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Review

Biocultural Linkages – Cultural Consensus, Cultural Consonance, and Human Biological Research

Jim Bindon

Department of Anthropology, The University of Alabama, Tuscaloosa, Alabama, USA

A B S T R A C T

Cultural consensus analysis tests for shared models of behavior in various cultural dimensions. Cultural consonance is used to assess the degree to which individuals behave in a way that is consistent with these cultural models. Results are presented from two studies using cultural consensus and consonance analysis (CCCA) on health risk in an African American population and on diet in a mixed sample from West Alabama. In the African American case study, cultural consonance in lifestyle and social support are demonstrated to have a significant effect on blood pressure. In the diet study, significant differences in cultural consonance on the health dimension of diet between groups espousing different dietary preferences were demonstrated in spite of all groups sharing the same model of healthy foods. These studies are used to argue that more sophisticated measures of culture in human biological research are readily available and accessible for most studies.

***Key words**: biocultural, cultural consensus, cultural consonance, KAP models*

Biocultural Anthropology

Most anthropologists point to the work on sickle cell anemia and malaria in West Africa by Livingstone[1] as one of the seminal works in biocultural research. Livingstone conceived the work as being in the mainstream of generalist anthropology common in the U.S. in the early 20th century, not as »biocultural,« a term which had not entered the anthropological literature yet. In the article there are over two dozen mentions of culture, most referring to culture history or to a specific cultural group, but there is no use of the terms biocultural or biosocial anywhere in the paper. Livingstone drew knowledge of the genetics and population genetics of sickle cell from biological anthropology, and he used ethnographic, linguistic, and archaeological data on various societies to make his points about the interaction of biology and culture. The term biosocial was used synonymously with biocultural during the 1960s and 1970s. Cohen used this term in the title of his 1968 reader, Man in Adaptation: the Biosocial Background[2]. The focus of this collection of articles was explicitly on adaptation and since the 1960s anthropologists have most frequently used the concepts of biosocial and biocultural in both biological and cultural adaptation research. Cohen included the Livingstone article in the collection, but the introduction to the volume and the organization of the readings clearly separate biological from cultural adaptation. Watts, Johnston, and Lasker published work from a 1973 conference in the edited volume Biosocial Interrelations in Population Adaptation[3]. The participating authors provided a variety of measures of the social variables that affect biological outcomes of interest to anthropologists. Some of these studies used community of residence or the school that children attended as a proxy for social measurements, some relied on social and cultural studies in the same populations, but conducted at different times on different samples, to characterize group differences; and a few studies measured social variables at the household level and looked at biological effects on the same household members. All of the social variables measured by the researchers were among the long list of socioeconomic status indicators that were already routinely measured by psychologists, sociologists, and biomedical researchers.

The term »biocultural« first appeared in an anthropological monograph by Paul Baker in 1968[4] when he pub-

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lished a summary of his long-term multidisciplinary project »Andean Biocultural Studies«. In fact, this monograph is the first use of the term biocultural noted in the English language book databases of the Online Computer Library Center[5]. This project was part of an attempt to find an example comparable to sickle cell in human adaptation research. In this volume, Baker attempts to answer several research questions including »how has the population adapted culturally and biologically to [the stress of living at high altitude]?[4]« The »sociocultural« characteristics considered in this study were education, knowledge of Spanish language, and possession of »Western« items. Since there was minimal variation in these characteristics, the population was considered to be socioculturally homogeneous. This assumption of cultural homogeneity would prove to be highly problematic in subsequent decades[6,7], but it was state-of-the-art biocultural research for its time.

The first article to appear in the anthropology journals indexed by JSTOR[8] with the term biocultural in the title is the 1975 review article by Bennett, Osborne, and Miller on biocultural ecology[9]. They defined the field of biocultural ecology as focusing on »the totality of interacting biological and cultural relationships specific to the survival of particular human ecosystems[9].« They advocated an individual approach to research, at an extreme microsocial level, which avoids larger scale cultural analysis:

> We are not, despite our rubric [biocultural ecology], dealing with traditional anthropological »whole cultures.« Thus, much earlier ethnographic work, and even more sophisticated recent work, is not cited here, although bits and pieces of data may be found in them[9(p. 175)].

They are calling for more of the same psychological, social, and epidemiological variables that earlier researchers used for biocultural analysis.

After the Andean research project, Baker's next long-term study, the Samoan Studies Project was explicitly biocultural in nature, focusing as it did on the biological effects of rapid culture change[10]. In the course of this study many social and cultural variables were measured and ethnographic work was examined for relevant bits and pieces to test associations and explanations for health-related variables. In particular, the »stress of modernization« was examined in relation to cardiovascular diseases and diabetes symptoms. The Samoans were not treated as a culturally homogeneous group, but rather as occupying different positions along a continuum of modernization or westernization. This led to a variety of attempts to operationalize modernization. Baker makes it clear that these attempts at measuring participation in modern society were merely proxy measures for the more direct (physiological) causes of biological change among Samoans[11]. In other words, measures of culture change were important, but they were not really integrated into an overall biocultural research paradigm.

Many researchers in the Samoan Studies Project thought that cultural measures could be better integrated into human biological research. As one of those participants, I worked with and learned to draw better cultural linkages from my colleague at the University of Alabama, Bill Dressler. In particular, I was interested in the issue of how culture is related to biological measurements. In the Samoan Studies Research paradigm, Baker divorced cultural from biological processes, making cultural variables remote from the biological outcomes of interest. This assumption went untested, and among others, Bindon and Dressler[12] sought to make this assumption testable. We argued for more sophisticated measurement of cultural processes in biological anthropology:

> »As physical anthropologists, we pride ourselves on the accuracy of our growth measurements, taking our cue on precision and standardization from Broca and Manouvrier. However, our measures of social status are nowhere near as carefully calibrated. Assessing lifestyle and socioeconomic status from a composite index would be analogous to trying to measure body composition with nothing but a beam balance scale[13(p. 68–69)].

The cultural measurement we were proposing was lifestyle incongruity, a measure Dressler had developed and tested in association with biological outcomes in many different cultural settings[14,15]. This measurement was operationalized from fundamental theoretical constructs of social class. At the 1990 school on Human Ecology and Anthropology: Lessons for the Twenty-First Century in Zagreb I presented the results of successfully testing lifestyle incongruity measures in American Samoa[16]. We concluded that:

> For the future, there are two areas which require a great deal of additional methodological work: specification of the critical variables of the cultural environment and characterization of the gene pool with regard to specific health problems[16].

In the mid-1990s there was still cause to continue to argue for better cultural measures. Dressler[14] and Dressler and Bindon[15] argued that biocultural researchers needed to take the concept of culture more seriously, that biocultural research needs to keep up with relevant developments in culture theory, as is done with new developments in DNA technology or hormone assays.

Based on a 1992 symposium, Goodman and Leatherman[17] advocated building a new biocultural synthesis based on the political economic theoretical focus of anthropology. Their volume focuses primarily at a macrosocial level on the unequal distribution of resources, and how the global-local interaction affects resources, which, they claim, is the key to understanding health inequities. Based on another symposium seeking a biocultural synthesis for biological anthropology held in 2003, Hruska and colleagues[18] critique the political economic approach and argue that:

> biocultural models will be incomplete unless they take into account the role of the mind in linking sociocultural context and individual biologies. In other words, a necessary step in mending the gap between

> biological and cultural theory is to understand the role of mind as a link between cultural processes and individual bodies[18(p. 8)].

Dressler[19] in his contribution to the 2003 symposium contended that the political economic models of Goodman and Leatherman stop short of assessing the shared aspect of culture that underlies the meaning of resource distribution. In other words, if people do not construe wealth differentials as being culturally meaningful, those differentials are unlikely to have biological implications beyond the obvious having enough to eat and a secure place to live.

In her 2005 Raymond Pearl lecture to the Human Biology Association, Dufour[20] still found insufficient care being given to cultural measurement in biocultural studies. She argued that measures of culturally-relevant factors need to be more carefully operationalized both in terms of biocultural theory and in terms of ethnographic realities. It appears that there is still need for additional lobbying for increased attention to culture in human biology.

So in spite of numerous calls for more cultural sophistication in biocultural research and the development of several promising avenues of research to address this lack, we are still not making satisfactory progress. Perhaps one problem is the concept of culture commonly held by biological anthropologists. It tends to consist of a »black box« approach to issues that appear to be difficult for biologists to measure[11,13,15]. There is a need to go back to the anthropological concept of culture and derive our research methods from that concept.

Operationalizing the Concept of Culture

According to my colleagues in cultural anthropology we continue to use Tylor's 1871 concept of culture. Culture, he wrote, is »that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society[21(p.1)].« From the 1960s to the 1980s, while human biologists were attempting to become more biocultural in their research strategies, cultural anthropologists in psychological and cognitive anthropology were refining and operationalizing Tylor's concept of culture. The shift in focus from culture as a material phenomenon to culture as cognitive organizations of material phenomena in the 1960s led to a methodological emphasis on the mental aspects of culture which had been stressed by Tylor[22]. Culture came to be seen as an organized system of learned and prescribed understandings that are complexly shared by a group of people[23]. Under schema theory these understandings underpinning culture were defined as coming in various forms such as models that tell us how to think about phenomena and scripts that tell us how to behave in different social situations[24]. An outgrowth of this concept of culture was the emphasis on intracultural variation based on the principle that cultural knowledge is shared unequally across individuals within groups[24].

The patterning of shared understandings became a matter for empirical investigation with the invention of cultural consensus analysis by Romney and colleagues[24]. Cultural consensus analysis is a method for assessing the degree of sharing of cultural models within a group. It also provides a rating of the degree of individual agreement with the model shared by the group, thereby demonstrating the unequal sharing of cultural knowledge. During the 1990s, Dressler and colleagues[25,26] were developing new techniques of biocultural research based on consensus analysis. They also devised a measure of the degree to which individuals behave in a way that is consistent with their shared cultural models, cultural consonance. McElroy and Townsend[27], in their medical anthropology text, review the work of Dressler and colleagues on culture change and cultural consonance. They conclude that, »combining ethnography, clinical measures, and survey techniques, this research on the long-term health impacts of adaptation to change sets a gold standard in biocultural methodology for studying stress[27(p.303)].« While there are significant conflicts about the utility of consensus analysis with cultural anthropology, especially among those who do not take a scientific approach to culture, it would seem that this set of methods and techniques offers substantial opportunity for human biologists to conduct sophisticated biocultural research.

Cultural Consensus and Consonance vs. Knowledge, Attitudes, and Practice

Most human biologists may not be aware of the developments in culture theory and method, but they are familiar with the Knowledge, Attitudes, and Practice (KAP) model from biomedical and epidemiological research. In the KAP model, standardized survey questionnaires are used to measure knowledge, attitudes, and behaviors relative to some specific health issue. For example, Gordon-Larsen[28] investigated KAP relative to adolescent obesity. She assessed knowledge using the Child Health Behavior Knowledge Scale, a standardized, pre-tested questionnaire; attitudes were measured using the standardized Children's Eating Attitudes Test and a body image questionnaire; and behavior was measured with a 24-Hour Dietary Recall and the 7-day Physical Activity Recall[28]. For each of these survey instruments, there are correct or more healthy answers defined by biomedical theory and subjects answers are evaluated relative to biomedicine. The correctness of their answers is then tested as a predictor of biological outcomes, such as obesity in the study by Gordon-Larsen.

Cultural consensus and consonance analysis (CCCA) is similar in many ways to a KAP survey, but there is a critical difference. In CCCA, the researcher is working in cultural domains that do not have pre-defined models (the questions on the standardized questionnaires) and correct answers. Both the questions and the answers have to be defined by the group being surveyed. Consensus analysis provides data that are comparable to those

garnered by the knowledge and attitudes portions of the KAP model, while consonance analysis provides answers to the practice or behavior portion of KAP.

Cultural consensus analysis tests to see if the sample shares a cultural model in the domain of interest. A particular model of factor analysis is used on a subject-by-question matrix representing answers to a series of questions on the given topic. The analysis evaluates the agreement among individuals, identifies the culturally correct answers to the questions, and estimates the level of knowledge of each respondent[24,29]. The crucial statistical test is given by the eigenvalues of the first two factors extracted by the factor analysis (E_1 and E_2). If $E_1 \div E_2 \geq 3$, i.e., if the first factor contains three or more times as much variation as the second factor, the model is considered to be shared by the sample. If $E_1 \div E_2 < 3$, i.e., the first factor contains less than three times as much variance as the second factor, it is likely that more than one model is embraced by the sample and the nature of intracultural variation in the models of interest must be explored, assuming the model items or questions constituted a single coherent domain.

If the statistical test indicates that the model is shared by the group, consensus analysis defines an »answer key« or the set of culturally appropriate responses to the questions or items in the model. The analysis also generates an individual competence score by comparing the individual's responses to the answer key. Technically, the competency score consists of the factor loadings of each individual on the first factor, giving a measure of how well the individual's understanding correlates with the group's knowledge. The competence score would be analogous to the knowledge and attitudes portions of KAP.

Cultural Consonance, the comparison of an individual's behavior relative to the culturally appropriate answer key, defines the behavior portion of the analysis. This is the component that has demonstrated significant associations with health risk in previous research[25,26,30].

An important part of CCCA is building the model that is to be tested. In order to do this, first the researcher must define the cultural domain of interest. This can be almost any aspect of culture that is hypothesized to be involved in the measured outcomes. Cultural domains that have previously been investigated by Dressler and colleagues include lifestyle, social support, health and prestige aspects of diet, and family life[25,26,30]. Generation of the model can be accomplished in a variety of different ways with standard ethnographic techniques such as using key informants, free listing, or focus groups to generate items of the model. As an example of free listing, the question »List some of the foods that are most typical of the way you eat« might be used to generate a list of foods that could be ranked on dimensions of interest such as health or prestige if these are areas of interest to the researcher. The lists generated by a small selection of individuals from the group to be studied would be examined for the frequencies of foods on the lists and the order in which the foods occurred to build a model of common dietary items. The frequency of mentions of a particular food and the position on the list of the food is formally referred to as salience[29]. An item that is mentioned more frequently and occurs higher in the lists would have greater salience than an item with fewer mentions occurring lower on the list. A decision must be made about the level of salience or the number of items (questions) that will be included in a given model. This model would then form the basis of the cultural consensus analysis.

The sample for cultural consensus analysis must be carefully chosen to represent intracultural diversity. Divisions within the group that might affect knowledge in the domain of interest might be ethnicity, age, sex, social class, or other aspects of group organization that are unique to the population being studied. Large samples and random samples are not necessary. The sample size in each cell can be as small as 4 to 10 individuals generated by snowball or opportunistic sampling to test for consensus, depending upon the degree to which the model is shared by the population[24,31].

Testing of the model could consist of having individuals rate each item on a scale that examines the dimension of interest. For example, the health dimension within the diet domain could be examined by asking subjects to rank the foods from least healthy to most healthy. Alternatively, each item could be rated on a multipoint likert type scale from least healthy to most healthy. A similar rating could be done for the prestige dimension of food. Additional dimensions of interest in regard to diet might be tradition and convenience and they could be rated in a similar fashion. The consensus analysis is then run on the matrix of ratings for the various items in the model. If the domain of interest is lifestyle, the items may consist of material style of life items and media and travel behavior[32]. The dimension of success in the lifestyle domain could then be examined by asking subjects how important the item is in defining a person as a success in life. The consensus analysis calculates an answer key, giving the culturally appropriate answer (or rating) for each item in the model.

Case Studies Using Cultural Consensus and Consonance Analysis

Dressler and Bindon[25] examined the lifestyle and health of African Americans living in West Central Alabama. A two phase research design was used to examine cultural dimensions of lifestyle and their effects on blood pressure in African Americans. In the first phase, a large-scale survey of lifestyle and health was undertaken sampling 600 African American individuals, aged 25 to 65, randomly selected from the Tuscaloosa metropolitan area. In the second phase, a cultural consensus survey was undertaken examining the domains of lifestyle and social support. The sample for this phase consisted of 48 key informants. These individuals were carefully selected to represent the full range of cultural knowledge by conducting a cluster analysis of socioeconomic and behavioral variables from the first 400 individuals in phase one. The four cluster solution best represented the data

structure, so we solicited 12 individuals (across all age/sex groups) from each of the 4 socioeconomic and behavior clusters.

Models of lifestyle and social support for this population were formulated on the basis of previous work among African Americans in Tuscaloosa[33]. For lifestyle the consensus sample rated the items or behaviors (e.g., owning a home, having hot water, watching news on the television, etc.) on a 3 point scale: 1 for not important in defining success in life, 2 for somewhat important, and 3 for very important. Social support also used a 3 point scale: 1 for not important in case supporters (e.g., family, co-workers, priest, etc.) for the different types of problems (e.g., financial, health, family, etc.), 2 for somewhat important, and 3 for very important. The consensus analyses found substantial sharing within both the lifestyle and the social support domains for all 48 subjects in phase 2 (Lifestyle consensus analysis: $E_1 \div E_2 = 5.9$, Social Support consensus analysis: $E_1 \div E_2 = 9.2$).

Average importance rankings for each item in the lifestyle index were calculated by weighting the ranking by the competence of the individual. That is, persons whose ratings agreed more with the culturally appropriate answers had their scores count more than individuals who deviated more from the consensus. This technique allows those who have the most cultural knowledge in this domain to affect the rankings of the items/behaviors more than others with less knowledge. For measuring cultural consonance, items with a weighted average that was less than 2 (somewhat important) were dropped from the calculation. This left the 18 items shown in Table 1. Nine items with weighted ratings of less than 2 were omitted from the analysis. Cultural consonance was then calculated on all 600 individuals in the full phase 1 sample by adding up the positive ownership or behavior responses for each item, dividing by 18 and multiplying by 100 – turning it into a type of percentage. Thus, the cultural consonance in lifestyle ranged from 0 for no items or behaviors to 100 for all items and behaviors.

Cultural consonance in social support is somewhat more complicated than the lifestyle measurement. In assessing social support we asked participants to tell us if they had a potential supporter from seven categories (close family/household members, other relative, friend or neighbor, church member, co-worker, health professional, or other) in the event that they encountered each of seven different types of problems (racism, problems at work, family problems, marital difficulties, financial trouble, health problems, and psychological problems). When we used multidimensional scaling and cluster analysis to evaluate the dimensions of social support, the supporters break into two dimensions: kin and non-kin. In order to calculate cultural consonance in social support the number of problems (0 to 7) for which an individual names kin (CCSSK) or any non-kin (CCSSN) as a potential supporter were summed, but the potential supporters were limited to those who were rated as at least somewhat important (weighted average of the consensus rating ≥ 2). This limit removed co-workers and health professionals from certain calculations for CCSSN and the »other« category was eliminated entirely from CCSSN. These procedures permitted the calculation of the two measures of cultural consonance in social support, CCSSK and CCSSN,

TABLE 1
LIFESTYLE ITEMS INCLUDED IN CULTURAL CONSONANCE ANALYSIS, WEIGHTED RATINGS BASED ON KEY INFORMANTS AND FREQUENCY OF OWNING OR REPORTING BEHAVIOR ON THE FULL SAMPLE

Lifestyle item	Weighted average of consensus rating for person to be a success in life (N = 48)	Percent owning item or reporting behavior (N = 600)
Hot water	2.98	99
Car	2.94	82
Owning a home	2.83	54
Telephone	2.81	93
Washer/dryer	2.78	84
Central air conditioning	2.75	92
Media use – television	2.72	50
Television	2.68	99
Central heat	2.65	90
Media use – newspapers	2.58	91
Media use – radio	2.49	47
Leadership position in church	2.36	36
Cable Television	2.35	85
Owning a new home	2.21	14
Microwave oven	2.19	81
Media use – magazines	2.12	57
Videocassette recorder	2.08	76
Membership in political orgs.	2.08	18

Items listed in order of consensus ratings, modified from Dressler and Bindon[25]

each with a range of 0 (no potential supporter available for any of the problems) to 7 (at least one potential supporter available for every problem).

Table 2 presents the descriptive statistics for the key variables in the analysis of the effects of cultural consonance in lifestyle and social support on blood pressure. Because of sex differences in diastolic blood pressure, age, body mass index, and cultural consonance in kin support, sex has been included as a covariate in all analyses.

Table 3 presents the results of the regression model of systolic blood pressure with all of the cultural consonance variables considered. There are significant effects of CCLS on both systolic and diastolic (non-linear effect) blood pressure, and CCSSK shows significant effects either as a main effect (diastolic) or in interaction with lifestyle (both systolic and diastolic blood pressure). Cultural consonance in non-kin social support (CCSSN) has been included in both analyses for the sake of completeness, but it is clear from these analyses that non-kin supporters are not having a significant effect on stress as indicated by blood pressure in this population.

TABLE 2
DESCRIPTIVE STATISTICS OF VARIABLES OF INTEREST FOR THE PHASE 1 SAMPLE (N=600)

Dependent variables	X±SD or percentage
Systolic Blood Pressure	134.0±16.9
Diastolic Blood Pressure*	87.5±11.9
Main covariates	
Age*	44.7±11.5
Sex (% females)	61
Body mass index*	31.4±8.0
Cultural consonance	
Lifestyle	69.3±14.6
Kin support*	3.5±1.9
Non-kin support	3.8±1.8

* Males significantly differ from females at p≤0.05, modified from Dressler and Bindon[25]

This study demonstrated the efficacy of using cultural consonance to measure culturally prescribed aspects of lifestyle and social support. The population to defined the culturally appropriate levels of these domains of life and these measures showed statistically significant associations with a biological variable, blood pressure.

As another example of how CCCA can be used in biocultural research, Szurek[34,35] investigated aspects of the diet domain in Tuscaloosa, Alabama. She sampled three groups which she termed »traditional« consisting of individuals she contacted through a local typical southeastern cafeteria, »health conscious« consisting of individuals enrolled through a local health food store, and »athletic« individuals who were recruited from a rowing team at the University of Alabama. First, she had 5 members of each of the three groups perform a free listing task to gather frequently used food items and she built a model based on these data by pulling out the 30 most salient items. Next, she had ten subjects (with no repeat from the free listing task) from each group rank the foods on dimensions of tradition, energy, and health. She also administered a 14-day food frequency recall to this sample using the same food items from the model to evaluate cultural consonance. Cultural consensus was demonstrated by high eigenvalue ratios for the first two factors for the health (ratio=13.7) and tradition (ratio=6.8) dimensions across all three groups, but not for the energy dimension (ratio=1.7). Since the greatest consensus was demonstrated for health, that dimension was explored in greater detail. Cultural consonance for the health dimension was then calculated by using a 3 point scale (0 = never, 1 = moderate frequency, 2 = high frequency, with frequency defined post hoc based on the fre-

TABLE 3
STANDARDIZED REGRESSION COEFFICIENTS OF SYSTOLIC BLOOD PRESSURE ON COVARIATES AND CULTURAL CONSONANCE VARIABLES

Variables (n=600)	Standardized Regression Coefficients (Beta)	
	Systolic BP	Diastolic BP
Age	0.323***	0.094**
Sex	–0.046	–0.148***
Body Mass Index	0.214***	0.206***
Cultural Consonance in Lifestyle (CCLS)	–0.116***	–0.006
$CCLS^2$ (Non-linear portion: square of CCLS)	0.105**	0.073*
Cultural Consonance in Kin Social Support (CCSSK)	0.072	0.106**
Cultural Consonance in Non-kin Social Support (CCSSN)	0.032	0.045
Interaction: CCLS × CCSSK	–0.124**	–0.106**
Interaction: $CCLS^2$ × CCSSK	–0.087*	–0.071
Multiple R	0.424***	0.267***
Multiple R^2	0.167***	0.071***

* p≤0.10; ** p≤0.05; *** p≤0.01, modified from Dressler and Bindon[25]

TABLE 4
AVERAGE CULTURAL CONSONANCE FOR THE HEALTH DIMENSION OF DIET

Sample	Mean Consonance for Health
Traditional group	7.7*,†
Health-conscious	9.8*
Athletic group	10.9†
Total Sample	9.5

F_{ANOVA} for sample =3.95, p=0.03; *,† mean consonance difference between pairs significant (t_{LSD}: p=0.02), a for traditional versus health-conscious and b for traditional versus athletic group, source: Szurek[36]

quency of consumption of 8 of the top 10 healthy foods resulting in a possible range from 0 to 16.

Table 4 presents the mean cultural consonance scores for healthy eating based on the healthy foods model that the three samples shared. The traditional group ate significantly fewer healthy foods than the other two groups, a not surprising finding given the traditional diet of the Southern U.S. and its obesogenic properties. The »athletic« group had been tutored in nutrition and healthy eating by their coach and so it is not surprising that they scored the highest competency and consonance on the health dimension of food. Szurek demonstrated that health ratings were extremely important in how her subjects thought about food by using a PROFIT analysis to examine a multidimensional scaling plot of unconstrained pile sorts of the food items. Health ratings accounted for a substantial amount of the way the subjects sorted the food items into groups (multiple R=0.85)[35].

This study demonstrated that CCCA can be used to investigate how cultural models affect intervening behaviors and processes, in this case diet, in studies of human variability in obesity or health or growth. It was also significant that the energy dimension did not achieve consensus as this indicates confusion and/or multiple models about the energy value of foods—a potential impediment to dieting behavior when trying to design intervention programs.

Conclusions

Cultural consonance can be an ethnographically sensitive and theoretically current way to assess the association of various domains of culture to traditional outcome measurements of human biology. Such issues as growth, health, body build and composition are all amenable to analysis of this nature. While cultural consensus and cultural consonance are not the only techniques available to reinvest biocultural research with cultural methods, these techniques have the advantage of having been validated in a number of different groups and settings in diverse cultural domains[19]. In addition to African Americans and European Americans in Alabama, cultural consonance has been used to study other ethnicities including Mexican Americans in Alabama, Brazilians in the area of Ribeirão Preto, Brazil, and multi-ethnic hotel employees in Hawaii. The domains that have been investigated include lifestyle, social support, diet, and family life among others. Neither the populations nor the cultural domains listed here are an exhaustive inventory of the possibilities for these techniques. These techniques offer one possible avenue to put the culture back in biocultural.

Of course there are limitations and criticisms of these techniques. It clearly takes more time to gain an ethnographic understanding of a population than it does to simply use previously standardized, but not necessarily culturally appropriate, survey instruments. Careful translation of standardized instruments into the local language does not guarantee cultural relevance. The model building phase of consonance analysis adds a step and more expense to a research project. In addition, there are critics of cultural consensus analysis, both among anthropologists who eschew a scientific approach to the study of culture, especially those from the post modern and critical schools of thought, and among scientific anthropologists who propose other techniques for the analysis of shared cultural models. Finally, there are also other important ways for biological anthropologists to conduct biocultural research, including the political economic approach espoused by Goodman and Leatherman[17] and the psychological and neurobiological approach fostered by the biocultural program at Emory[18,37]. The important thing for biological anthropologists at this point in the history of the discipline is to stay abreast of these developments and to move from mid-20th century techniques borrowed from psychologists and sociologists into 21st century techniques developed by anthropologists to study culture and biocultural phenomena.

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J. R. Bindon

Department of Anthropology, The University of Alabama, P.O. Box 870210, Tuscaloosa, AL 35487-0210, USA
e-mail: jbindon@tenhoor.as.ua.edu

BIOKULTURALNE POVEZNICE: KULTURALNI KONSENZUS, KULTURALNA KONSONANCA I BIOLOŠKA ISTRAŽIVANJA LJUDI

SAŽETAK

Analiza kulturalnog konsenzusa proučava zajedničke modele ponašanja u različitim kulturalnim dimenzijama. Kulturalna konsonanca se koristi za procjenu koliko je ponašanje osoba u skladu s ovim kulturalnim modelima. Prikazani su rezultati dvaju istraživanja u kojima su se koristili kulturalni konsenzus i kulturalna konsonanca za procjenu zdravstvenog rizika u afroameričkim populacijama i prehranu u mješovitom uzorku populacije iz zapadne Alabame. U populaciji Afroamerikanaca kulturalna konsonanca u životnom stilu i potpora društva pokazali su značajan učinak na krvni tlak. U istraživanju prehrane, unatoč tome što sve proučavane grupe dijele isti model zdrave hrane uočene su značajne razlike u zdravstvenoj dimenziji kulturalne konsonance među grupama različitih prehrambenih navika. Ova istraživanja se koriste da bi se pobila teorija da su sofisticiranija mjerila kulture lako dostupna i primjenjiva za većinu istraživanja.