<td>Men</td>
<td>.39(±.19)</td>
<td>.46(±.18)</td>
<td>.49 (±.19)</td>
<td>.56(±.13)</td>
<td>.47(±.18)</td>
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<tr>
<td>Sodium intake</td>
<td>2022(±810)</td>
<td>2117(±1020)</td>
<td>2098(±1027)</td>
<td>2023(±823)</td>
<td>2066(±924)</td>
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<tr>
<td>Women</td>
<td>2512(±891)</td>
<td>2552(±1175)</td>
<td>2527(±1281)</td>
<td>2155(±913)</td>
<td>2424(±1092)</td>
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<td>Men</td>
<td>1806(±675)</td>
<td>1838(±806)</td>
<td>1765(±609)</td>
<td>1916(±737)</td>
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<td>Fat intake*</td>
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<td>22.2(±36.2)</td>
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<tr>
<td>Men</td>
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<td>10.0(±5.8)</td>
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<tr>
<td>Family income (reais)**</td>
<td>939(±522)</td>
<td>1301(±533)</td>
<td>1346(±576)</td>
<td>1914(±237)</td>
<td>1381(±596)</td>
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<tr>
<td>Women</td>
<td>910(±562)</td>
<td>1276(±581)</td>
<td>1464(±572)</td>
<td>1970(±164)</td>
<td>1458(±612)</td>
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<tr>
<td>Men</td>
<td>952(±509)</td>
<td>1317(±507)</td>
<td>1255(±569)</td>
<td>1871(±275)</td>
<td>1331(±581)</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01 (oneway analysis of variance)
### Table 2: Regression of systolic and diastolic blood pressure on cultural consonance in lifestyle, cultural consonance in social support, and covariates (unstandardized coefficients)\(^a\)

<table>
<thead>
<tr>
<th></th>
<th>Systolic blood pressure</th>
<th>Diastolic blood pressure</th>
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</thead>
<tbody>
<tr>
<td>Age</td>
<td>4.75**</td>
<td>3.39**</td>
</tr>
<tr>
<td>Sex</td>
<td>8.69**</td>
<td>5.94**</td>
</tr>
<tr>
<td>Body mass index</td>
<td>4.19**</td>
<td>3.38**</td>
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<tr>
<td>Cultural consonance in lifestyle</td>
<td>-1.75*</td>
<td>-.06</td>
</tr>
<tr>
<td>Cultural consonance in social support</td>
<td>-1.05</td>
<td>-.86</td>
</tr>
<tr>
<td>Lifestyle X social support</td>
<td>2.51**</td>
<td>1.46*</td>
</tr>
<tr>
<td>Sodium intake</td>
<td>(1.45)</td>
<td>(-0.12)</td>
</tr>
<tr>
<td>Fat intake</td>
<td>(-0.14)</td>
<td>(-0.34)</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>(0.58)</td>
<td>(0.69)</td>
</tr>
<tr>
<td>Perceived stress</td>
<td>(0.13)</td>
<td>(0.96)</td>
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<tr>
<td>Family income</td>
<td>(-0.43)</td>
<td>(-0.30)</td>
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<tr>
<td>Constant</td>
<td>118.50</td>
<td>73.98</td>
</tr>
<tr>
<td>Multiple R</td>
<td>.572**</td>
<td>.550**</td>
</tr>
<tr>
<td>Multiple R(^2)</td>
<td>.327</td>
<td>.303</td>
</tr>
</tbody>
</table>

\(^a\)All variables except for blood pressure were standardized prior to the analysis, so that the above coefficients can be read as the change in blood pressure associated with a one standard deviation change in the independent variable. The standard covariates of age, sex, and the body mass index were forced in as a block, and then the cultural consonance variables were forced in as a block. The remaining alternative explanatory variables were allowed to enter on a stepwise basis. The coefficients in parentheses indicate that none of the variables were strongly enough associated with blood pressure to enter the analysis. The coefficients given are the coefficient for that variable if it had been forced into the analysis. The multiple R is for the covariates and the cultural consonance variables only.
Fig. 1: Cultural Consonance and Blood Pressure in Brazil – 2001 Study
Fig. 2: Cultural Consonance and Blood Pressure in Brazil - 1991 Study

- Low cultural consonance in social support
- Mod. cultural consonance in social support
- High cultural consonance in social support

SBP vs. Cultural consonance in lifestyle

- Low cultural consonance in lifestyle
- Mod. cultural consonance in lifestyle
- High cultural consonance in lifestyle
Fig. 3: Cultural Consonance and Blood Pressure in Brazil – 2001 study subsample
(European-Brazilians > 40 years old, see text)