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A Biocultural Perspective on Fictive Kinship in the Andes: Social Support and Women's Immune Function in El Alto, Bolivia

This article examines the influence of emotional and instrumental support on women's immune function, a biomarker of stress, in the city of El Alto, Bolivia. It tests the prediction that instrumental support is protective of immune function for women living in this marginal environment. Qualitative and quantitative ethnographic methods were employed to assess perceived emotional and instrumental support and common sources of support; multiple linear regression analysis was used to model the relationship between social support and antibodies to the Epstein-Barr virus. These analyses provided no evidence that instrumental social support is related to women's health, but there is some evidence that emotional support from compadres helps protect immune function. [social support, immune function, Bolivia, biocultural]

Early investigations of the relationship between aspects of social relationships and health revealed that social isolation is a powerful predictor of mortality (House et al. 1988). The concept of social support emerged from efforts to clarify the characteristics of social interaction responsible for this pattern, particularly the positive, functional aspects of social ties (Uchino et al. 1996). Cobb (1976:300) defines social support as the perception that one “is cared for and loved, esteemed, and a member of a network of mutual obligations.” Social support is often classified based on the type of aid it confers: Franks and colleagues (2004) describe emotional social support as a relationship that reinforces feelings that one is valued and instrumental social support as aid in labor or money. A number of scholars have suggested that the most powerful influence on physiology—including endocrine, cardiovascular (e.g., Eisenberger et al. 2007), and immune function (e.g., Cohen et al. 1997)—comes from the perception that support is available, rather than its actual mobilization (House et al. 1988). Scholars further distinguish between the direct and buffering effects, where support is seen to alter an individual's appraisal of, or lessen their physiological reaction to, a stressful circumstance (Cohen and Wills 1985).

There are a number of validated instruments for assessing social support that measure both perceived general support and levels of satisfaction with this support, for example (Doeglas et al. 1996) and access to support with regard to specific problems (Winemiller et al. 1993). These are important tools for the purposes of generalizability but they often make assumptions about social relationships (e.g., that all sources are equal and that all support is positive) (Berkman et al. 2000). Relatively few studies have explored the importance of how cultural context influences norms of social support or have examined these relationships in non-Western settings (Berkman et al. 2000; Dressler and Bindon 1997, 2000; Jacobson 1987).

Anthropologists have argued that culture specifies the norms associated with various classes of social ties and under what general circumstances these relationships can be appropriately drawn upon, which can influence the costs and benefits of doing so (Dressler and Bindon 2000; Dressler et al. 1986; Dressler and Santos 2000). In particular, cultural classifications of kinship and fictive kinship serve, in part, to define expectations associated with

specific categories of relationship, including expectations of support (Jacobson 1987). These relationships are also not static; the meaning attached to these concepts is influenced by a changing political economic context (Wutich 2011). Ethnographic explorations of the context of social support are important for clarifying the dialectical relationship between changing norms and individual/household strategies and their association with specific health outcomes.

Several anthropologists have relied on ethnographic methods to explore cultural norms of social support and their relationship to health. In a qualitative study of the elderly, Jacobson (1987) reported a hierarchy of support expectations, such that individuals expect more support from their female kin, particularly daughters, but excuse those with family obligations of their own. Working in a community in central Mexico, Dressler and colleagues (1986) found that social support from fictive kinship ties, specifically ritual co-parents, was associated with lower blood pressure only for men. In addition, while older women and men benefited from friend support, this was associated with higher blood pressure for younger women. These authors explain this positive association as a result of the fact that women are expected to serve, first and foremost, as a source of support to their own family.

More recently, Dressler and colleagues (Dressler et al. 1997; Dressler and Bindon 2000) used consensus analysis to examine the cultural dimensions of social support. Working in Brazil, and among African Americans, these authors developed cultural models of social support in these communities—specifically, a culturally accepted hierarchy of resort with regard to particular problems. Cultural consonance, or the degree to which individuals maintained this hierarchy in their perceived support for various problems, was more predictive of blood pressure than overall levels of perceived support, indicating that asking the right person for help is as important as having someone to ask.

A number of scholars have investigated the direct effects of Instrumental support. In a prospective study among low-income Americans, Henly and colleagues (2005) found that individuals with higher levels of perceived support reported lower perceived economic hardship and that an improvement in support over time led to a reduction in the likelihood of experiencing actual material hardship such as hunger or homelessness. Hadley and colleagues (2007), working with women in rural Tanzania, found that perceived instrumental social support was related to greater food security during the lean season, controlling for household wealth, and that the relationship was stronger among wealthier households, suggesting they were able to derive greater benefits from their relationships. Social support may also be particularly important for households headed by women (Lemke et al. 2003).

Kinship in the Andes

In many parts of the Andes, inheritance is parallel; husbands inherit land from their father, and women from their mothers, with both partners retaining control of their own resources (Collins 1986). In other areas, perhaps based on Spanish social norms, inheritance is through the father, and biased toward sons, reducing women's status and economic independence (Buechler and Buechler 1971; McEwen 1975). Further, as in other parts of Latin America, women are increasingly likely to head their own households (Staten et al. 1998). Many feminist scholars have questioned the applicability of the household or biological family as a fundamental unit of production and reproduction (Collins 1986; Nash 1993; Van Vleet 2002; Weismantel 1995). For example, among rural Aymara, women and men both retain the rights to their inheritance upon marriage and rely to a large degree on extra-household labor for agricultural production (Collins

1986; Harris 1978). Collins (1986) argues that an increasing emphasis on the nuclear family is evidence of a loss of social resources; whereas engagement in wage labor increases the difficulty of creating these ties (Collins 1986).

Compadrazgo (ritual co-parenthood) has long been an important means of developing extra-household ties in the Andes. This is a Spanish term for a custom from Europe, and associated with Catholicism, but it reflects practices that were common in the Andes in pre-Columbian times (Buechler and Buechler 1971). In this system, children have god-parents or *padrinos* for important events such as baptism, graduation, and marriage, and these padrinos become the co-parents, or *compadres* of the child's parents. Generally, the more equal and important of the relationships is between compadres (Buechler and Buechler 1971). *Compadrazgo* also plays a role in urban communities (e.g. in structuring obligations related to participation in neighborhood festivals) (Goldstein 2004; Lazar 2008); *evangelistas*, however, a significant and growing minority, generally eschew as pagan communal religious practices like festivals and *compadrazgo* (Canessa 2000; Van Vleet 2011). Among other things, the focus of Protestantism on individual salvation over mutual obligation is likely more consistent with participation in the market economy and household retrenchment, though it may lead to other forms of community building (Canessa 2000; Stoll 1993).

El Alto

El Alto (population \pm 800,000) overlooks the colonial city and administrative capital of La Paz, contained within a bowl-shaped valley. Early migrants to the city built houses ascending the valley walls, but starting in the 1950s, settlement began to spill out onto the *altiplano*. Declared an independent city in 1988, El Alto was fed initially by miners displaced with the closing of government-owned mines, and farmworkers freed from haciendas following agricultural reform in 1952 (McEwen 1975; McFarren 1992). It largely developed during a period of austerity and neoliberal governance starting in the 1980s (Arbona and Kohl 2004; Gill 2000). Residents have become used to the absence of the state and are largely self-reliant; for example, neighborhoods have organized to build their own water and sewer infrastructure (Laurie and Crespo 2007; Revilla 2011). *Alteños* demonstrate a high degree of civic participation, with nested organizations from neighborhoods to the Federación de Juntas Vecinales (Federation of Neighborhood Organizations), through which they engage with the state (Lazar 2008).

The city is primarily composed of first- or second-generation migrants, and many retain agricultural plots in and economic relationships with rural communities. Among the factors that make livelihoods particularly precarious within the city include an absence of formal employment opportunities, a small tax base, state neglect, and an infrastructure that has not kept pace with the rapid urban growth (Arbona and Kohl 2004; Lazar 2008).

This article is based on broader research designed to assess interactions between household composition, access to social support, and women's health in the context of changing social norms and economic hardship. It explores norms of social support, particularly the role of kinship and fictive kinship for women living in El Alto and the relationship between social support and antibodies to the Epstein-Barr virus. This analysis tests the predictions that instrumental social support is a particularly important coping mechanism for women in this marginal urban community, that the most important source of support is family and that women benefit from extra-household relationships with fictive kin.

Methods

This study involved a sequential mixed-methods approach (Driscoll et al. 2007), using analysis of qualitative data to design structured interviews. Anthropological work on social support indicates that appropriate sources and types of support are highly dependent on cultural and economic context. Anthropologists have used a mix of qualitative and structured ethnographic methods to explore norms of social support, and develop context-appropriate measures for quantitative hypothesis testing (e.g., by asking about problems for which people are likely to turn to others for help and about specific sources of support) (Dressler 1991; Dressler et al. 1997; Dressler et al. 1986; Jacobson 1987; Janes and Pawson 1986).

Sampling Procedures

Participants in this study were drawn from a women's craft cooperative in El Alto. This organization was designed to provide women with regular income-generating activities in a setting with few opportunities for formal employment. This strategy holds one aspect of socioeconomic status—employment—constant, in an environment where this is difficult to measure. Women from the cooperative complete most of their work at home but spend one afternoon of the week at the workshop to drop off completed items and pick up supplies and orders. All data collection procedures were carried out by the author in collaboration with an experienced, female local research assistant. The sample includes all members who chose to participate in the study. We completed all the interviews and biological data collection in a separate room in the workshop on women's normal workdays. The Northwestern University Institutional Review Board and an administrator at Hospital San Gabriel, La Paz, conducted reviews of the research protocol.

Data Collection

During the first phase of the study, we collected semi-structured interviews with six women. Specific goals for these interviews included gaining a qualitative understanding of how people conceptualize social support or what kind of language they use to talk about it. During the second phase, we collected longer semi-structured interviews from a group of 29 women (including the same initial six) to assess the utility of possible questions and to explore a broader range of variation in perceptions of and experience with social support. Qualitative analysis of these data (Bradley et al. 2007) was used to develop measures of social support, described in more detail below.

In the final phase, we conducted structured interviews and biological data collection among most members of the cooperative ($n=91$, about 80%). Before this final round of interviews, we spent a week demonstrating biological data collection methods and answering questions about the study. In agreement with leaders of the cooperative, we contributed food to the daily meal shared by women in the workshop and provided individual women with information on their health. This kind of reciprocity was important for building relationships in this setting.

Independent Variables

Social Relationships. We asked whether participants had compadres, padrinos, and family in El Alto or La Paz.

Instrumental Social Support. This is often assessed based on individuals' perception that they have someone to turn to in case of a financial emergency or to borrow money (Hadley et al. 2007; Henly et al. 2005). In this case, qualitative analyses of the first two rounds of interviews indicated that the two most common forms of instrumental support discussed by women, both in terms of support they had accessed in the past and support in hypothetical terms, were needing money and help with childcare. In the final round of data collection, we asked participants to list the individuals to whom they would turn if they had a financial crunch and needed money and if they needed someone to take care of their children. In each case, the answers were recorded as the number of potential sources of support for each potential problem. Finally, with regard to specific relationships, we asked women whether they thought they could ask members of their family, their padrinos, or compadres for money in case of an emergency.

Emotional Social Support. As with instrumental support, we asked participants to list people to whom they would turn when they needed emotional support or someone who cared for them and would be there to listen when they had a problem. They were also asked if they could turn to members of their family, their padrinos, or compadres for emotional support when necessary.

Control Variables

Age and Reproductive History. We asked participants to report their age in years and how many children they had borne. We also asked whether they were currently pregnant or breastfeeding.

Socioeconomic Status (SES). SES has been shown to moderate the relationship between social support and health in some cases (Fagundes et al. 2012). All the participants in this study have the same job, but they were asked whether they had additional employment, about their husband's employment, and their years of education. Goldstein (2004) reports that many Bolivians are reluctant to answer questions about their income and other aspects of SES. On the recommendation of our research assistant and leaders of the cooperative, we did not ask women to report their income or about their access to consumer goods. Instead, we asked whether they had a school, hospital, and health clinic in their neighborhood; whether they had access to water, plumbing, electricity, and a gas stove; how many rooms they had in their house; and whether they owned, rented, lived with a relative, or paid for their lodgings through *anticrítico* (a form of lease where the landlord is lent a lump sum of money over a specified time period).

Household Composition. Women may have more or less need for social support, depending on their marital status and number of dependents (Lemke et al. 2003). We collected information on the ages and occupations of all household members and about household headship, following Staten and colleagues (1998).

Anthropometrics. Weight in kg (to the nearest 100 g) and body fat (bioelectrical impedance analysis [BIA]) was measured with a Tanita BF-350 analyzer and used to calculate fat free body mass (FFM) in kilograms.

C-reactive Protein (CRP). CRP is released by the liver as part of the acute-phase response to tissue injury and can increase by a factor of 1,000 in response to a wide range of infections (Black et al. 2004; Mortensen 1994). Marked elevations are the result of acute bacterial or viral infection (Mortensen 1994). CRP concentrations are generally highly skewed and therefore cannot be used in continuous form in multivariate analysis; elevations of >5.0 mg/L have been used as indication of active infection among children and adolescents (McDade 2001, 2002). CRP concentrations in mg/L were assayed from finger-prick blood spots and applied to standardized filter paper (described in more detail below), following procedures outlined by (McDade et al. 2004).

Immune Function

Blood Spot Collection. Finger-prick blood spots were collected following McDade and colleagues (2000). One finger was cleaned with an alcohol pad, and a sterile, disposable microlancet was used to make a small puncture. Up to five drops of blood were applied to standardized filter paper commonly used for neonatal screening (#903, Schleicher and Schull, Keene, NH). The samples were covered and allowed to dry overnight, and then transported to the Instituto Boliviano de Biología de Altura to be stored at -18°C . I carried the samples to the Laboratory for Human Biology Research at Northwestern University and stored them at -30°C prior to analysis. The samples were exposed to ambient temperatures for fewer than three days, within the limits necessary to maintain sample integrity (McDade et al. 2004).

Epstein-Barr Virus Antibodies (EBV antibodies). EBV is a herpes virus that persists in a latent state throughout the lifetime of infected individuals. In developing countries, virtually 100% of individuals are infected by this virus by early childhood (McDade et al. 2000). Although most healthy individuals are able to successfully suppress viral activity after primary infection, impaired immune function due to stress allows the virus to multiply and results in increased antibody concentrations (Glaser 2005; Kiecolt-Glaser et al. 2002). A wide body of evidence supports the use of EBV antibodies as a sensitive measure of or HPA and sympathetic activation (e.g., Cacioppo et al. 2002; Glaser 2005; Kiecolt-Glaser et al. 2002; Yang et al. 2010). Anthropologists have recently used EBV antibodies to study physiological states related to status incongruity (McDade 2001; Sorensen et al. 2009), discrimination (McClure et al. 2010), and social life in a conservative, war-torn country (Panter-Brick et al. 2008). Potential confounders of EBV antibody concentrations include current infection and nutritional status (Chandra 1997; Kiecolt-Glaser and Glaser 1988). We tested percent body fat and C-reactive protein as potential confounders.

Data Analysis

Laboratory Analysis

I analyzed blood spot samples at the Laboratory for Human Biology Research at Northwestern University using enzyme-linked immunosorbent assay (ELISA) according to previously validated protocols.

Assay of EBV Antibodies

The following protocol was developed and validated by McDade and colleagues (2000) to use a commercially available assay kit (No. 7590, DiaSorin Corporation, Stillwater, MN), to measure p18-VCA IgG antibodies to EBV. One day prior to analysis, a 2.5-mm hole punch was used to remove a sample of each blood spot, and these were eluted in 250 μ L of diluent buffer, overnight at room temperature. One hundred μ L of eluate was added to each well, and the assay completed following kit instructions. The kit includes four levels of p18-VCA IgG standard, and three levels of control stabilized human sera. Four additional levels of control in whole blood were added to filter paper, dried overnight, and stored at -23°C . Standard concentrations, supplied by the manufacturer, were used to derive standard ELISA scores from absorbance values. Note: the unit of measure for this variable is ELISA units, rather than units of concentration per unit volume of blood.

Assay of CRP

This protocol was developed and validated (and is explained in detail) by McDade and colleagues (2004) as a high-sensitivity assay of CRP concentrations.

Statistical Analysis

All analyses were performed using STATA 8.0 (Stata Corporation, College Station, TX). All continuous variables were tested for normality by visual assessment of the distribution and statistical tests (skewenes and kurtosis, and Shapiro-Wilk tests for normality). Where possible, non-normally distributed variables (age, BMI) were log transformed to preserve continuous variation. CRP was dichotomized at three mg/L, with approximately 10% of the sample showing equal or higher levels of elevation. Least squares multiple linear regression analyses were used to explore the relationship between social support and EBV antibodies, controlling for appropriate confounders with a significance level set at $\alpha < 0.05$.

With regard to SES, ratios of the number of economically active individuals and rooms in the house were divided by the number of people in the household to create a ratio, and were then log transformed to normalize their distributions. Neighborhood (number of schools, health clinics, and hospitals) and household characteristics (presence of running water, plumbing, electricity, gas stove) were added and then dichotomized into two groups of higher and lower SES. Education was dichotomized using a median split, and type of housing was modeled as a dummy comparing renters and women living at home to women who own their own house.

Access to social support was modeled in two stages. First, dummy variables were created comparing women with zero, one, and two or more sources of either emotional support or instrumental support (source of money). Second, dummy variables were created comparing women with and without either instrumental or emotional support from family, compadres, and padrinos. Finally, the relationship with EBV antibodies and a number of potential confounders were tested to determine which variables to include as controls in the final models. Because of the small sample size, variables that had no significant relationship to this outcome were excluded.

Results

In the preliminary interviews, we asked the participants what kinds of problems they typically needed help to solve. The most common answers among the sample of 29 women who participated in the first two sets of interviews (some of them twice) were help with an illness, needing money, and needing advice regarding family or interpersonal conflict. We also discussed with participants the problems that caused them the most worry or preoccupation. The most common problems were needing money, providing for their children's education and future (both mentioned by almost everyone), having a stable source of employment, and family and interpersonal conflict, particularly with a spouse or mother-in-law.

Of the sample of 91 women, most had family in the area and three-quarters had compadres and/or padrinos. Table 1 displays the number and percentage of women with compadres and padrinos with perceived instrumental or emotional support from these relationships. In each case, emotional was more common than instrumental support, and support from kin more common than from fictive kin. The mean number of family members in the area was 10.1. When asked how many sources of instrumental and emotional support they could turn to (general perceived support), participants reported an average of 0.9 (SD 0.6, min 0, max 2) and 1.5 (SD 0.9, min 0, max 5) respectively. Twenty-one (23%) women reported no source of instrumental support, while only eight (9%) reported no source of emotional support.

Table 1. Number and percentage of women with compadres, padrinos, and family in La Paz–El Alto; average number of family in the area; and number and percentage of women perceiving support from these relationships.

	<i>N</i> (%)	Mean (SD)	IS* <i>N</i> (%)	ES* <i>N</i> (%)
Family	84 (92)	10.1 (9.2)	24 (26)	50 (55)
Compadres	66 (73)	-	11 (17)	14 (21)
Padrinos	68 (75)	-	8 (12)	23 (34)

*IS: instrumental support, ES: emotional support

In the initial ethnographic interviews, we asked women to discuss their compadrazgo relationships, particularly whether they perceived any benefits associated with these connections. Most of the women reported that they either did not have compadres or saw them only rarely (e.g., once a year at Christmas). Although one woman felt that this relationship was simply a formality associated with baptism, several others conveyed that they shared an affectionate and mutually supportive relationship with their compadres. Those who described a benefit other than friendship and moral support from compadrazgo ties highlighted the importance of the provision of counsel and direction to their children by their baptismal compadres.

In the larger sample, 66 of the 91 women had compadres. The probability of having compadres went up with the number of children rather than women's age (Wilcoxon rank-sum, $z=-3.6$, $p=0.000$). Women self-identified as both Catholic and Protestant participated in these relationships. Most of these ritual ties were associated with baptism, but there were others, for example, for a child's graduation. Fourteen women described their relationship with their compadres as emotionally supportive, and 23 described their padrinos as such. Eleven women reported that they received some kind of economic or instrumental support from their compadres; only eight said the same of their padrinos.

Table 2 presents perceived support, or who women would turn to if they needed immediate help regarding several problems. A fair number of women reported that they would have no one to turn to if they needed money. For most problems, participants were likely to turn to family first, followed by friends. Padrinos were a potential source of support for marital conflict, but were otherwise absent. A comparison of Tables 1 and 2 reveals that the different questions yielded slightly different results. When asked if they could ask their compadres or padrinos for instrumental or emotional support, many women said yes, but were less likely to list them as a first- or second-order source of support with regard to specific problems like needing a loan. Finally, women were less likely to turn to any of these sources with regard to illness and needing a loan and were more likely to turn to colleagues or supervisors for work-related problems than friends, family, neighbors, or fictive kin.

Table 2. Perceived support, including sources of first and second resort.

Problem	No one <i>N</i> (%)	Family <i>N</i> (%)	Friend <i>N</i> (%)	Neighbor <i>N</i> (%)	Compadres <i>N</i> (%)	Padrinos <i>N</i> (%)	Other <i>N</i> (%)
Loan 1 st	23 (25)	39 (43)	6 (7)	1 (1)	0	0	22 (24)
Loan 2 nd (<i>N</i> =11)	-	3 (27)	3 (27)	0	3 (27)	0	2 (18)
Childcare 1 st	8 (11)	43 (57)	5 (7)	4 (5)	0	0	16 (21)
Childcare 2 nd (<i>N</i> =10)	-	2 (20)	3 (30)	4 (40)	1 (10)	0	0
Conflict w Husband 1 st	11 (15)	28 (39)	11 (15)	0	0	13 (18)	10 (8)
Conflict w Husband 2 nd	-	3 (23)	1 (8)	1 (8)	0	5 (38)	3 (22)
At work 1 st	5 (6)	23 (27)	9 (11)	0	1 (1)	0	48 (53)
At work 2 nd (<i>N</i> =14)	-	1 (7)	4 (29)	0	1 (7)	0	8 (51)
Illness	0	21 (23)	2 (2)	1 (1)	1 (1)	0	66 (73)

Table 3 shows that EBV antibodies rose with age, and the association between these variables was significant. In bivariate analyses, EBV antibodies were positively associated with neighborhood SES and marginally positively related to household SES, but this second predictor dropped out of significance when modeled with age. It was not related to years of education or the ratio of household workers to total household members. Nor was it related to a summary variable based on a combination of all of these different measures. Since the goal was to control for SES, only neighborhood SES was included in the final models. Finally, EBV antibody concentration was not related to household size or composition.

Table 3. Geometric means and 95% confidence intervals for EBV (ELISA units) by age category.

Age	<i>N</i>	Mean	95% CI	
18–29	36	128.6	104.2	158.7
30–39	29	130.2	103.2	164.4
40–49	12	201.0	163.7	246.8
50–75	14	169.8	122.7	235.1
Total	91	142.4	125.8	161.3

Percent body fat was higher among older women and lower among women who rented rather than owned their homes. CRP was significantly higher only among women with higher

body fat. There was no association between EBV antibody and CRP concentrations over three mg/L. For this reason, this variable was not included in the final models. Although BMI was not a significant predictor of EBV antibody concentrations in the bivariate associations, there was a significant association when age was added to the regression model.

The first relationships tested were between overall perception of access to emotional and instrumental social support and EBV antibodies (results not shown) in two separate models. Both of these predictors were negatively related to EBV antibodies, but neither relationship was significant. qq

A second set of analyses tested perceived availability of emotional or instrumental support from kin, compadres, and padrinos. There was no association between EBV antibodies and perceiving either form of support from kin or padrinos, or instrumental support from compadres. Table 4 displays multiple linear regression models of the relationship between EBV antibodies and emotional support from compadres. Women with emotionally supportive compadres had significantly lower EBV antibody concentrations than women without compadre support. This relationship is illustrated in Figure 1. Women without fictive kin and with unsupportive fictive kin had similar levels of EBV antibodies.

Table 4. Regression coefficients and standard errors for multiple linear regression models of the relationship between emotional social support from compadres and EBV antibodies.

	Model 1A N=88	Model 1B N=88
log Age		95.81 (26.23)**
Log BMI		-110.38 (50.36)*
High SES		46.74 (15.70)*
Compadre support	-52.03 (20.26)*	-45.27 (18.75)*
R^2	0.06	0.22

* $p < 0.05$, ** $p < 0.001$

Discussion

This analysis tested the prediction that perceived instrumental social support is negatively related to EBV antibody concentrations, and therefore positively related to immune function. While associated in the expected direction, this relationship was not significant, suggesting that perceived support does not moderate the effects of stressful economic circumstances on physiology. Further, reports of having drawn on this kind of support in the past were relatively few (Hicks 2008), indicating that these ties are rarely mobilized. This is in keeping with the argument that neoliberal governance and widespread poverty is associated with a weakening of supportive networks and household retrenchment (Gledhill 2005) and consistent with the marginal conditions experienced by Alteños (Gill 2000).

This also consistent with research conducted in other settings in Bolivia. For example, in Cochabamba, Wutich (2011) found less emphasis on compadrazgo, or relationships that carry long-term and costly reciprocal burdens, and more emphasis on, for example, patron–client relationships that can be severed more easily. Similarly, Andean intellectuals and communities have reclaimed the ayllu—an ancient Andean social unit based on shared territory and kinship—to envision a communitarian alternative to Western capitalism (Weismantel 2006). In the case of

the Landless Peasant Movement that is working to build new agricultural communities around social justice and economic cooperation, discourses on reciprocity based on an imagined ayllu routinely come into conflict with the economic needs of individuals and households (Fabricant 2010).

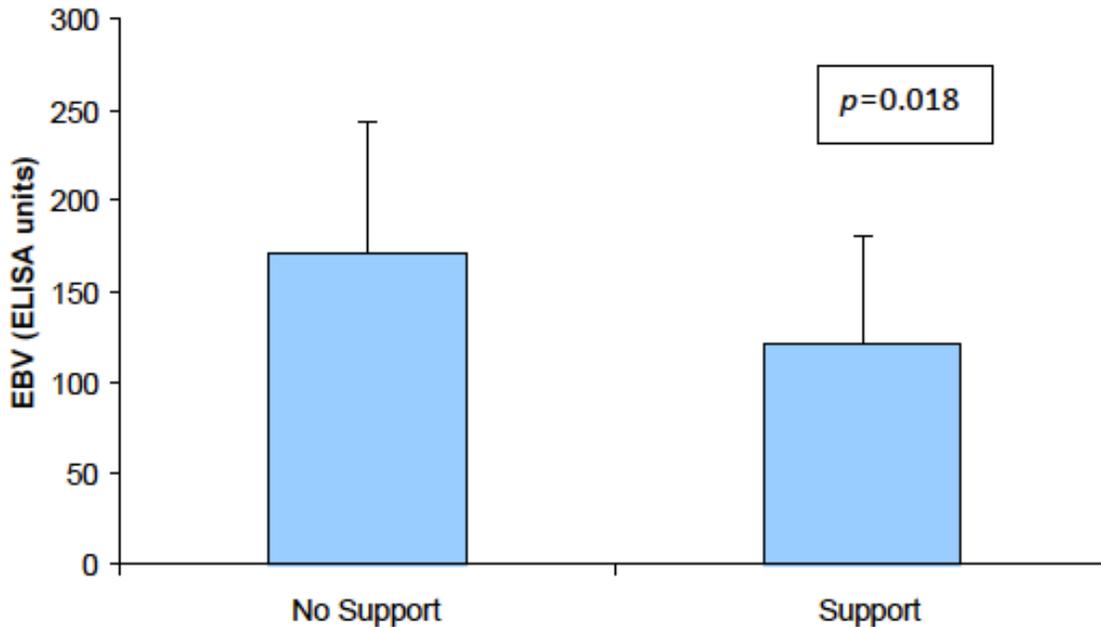


Figure 1. EBV antibody concentrations and standard deviations for women with and without supportive compadres.

A second prediction was that family would be the most important source of support. This conclusion is supported by overwhelming emphasis on perceived support from family in response to each type of hypothetical problem and interview responses that family members are the most appropriate sources for most kinds of problems. In several interviews, however, respondents indicated that they would never want to be obligated to members of their family for anything and would prefer to seek assistance from institutional sources.

Despite this emphasis on family, this analysis provides no support for the conclusion that supportive family relationships, either in terms of instrumental or emotional support, are associated with immune function. That is, this form of support has neither positive nor negative implications for women's health. This contrasts with research conducted in a number of other settings that shows a strong relationship between social support from family and health outcomes (Dressler et al. 1997; Uchino et al. 1996).

In Cochabamba, although more residents reported reciprocal relationships with neighbors, the highest frequency of exchanges occurred between family members, despite ambivalence toward these obligations expressed by several participants (Wutich 2011). Wutich (2011) explained this as evidence of a strong sense of social obligation that discouraged people from refusing requests for help from family even when that was not in their short-term economic interest. The results of this analysis may suggest that the normative expectation of support associated with family ties lowers their influence on individual physiology. Alternatively, the category of family may be too broad to capture variation in experiences with specific kinds of family relationships.

Finally, the only source of emotional support significantly related to EBV antibody concentrations was that from *compadres*. Most of the women in this sample did have *compadres*; however, many reported cordial but relatively distant relations with their ritual kin. Among those with no *compadres* were all the women without children and some, but not all, Protestants. Despite the high frequency of these connections, a minority of women reported having relationships that were supportive, and few listed *compadres* as a first- or second-order resort to specific problems.

Spatial and temporal diversity in social norms is reflected in ethnographic work in the rural Andes. This demonstrates that *compadrazgo* is an adaptable system and can serve as an important means of reinforcing reciprocal ties between kin and friends (Allen 1988; Bastien 1985; Buechler and Buechler 1971; Nash 1993; Paulson 2006; Weismantel 1988) and as a means for establishing exploitive economic relationships based on race and class (Albro 2000; Mayer 2002; Nash 1993; Paerregaard 1997; Seligmann 2004; Weismantel 1988).

In peri-urban Cochabamba, these relationships are relatively rare, particularly among younger people, and are associated with a low frequency of reciprocal exchange (Wutich 2011). This analysis similarly does not support *compadrazgo* as an important means of extra-household economic cooperation in this urban setting, consistent with the argument that these relationships are deemphasized in conditions of economic hardship (Wutich 2011). Rather, these findings support the conclusion that *compadrazgo* can serve an important role in formalizing and strengthening supportive relationships in ways that have significance for individual physiology.

The sampling strategy involved in this research—designed to examine interactions between household headship, social support, and women's health—likely has implications for interpreting the results. Engagement in the cooperative might be expected to prove an important means of networking and developing supportive relationships for women in this sample. For example, friends, family members, and neighbors often suggested new members. Although one respondent did stress the importance of close friends she developed in the group, this theme was not emphasized in the qualitative phase of the study. In addition, livelihoods in this city are generally based on family members pursuing multiple forms of informal and uncertain employment (Gill 2000). The relatively stable employment of these women may mean that they experienced more household economic security than typical in this city, which may have implications for their social relationships.

This study's primary limitation is the difficulty associated with assessing SES in urban Bolivia. The measures used here are similar to those used in the Bolivian census and by local survey researchers precisely because of this difficulty, and residents may not answer these questions honestly for fear of being assessed higher taxes (Goldstein 2002). The measure associated with EBV antibodies was related to conditions in the neighborhood, which may be less problematic than characteristics of households. Nevertheless, these models include unmeasured variation in SES. An additional limitation is that although this study assessed support from kin and fictive kin, participants were not asked whether they had supportive friends, a class of relationship found important in other studies (Dressler et al. 1986). A third problem is that the analysis involved several statistical tests, increasing the probability of finding significant relationships by chance.

Conclusion

This combination of qualitative, quantitative, and biological methods provides unique and valuable insight into women's experience with specific kinds of social support in El Alto. These results suggest that *compadrazgo* serves an important role in solidifying supportive relationships for some women in a setting where making ends meet is one of many potential daily stressors. The results further support the conclusion that although many women report perceived instrumental support, particularly from family, economic conditions may reduce the value of this as a coping mechanism. This is likely a result of changing social norms, including an increasing emphasis on the nuclear family as the primary economic unit and more individualistic survival strategies. This household retrenchment may have important implications for women's status and economic independence. More broadly, this research highlights the value of biocultural approaches for understanding the cultural and political economic context of social relationships. Embodiment in the form of physiological function (Krieger 2005) powerfully illustrates the costs and consequences of social ties.

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