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South American Indians Term Paper  
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The Rebounding Populations of Brazilian Indians:  
An Epidemiological Study of Population Growth in the Amazon

Brazil has had a long history of taking land from its indigenous populations, exploiting them for labor, and ultimately decimating populations of native Amazonians. At the time of conquest, there was a 20:1 population loss, but some estimate that this could be even higher at 35:1. Estimates of the Indian population at the time of conquest were between 8,500,000 and 10,000,000. This number was reduced to just 250,000 by the end of the conquest period. By 1991, this number had rebounded to 500,000 (Hern, Effects 1991). Brazil's indigenous populations have faced two major crises of contact, the first upon conquest and contact during the sixteenth century, when Europe was expanding. This introduced Western diseases into indigenous populations that had never been exposed to such types of disease. As a result, they were horrifically diminished. The second crises of contact occurred in the 20th century, after some groups had steadied their growth. The Brazilian government implemented economic policies that cut into the Amazon, and resulted in contact and epidemic once again. Despite these two incidences of social disruption, the populations of many Brazilian Indians have, and still are growing at an extraordinarily fast rate. The pattern of growth that has been seen among these groups has been complete decimation rebounded to steady growth, a second period of population decline, and then rapid growth once again. Most studies on the demographics of Brazilian Indians were conducted throughout the 1980's and 1990's; there is very little research on these groups within the past ten years. However, the results of case studies among various anthropologists reflect the population growth of many groups. Overall, while some populations have high infant mortality rates and shorter life expectancies, the indigenous populations of

Brazil are not succumbing as quickly to disease, have acquired immunity, and additionally, have tremendously high fertility rates. Various studies suggest that this phenomenon is a result of increased contact with the outside world, an introduction of modern medicine, and changes in specific cultural practices that effect fertility rates.

Some anthropologists criticize past demographical studies on Brazilian Indians for their focus on specific groups of people rather than nationally representative samples. However, it is often difficult to set standards or averages that can apply to the behavior of all of Brazil's Indians, because each group's culture and contact experiences are different. Despite the fact that the majority of research on this topic is conveyed through separate case studies, the First National Survey of Indigenous People's Health and Nutrition in Brazil was conducted throughout 2008-2009 to "obtain baseline information on a nationwide representative sample". This survey sought to examine the health and nutritional status among indigenous children less than five years old, as well as among indigenous women ages 14-49 years old. The survey was administered in four major regions of Brazil (Coimbra 2013). According to the survey, Brazil's indigenous population only make up .4 percent of the country's population; a total of 896,917. Estimates of the Indian population at the time of conquest were between 8,500,000 and 10,000,000. This size was eventually reduced to just 250,000 by the time the Europeans had finished colonizing. By 1991, this number had risen back to 500,000. (Hern, Effects 1991).

When discussing population growth, the average number of children a woman is capable of having is a key indicator of a growing population. This is referred to as a fertility rate. Rates above two children indicate populations growing in size and whose median age is declining (Country). Cross-cultural studies suggest that the fertility rates of Brazilian Indians range from 4-8 kids. It is difficult to provide a more specific number, because all groups of Indians are

different. Some researchers say it is safe to estimate six as an average number (Picchi 1994). In the early stages of a population whose size is rebounding, the majority of the population is under fifteen years old. Large cohorts of young people also mean that people marry at an early age. In indigenous Brazilian tribes, women marry and typically start to reproduce before the age of 25. Among the Barama River Caribs, women usually become pregnant between the age of 18 and 22; after this they gave birth every 20 to 30 months for 25 years (Adams 1994). Since the early 1970's, fertility rates among Brazilian indigenous women have been increasing at high rates.

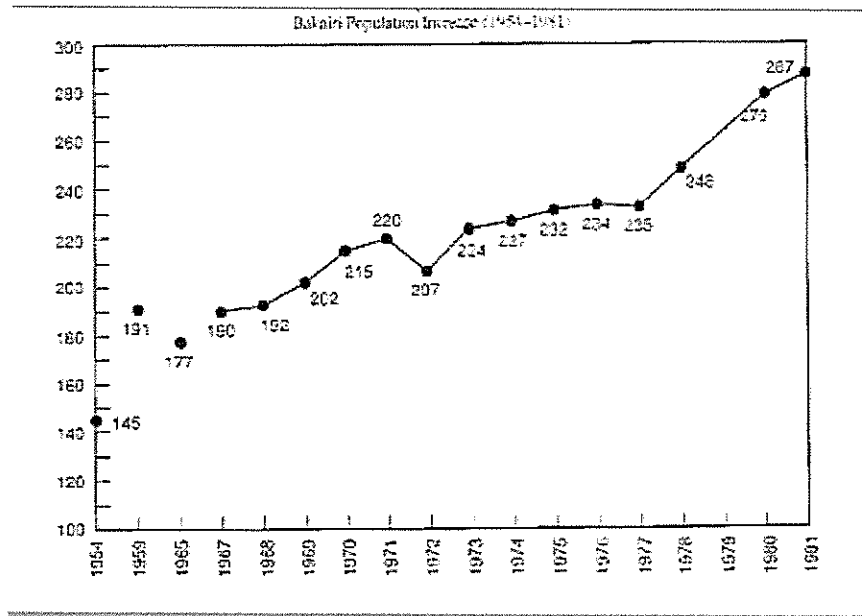
In many Brazilian tribes, the absence of contraceptives contributes to high fertility rates. Additionally, abandonment of certain cultural marriage traditions results in both higher individual and communal fertility rates. Many indigenous groups have engaged in polygynous marriages since before contact. However, as a result of modernization among many tribes, polygynous marriages are declining while monogamy is increasing (Hern, Cultural 1994). This is significant, because there is a direct negative relationship between polygyny and fertility rates. Women in polygynous relationships have shorter intervals of postpartum abstinence (refraining from intercourse after giving birth), which is unhealthy for the baby. Postpartum abstinence also contributes to decreasing child mortality rates, which will be discussed later (Chojnacka 1980).

In addition to increasing fertility rates, the presence of infectious disease has become rare among Brazilian Amazonian Indians. One explanation as to why these populations do not face frequent episodes of endemic and infectious disease is because they have built acquired immunity. Linda Newson discusses the spread of disease among small populations of people in her chapter, "*A Historical Ecological Perspective on Epidemic Disease*" (Newson 1998). At the time of initial contact during conquest, indigenous groups were decimated after being exposed to measles, malaria, tuberculosis, and yellow fever. In particular, malaria and yellow fever were

introduced into these populations during the African slave trade. According to Newson, after this period of decimation there was a decline in general epidemics because of isolation of disease organisms and the introduction of preventative measures. In small populations in particular, “the persistence of acute infection depends either on the existence of large populations of previously uninfected persons, or on non-human hosts” (43). While a larger population allows an optimal environment for hosts and parasites to survive and spread, populations that are small and dispersed (such as tribal groups), experience disease “fade-outs”. Typically, these populations remain disease-free for long periods of time. In the small populations of the Brazilian Amazon, there are not enough humans to enable a parasite to reproduce and spread. Each epidemic has its own history, and the social context of parasites is also important. Many tribal groups avoid infection by isolating themselves from their neighbors, who may be known to harbor diseases because they have increased contact (49). For example, the Xavante, who were semi-nomadic, could abandon their temporary settlements when disease struck and hence, avoided contagion (Flowers 1994). Ironically, it seems that although upon initial exposure numerous Old World diseases decimated these populations, this exposure has resulted in a certain degree of acquired immunity.

The Bakairi Indians of Central Brazil exemplify a very small population that once faced concomitant population loss, but after the fade-out of disease, began to rebound. In the 1920’s, this group first came into contact with the outside world. Between 1918 and 1921, a reservation was demarcated that placed them at an Indian post. This was intended to protect their land from being invaded by settlers, but instead resulted in forced culture change because they were in such close proximity to the administrators of the reservation. Thereafter, the Bakairis experienced acculturation and epidemics that almost resulted in their extinction. After this population loss, a

rebound occurred. By 1994, only one measles epidemic had occurred in the previous thirty years, demonstrating how previous exposure to measles during contact contributed to their acquired immunity. This occurred in 1962, and was the last epidemic after a whooping-cough epidemic in 1960. Although this killed ten Bakairi, the disease did not resurface after it passed (Picchi 1994). The fade-out of such epidemics illustrates Newson's point about the difficulty of perpetuating infectious disease among small groups of people.



The above chart illustrates the population growth of the Bakairi Indians from 1954-1981. The growth of the population remains steady from 1973-1977. Beginning in 1978, the population begins to grow at a much faster rate (Picchi 1994).

The introduction of modern medicine has also contributed to healthier populations. In the mid twentieth century, FUNAI created vaccination programs to ensure that populations were vaccinated against Old World diseases. The decline of whooping cough and measles can be attributed in part to such vaccinations, although Indians frequently resisted FUNAI's medical

involvement. It was not until the 1940's when they began to recover. At first, the rebound in its population was steady, not rapid. In 1954, its population was 145, increasing at a steady rate until 1981 when it reached 287. Overall, the Bakairi experienced an increase in fertility, but because they kept certain fertility-inhibiting practices in place, their population growth was steady rather than rapid (Picchi 1994). Similarly, FUNAI also introduced vaccinations to the Canela Indians. Tuberculosis has always been attributed as a strong killer among Brazilian Indians. Despite this, the spread of TB among the Canela Indians has been controlled as a result of commitments made by agents of FUNAI. In the early 1970's, one man single handedly devoted his time to administering medicine and vaccinations among infected TB patients. He taught the importance of taking TB medication through its entire course to prevent treatment immunity. Prior to this, there were very high treatment abandonment rates, which only perpetuated the number of tuberculosis related deaths. After changes in medical behavior, the number of deaths per year decreased from 53 in 1975 to 29 by 1979 (Greene). His efforts and introduction of antibiotics and modern medicine led to decreased mortality among the Canela and significant changes in control of TB.

The Kayapó, Shibibo, and Xavante are all Brazilian Indians whose populations have doubling times of less than fifteen years. In early stages of a population rebound, half the population is less than fifteen years old. Longitudinal evidence of certain groups varies depending on the time when they were observed, because some groups may have experienced the effects of contact at earlier or later times. In the 1940's, the Xavante experienced contagion through their neighbors the Karajá, who were in contact before them and carried disease. This is one of the primary ways in which contagion spread. In 1962, the Xavante were living on a government-designated Indian reserve, during which their population declined because of

epidemic disease. Some men from the reserve had traveled to nearby Brazilian cities and most likely brought back disease. They were experiencing a second “crisis of contact.” Biological anthropologists had found antibodies from measles and whooping cough in their bodies, most likely brought into their populations from the cities. Additionally, ranchers were infringing the land surrounding the reserve trying to claim land, causing further social disruptions. Despite their population loss during early years of contact, by 1988 the reservation was fifty percent larger than in 1977. Their doubling time was close to fifty percent in ten years. In 1977, the population was 249, but increased to 411 in 1988. In thirteen years, 221 people had been born into the population. Researchers found an average birth rate of 16.3 births per year, a rate similar to that of some of the world’s fastest growing populations. The increasing number of births was also attributed to a predominantly young population. In 1977, only 2.8% of the population was over 50 (Flowers). The Xavante were able to resist economic agricultural projects implemented by FUNAI and preserve their traditional customs and values, resulting in increased fertility and population growth.

This chart depicts the population changes by gender of the Xavante Indians. In total, the population almost doubled from 1977-1990, increasing from 249 to 416. This demonstrates a more steady population growth as opposed to rapid; the population still had not doubled after ten years (Flowers 1994).

Figure 1.  
Xavante Population at Pimentel Barbosa, July 1977

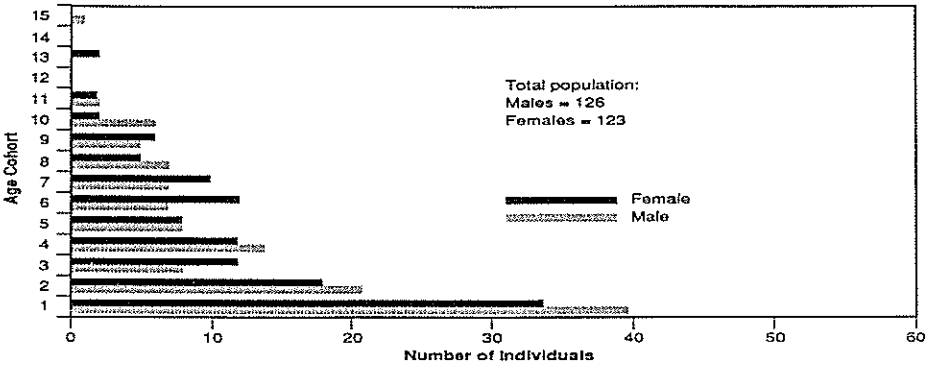
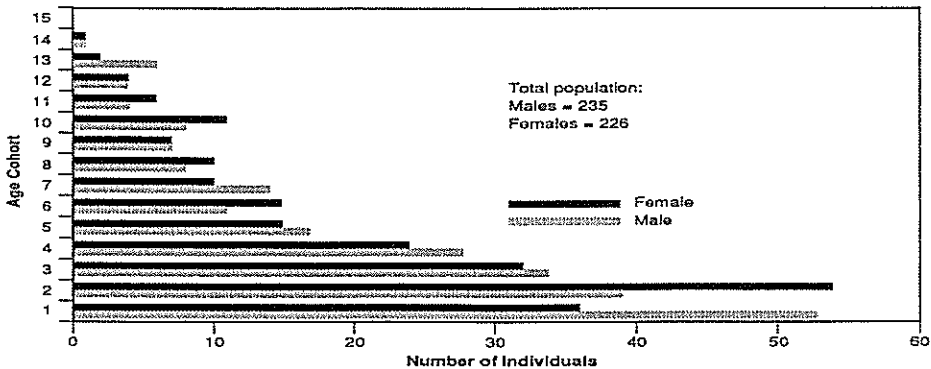


Figure 2.  
Xavante Population at Pimentel Barbosa, June 1990



Similar to the study of the Xavante, a study done on the Ramkokamekra Canelas demonstrates how resisting acculturation has contributed to population growth. Before contact in 1840, the Canela numbered between 1,000 and 2,000. By the end of their initial contact period, their population was less than a hundred people. They were able to avoid extinction and escape further contact attempts of pioneering settlers by mobilizing into their hills, where outsiders could not access them. After years of isolation, the government relocated them to a Guajajara Reservation that was located in the dry forests of the *cerrado*. The change in environment affected their traditional hunting, farming, and sanitation conditions. However, between the years of 1970 and 1988, their population grew from 437 people to 836; this is a growth rate of four percent throughout the 1980's. Multiple factors contributed to their population rebound. First, matrilocality and matrilineality, cultural marriage practices in which women live in their family's home after they marry (Cite). Second, there were a growing number of people under the age of fifteen, which has already demonstrated to contribute to population growth. The proportion of ages 15-59 decreased from fifty four percent in 1970 to forty-two percent in 1988, while the number of people under 15 and over 60 increased from forty-eight percent to fifty eight percent (Greene). This trend reflects an increasingly young age distribution and a decline in median age. The increase in people over sixty also demonstrates that there was a higher life expectancy at birth.

Child mortality rates are another significant indicator of population growth. The World Bank defines child mortality rate as "the probability per 1,000 that a newborn baby will die before reaching age five" (Mortality). The higher the child mortality rate, the slower the population growth. High child mortality rates mean there are more elderly people closer to death than there are young people capable of reproducing. The trend among most groups of Brazilian



Indians has been a decrease in these rates; however some groups still have high child mortality rates as a result of infanticide. The practice of infanticide has been indicated by unusually high sex ratios at birth, especially among the Xavante. During the years of 1957 to 1971, the ratio of male to female infants was at its highest, the same era during which child survival rates were lowest among females. Among the Xavante, it was customary to kill one child in the event that a woman bore twins. Child mortality rates are difficult to obtain from many Brazilian Indians, because often times these groups of people do not have records of exact birth dates, so birth and death rates for specific years are sometimes estimates. One large source of child mortality among many Brazilian Indians result from cultural practices such as infanticide. This is still acceptable among many populations, although condemned by FUNAI. As a result, many women do not report certain deaths. Also among the Xavante, child mortality was relatively high. Although the fertility rate was 4.5, only 2.5 of those births were live births. The infant mortality rate over thirteen years was 70.8/100, but is estimated to be much higher given that many women do not report certain infant deaths. On the contrary, there was an overall decline in child mortality among the Canela. Whereas in 1975, the rate was 53/100, in 1979 it dropped to 29/100 (Flowers).

Certain changes in cultural practices have contributed to a decline in child mortality rates as well. While polygyny is still practiced among many of these tribes, the practice is diminishing among some. Missionaries have been discouraging polygyny since the earliest contacts with many groups. For example, many of these indigenous groups have abandoned polygynous marriages. In tribes where polygyny is fading, women have shorter birth intervals. Whereas polygynous women have individual fertility rates of 4.7, monogamous women have rates 6.0 (Hern, Cultural). Polygyny is almost universally linked to lower fertility rates. Modernization

results in a declining presence of polygyny, as more Western cultural norms influence some groups (Chojnacka). For example, both the Canela and Xavante were placed on Indian reservations where modern cultural practices were imposed on them by the agents who worked on the reservations. Frequently, their culture is interrupted when placed in these reserves. Monogamous women tend to have higher fertility rates, because their postpartum abstinence intervals are longer. This results in a healthier infant because it provides a woman with more time to restore her body's nutrients. Very short intervals between births are dangerous for infants; having intercourse less than six months after a birth leads to greater health risks for the baby and numerous post-natal consequences. For example, shorter intervals can lead to lower weights in newborns, and infant weight is a strong determinant of early mortality. This is because short intervals between two pregnancies do not allow sufficient time to restore women's nutritional reserves, which affects fetal growth. Additionally, health risks result from competition between children. A shorter interval between pregnancies means that a mother still has another young child when her second infant is born. She needs to balance both of their health needs, which can lead to a competition to meet these health needs. Two young infants in a household can also increase the spread of infectious disease. While young children are initially more susceptible to infection, they can transfer these infections even faster to newborns, where it will become even more severe (Bicego 1992). The Xavante are an example of a group of people whose growth rate was steady, not rapid, as a result of polygynous marriages. Their population just barely doubled from 1977 to 1990. Their fertility rates are significantly lower than woman in monogamous marriages (Flowers 1994).

The rapid growth of Brazilian Indians since the 1970's can be attributed to acquired immunity, the introduction of Western medicine, and changes in cultural marriage practices that

affect fertility. The resulting trend has been higher fertility rates, increasing life expectancy, and reduced mortality. Each indigenous group has different cultural values and behaviors, which makes it hard to generalize about demographic trends for Brazil's indigenous population as a whole. Yet because many share similar marriage patterns and have experienced similar episodes of contact, the overall pattern is rapid population growth. Presumably, they will continue to grow in size as development and modernization in Brazil continues, and expands further into the Amazon.

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