Title: Chucaque and Social Stress among Peruvian Highlanders
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This is the author’s post-print. Please cite the final version of the article, available at http://dx.doi.org/10.1111/maq.12068.
**Chucaque and Social Stress among Peruvian Highlanders**

Highland agriculturalists complain of the cultural syndrome chucaque in the Peruvian Andes. The first aim of this research was to ethnographically document cases of a cultural syndrome utilizing theoretical elements borrowed from cognitive anthropology. Another aim was to use case-control sampling to determine if there was a relationship between higher social stress levels and the development of a cultural syndrome. The research reported here integrated qualitative and quantitative methods. The social stress gauge developed by Rubel et al. (1984) was adapted to the Andean cultural environment and utilized to assess highland social stressors. Chucaque was found to be locally defined as a specific type of head pain commonly associated with the episode of a traumatic event. Chucaque and household social stress levels were found to be significantly related, especially when the ratio of males to females, which often was imbalanced, was included in the analysis. [cultural syndrome, biocultural, Andes, social stress, Andean highland health]
Theoretical Background of Cultural Syndromes

In medical anthropology literature, the nature of illness is conceptualized from various perspectives. The literature on cultural syndromes is voluminous, and this review of the literature will necessarily be highly selective, with particular emphasis on the epidemiology and ethnography of cultural syndromes in Latin America. For my purposes here, a cultural syndrome will be defined as a complex understanding of illness that is culturally specific (O’Neill and Rubel 1980; Oths 1999).

Cultural syndromes amalgamate elements of a holistic conception of the mind–body connection with group and individual collective meaning. Cultural syndromes have been labeled in the medical anthropological literature in multiple ways, including as culture-specific illnesses (Rubel 1984) and culture-bound illness (Oths 1999). In a study of debilidad, using the term culture-bound illness, Oths (1999) suggests that in different cultures distress in the form of disease can be expressed by local patterns of perceived etiology, diagnosis, and treatment. Some researchers have suggested that a more appropriate term for these types of illness should be cultural syndrome, and they define this new term as a discrete set of clustered symptoms unique to a particular cultural group (Davis and Guarnaccia 1989). However, this definition of cultural syndromes is slightly problematic because it neglects to consider that the same cultural syndrome (albeit with symptomatic and causal variations) is sometimes found in distinct locations.

Epidemiological Approaches in Medical Anthropology

The epidemiological medical anthropological approach to illness utilizes an understanding of cross-cultural notions of health to conceptualize cultural syndromes, not as unique groupings of symptoms but as related to specific risk factors found in varying degrees in many different populations. Epidemiological medical anthropological studies of cultural syndromes focus on identifying the prevalence rate within a population. They also compare individuals with and without a given cultural syndrome who belong to the same group and have been exposed to the same risk factors, to determine what may be causing the differing levels of illness. In this type of medical anthropological approach, it is understood that it is not culture alone that causes an illness, but rather a complex interaction between multiple biological, environmental, psychological, and cultural risk factors.

A stronger epidemiological medical anthropological approach integrates the biocultural orientation in medical anthropology, which recognizes the relationship between biology and culture by understanding that to study illnesses like cultural syndromes, one must assess the human physiology as well as the cultural models used by individuals to organize and interpret their social surroundings. In “What’s Cultural about Biocultural Research?,” Dressler (2005) describes the biocultural approach to medical anthropology as a research orientation that furthers the understanding of culture and biology by incorporating a cognitive notion of culture that is embedded within current culture theory, utilizes more rigorous research methods such as cultural consensus analysis, emphasizes meaning, and links collective meaning to individual behavior. The biocultural framework is used to study cultural syndromes by allowing the researcher to show how collective and individual meaning relate to individual behavior in the context of an illness.

Other biocultural researchers, such as Guarnaccia and Rogler (1999) suggest that further research on cultural syndromes must integrate cultural and clinical knowledge. The biocultural
medical anthropological perspective shows that each cultural syndrome is not necessarily unique, but a complex notion of meaning related to the way an individual tries to enact agreed-on cultural models in his or her life, along with the physiological consequences of failure to adequately enact those models.

**Cultural Syndromes and Epidemiological Perspectives**

There are many ethnographic examples of cultural syndromes in Latin America. In a study of the cultural syndrome *manchariska* in the Peruvian Andes, Carey (1993) surveyed the entire population to determine the prevalence of manchariska (soul loss). Knowing the prevalence rate within the Andean population helped Carey understand the degree of illness burden caused by cultural syndromes (Carey 1993).

In a study of *susto*, Klein (1978) discusses how many studies of susto fail to recognize the physiological dimensions of susto. This researcher suggests a relationship between susto and an underlying physiology, because not only adults but also young children, who presumably are unaware of social stresses, suffer from susto (Klein 1978). Bolton (1981) studied risk factors of susto by collecting blood glucose measurements to determine whether individuals were hypoglycemic. Using these data, he determined that individuals with high levels of aggressiveness, a symptom of hypoglycemia, actually were hypoglycemic and, because of this risk factor, more likely to have had susto than normoglycemic individuals. Bolton’s approach (1981) reveals that using epidemiological methods to identify potential risk factors for susto can be usefully combined with biological theories of human physiology to further explain the variance observed among cultural syndrome sufferers.

In considering a cultural syndrome’s relationship to biologically influenced elements, stress and depression, Weller et al. (2008) examined susto and nervios as comorbidities due to stress. Their research demonstrates the application of a biocultural approach to research design; they used Cohen’s perceived stress scale and the Zung depression scale to assess the biology of stress and depression in relation to susto and nervios. With the same research design, they also collected data on sociocultural variables using self-reported cultural syndrome histories, determining that susto and nervios may be indicators for severe depression and stress (Weller et al. 2008).

Expanding on previous ethnographic and epidemiological work conducted in the Andes, Oths (1999) utilized epidemiological approaches and a biocultural perspective to measure the impact of social stress and other stressors on the development of the cultural syndrome (WR) of debilidad. Oths (1999) discovered, from a biological perspective, that post-reproductive women were more likely to suffer from debilidad. Oths found that the etiology of debilidad involved social stress as well as other stressors such as inadequate diet. These stressors embodied the inability of sufferers to meet their social role expectations of production and reproduction. The social stressors of having few women in the home (among whom to distribute the female household tasks), loss of economic resources, loss of social support networks, and spousal problems can impact feelings of adequacy toward the fulfillment of the social role of production. Oths’s (1999) debilidad study demonstrates the importance of utilizing a perspective that simultaneously considers biological and cultural variables when studying cultural syndromes.

In the literature on cultural syndromes, numerous syndromes have been described through the combined use of biocultural and epidemiological approaches. This research presents an intriguing set of findings and suggests opportunities for further investigation, especially with
respect to refining our understanding of social stress processes and increasing the range of cultural syndromes examined. The issue of social stress and cultural syndromes represents an area of research that needs further exploration, and the Peruvian cultural syndrome of chucaque provides an opportunity for this research.

Setting, Sample, and Methods

I studied chucaque in the Callejón de Huaylas, which is located in the Peruvian Andes in the department of Ancash. Within the valley, the town of Huaraz and six of its surrounding hamlets were selected based on my prior knowledge of the communities in the area. Huaraz is a high mountain town located at an altitude of 10,000 feet above sea level and has a population of 100,000.

This research was conducted from May until August 2007, with a case-control research design consisting of 10 households that had an individual who had suffered from chucaque and a comparable control group of 10 households in the same locations. As the key informant, a curandero, had treated chucaque cases in the valley, he was helpful in locating chucaque cases, which were then matched to non-cases from the same community. The sample size was relatively small because the healer had not treated many cases of chucaque, suggesting that the illness was fairly uncommon in the valley. The case-control research design for the project was selected for its ability to allow a researcher to study an illness with an extremely low prevalence rate within a population. The informants who were selected to be cases were matched to chucaque cases based on gender, age, and socioeconomic status. Previous research has shown that social stressors act on individuals but are then dispersed throughout the structure of the household (Oths 1999).

Once a chucaque household in the hamlet had been identified, a control was selected from the closest nearby household, usually next door. I chose the research design of measurement at the household level because it facilitates the comparison of households instead of individuals, eliminating sampling bias and reducing the confounding of variables due to gender and age. The research design involving the case-control and household unit analysis approaches utilized both qualitative and quantitative methods of data collection.

The sample of 20 informants was composed of 14 females (70%) and 6 males (30%). The ages of participants ranged from 18 to 89, with a mean age of 43. The mean education level for the sample was 5.2 years, with a range from 0 to 11 years. The cases and controls were matched based on age, sex, and education level. The major occupations were seven (35%) market sellers and four (20%) farmers, but other informants were teachers, weavers, beekeepers, and laborers. Ninety percent of informants were from six highland hamlets surrounding Huaraz: Four were from Jahua, four from Shilla, four from Huarmarin, two from Pampamaca, two from Llupa, and two from Unchus. Two informants were from Huaraz.

Gender Roles in the Andes

The ethnographic setting surrounding Huaraz in the Callejón de Huaylas represents typical Andean highland communities that involve both men and women practicing the subsistence strategies of sustaining the household and market-oriented agriculture. Agricultural labor is a task that is performed collectively by both men and women. The Andean work ethic is legendary; both sexes perform task production with tenacity and fierceness.
Specialization among Andeans comes in two forms: agricultural tasks (separated by gender roles) and other skills. The specialization based on gender can create the potential for stress if a sex ratio imbalance exists within the household. Some males bring in additional income driving a taxi and working in construction, and many women enable their brothers, fathers, and husbands to do these extra wage-earning tasks by performing valuable domestic chores such as cooking and caring for children. Men plow the fields and load burros for crop transportation and women contribute to working in the fields by planting and processing crops after harvesting (Bourque and Warren 1981).

The hamlets surrounding Huaraz are much smaller than the city. The lower hamlets generally cultivate many different varieties of maize; the higher hamlets cultivate various tubers such as oca, papa huayro, olluco, and mashua. In addition to farming, many highlanders also travel from the various hamlets to Huaraz for daily wage labor as domestic helpers and construction workers. Hamlet life is often difficult because of the debilitating conditions of chronic poverty and the harsh physical challenges associated with living at high altitudes.

This project utilizes a combination of descriptive methods from the cultural syndrome literature to study chucaque. The following qualitative section of the interview schedule defines the syndrome and the quantifiable section operationalizes social stress.

Qualitative Interview Schedule

A qualitative interview schedule was used to study chucaque descriptively. The chucaque interview schedule was only used with the sample of 10 informants who had suffered from chucaque, and it consists of open-ended questions that elicit descriptive information about chucaque, allowing for the determination of similarities and differences between sufferers and controls. The informants who comprised the control sample were not administered the questions specific to chucaque because these questions elicited information about the feelings one has while developing the illness. These questions were derived based on the information that chucaque sufferers used to describe the embodied knowledge of the illness. An individual who had not experienced chucaque would have had difficulty in describing the specific symptoms and causes of the illness. The qualitative data have been analyzed utilizing the concept of a cultural syndrome as a cultural model (see Guarnaccia et al. 1996).

Social Stress Gauge

The social stress gauge enables an investigator to gather data on self-perceived role adequacy and translate those data into numerical scores representing social stress. Based on ethnographic data gathered during fieldwork in Oaxaca, Mexico, Rubel et al. (1984) developed the social stress gauge as a model to operationalize observed social role discrepancies called social role stress. The social stress gauge used for this research was previously published in Brooks (2007). Social stress is the consonance between local social norms and individuals’ success in adhering to those norms. The social stress gauge interview schedule for the present study is comprised of variables that have been modified to appropriately test for social stress among chucaque and control participants in the Callejón de Huaylas of Peru. For Andeans living in this region, sources of social stress are differentiated by gender due to variations in social roles. The principal sources of social stress are the discrepancies between the expected and actual social role. The social stress gauge data suggest that for women, the actual completion of social role
tasks contributes to lower social stress levels; whereas for men, the perception of fulfilling one’s role as a male functions to lower levels of social stress.

For the study, social stress scores were calculated (see Rubel et al. 1984) by grouping the variables into sets and then measuring the incongruity between perceived role requirements and perceived levels of role performance. The scores for each variable set are based on a 0 to 2 scale. The absence of a discrepancy is scored as 0. The indication of moderate discrepancy is scored as 1. The maximum discrepancy is scored as 2 (Rubel et al. 1984). The sum of scores for each of these variables may then generate a total social stress score. For both men and women, the objective in scoring interviews according to the social stress gauge is to assess the degree to which individuals fail to approximate in their own behavior either local social norms or their own individual expectations. A higher score on the social stress gauge generally indicates a greater distance between social norms/personal expectations and one’s own behaviors.

In addition to the social stress gauge, sex ratio imbalances, another potential stressor, are included in the analysis. These types of imbalances are used in another cultural syndrome study by Oths (1999), in which she identifies sex ratio imbalances in relation to the cultural syndrome known as debilidad in Peru. Oths (1999) argues that work demands on Andean households require an appropriate balance of labor input from both men and women; if this ratio is not equal, social stresses can result. For the chucaque study the household sex ratio is the proportion of men over the age of 12 compared to the number of women over the age of 12 in a household.

**Ethnographic Descriptions of Chucaque**

The cultural syndrome identified for the study is *chocake* (pronounced “cho-ká-kay”). However, this spelling is a derivation from key informants and represents a localized version of the cultural syndrome chucaque. For this article, and to place the study of chocake within an existing body of cultural syndrome literature, the localized spelling will be replaced by the more common use of chucaque.

Chucaque has never been extensively described in the literature; however, several anthropological researchers have identified it. My interest in the cultural syndrome has been stimulated by reading the descriptions provided by Oths (1991, 1996) for chucaque in the northern Andes and similar descriptions provided by Andritzky (1990) in his discussion of manual medicine and alternative treatments. In a study of manual medicine in Peru, Andritzky (1990) briefly describes chucaque as a folk syndrome found in Peru. He notes that chucaque includes the symptoms of headaches, diarrhea, and general malaise or loss of activity. He describes the treatment for it as the pulling of the hair in certain place on the head until a particular sound is heard (Andritzky 1990). Oths (1991) identifies and briefly describes the illness in a survey of Andean cultural syndromes in Chugurpampa, Peru. She observes that chucaque onset could be related to a heightened state of the body due to nervousness and high altitude fatigue. Oths (1996) notes the symptom of head pain commonly occurs in conjunction with chucaque. Oths (1991) describes chucaque as primarily a mild disorder experienced by children.

Having read about chucaque in northern Peru, I decided to concentrate my study in the Callejón de Huaylas to determine if chucaque was common in other parts of Peru and to see if it had the same symptom profile as previously documented cases of chucaque. I expected to find a similar cultural model of the syndrome in the area I chose for my fieldwork: the Callejón de Huaylas. To my surprise, locals described it differently there. The treatment procedure of pulling
the hair on the head until a particular sound is heard was the same; however, in the Callejón de Huaylas, participants in the study described chucaque in relation to a specific head pain commonly associated with the occurrence of a traumatic event, such as the loss of a spouse. Specific reasons why the cultural syndrome is described differently in the Callejón de Huaylas will be explored later. Informants and local healers described chucaque as a rare condition that is much less common when compared with other more prominent illness in the area such as susto. To maintain the focus of my project, informants were not asked about other illnesses beside chucaque during interviews.

According to descriptions given by informants in the study, chucaque is a specific type of head pain commonly associated with grief, which is catalyzed by an emotional and traumatic stressful family event, such as the death of a close family member. Based on the data collected using the descriptive conceptualization of cultural models, qualitative analysis determines the cultural model of chucaque. The cultural model is composed of symptomatic and causal dimensions. The symptomatic dimensions are head pain, emotional expression, alterations in consciousness, and bodily sensations. The causal dimensions are susto occurrences (specifically fright, not soul loss), mental anguish, and familial stresses.

I remain appropriately skeptical of my own inferences regarding the implicit categories that individuals use to organize their thinking. For purposes of analysis, I have divided the data collected from my key informants and research subjects into “my categories,” to develop holistic understandings of the cultural model of chucaque.

The symptoms of chucaque can be categorized by emotional expressions categories, bodily sensations, and alterations in consciousness. In contrast to the symptoms of chucaque, the various causes can be grouped as the categories of familial stresses, mental, and susto occurrences. These symptom groups and causal categories compose a cultural model of chucaque based on the main dimensions that Andeans use when describing the symptoms and causes of chucaque.

The most frequent physiological symptom reported by all individuals with chucaque is head pain. Fifty-five percent of sufferers also experienced sadness, and 45% suffered from altered states of consciousness, dizziness, and experiencing a drunken state. Being in a dazed state, blacking out, feeling nauseated, lacking desire, feeling tired, and lacking concentration were experienced by 18% of individuals. The most common types of altered states of consciousness reported were a drunken state and dizziness. Chucaque has an elaborate symptomatic profile, which may explain why most of the symptoms were described by less than half of the sample. Head pain and sadness are the only symptoms that most chucaque sufferers experience in common, suggesting that these are the most culturally salient physical symptoms. Chucaque is more than just head pain or a migraine; it is a complex illness. It represents a cultural model of symptoms that require a cultural specific type of treatment.

**Symptoms of Chucaque**

**Emotional Expressions**

The core symptoms of the emotional experiences of chucaque are sadness and desperation. These two symptoms are sometimes experienced together in a single emotional event marked by fits of crying and trembling (see Table 1). The effects of having chucaque seem to be an overburdening of the body. People who are experiencing chucaque are not just slightly sad or feeling somewhat
depressed about their lives, but instead seem to be drawing on a collective cultural model as they experience deeply emotional and traumatic events.

Table 1: Chucaque Informant Symptoms Quotations

<table>
<thead>
<tr>
<th>Emotional Expressions</th>
<th>Emotional Expressions—Temblando. [Trembling.] Como desesperado, triste vuelve. [Like desperate, it becomes sad.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bodily Sensations</td>
<td>Cuando me agarró chucaque, es que sentí como una desesperación que movió mi cabeza. Sí, y un poco de nauseas me dio. Pero de eso ha calmado cuando me aplastaban. [When I got chucaque, I felt a desperation that moved my head. Yes, and it gave me a bit of nausea. But that was calmed when they pressed on my head.]</td>
</tr>
<tr>
<td>Alterations in Consciousness</td>
<td>Cuando duele, sientes que está moviendo, así zeros, o te duele así justamente. Todo. Ya sientes como borracho. Cuando me duele la cabeza no me doy cuenta ya lo que hago, lo que pongo mis cosa también. Me olvida. [When it hurts, you feel like everything is moving in circles, it hurts so intensely. Everything. You feel like you are drunk. When my head hurts I do not realize what I am doing or where I put my things. I forget.]</td>
</tr>
</tbody>
</table>

Bodily Sensations

Several informants describe having experienced nausea while having the head pains of chucaque. Another informant also states that when she got chucaque, her head started to move indicating dizziness and nausea (see Table 1). The cultural model of chucaque suggests that certain physiological imbalances are experienced within the body when one begins to feel the effects of the head pains.

Alterations in Consciousness

Within the cultural model of chucaque, a symptomatic dimension of particular interest is the prevalence of altered states of consciousness among chucaque sufferers. These altered states of consciousness can include the sensations of being dazed, in a drunken state, blacking out, and dizziness (see Table 1). The experience of chucaque can cause an individual to feel inebriated and incredibly dizzy. For women in the Andes, the chucaque-altered state of consciousness of feeling drunk can be extremely devastating. In the Andes, it is socially acceptable for men to be drunk in public; however, for women, the appearance of public intoxication, except on fiesta days, is strictly forbidden (Bourque and Warren 1981). When a woman suffering from chucaque experiences the feelings of intoxication, her condition is exacerbated because her level of social stress increases as she begins to worry about what people may think of her appearance.

In addition to the symptoms of chucaque, there are specific causes for the occurrence of chucaque (see Table 2).

Causes of Chucaque

There are specific causes for the occurrence of chucaque (see Table 3). These causes can be categorized into familial stresses such as death of a family member, family conflict, or spouse conflict/separation. Receiving bad news, worry, and nervousness are different types of mental
anguish that can contribute to chucaque. Experiencing a susto-frightening event also contributes to chucaque.

Table 2: Chucaque Informant Causal Quotations

<table>
<thead>
<tr>
<th>Familial Stresses—Primera causa fue la muerte de mi esposo. Seguro con la llorada, pues con la preocupación. [The first cause was the death of my husband. Probably the crying, then the worry.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental Anguish—Tanto no sabemos, pero sabemos de que, por lo menos, a mí me agarró cuando murió mi esposo, de pena y de preocupación. [We do not know a lot about it, but we do know, at least, that when my husband died I got it, from grief and worry.]</td>
</tr>
<tr>
<td>Susto Occurrences—Cuando pastaba sus animales: toro, chancho, burro y carnero. Cuando se cayó su burro por las piedras. Cuando estaba comiendo en pendiente se fue. Se asustó. [When she was pasturing her animals: bull, pig, donkey and sheep. When the donkey fell because of the rocks. While it was eating on the slope, it went. She was scared.]</td>
</tr>
</tbody>
</table>

Table 3: Causes Most Frequently Reported by Informants for Chucaque

<table>
<thead>
<tr>
<th>Causes</th>
<th>Frequency (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shy</td>
<td>7(64)</td>
</tr>
<tr>
<td>Worry</td>
<td>6(55)</td>
</tr>
<tr>
<td>Shame</td>
<td>6(55)</td>
</tr>
<tr>
<td>Received a Susto</td>
<td>5(45)</td>
</tr>
</tbody>
</table>

Familial Stresses

A major dimension of importance for the cultural model of chucaque seems to be the culturally appropriate ways for dealing with the death of a family member. Death can be a traumatic event in any individual’s life, but it is especially difficult for Andeans because most members of a family are vital for providing income and labor to the household (Bourque and Warren 1981). In this study (see Table 2), informants communicated very strong emotional responses to the death of a family member; many described the death of a loved one as a major cause of chucaque. When the household decreases in size due to the loss of a family member, usually the husband, that loss of labor must be regained through the additional labor of the wife and other existing household members.

Mental Anguish

The cultural model of chucaque represents an overarching embodiment of anxieties about one’s social roles, family life, and economic sustainability, which is manifested in elevated levels of grief and worry (see Table 3). Feelings of shyness were also reported by many informants in discussions of how they developed a case of chucaque. In the literature on chucaque, this illness occurs most often among children who display feelings of shyness (Oths 1991). It is interesting to note that although shyness appears as a cause of chucaque both in the Callejón de Huaylas and
in Chugurpampa, chucaque is most common among adults, instead of children, at my research site.

**Susto Occurrences**

A major causal component of the cultural model of chucaque is the occurrence of sustos or frights (Table 3), which, in turn, cause chucaque. Susto occurrences associated with chucaque may be understood as frightening occurrences that are believed to have caused chucaque symptoms. Susto occurrences such as walking alone at night, working in the field alone, killing an animal that is not your own, parental or spousal abuse, and living alone were common causes of chucaque. Being alone is potentially dangerous and stressful for highlanders, which may explain why it associated with chucaque. An elderly mother of a chucaque sufferer from Jahua recalls the fright event (see Table 2), which caused her daughter to develop chucaque at a young age. This girl was returning from pasturing her family’s animals in the field, walking alone with her animals when she received the susto. The girl was leading the donkey along the road and the donkey slipped on the rocks and fell down the mountainside. This frightening event scared the girl and she developed chucaque.

The experience of chucaque varies between informants, but the main details organize around these symptoms and causes. The causes of the onset of susto, such as the death of a close family member or a susto occurrence, can be considered perceived stressors. However, it is important to note that the frightening events described by informants as susto occurrences are not the same as suffering from the cultural syndrome of susto. Susto the illness is different from susto as a cause of chucaque. Qualitatively, chucaque represents a cultural model of embodied suffering and a socially acceptable expression of the effects of household social stressors.

**Results**

The research project explores two main hypotheses. The first is that households reporting higher levels of social stress are more likely to have an individual who has suffered from chucaque than households in which lower levels of social stress are reported. The second is that households with an imbalanced sex ratio are more likely to have an individual who has suffered from chucaque than households reporting a balanced sex ratio. The potential effects of sex, age, and education level are assessed with no differences between cases and controls on these demographic variables.

I recognize that I chose to accept significance levels of less than 0.1; however, the high significance level was necessary considering the small sample size used for the data analysis. It is important to be cautious in significance interpretation for this small sample size, but these Mann-Whitney tests are useful in gaining insight into the possible relationships between chucaque, social stress, and household sex ratio imbalance.

**Types of Cases: Chucaque and Controls**

*Household Social Stress: All Highland Communities*

The Mann-Whitney U test has been used to determine the existence of a relationship between the independent variable of social stress score and the dependent variable of chucaque or control
status. There is a difference (see Figure 1) in the median social stress scores between chucaque cases and controls (Mann-Whitney U test \( p=0.095 \)). Chucaque cases have higher social stress scores when compared with the scores of controls.

![Figure 1: Differences between Cases and Controls on Household Social Stress (Mann-Whitney U test; Variable Medians Shown)](image)

**Sex Ratio Imbalance in All Highland Communities**

As noted above, household sex-ratio is a potential stressor, identified by Oths (1999) in relation to the cultural syndrome known as debilidad. Using the Mann-Whitney U test, the second hypothesis examines the likelihood an individual who has suffered from chucaque will live in households with an imbalanced sex ratio. There is a difference (see Figure 2) between chucaque cases and controls in the median household sex ratio (Mann-Whitney U test \( p=0.092 \)). Chucaque individuals in both rural and urban areas are more likely to live in a household in which there is an imbalance between males and females, which could contribute to social stress. Based on the ethnographic context of many of the households in the sample sex ratio, imbalances were potential risk factors for social stress since, in many cases, the chucaque households were families in which a husband or wife had died or abandoned the family.
Figure 2: Differences between Cases and Controls on Household Sex Ratio (Mann-Whitney U test; Variable Medians Shown)

Types of Cases: Chucaque and Controls in Rural Communities

Household Social Stress in Rural Highland Communities

The size of Huaraz, with its more urban environment, creates different stressors than those present in the rural environment of the other research sites, making the social stress gauge less effective in measuring social stress levels in Huaraz. For the secondary testing of the hypotheses the two Huaraz cases have been omitted from the analysis to create a new test sample of 18 cases, 9 chucaque and 9 controls. The secondary test shows a significant difference (see Figure 3) between the median social stress scores of the chucaque and the control non-Huaraz cases (Mann-Whitney U test $p=0.041$). Chucaque cases have much higher social stress scores when compared with controls.
Figures 3: Differences between Cases and Controls on Household Social Stress, in Rural Highland Communities (Mann-Whitney U test; variable medians shown)

**Types of Cases of Chucaque and Controls, in Rural Highland Communities**

**Sex Ratio Imbalance in Rural Highland Communities**

Utilizing the independent variable of household sex ratio allows for the exploration of the impact of sex ratio imbalances on the rural and urban households. The medians of the variable household sex ratio (see Figure 4) are found to not be significantly different between chucaque and control non-Huaraz cases (Mann-Whitney U test $p=0.215$). Chucaque and control households in the rural areas seem to have similar sex ratios of males to females. The secondary tests of the hypotheses, when compared with the primary hypothesis tests, suggest that although the potential resources that males may contribute to the household are important in both rural and urban environments, the tasks associated with the male social role may differ depending on the setting.
**Discussion**

The study of chucaque is embedded in a body of medical anthropological literature that focuses on the relationship between cultural syndromes and social stress viewed through the perspective of biology and culture. A cultural syndrome such as chucaque is an illness that exists within a cultural system of analysis that accounts for the amalgamation of the mind and body (Oths 1999). Chucaque should be conceptualized as a socially acceptable cultural model that allows individuals to express the effects of social stress. In “What’s Cultural about Biocultural Research?” Dressler (2005) explains how the biocultural approach to medical anthropology increases the understanding of the interaction of culture and biology by incorporating a cognitive notion of culture. The cultural syndrome of chucaque was analyzed using a biocultural approach to ethnographically document the syndrome and to examine social stress as a potential risk factor. It was found that households with higher levels of social stress were more likely to have had a member who suffered from chucaque when compared with control households. Also, chucaque households were found to be more likely to have sex ratio imbalances, which may account for the higher levels of social stress in those households.
Chucaque is a specific type of head pain commonly associated with grief, which is catalyzed by an emotional and traumatic stressful family event, such as the death of a close family member or another unexpected frightening event. The cultural model of chucaque is composed of the symptomatic dimensions of head pain, emotional expression, alterations in consciousness and bodily sensations. The causal dimensions of susto occurrences include mental anguish and familial stresses. Although the symptoms of chucaque may appear closely related to the common biomedically defined migraine, it is important to understand the complex cultural components of this illness.

In the Andean cultural context, the combination of a recognizable set of symptoms and the culturally specific treatment available must be present before participants label their experience as chucaque. The cultural context is essential to understanding chucaque, because it represents a shared cultural model used by Andeans to cope with the social stress they experience when they find themselves unable to live up to culturally agreed on social role expectations. Many Andeans experience grief and trauma associated with the death of a close family member, but not all highlanders process that trauma in the same way. Some highlanders have additional factors such as high levels of social stress that can increase their risk for developing chucaque. For some, the grief and trauma associated with the loss of a close family member act as catalysts for the physical manifestations of that loss. Although head pains commonly occur among Andeans, they are not all labeled as chucaque because the combination of trauma experienced from the loss of a family member must accompany specific physical ailments if the symptom is to be socially labeled as chucaque. The illness of chucaque seems to be a culturally acceptable way of responding to the experience of extreme grief or a dramatic and sudden frightening event, when accompanied by the debilitating stressful feeling of not being able to match highland social expectations.

Stress is associated with the development of many diseases and illnesses such as cardiovascular disease, hypertension, and other cultural syndromes (Dressler 1995). The strong relationship between social factors and stress has been well documented in medical anthropological research (Dressler and dos Santos 2000; Rubel et al. 1984). The social stress gauge effectively measures informants’ household levels of social stress, which is important because stress can negatively affect the health of the individuals living in the household. The relationship between cultural syndromes and social stress has previously been demonstrated by Rubel et al. (1984) in a study of the cultural syndrome of susto in Mexico. Rubel et al. (1984) found that individuals suffering from social stress are at greater risk for developing susto. This research on susto in Mexico demonstrates the relationship between social stress and cultural syndromes and suggests that further research should be conducted to examine the complex relationship between social stress and illness.

This chucaque study expands the literature on social stress and illness by using a modified version of the social stress gauge modeled after Rubel et al. (1984). I identified stressors in Andean social life and determined the degree to which each one contributed to the overall social stress level of the household. For Andeans in the Callejón de Huaylas, the social roles for males and females generate stress in different ways. However, regardless of gender, the primary sources of social stress are based on discrepancies between expected and actual social roles. After comparing the social stress scores of chucaque and control households, I found that chucaque households do have higher total social stress scores than control households. This supports my hypothesis that chucaque households are likely to have higher social stress scores than control households. These findings contribute to the discussion in the medical
anthropological literature that there must be some relationship between higher social stress levels and an individual’s category of risk for developing a cultural syndrome.

One limitation of the social stress gauge is that the gendered division of labor in the Andes necessitates a separate set of questions for males and females. The gendered difference in questions can make it more difficult to measure the impact of a potential stressor on a household. Therefore, the social stress gauge may be a better predictor of sources of social stress for one gender over the other.

Oths’ (1999) work reveals the importance of the measurement of discrepancies between expected and actual elements of social roles in the Andes; it seems clear that the cultural consonance of informants must be considered in any evaluation of social stress. Building on this approach, I used the social stress gauge as an instrument to measure the extent to which individuals meet shared ideas of social roles. The measurement of an individual’s behavior in relation to group consensus is a rudimentary determination of 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 (Dressler et al. 2005). The social stress gauge measures cultural consonance by assessing one’s ability to match individual behavior with the shared cultural model or the expected social role.

The Peruvian Andean Callejón de Huaylas has many potential social stressors because of its traumatic social history. The chucaque study helps refine the level of cultural knowledge regarding sources of Andean social stress in the medical anthropological literature. The highlanders living in the valley are intensive agriculturalists whose main subsistence crops are tubers. These highlanders possess knowledge of many cultural syndromes, including susto, debilidad, and chucaque. Prior to this study, the cultural syndromes of susto had already been studied in other areas of Latin America. I chose chucaque for this project because it had never been extensively studied in relation to social stress.

Females and males differ in what they regard as stressful in Andean life. For example, in interviews, some male participants suggested that not owning a team of bulls to be used for plowing was a stressor, because this meant they would have to rent the animals. Some females described their frustration at how periodic shortfalls of the harvest negatively affected the family. The modified social stress gauge provides an accurate measure of most of the elements of social stress that Andean women experience. This conclusion is supported by the range of female social stress scores from 7 to 27 out of a possible 40 stress points. The male range of social stress scores is 10 to 15 out of a possible 38 stress points.

The indication that the social stress gauge is less successful at identifying the elements of stress experienced by Andean men than for women is another limitation of this research instrument. Although the modified social stress gauge did successfully address the areas of importance for females regarding the expected social role and discrepancies in the achievement of that role, the gauge did not appropriately identify the actual areas of stress that comprise the male social role. The use of the social stress gauge to study the relationship between chucaque and social stress further expands the medical anthropological literature on the complex relationship between illness and social stress. It identifies the biocultural nature of cultural syndromes as embodied stressful experiences in the form of cultural perceptions of social expectations.

Oths (1999) has shown that Andean social roles are essentially connected to cultural syndromes. In an effort to further expand the anthropological knowledge of the relationships between social stress social and cultural syndromes, I conducted a secondary test of the
hypotheses for all non-Huaraz cases. Chuque non-Huaraz households had a significantly higher median social stress score than control non-Huaraz households. The secondary hypothesis test demonstrates that rural households are more effectively studied for chuque by the social stress gauge than urban ones. Chuque cases and control cases differ in terms of household sex ratio in that chuque households have significantly fewer men. The ethnographic context of this Andean valley suggests that many households where chuque sufferers lived had experienced the loss of a male or female contributing member due to abandonment or death. The loss of an active member of the household can create a potential source of household stress. The sex ratio imbalance findings suggest that stress is socially mediated in the form of the loss of a community member at the household level and further support the discussion of the relationship between social stress and illnesses such as cultural syndromes.

The sex ratio imbalance hypothesis test highlights a limitation of the social stress gauge: It only meaningfully operationalizes rural stressors and therefore is not an adequate measure of social stress levels of households located in urban environments. Additionally, the secondary hypothesis test using non-Huaraz cases shows a lack of significance among all non-Huaraz cases for household sex-ratio. These findings suggest that, regardless of whether it is situated in a rural or urban Andean environment, living in a household with fewer men may be stressful because of the loss of potential resources they might have contributed. It is important to understand that the demonstrated relationship between household level stresses in the loss of a contributing member and the development of cultural syndromes further suggest that in studies of illness, one must consider social stress as a risk factor.

The limitations of the research described here center on the differences in the design of this project from that of other cultural syndrome studies. In the chuque research design, children were not included in the sample. This could account for the discrepancies in my chuque study’s findings when compared to Oths’s (1991) Andean cultural syndrome research. Additionally, the data were gathered with the aid of a key informant who was a healer, meaning that all chuque cases I studied had sought treatment from a healer. I excluded chuque cases treated in the home because of the case-control sampling strategy.

When comparing this research with Oths’s previous study on Chugurpampa household illness, in which chuque is documented, the difference in sampling strategies sets it apart. For example, in the Chugurpampa households, chuque was found predominantly among Andean children. In my chuque study in the Callejón de Huaylas, children were not a part of the sample. In the chuque study in Chugurpampa, chuque was studied using repeated case illness collection from a random sample of households, whereas in the chuque study in the Callejón de Huaylas it was investigated using a case-control sampling strategy with the aid of a key informant. The differences between these studies of chuque demonstrate how earlier cultural syndrome work can provide guidance for further research on cultural syndromes.

Directions for further research on social stress and cultural syndromes should focus on evaluating what is actually meaningfully stressful for Andeans. To explore the stressful elements of the Andean cultural context, a cultural consonance model focusing on social stress, physical well-being, and susto is a good approach. As noted earlier, a cultural consonance model is one that relates individual behavior to culturally shared models for specific cultural domains. Furthermore, cultural consonance is the degree to which individuals approximate in their behaviors the shared elements of a given cultural domain (Dressler 2005). This model links culture to individual behavior by eliciting agreed-on group cultural models and individual models for a given domain. These models may then be compared to better understand their
impact on individual behaviors in society. Since cultural consonance looks at individual behaviors in relation to society, it determines whether or not an individual is living in accordance with the shared group models of the given cultural domain, regardless of whether the individual is actually suffering due to this reality.

Dressler (1993, 1999), who uses the cultural consonance model to study blood pressure in Brazil and the United States, has found that the socioeconomic realities of individual lives are not caused by a lack of cultural knowledge of the model but rather by an individual’s lack of the necessary resources to attain consonance with members of society who are able to enact the shared model. The cultural consonance model explains how political economic structural conditions can influence an individual’s behavior and physiology. The research on cultural consonance suggests that further work needs to be done on measuring cultural consonance in other domains.

The relationships between social roles and sex ratio imbalances demonstrate that comorbidity must be considered when analyzing cultural syndromes. Multiple factors can contribute to the development of cultural syndromes. Additionally, one must consider the development of cultural syndromes from childhood to adulthood as an area that needs additional exploration because children and adults can be impacted by stressors at the Andean household level. This research has found that the cultural consonance model could help address the challenges in understanding socially stressful experiences, comorbidity, and the onset of cultural syndromes. Therefore, this study contributes to the field by suggesting that biocultural medical anthropology would benefit from more research on the relationship between the cultural syndromes and cultural consonance in Andean social roles.

Conclusion

The original research on the cultural model of chucaque and social stress discussed here links several important topics in medical anthropology. It highlights the notion that the experience of individual dysfunction is culturally constructed and labeled in the form of cultural syndromes. It demonstrates how stressful events and circumstances within a society place individuals at risk for developing cultural syndromes. Additionally, this chucaque research supports the notion that individuals’ lack of consonance in attaining agreed-on social norms for specific social roles impacts individual health and wellbeing. The social stressors in the environment of the Callejón de Huaylas impact the structure of the Andean household in a variety of ways, ultimately contributing to the development of illness defined by local idioms of distress.

Note

Acknowledgments. The research reported here was sponsored by grants from The Capstone International Program and the University of Alabama Department of Anthropology. I am indebted to a great number of advisors who responded critically to earlier reports of my research including Dr. William Dressler and Dr. Kathryn Oths. I appreciate Shelly Hines-Brooks and Myra Combs for their comments on earlier drafts of this article.

1. Chucaque references do occur in the cultural syndrome literature; most notable is Oths’s (1996) discussion of the symptoms and causes associated with the cultural syndrome. Other chucaque studies include Oths (1991) and Andritzky (1991). These studies use the more common
spelling of chucaque and do not describe other spellings of the cultural syndrome such as chocake in the Callejón de Huaylas of Peru.

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