

Chapter 9 Case Study (9.4): Biological Distance in Postclassic Mexico

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Studies of biological distance are useful in comparing cultural and biological relationships. Cultural information from ethnohistoric accounts or from archaeological excavations may suggest specific cultural relationships among various populations, which biodistance analyses can confirm or negate. Factors such as trade networks, warfare, and population growth may impact migration patterns of human populations, which may result in shifts to patterns of human variation. Corey S. Ragsdale and Heather J.H. Edgar (2015) explored such patterns in their study of biological distance in Postclassic period Mexico (AD 900–1520), a period in which migration varied in scale throughout the region. Most populations in pre-contact Mexico were connected via economic, political, and cultural relationships, which Ragsdale and Edgar investigated by comparing the biological affinity of several groups using dental morphology traits. They tested three hypotheses to determine which factor(s) correlated with biological distances: geographic distances, shared migration histories, or trade and political interactions.

Using a modified world systems approach in which an economic zone is composed of a core (or cores) and peripheral societies, Ragsdale and Edgar included trade network sites with varying socioeconomic structures, and included peripheral members to the Mexican world system to determine whether these populations contributed to population interactions. Previous biological distance studies have been conducted in both Classic and Postclassic Mexico populations and have found some correlation between biological distances and migration patterns. Prior to Spanish contact in AD 1519, it is not clear how geographic distances and cultural relationships impacted population structure and biological affinity. Large- and small-scale migration was occurring during the period, connecting many of the populations in the Mexican world system.

To test their hypotheses, the researchers assessed the dental morphology traits in the permanent teeth of 810 individuals from more than 25 Middle to Late Postclassic sites (AD 1200-1520). The samples are spread regionally from Central Mexico to West Mexico, Northern Mexico, the Gulf Coast, and the Maya region. A maximum of 62 maxillary and mandibular traits were collected and scored based on the Arizona State University Dental Anthropology System and presence–absence was used for statistical analyses. Of the 62 traits scored, 23 were used to generate pseudo-Mahalanobis D^2 distances. To determine correlations among biological, geographic, and cultural factors (including migration history, trade, and political interaction), Mantel and partial Mantel tests were employed.

The results of this study indicate that shared migration and trade/political interaction are significantly correlated with biological distances. Geographic distances are not correlated with biological distances. Moreover, for all regions, shared migration history is correlated with biological distances, while trade and political interactions are

correlated with biological distances in two areas: Central Mexico and Gulf Coast / Maya regions. These analyses also reflect a strong phenetic affinity among the Central Mexico groups and between Central Mexico and West Mexico, as well as between Central Mexico and the Gulf Coast. The similarities among the Central Mexico groups likely reflect shared migration histories, as the populations would have been in frequent contact with one another due to economics and trade. Additionally, these populations were close geographically. The similarities between West Mexico and Central Mexico were unexpected as they represent politically and geographically separate regions that were arguably hostile to one another. Of the three hypotheses tested by Ragsdale and Edgar, two are supported by these results. Biological distances are correlated with shared migration history and with trade and political interaction. Biological distances, by contrast, are not correlated with geographic distances, although many samples cluster together within a particular region. This result suggests that geographic proximity does not necessarily relate to phenetic similarity, and that proximity of location was not the primary factor in population interaction.

Using ethnohistoric sources and archaeological data, migration histories were developed and were found to correlate positively with biological distances. In other words, two populations that were biologically similar shared a parent population, which is the case for some of the Central Mexico and West Mexico groups that originated from a population in West Mexico. Trade is also positively correlated with biological distances even when geographic distance, political interaction, and cultural groupings were held constant. Based on this, Ragsdale and Edgar asserted that groups that were involved in market exchange and shared trade routes were biologically similar to one another. The combination of trade and political interaction is highly correlated with biological distances, which indicates that political relationships were of paramount importance in determining population interactions.

This study illustrates the effectiveness of using biodistance to parse out cultural and political relationships among populations even when ethnohistoric and archaeological evidence is available. During the Postclassic period in Mexico, migration was commonplace and occurred within and between regions. Prior to studies such as this, most of the information regarding migration history in the region was based on linguistic similarities, origin accounts, and material culture similarities, but left room for much debate among scholars. Ragsdale and Edgar demonstrate the usefulness of biological data in assessing various cultural hypotheses. Based on their results, there were several migration origins during the Classic period (AD 300–900) and the Early Postclassic period (AD 900–1200), rather than a single migration. They found that populations in Central Mexico likely derived from Northern, West, and Central Mexico, which supports the Aztec origin account. This research also underscores the importance of trade networks during this period in Mexico, which facilitated contact among groups throughout the area. Drawing on ethnohistoric, archaeological, and biological data, this study is an excellent example of the usefulness of a holistic approach in bioarchaeology.

Reference

Ragsdale CS, Edgar HJH. 2015. Cultural interaction and biological distance in Postclassic period Mexico. *American Journal of Physical Anthropology* 157:121-133.