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Kinship and Religious Identities in Medieval Central Asia (8th-13th c. CE): Tracing Communities of Mortuary Practice and Biological Affinity

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Abstract of the Dissertation

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by

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Doctor of Philosophy in Anthropology

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Professor Michael D. Frachetti, Chair

Ethnic, political, and religious upheaval has cascading impacts on social identity. Kinship and religious ritual are two sources of social identity that are particularly salient in periods of change. Their practice provides access to and protection of important social, economic, and ideological resources that help groups negotiate times of uncertainty. During the medieval period (8th-13th c. CE), Central Asia saw the invasion of Arab armies, the rise of Turkic political dynasties, and the spread of Islam. This period yielded a Turko-Islamic culture that pervades modern dialogues on Central Asian history and culture. The local and regional social systems that sustained the spread of ethnic and religious identities during the medieval period, however, remain poorly understood. This dissertation investigates mortuary ritual and biological affinity in medieval (8th-13th century) Central Asian populations to document the practice of social identity across diverse populations during this period of dramatic change. This thesis represents the first comprehensive bioarchaeological study of medieval Central Asian populations. Mortuary and cranial shape data were obtained from nineteen sites dating between the 7th and 14th c. CE located in modern-day Uzbekistan. Data collection was comprised of three years of research at the archives and osteological collections of the Institute of Samarkand

and cemetery excavations at the site of Tashbulak in southeastern Uzbekistan. In this study, I analyze spatial organization, architecture, and body treatment in burials, as well as geometric morphometric analysis of three-dimensional cranial landmark data. I interpret my results as reflecting kinship and mortuary communities-of-practice and examine how these social identity practices reflect or refute previous historical narratives about ethnic and religious identity.

I demonstrate that populations in medieval Uzbekistan buried their dead according to Islamic funerary prescriptions across diverse geographic and social settings. I identify seven sets of burial practice within these prescriptions that are practiced at local and regional scales. Biological affinity analysis demonstrates shared genetic background of populations at study sites, with overlapping variation at all sites. I find no evidence of genetically based ethnic groups or differential practice of Islam across rural and urban contexts, as historical documents from this period would suggest. Instead, my data speak to an integrated social landscape, within which Islamic was broadly practiced, and genetic relatedness did not act as a reproductive boundary. I argue that increasing urbanism and reliance on market economies could have promoted shared identity and genetic homogeneity, through integration of urban and rural sites into a system that promoted participation in a non-kin-based economy, in which conversion to Islam was rewarded with monetary and social capital. Within this regional homogeneity, however, there is local diversity in both the mortuary and biological affinity record. People practiced a variety of architectural and body positioning traditions within overarching Islamic prescriptions. Genetically, individuals do not consistently cluster most closely with individuals from the same site. Medieval Central Asian populations therefore, engaged in social lives derived from shared institutional pressures, but through which groups also expressed a variety of identities that they carried between sites, across diverse geographic and social contexts.

Chapter 1: Introduction

1.1 Themes and Goals

Humans are social animals. We socialize and cooperate on a scale that has allowed us to transform our environments to a point where we move more soil than natural processes (Price et al. 2011). Humans socialize through networks of relationships that mediate interaction with other humans and the physical world. These networks develop through complex and non-linear cultural, political, and economic practices, creating groups by defining who is and is not a member. The practice of asserting, performing, and embodying belongingness to a group is recognized by many anthropologists as social identity (Meskell 2002). Throughout human history, religion and kinship have profoundly shaped social identities across cultures. Their ubiquity is evidenced in cross-cultural ethnographies (Metcalf and Huntington 1991; Lambek 2008; Chun et al. 1996) and attention from evolutionary psychologists trying to explain their adaptive significance (Bulbulia 2004; Kirkpatrick 1999; Jones 2000). These contemporary and historical examples show the ability of kinship and religion to form scalar relationships on local and regional levels. Both kinship and religion can create relationships that connect people across geographic distance through participation in systems that are both created through the practices of individuals and groups, but that can also exist in the ideological realm through the mutual recognition of these relationships, regardless of constant practice. This ability to tack between local, perpetual practice, and broad-reaching ideological institutions, make kinship and religion productive lenses through which to examine different scales of community engagement and integration.

Central Asia is often referred to as the crossroads of civilization. Many scholars have worked to break down the image of Central Asia as a region that is simply a product of combining cultures, technology, and ideologies of surrounding areas (Frank 1992; Starr 2013). Central Asia has been instrumental in the technological, religious, and political trajectories of Eurasia for millennia. Much of its perceived importance is rooted in the long-distance connectivity, exemplified by the Silk Roads. Recent work has increasingly shown the social, geographic, and economic complexity and time-depth of this connectivity (Frachetti et al. 2017; Spengler et al. 2014; Frachetti and Bullion in press). This connectivity is especially important to understanding cultural processes in the medieval period of Central Asia (8th-13th c. CE). This period saw the influx of groups from Southwest Asia and Eastern Eurasia, the rise and fall of political regimes, and the transformation of religious and linguistic landscapes of the region. Perhaps the most impactful of these transformations were the introduction and spread of Islam and Turkic culture and language. These changes are why the medieval period is seen as one of the most foundational eras in shaping the Turko-Islamic landscapes of historical and modern Central Asia. These cultural, linguistic, and religious landscapes are usually described as emerging out of the actions of political regimes (Davidovich 1998). To understand how these cultural transformations had such long surviving impacts, however, it is necessary to examine how they were embedded in the practices of individuals in diverse social and geographic settings.

This study addresses one broad research question: what do mortuary ritual and biological affinity reveal about social identity and connectivity in medieval Central Asia? In this study I explore what mortuary ritual reflects about religious identity in medieval Central Asia, and what biological affinity reflects about kinship in medieval Central Asia. By addressing these issues, this study will reexamine the assumptions made by current narratives about the nature of the practice of Islam and the basis of ethnic identity. While these themes may seem distinct from each other, I argue that religion and mobility reflect underlying shared social networks which connected people across large spatial and cultural distances.

Here, I present an integrative bioarcheaeological study of social identity and connectiveness. I document mortuary ritual and biological affinity across nineteen sites located in the region of modern-day Uzbekistan. Mortuary rituals are locations of social and ideological negotiation, involving communities of the living and dead, and opportunities for people to practice social identity (Chesson 2001; Joyce 2001). Studies of morphological and molecular affinity allow examination of genealogical relatedness between individuals (Cheverud and Buikstra 1982; Pilloud and Heftner 2016). These connections manifest in complex social relationships that must be understood through contextual analysis. I analyze the similarities and divergences of mortuary ritual and biological affinity separately to document how people were connected or divided by religious and kinship networks. I then integrate these data to examine evidence for networks on the scale of site and region.

1.2 Outline of the Dissertation

This dissertation is structured in eight chapters. Chapter 2 describes the current academic interpretations of political and cultural succession in Central Asia during the medieval period and the centuries leading up to this era. I begin by describing the use of the term Central Asia in this study as a geographically and historically meaningful unit. I then outline the period from the 5th to the 8th centuries to contextualize the social and political environment leading up to the medieval period. Next, I summarize the chronological and territorial extent of the political regimes that controlled Central Asia from the 8th to the 13th centuries, focusing on those polities within the region of modern-day Uzbekistan, as this is the region addressed in my study. The primary goal of chapter 2 is to present the traditional understandings of the politio-social environment that resulted in the spread of Islam across Central Asia. I use this context to identify gaps in understanding and to contextualize the types of possible communities and identities I hypothesize existed in this period.

Chapter 3 provides the theoretical framework for my research and interpretation of data. In this chapter, I first review how identity has been addressed in medieval Central Asia, and outline how my work will build on and expand this work by analyzing biological affinity and mortuary ritual. I then present how social identity can be related to these data using kinship theory to interpret biological affinity, and communities-of-practice to interpret mortuary ritual. Finally, I describe how integrating these two data sets allows us to reexamine social identity in medieval Central Asia and its reflection of the larger themes of the spread of Islam and movement of people.

In the first part of chapter 4, I describe the location, chronology, archaeology, and mortuary practice at previously excavated sites included in this study. In the second part of the chapter, I describe the geography, excavation, and chronology of the site of Tashbulak. This chapter includes maps and tables detailing sample locations and chronologies in this study.

Chapter 5 provides detailed descriptions of the bioarchaeological methods used in this study to collect and analyze data. I first describe my approach to osteological data collection, including generating skeletal inventories and sex and age estimation. I then outline the variables collected for mortuary analysis and my standards for identifying patterns in practice. Finally, I provide detailed descriptions of my cranial geometric morphometric data collection, management, and statistical analyses.

Chapter 6 lists the results of my mortuary and geometric morphometric analyses conducted on the study sites. The results for my mortuary study are presented first and include the complete list of burial components recorded in my sample, followed by my data on the distribution of these components within and among sites. The second section of this chapter presents the results of my cranial geometric morphometric analyses. Results are organized by spatial level (region, site, individual). Trends in results are discussed for each spatial level as well as for chronology and demography. The final section of the chapter presents qualitative analysis of similarities in mortuary practice and biological affinity between sites and regions.

In Chapter 7, I synthesize and interpret the mortuary and GMM data to address my research goals of documenting biological affinity and mortuary ritual in medieval Central Asia. I show that there are elements of mortuary practice that demonstrate both inter-site communities of practice as well as engagement with Islamic religious identity on a regional scale. I argue that these broader communities of identity were supported by the rise of urbanism, market economies, and mobility on the landscape, and that Islam reached a broad range of sites through these networks. I argue that local communities of practice solidified Islam as an important social element at least in part through mortuary ritual. I also reflect on the overlapping variation of my biological affinity results as evidence that ethnic identities in this period were not based in shared genetic background, as assumed by previous research. I also hypothesize that the same processes of urbanization, market economies, and mobility could have served to breakdown reproductive barriers and extended kinship networks, leading to homogeneity in biological affinity.

Chapter 8 forms the conclusion of the dissertation. I summarize my two sets of data and reiterate how patterns of burial practice and biological relatedness relate to the spread of Islam during the medieval period. I argue that the integration of Islam into Central Asian identity needs to be understood not just as a top-down imposition from a foreign source, but as process that only succeeded through the enacted rituals of local communities, connected through broad ideological systems, economic strategies, and patterns of mobility. In this section, I also discuss future research plans. These include the additional of genetic data on biological relatedness, as well as expanding my data set to include a broader chronological and geographic sample.

Chapter 2: History and Archaeology of Medieval Central Asia

In this chapter, I describe current academic interpretations of political and cultural succession in Central Asia during the medieval period and proceeding centuries. I begin by describing the use of the term Central Asia in this study as a geographically and historically meaningful unit. I then outline the period from the 5th to the 8th centuries to contextualize the social and political environment leading up to the medieval period. Next, I summarize the chronological and territorial extent of the political regimes that controlled Central Asia from the 8th to the 13th centuries, focusing on those polities within the region of modern-day Uzbekistan.

2.1 Central Asia as an Analytical Unit

In this work, I treat Central Asia as a coherent analytical unit that has relevant historical, geographic, and cultural meaning in the context of my research goals. In the most general terms, Central Asia is the region that occupies the geographic center of Asia. Culturally, it is a region that is often seen as a crossroads, an area of mixing and exchange. Because of this perception of Central Asia as a transitional zone, Central Asia as a territorial unit has been defined in a variety of ways depending on the chronological and topical concerns being addressed. The most common designation of Central Asia in a modern context is the region that includes the former Soviet republics of Turkmenistan, Uzbekistan, Kyrgyzstan, Tajikistan, and Kazakhstan (figure 2.1). This definition however, may not encapsulate all areas relevant to cultural or ecological issues. The boundaries of modern states are not an accurate reflection of ethno-linguistic and cultural traits that are shared between the former Soviet republics and neighboring regions. For example, Tajikistan shares a language family with Iran, and the Turkic language family that comprises most Central Asian languages is also found in western China's Uyghur population. Central Asia as a cultural region, therefore, is often drawn to include areas of Iran, Pakistan, Afghanistan, western China, and Mongolia.

Central Asia is also often defined in contrast to, or as a sub-unit of, Inner Asia. In their examination of modern-day pastoralist groups, Humphrey and Sneath (1999:2) distinguish these as two “cultural-economic zones.” Inner Asia is comprised of the steppe zones of the countries of Russia, China, and Mongolia. Central Asia is comprised of the former Soviet Republics to the west. They make this distinction based on ecological divisions between the Inner Asian grasslands and mountains and deserts of Central Asia, as well as cultural differences between the Buddhist-shamanic traditions of Inner Asia, and the primarily Islamic Central Asia. Similar distinctions are made based on economic strategies. Inner Asia is associated with nomadic pastoralism, and Central Asia with more sedentary agricultural practices (Humphrey and Sneath 1999).

Figure 2.1 Map showing region of Central Asia including political borders, important geographic features and global location.

In certain contexts, Central Asia is denoted by the broader moniker of “Central Eurasia” especially in scholarship concerned with issues that crosscut the region and also impact regions such as Europe, East Asia, and South and Southwest Asia (e.g., Jackson 2014; Spengler et al. 2014). The themes of my research articulate with questions relevant to broad, even global scale processes of the spread of Islam and the movement of people across Eurasia. However, I have chosen to use the more narrow term of Central Asia rather than Inner Asia or Central Eurasia, because my data address these broader themes in a specific area. In chapter 7, I discuss how my work fits into the expanded narrative, but for chapters dealing with my data, the term Central Asia is primarily used. In addition, as my work is primarily concerned with the Islamic portions of this region, I follow convention by using the term Central Asia rather than Inner Asia.

My research addresses religious and biological communities at medieval sites in Uzbekistan. Therefore, in defining the regional scope of my work, it is necessary to define the areas that shared relevant political, biological and religious landscapes with my sites. Modern-day Uzbekistan was one of the regions invaded by the Arab incursions of the 7th and 8th centuries. The progression of these invasions is described in more detail below. Here, it is important to note that while these invasions affected many parts of Eurasia and Africa, incursions into Uzbekistan were part of a specific set of campaigns that moved out of the Arabian peninsula, north through the Iranian plateau, and across the Amu Darya. For the better part of two centuries, Arab armies moved into the lowland river and oasis valleys of Northern Afghanistan, Turkmenistan, Uzbekistan, and southern Kazakhstan. In the succeeding centuries (9th-13th), Islam was adopted by polities that ruled over these regions and the mountainous regions of Tajikistan and Kyrgyzstan.

In terms of biological boundaries in medieval Uzbekistan, this is a period during which historical documents note migrations and invasions of groups from southwestern Asia and east Central Eurasia. My work focuses on the creation of sustained biological communities. Areas that were likely in most consistent contact with each other, and included Uzbekistan, include: the modern-day states of Uzbekistan, Turkmenistan, Kyrgyzstan, Tajikistan, northern Afghanistan, northern Iran, and southern Kazakhstan. I base the boundaries of this sphere of interaction on shared political systems, evidence of shared material culture, and ease of travel between these regions. This area is bordered to the north by sparsely occupied steppe regions of Kazakhstan, to the west by the Caspian Sea, and to the south and east by high mountain ranges (Himalayan Plateau). This is not to say that no interaction or movement occurred beyond this area, but when considering the populations most relevant to sustained biological communities, it makes sense to use a more circumscribed region.

In summary, in this work, the regional scope of my work addresses the area of Central Asia, which I define here as comprised of the regions of modern-day states of Uzbekistan, Turkmenistan, Kyrgyzstan, Tajikistan, northern Afghanistan, northern Iran, and southern Kazakhstan. This area is bounded to the north by the Kazakh steppe, to the west by the Caspian Sea, and to the south and east by the Himalayan Plateau.

2.2 Current Understandings of Political Succession in Medieval Central Asia

Reviewing current historical and archaeological knowledge allows gaps in understanding to be identified and addressed. As will be shown below, there is a great deal of scholarship surrounding political succession and military campaigns. However, there is little discussion about how these events impacted the diverse populations occupying Central Asia during this period. This review also gives me a reference point against which to compare my data and analyses. To assess how the data in this study compares to current historical narratives, it is necessary to review the economic, political, and ideological system in medieval Central Asia as they are currently understood by scholars. In this chapter, I describe the political and social succession that occurred in Central Asia from the 5th to the 13th centuries as described by historians and archaeologists.

In Central Asia, the period from the middle of the 8th century to the beginning of the 13th century CE is bordered by the Arab invasions on one end, and the emergence of the Mongol empire on the other. It is a period characterized by the rise of nomadic and military polities with far reaching economic, political, and ideological impacts. These centuries also saw the proliferation and entrenchment of many of the ethno-linguistic landscapes that are still seen in Central Asia today. To fully understand the emergence and development of the polities that shaped the social, political, and economic order of this period, it is important to first review the periods directly preceding it. It was during these earlier centuries that the basis was laid for later polities to create large political and economic systems grounded in centralized ideologies and institutions (Islam, monetary systems), but which left in place local forms of organization and identity expression. This stage was set first by the breaking down of strong Iranian states with the Turkic migrations of the 5th to early 7th centuries, the further breaking down of power by the Arab invasions, and the subsequent vacuum of power that emerged with the eventual decline of the Abbasid caliphate.

2.2.1 5th-early 7th Centuries: The Turkic Qaghanates

Historical documents, archaeological evidence, and linguistic analysis indicate that at the beginning of the 6th century, Central Asia's population was predominantly Iranian in ethnic, cultural, and linguistic composition (Bosworth and Bolshako 1998:28; Golden 2006:19). To the east, in the region that is today Mongolia and Xinjiang China, the dissolution of the Xiongnu state in the 1st century CE had begun the migration of Turkic populations west. In the mid-6th century, a remnant group of Xiongnu, descendants of the Ashina clan in the Altai region, founded the first Türk Qaghanate (Bregel 2003:14; Seregin 2014:2139). During the course of the 6th century, the Türk Qaghanate expanded east, defeating the Mongolic Qitan, and west up to the Amu-Darya, subduing the Hephthalites. The Qaghanate was organized politically into an east/west bipartite structure. At first this division was internal, but after 582, each wing became an independent Qaghanate. The eastern wing of the state fell in 630 after engaging with the Sui dynasty of China and succumbing to rebellion from the Oghuz tribes (Bregel 2003:14). The western Qaghanate survived until the mid-7th century, when internecine conflict led to its dissolution.

It is believed that the Türk Qaghanates brought ethnically Turkic populations into western Central Asia, replacing Iranian nomads in the steppe region, and to a lesser extent introducing Turkic populations to the settled oasis regions. Despite the conquest of a large region of Central Asia by Turkic peoples, this period also saw the expansion of the influence of some Iranian groups, particularly the Soghdians. The Soghdians played a pivotal role during this period, both as diplomats to the Türk Qaghans, and in the flourishing of their trade colonies across the region (Seregin 2014:2140). Soghdian colonies were found as far east as north-western China, and facilitated much trade along the Silk Routes. Many of these Soghdian centers, such as Penjikent in modern day Tajikistan, developed into large cities, with historical and archaeological records that indicate culturally and religious diversity (Bregel 2003:14; Sinor 1990:4; de La Vaissier 2005).

2.2.2 7th-8th Centuries: The Arab Invasions

After the decline of the Türk Qaghanate, Central Asia saw approximately a century of independent rule before the beginning of the Arab invasions. In the region known as Transoxiana or Mawaraunnahr (modern day Uzbekistan, Tajikistan, southern Kyrgyzstan, and southwest Kazakhstan), political and economic power lay in the hands of a network of Soghdian city-states (Bosworth and Bolshako 1998:28; Bregel 2003:13). In Bactria (located between the Hindu Kush mountain range and the Amu Darya river, region that straddles modern-day Afghanistan, Uzbekistan and Tajikistan), the Hephthalites, a group believed to have nomadic origins to the east in Tokharistan, held territorial control. In Khoresm (region surrounding the Aral Sea) Iranian culture flourished under the Afrigid Khoresm Shahs (Bosworth and Bolshako 1998:28). Although most of these polities were led by Iranian dynasties and ruled over primarily Iranian populations, Turkic groups were present in the area, especially in northern regions. Beyond the steppe regions, the Karluk, Kimek, Kïpchak and Oghuz Turkic tribes are believed to have infiltrated the regions of Khoresm and Ferghana during this period (Bosworth and Bolshako 1998:28; Bregel 2003:18).

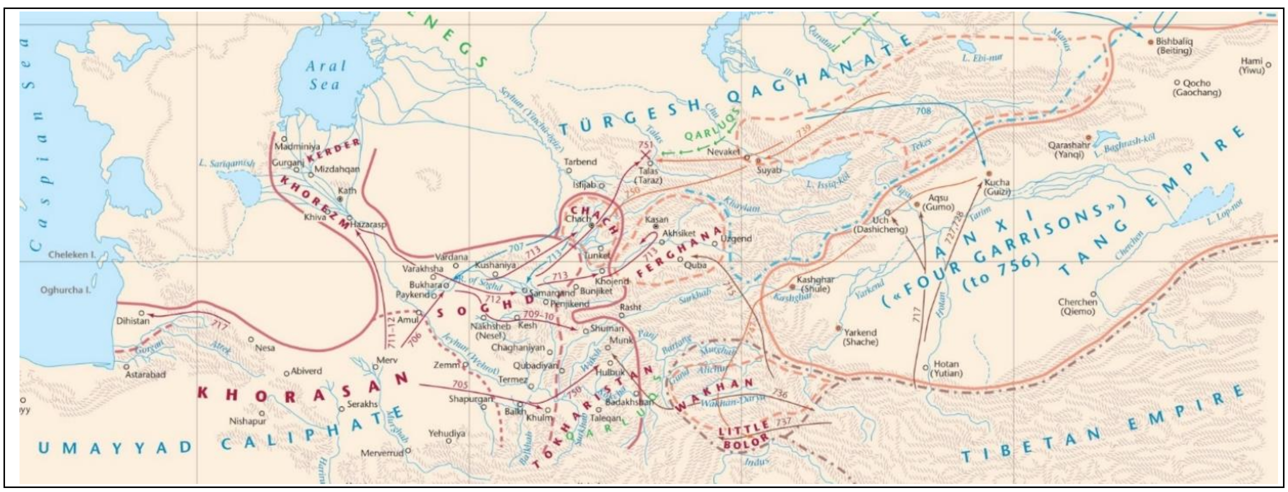

Figure 2.2 Map showing the progress of the Arab armies into Central Asia (first half of the 8th c. CE) (after Bregel 2003: figure 9).

Arab armies first crossed the Amu Darya in 653-654, during the caliphate of Uthman (644-56 CE), but it took them until 674 to make significant progress into Central Asia, with the defeat of the forces of the Soghdian ruler of Bukhara, Bukhār Khudāt (Bosworth and Bolshako

1998:29). Early resistance held Arab progress in check, but by 715, general Qutayba b. Muslim al-Bahili, governor of Khurasan had conquered major cities including Bukhara, Samarkand, and Paykand (Bosworth and Bolshako 1998:29). Initial Central Asia resistance was led by the Soghdian princes. The princes tried to recruit the aid of the Chinese, who refused, and the eastern Turks, who joined in support, but were ultimately defeated (Bosworth and Bolshako 1998:29; Golden 2006). For much of the first half of the 8th century, regions of Central Asia continued to trade hands between local leaders and Arab armies (Sinor 1990). When Arab armies did manage to gain control of cities, the caliphal governors engaged in campaigns to introduce Islam to the region, building mosques and laying institutional groundwork (Starr 2013). In 728, the western Turks nearly pushed the Arabs out of Central Asia entirely, but by 748, Nasr b. Sayyār al-Kinān I, governor of Khurasan, reestablished broad Arab influence in the region, from Khurasan all the way to Ferghana (figure 2.2). An important part of his campaign was to remove the *jizya* (poll tax) from non-Arabs who had converted to Islam.

By the mid-8th century, Central Asian politics and economy had become entangled with that of the caliphate (Starr 2013). This situation left Central Asia with an important role after the splitting of the Muslim community into Sunni, Shiite, and other factions during the Umayyad caliphate and the rise of the Abbasid dynasty. Many pro-Abbasid factions found support in Central Asia. The Kharijites gathered a strong following on their platform of equality for all Muslim subjects regardless of race, and religious positions based on merit (Bosworth and Bolshako 1998:31; Starr 2013). By 750, the Abbasids had taken control of the caliphate (Bosworth and Bolshako 1998: 35). The rise of the Abbasids did not resolve Arab conflicts with the Central Asian Iranians and Turks. While Bukhara remained an Arab stronghold, and local leaders in the region of Iran allied with the Abbasids, dynasties in Transoxania, many helped by

Chinese forces, used the religious and political fracturing as an opportunity to resist Abbasid sovereignty (Bregel 2003:18-20).

2.2.3 9th-13th century: Independent Polities in Central Asia

The Abbasids maintained their territory in Central Asia until the mid-9th century. Deterioration of this control was driven in part by the ambitions of Turkish slave soldiers in Iraq and Syria. The use of Turkish slaves had been an attempt by the caliphate to undermine the independence of Iranian-led forces and exert more direct control on military operations (Daftary 1998:62). However, over time the Turkish ranks incited unrest and rose to positions of influence, ultimately undermining the power of the caliphate they were supposed to serve. This resulted in an inability of the caliphate to control more far-flung territories, and by the mid-9th century, the caliphate functioned as more of an ideological power than a territorial one (Daftary 1998:64). In the aftermath, Central Asia saw the rise of independent polities that were not directly aligned with religious factions.

Samanids (810-999 CE)

One of the earliest of these polities emerged under the auspices of the Abbasid Caliphate. Sāmān-Khudā, the founder and ruler of the estate of Saman with territories in the regions of Balkh, Samarkand, and Termez, converted to Islam while under the patronage of the governor of Khurasan, Asad b. Abd Allāh al-Qasrī (725–7, 735–8). In 805-810, Sāmān-Khudā's grandsons aided the Abbasid caliph, al-Ma'mūn in suppressing local uprisings over taxation policies. The Caliph in turn awarded the brothers control over several important and rich provinces in Central Asia: Samarkand, Ferghana, Chach, Usrushana, and Herat (Bregel 2003:20-21). Although technically subjects of the Tahirids, the Samanid brothers exerted autonomous control over their regions. This is apparent from coins minted in their names, and military campaigns they undertook. The consolidation of Samanid power occurred as these formerly independent provinces were unified under the initial Samanid brothers' sons. (Negmatov 1998:84). During the second half of the 9th century, and into the 10th century, the polity gradually incorporated more territory in the regions of Khurasan, Sistan, Tukharistan and Kabulistan, as well as the Syr Darya Basin, eventually even extending its southern boarders to the Persan Gulf (Negmatov 1998:85).

The head of the Samanid polity was the amir, who in turn appointed governors to each province. The government also included civilian and military bureaus to oversee administrative, political, and economic institutions (Negmatov 1998:86). Records reveal that most of the state's budget was spent on maintaining military and state officials. The Samanid amirs pledged their service to the Abbasid Caliphate, but in reality the polity operated with little influence from the caliph-imam. Despite the centralized nature of the Samanid's monetary system and military, more peripheral regions tended to retain sometimes significant autonomy. This resulted in many local leaders and dynasties remaining in political and economic control. It likely also contributed to continued non-Islamic religious practice in regions such as the upper Amy Darya (Negmatov 1998:85). Social order under the Samanids was largely dictated by land ownership. Dynasty members, major landowners, and religious leaders topped the hierarchy. Their position exempted them from taxation, while smaller landowners and peasants sharecropping had to pay state taxes (Negmatov 1998:87).

The Samanids experienced a period of political stability, economic prosperity, and cultural florescence during the final decades of the 9th century, and the first half of the 10th century. During this period, the Samanids successfully protected much of the core of Central

Asia from external incursions (Bregel 2003:20-21). Under the Samanids, i.e. in the later ninth and the tenth centuries, there was a period of expansion and florescence for the cities and towns of Khurasan and Transoxania – Nishapur, Merv, Balkh, Bukhara, Samarkand, Khujand, Bunjikat, Hulbuk, and so on – around which the cultural, social and economic life of the whole region was concentrated. This peace coincided with great productivity in the realms of literature, art, and the sciences. A great deal of this fluorescence focused on Persian language, identity and history (Frye 1979). Literature sought not only to extol the accomplishments of the Samanid dynasty, but also to resurrect ancient Iranian legends and heroes. Some of this work drew on deep roots of the Saka and Soghdians, especially in the much celebrated tales of Rustam, which were woven into the famous epic, the Shahnameh (Negmatov 1998:99). Despite the anger many Central Asians aimed at Arabs in the wake of their invasions, Arab literature was celebrated in the court culture of the Samanids (Negmatov 1998:97; Yücesoy 2015).

Islamic scholarship was another realm heavily patronized by the Samanids. Two of the six authors of the Sunan were natives of Central Asia (Muhammad ibn Ismail al-Bukhari (810–870) and Abu ‘Isa Muhammad al-Tirmidhi (825–892)) (Negmatov 1998:95). According to historical accounts, this patronization created tension between the Samanids and Turkic soldiers in their service (Negmatov 1998:95). In the 9th and 10th centuries, Sunni Islam was established as the dominant religion in much of Central Asia. Other sects of Islam mostly receded in popularity, although Ismailism did gain a brief foothold. The powerful Sunni religious class, however, suppressed these elements (Negmatov 1998:101) Other religions that continued to be practiced within the Samanid state included Christianity, Zoroastrianism, and Manichaeism (Negmatov 1998:101).

The economy of the Samanid polity relied on agriculture and mining. Across nearly every province, some mineral or metal or was mined, from precious stones to valued metals (Negmatov 1998:89). The textile industry was also important. Settlements near many of the large oasis cities produced cotton fabrics, while woolen cloth (along with leather garments) tended to be produced close to nomadic regions. Other crafts produced in the Samanid polity and traded widely included paper, glass, and armor and weapons. Metal products were especially produced in the areas of Ferghana and Ustrushana (Negmatov 1998:90). This regional patterning of the Samanid economy resulted in towns that specialized in production or trade of certain products (Negmatov 1998:91). Another important element of the Samanid economy was the expansion of urban centers. Large urban centers had long been important to political and economic power, especially in the oases of Bactria and Transoxiana, under the Samanids these centers not only increased their internal influence and production, but also promoted exchange between rural and urban regions.

The specialization of regions was facilitated by the movement of caravans which allowed goods to be transported long distances within the Samanid's territory and beyond, along the Silk Routes. While a significant portion of trade likely occurred on a small scale, Central Asian merchants also reached as far as China, India, Eastern Europe, and into Russia. The extent of these routes is testified by accounts of geographers and historians such as Al-Maqdisī, who witnessed caravans traveling from Sogdiana and Khurasan to Tibet and China. Contact with Eastern Europe was described by Ibn-Fadlan in 921, and corroborated by archaeological discoveries of Samanid coins (Mitchiner 1987:143; Negmatov 1998:91). Much of the earlier trade along these routes was of luxury goods (silk, precious stones, etc.). By the 9th and 10th centuries however, these routes served as lifelines to polities, providing everything from textiles, to weapons, to food (Hansen 2005; Negmatov 1998, 92; Wood 2002:73-80). Caravans were also responsible for the movement of large groups of people. Beyond the drivers and merchants, caravans were usually accompanied by guards. Artisans, scholars, envoys, and other people moving between locations were also often part of these caravans. One of the biggest exports of Central Asia was slaves, including Turkic slave soldiers to Iranian and Arab areas, as far as to Egypt (Bregel 2003:20; Sinor 1990:345). In some cases caravanserais could house in some cases up to 5000 individuals (Negmatov 1998:92).

Up until their decline in the second half of the 10th century, the Samanids maintained firm control over their territories. Arab geographers such as Ibn Hawqal and al-Maqdisī noted the thriving state of the Samanid lands during the height of its power. In the second half of the 10th century, the success of the Samanid state was strained by external pressure from the north-east by the Qarakhanids, and from the south-east by the Ghaznavids. Internal pressure from discontented populations and infighting in the government also contributed to weakening the military and financial power of the Samanids (Negmatov 1998:87).

Ghaznavids (977-1186 CE)

The rise of the Ghaznavids was in part facilitated by the weaknesses of the Samanid polity. The founders of the Ghaznavid polity were Turkic generals in the employ of the Samanid state. By the mid-10th century, several groups of Turkic generals had gained great influence, not just in the military, but also in the realm of politics (Bosworth 1998:103). One of these contingents, led by the general Alptegin, attempted to place into power in Bukhara a leader of their choosing upon the death of Abd al-Malik in 961. They failed, and as a result, Alptegin was sent to the far reaches of the Samanid territory, in the area of modern day eastern Afghanistan, to a town known as Ghazna or Ghazni. While technically still under the auspices of the Samanids –

as can be seen in early Ghaznavid coinage - the Turkic generals were able to establish mostly independent control in the region (Bregel 2003:22). Under the tenure of Alptegin's former slave, Sebüktegin (977-997), the Ghaznavids continued to move toward autonomy. One of the most important elements to this autonomy was the establishment of agricultural revenue territories to support the military endeavors of the Ghaznavids (Bosworth 1998:105). The military exploits in turn, were necessary to both protect the enclave of Turkic control from the surrounding Indian and Iranian powers, and to satisfy their soldiers' need for occupation and income (Sinor 1990: 366).

As the Ghaznavids gained ground and power, the Samanids increasingly relied on their military aid to hold back incursions from the Qarakhanids, who by 992 briefly captured Bukhara, the heart of the Samanid polity (Bosworth 1998:105). The Ghaznavids in the end negotiated with the Qarakhanids to stop their advance at the Syr Darya River. This arrangement left nearly all of Khurasan in the hands of the Ghaznavids, although the Samanids would not officially grant Mahmud (successor of Sebüktegin) control over the region until 999. At this point, such a move was likely only symbolic in effect. Under Mahmud, the Ghaznavid territory reached its maximum extent, stretching to the Caucasus region in the west, south along the Indian Ocean, east along the Indus valley, and bordered on the north by Khoresm and the Amu-Darya River (Bregel 2003:27).

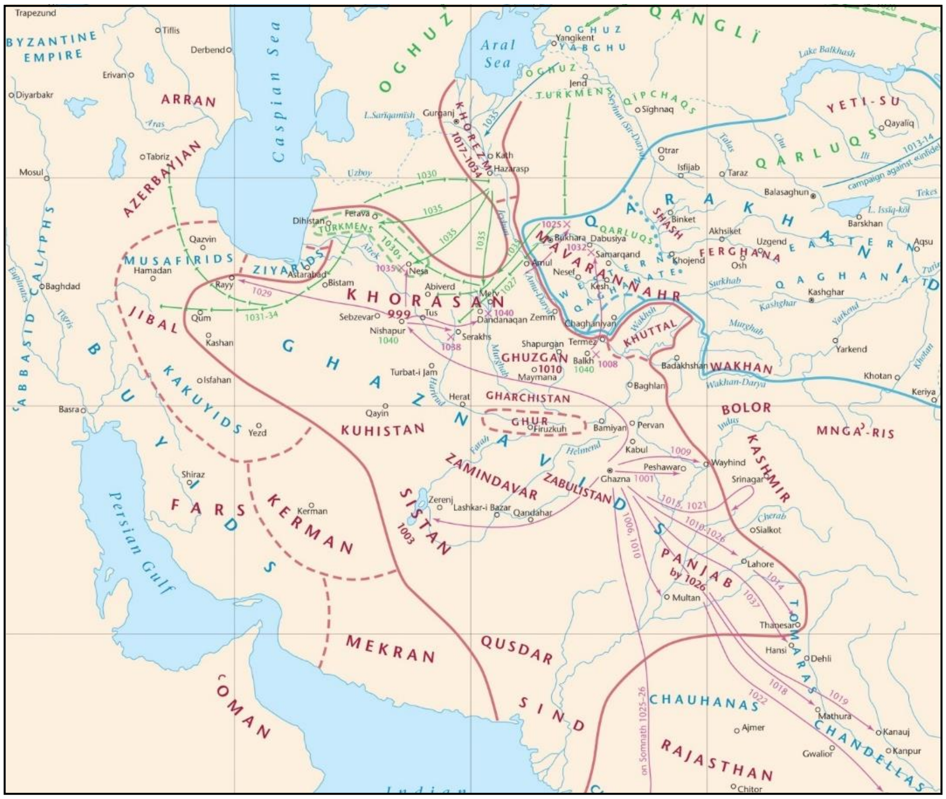

Figure 2.3 Map of political control and military campaigns in the early 11th c. CE (after Bregel 2003: figure 13).

From the late 10th century on, the Ghaznavids controlled the region of Khorasan (see figure 2.3). This was vital to sustaining the polity, as Khorasan was home to extensive agricultural oases, and several large urban centers, resources mostly lacking in the highland regions comprising most of the Ghaznavid territory (Bosworth 1998:107). Another region important to the economic success of the Ghaznavids was Khorezm. While nominally subject to the Samanids, Khorezm had long functioned under its shahs as an independent region. Bordered east by the Qara-Qum Desert, to the southwest by the Quizil-Qum Desert, and to the northwest by the Ust-Yurt Plateau, Khorezm was a land of rich agricultural land, fed by the Amu-Darya delta, in an otherwise arid region (Bregel 2003:3). It was a region that also had long standing trade ties with other regions of Inner Asia and Russia (Bosworth 1998:108-109). Mahmud married his sister, Hurra-yi Khuttalī to the shah of Khorezm, Ma'mūn b. Ma'mūn, and incited internal disputes that eventually led to the assassination of the shah in 1017. Mahmud used this as an excuse to invade and secure Khorezm for the Ghaznavids, ending the last Iranian dynasty in Central Asia (Bosworth 1998:109).

The Islamic devotion of the Ghaznavid Turkic generals was initially questioned by many in the Samanid leadership. By the end of their rule, Ghaznavid rulers would place great emphasis on their image as the defenders of orthodox Sunni Islam. Beginning with Sebüktegin, all Ghaznavid rulers sought legitimization through the endorsement of the Abbasid caliph (Bosworth 1998:106; Sinor 1990:366). This endorsement was encouraged and rewarded by gifts and tribute, mostly derived from Ghaznavid incursions into India (Bosworth 1998:111; Bregel 2003:26). Mahmud seems to have been especially preoccupied with creating an image of himself as the guardian of orthodox Sunni Islam in the face of heretic Muslims (such as the Shiite Fatimids or Ismailiis) and pagans (an increasing concern – at least it is presented as such – with the increasing influx of Turkic nomads) (Bosworth 1998:112). Mahmud is said to have turned down marriage proposals from the Uighur and Kitan on the basis of their non-Muslim beliefs (Bosworth 1998:108).

Ethnic politics were a source of tension in the Ghaznavid polity. The Ghaznavid polity had been founded by Turkic generals, and the bulk of their military, arguably their primary base of power, was Turkic. However, the administration of the Ghaznavid government relied heavily on the Iranian secretarial class, who were part of a tradition dating back to the Sasanians (Bosworth 1998:117). This reliance on Iranian institutions, coupled with the emphasis on the caliphal legitimacy of rulers, seems to have left little space for or interest in promotion of Turkic identity among the Ghaznavid elite. Historical records describe Iranian and Islamic celebrations, but not any related to Turkic identity (Dankoff 1975). Some scholars argue that this lack of a common, widespread identity for the Ghaznavid population contributed to their decline (Sinor 1990:366). Rulers saw their own duty as protecting subjects militarily, and saw their subjects' duty as conducting their occupations and paying taxes. Because of a lack of greater ideological integration, if either side found their duty inconvenient or dangerous, they were more likely to abandon it. Thus, in the face of invading forces, locals were unlikely to resist on behalf of their Ghaznavid rulers (Bosworth 1998:117-118).

The decline of the Ghaznavids, at least in terms of territorial control in Central Asia, was precipitated by conflicts first with the Qarakhanids and then with the Seljuks. When Masud inherited control of the Ghaznavid polity upon his father's death in 1030, it was at its greatest territorial extent. The Qarakhanids were also nearing the height of their power, and increasing pressure was being applied from Turkic tribes migrating west. Despite these growing concerns on the Ghaznavid eastern and northern borders, Masud focused his attention south, on India in pursuit of plunder to fund this massive territory, and to keep the caliph plied with gifts (Bregel 2003:26). Along the outer provinces of the Ghaznavid territory, things began to deteriorate. Relations between the Ghaznavids and the Qarakhanids began to deteriorate when the Khoresm shah Hārūn allied with the Qarakhanid Khan, Alī Tegin, and with groups of Seljuks settled on the Khorezm border (Bosworth 1998:115). The real blow to Ghaznavid stability in Khoresm and Khorasan came with the disruption from Oghuz groups (including Seljuks) moving south into Ghaznavid territory. Their disruption of the economies of these regions, coupled with lack of Ghaznavid support for afflicted towns, led many cities and populations to submit to the Seljuks (Bosworth 1998:116). After their loss of this territory, the Ghaznavid shifted focus to India, where they maintained power until 1186.

Seljuks (950-1157)

The the dynasty known as the Seljuks is known from the first half of the 10th century, when they appear in historical documents as part of the Kïnïk family of the Oghuz Turkish people (Sevim and Bosworth 1998:151; Barthold 1962:109-16). The Dīwān lughāt al-turk, compiled by Mahmūd al-Kāshgharī as a compendium of the Turkic peoples in 1074, identifies them as the leading, princely tribe of the Oghuz (al-Kāshgharī, Dankoff trans. 1982-85). During the first half of the 10th century, the Oghuz inhabited the steppe north of the Aral Sea, and east of the Caspian Sea. Historical accounts from this time (written mostly by individuals of Arabic and Iranian background) describe the Oghuz as wandering like animals, with no real religion (Sevim and Bosworth 1998:151; Barthold, 1962:91–9; Bosworth 1973:215–18). The Oghuz became of interest to many of the sedentary groups during this period due to the movement of these Turkic groups south, likely the result of pressure from other Turkic peoples, the Kïpchak and Kimek, in the steppes further north (Bregel 2003:22). The rise of the Seljuks, separate from their Oghuz kinsmen, began with the appointment of Seljuk (the namesake of the Seljuk dynasty) as war leader by the Yabghu (head of the confederated Oghuz tribes) in the mid-10th century. Shortly after this appointment, the Yabghu decided that Seljuk posed a threat to his authority. In response to heightened internal conflict, Seljuk and his group moved farther up the Syr Darya to Jand (Sevim and Bosworth 1998:152). This move brought Seljuk and his people to the borders of the Samanid state, and therefor *Dār al-Islām*, and Islam began to spread at least within the immediate Seljuk family. During this period, Islam is said to have been spreading across the borders of the Samanid state among “semi-Islamized” nomadic peoples (Sevim and Bosworth 1998:152). Later Seljuk histories claim that with this conversion, the Seljuks quickly became *ghāzīs* (fighters for the Islamic faith). Whether or not this ideology was in fact a driving force, by the late 10th century, the Seljuks were working as auxiliary troops for the Samanids. Around 990, the Samanids allowed the Seljuks to settle between Bukhara and Samarkand.

In the conflicts between the Samanids and Qarakhanids during the last decades of the 10th century, the Seljuks changed allegiance several times, ultimately establishing relations with the Qarakhanids. Arslan Isra'il, Yabghu of the Seljuks, married the daughter of Alīl Tegin, Bughra Khan of the Qarakhanids victory (Sevim and Bosworth 1998:153; Sinor 1990:367). The alliance with Alīl Tegin meant that when the Ghaznavids drove the Qarakhanid khan from Bukhara in 1025, his Seljuk allies were displaced as well. The Seljuks continued to offer their military services in exchange for land and political gain. By 1040, their alliances with the governor of Khorezm, and advances against the Ghaznavids left the Seljuks with an established territory in Khorezm and eventually Khorasan (Bregel 2003:28-29; Sevim and Bosworth 1998:156). After the Seljuk entry into Nishapur, the Abbasid calilph al-Qā'im (1031–75) sent an envoy to Toghrïl, leader of the Seljuks. Upon Toghrïl's declaration of rulership over Khorasan, he sent a letter to the Abbasid caliph. In the *fat'h-nāma* (announcement of victory) to the caliph, al-Qā'im promised allegiance by to the caliph and the cause of orthodox Sunni Islam. The letter also included an ancient symbol of the Turks, a bow-and-arrow symbol (Sevim and Bosworth 1998:158). After securing Khorasan and Khorezm, the Seljuks turned their attention south and west, eventually reaching Baghdad, defeating the Buyid ruler in 1055, and reaffirming the Caliph as the spiritual and ideological head of the Abbasid commonwealth/Abbasid (Sevim and Bosworth 1998:160). This was an important development in the the Abbasid world, as after this period, the secular and religious authorities were treated as two largely independent, if intertwined, powers.

The zenith of Seljuk power came in the second half of the 11th century, during the reigns of Alp Arslan (1063–73) and of Malik Shāh (1073–92). During this period, Seljuk power in

Khurasan and western regions in the Caucasus and Mesopotamia were consolidated. The Seljuk southern border with the Ghaznavids stabilized in the late 11th century (Bregel 2003:28-29). To the east, the Seljuks were able to expand their power at the expense of the Qarakhanids. In 1089, Malik Shah, supposedly at the request of orthodox Sunni groups, invaded Transoxiana with the intent of overthrowing the western Qarakhanid Khan (Bosworth 1998:164; Sinor 1990:367). Malik succeeded, and continued his campaign to Semirech'ye, putting pressure on the eastern branch of the Qarakhanids as well. By the time of his death in 1092, the *khutba,* the weekly religious sermon, was made in Malik Shāh's name from northern Syria to East Turkistan.

After this period of peace and consolidated power, the 12th century Seljuk state was characterized by less centralized power and internal and external strife that lead to its downfall. In the 11th century, the Seljuks had adopted the traditional Turkic east/west organization of state leadership, with the sultan of the western region taking precedent. In 1118, this organization was upset when Adud al-Dawla Ahmad Sanjar, ruler of the eastern Seljuk provinces, took over as supreme sultan. Externally, the Seljuk's greatest opponent was the Qara Khitai, a nomadic Turkic confederation with origins in Mongolia, who by the early 12th century had control of the Semirech'ye region of modern day Kazakhstan and was advancing west (Bregel 2003:28-29). The Qarakhanids were the first to encounter the Qara Khitai, and they reached out to the Seljuks for aid. The Seljuk military, already stretched thin by dealing with border disputes, was further stained by internal conflicts arising from the Oghuz tribes and Khorezmia. According to historical accounts, the Oghuz tribes constituted a considerable element of the population in Khorasan, northern Jibal and the Caspian provinces. Their historical ties to the Oghuz, as well as the importance of the Oghuz as military allies, led the Seljuks creating specific channels of communication and special administrative districts for these groups. The Oghuz reportedly embraced this role: ‘We are the specially close/elite/privileged subjects [raʿiyyat-i khāss] of the sultans and we do not come under the jurisdiction of anyone else.’ (according to Rāwandi, the historian of the Seljuqs, Bosworth 1998:179).

By the mid-12th century, the numbers of Oghuz in Khorasan had grown to an extent that the Seljuks struggled to accommodate them in the administrative and social structure of the Seljuq state. Unhappy with their political treatment and taxation by the Seljuks, the Oghuz captured the sultan Sanjar in 1153 and subsequently swept through Khorasan. With their leadership decimated, the Seljuk state finally succumbed to the advances of the Khorezm and Gurid polities in 1157.

Khorezm State (1156-1218)

The region of Khorezm stands out as unique in its cultural, and political character throughout Central Asian history, and this is apparent during the medieval period as well. Khorezm was an important strategic and economic center, an agricultural oasis in the midst of arid steppe occupied by nomadic pastoralists. It was also unique in its long standing political independence, even when under vassalage of other states. In the mid-12th century, this independence was more completely asserted as an autonomous Khorezm state was created under the rule of Shah Atsïz in 1156 (Bosworth 1998:173; Mitchell 2016). The polity had a short-lived existence, extinguished with the arrival of the Mongols in the early 13th century. Despite its short existence, it had extensive impacts politically and on the cultural-ethno-linguistic landscapes of Khorezm in the second half of the 12th century. Khorezm had been ruled by Turkic Shahs since the Ghaznavids toppled the last Iranian dynasty there in 1017. However, it was under the tenure of the Khwarazm state that the Iranian Khwarazm dialect began to significantly diminish in use, replaced by Turkic dialects (Bosworth 1998:180).

In the wake of the Oghuz's toppling of the Seljuk sultan, the Khorezm Shah was able to step into the relative power vacuum in Khorasan and claim the region. Shah Atsïz also extended his territory north, into the steppe regions between the Aral and Caspians Seas, as well as the area just east of the Aral Sea, a region occupied by the nomadic Qipchaq Turks (Bregel 2003: 33). The greatest extent of the Khorezm state was achieved during the rule of Alā' al-Dīn Tekish b. II Arslan (1172–1200). Up until the rule of Tekish, the Khorezm Shahs had paid vassalage to the Qara Khitai. However, with their sights set on the remaining Qarakhanid lands in Transoxiana, the Shah called on local populations to rise up against the pagan Qara Khitai and ally themselves with Khorezm (Bosworth 1998:174-175). By the early 13th century, the Khorezm State controlled or held vassalage over nearly all of Khorasan and Transoxiana.

The final decades of widespread Khwarazm rule came under the rule of Tekish's son, Muhammad. In contrast to the confrontational approach his father held toward the Qara Khitai, Muhammad took a conciliatory stance with this force in the east, allowing him to focus on pushing the Gurids out of Khurasan where they had made advances. Despite military success on the borders, the political situation soon began to deteriorate from within. The Khorezm Shahs had been demanding and often brutal in their taxation and military recruitment of local populations across their territory. Discontent with these policies erupted in local revolt in Samarkand in 1210 which led to the slaughter of Khorezmians living there (Bosworth 1998: 177). Shortly after this, the Qarakhanid Khan in Samarkand tried to switch alliances from the Shahs back to the Qara Khitai. The Shah ordered Qarakhanid dynasty members there to be killed, ending all but a small holdout of Qarakhanids in Ferghana.

Despite unrest in the core of the state, Muhammad spent the last years of his rule pursuing the western front of his territory. Muhammad continued the anti-Abbasid stance of his father, espousing pro-Shiite rhetoric, and obtaining a fatwah against the Abbasid Caliph. This was in preparation and to garner popular support for his campaign against the caliph, which he undertook in 1217. Word of Mongol forces entering Central Asia stopped Muhammads advance, drawing his attention back east (Bosworth 1998:176; Bregel 2003:35). The entry of Chinggis and his forces into Transoxania seems to have been hastened by the killing of Mongol envoys by Muhammad. By 1218, Chinggis' forces had decimated what was left of the Shah's territory.

Throughout the 12th and 13th centuries, Khwarazm continued to flourish agriculturally. Geographer and traveler, Yāqūt, visited Gurganj in 1219 and wrote that "he had never seen a richer or fairer city in the world than the Khorezmian capital; and he found the Khorezmian countryside extraordinarily fertile, filled with settlements which had markets and an abundance of food" (Bulliet 1972:76 –81). This agricultural success was in part due to extensive irrigation systems, likely based on infrastructure in place for thousands of years before.

Qarakhanids (840-1212 CE)

The Qarakhanid state overlapped and outlived many of the polities described above. While most of these early Islamic Central Asian states lasted at most 200 years, the Qarakhanids maintained some degree of territorial control for close to 350 years. The territorial extent of the Qarakhanids is also notable, at its height controlling one of the largest territories of the Silk Routes in Central Asia. Culturally, the Qarakhanids were a driving force in the Turkicization and spreading of Islam across broad portions of Central Asia society. The Qarakhanid dynasty originated as part of the Qarluq confederation of Turkic tribes (Golden 1990; Kochnev 1996;

Sinor 1990). These tribes were gradually pushed west by Uyghur confederations in regions farther east, in today's Mongolia, China, and Kazakhstan (Bregel 2003). This pressure eventually brought the Qarluq tribes into contact with the northern border of the Samanid state. In 840, the *yabghu* of the Qarluqs, took the title of *qaghan*, founding the qaghanate that would come to be known as the Qarakhanids. Initially, the Samanids had a policy of expansion and invasion against the Karluks and other Turkic tribes in Semirech'ya, capturing Isfijab in 839-840 and Taraz in 893 (Davidovich 1998:121; Bregel 2003:20-21). As time went on however, the Samanids took a more defensive approach, setting themselves up as a barrier or border between Islam and the Buddhist/pagan steppe (Golden 1990:347).

The dynamic between the Samanids and Qarakhanids was transformed by the conversion of the Qarakhanids to Islam in the mid-10th century. The exact date of conversion is not known, but according to historic documents, Prince Satuq was the first Qaghan to convert, followed by the rest of the dynasty. Saltuq died in 955 AD, causing most scholars to believe that the conversion occurred sometime in the mid-10th century (Golden 1990:357). As the Qarakhanids were no longer considered infidels, there was not the same motivation for Samanid soldiers to flock to the border to fight them. This left the Samanids vulnerable, and by 992, the Qarakhanids had conquered nearly all of the northern regions of the state, and by 999 they captured Bukhara, ending the Samanid rule for good (Bregel 2001:22-23). The conquests of Transoxiana were led by Ali b. Musa, head of the dynasty, and his cousin Hasan b. Sulayman, Bughra Khan. The interactions between the families of these two Qaghans, called the Alids and Hasanids by Pristak, would help shape the political structure and dynastic interactions in the centuries to come (Davidovich 1998:121).

The expansion and consolidation of power in the 9th and 10th centuries helped to solidify the political structure of the Qarakhanid Empire. Military and political power lay primarily in the hands of dynasty members, who were the primary rulers in most regions. The division of power within the dynasty was a matter of constant negotiation, with members given the rights to rule and collect revenue from regions known as appanages (Davidovich 1998:122-123). The dynasty was divided in a bipartite east/west system both genealogically and territorially. The dynasty head, or Qaghan, was a member of the eastern branch (Chigil, Hasanid family), and a lesser Qaghan ruled the western branch of the dynasty (Yaghma, Alid family) (Davidovich 1998:126; Golden 1990:356). Not all regions were directly ruled by the dynasty. The areas captured by the Qarakhanids from the Samanids were integrated into the empire, especially those cities important for trade, such as Bukhara and Isfijab, but their rule was also often left in the hands of their former rulers (Davidovich 1998:120-121).

The ostensibly straightforward division of power within the hierarchy and bipartite system was in reality subject to constant negotiation and conflict within the dynasty. This led to situations where multiple dynasty members claimed the right to the same title or appanage. This internal conflict was exacerbated by a shift toward the Qarakhanids locating their centers of power in highly urbanized centers, as opposed to nomadic military camps which had been the tradition dating back to earlier Turkic groups (Schamiloglu 1995). The shift to cities added a new push for more direct control over resources and economy, which in turn precipitated more infighting over control of the most lucrative regions. The mounting tensions culminated in the mid-11th century, when the state split into two Qhanates, one in the west and one in the east (Golden 1990:365). The border between the two Qhanates was in constant flux especially with regards to control over the region of Ferghana.

Initially, control over the western khanate by the Qarakhanid dynasty leaders was not secure, with cities and economies functioning outside state control (Davidovich 1998:126-127). Under the leadership of Ibrahim Tamghach Khan however, the political and economic hierarchy was reorganized to allow more direct control. The appanage system was rearranged to reduce the number of territories and limit the rights of holders. It was also during this period that currency was standardized throughout the western khanate, making it easier for the state to control economies (Davidovich 1998:127-129). Less is known about the political organization eastern khanate. According to Turkic tradition as the eastern region of a bipartite state, the eastern dynasty ruler would have been the highest-ranking dynasty member. It seems more likely, however, that at this point in Qarakhanid history, control of trade centers, not traditional dynastic values dictated the distribution of power (Golden 1990:365).

The start of the Qarakhanid decline can be traced to the splitting in two of the empire in the mid-11th century. After the division, attempts were made to consolidate economic and political power, with some success in the west. However, some regions were becoming increasingly autonomous. As appanages become more independent, they were also more frequently treated as hereditary possessions, with rights bestowed by family, not the state (Davidovich 1998:128). This helped precipitate an economic crisis which also weakened the state. The breakup of large estates led to a fall in prices, and this was accompanied by a decline in the value of silver and a subsequent debasement of coinage (Davidovich 1998: 129; Frye 1979:373). Another internal conflict which disrupted the power of the dynasty was conflict with the ulama (Islamic scholars, and legal experts), which had grown powerful, with clerics holding important government roles, even holding rights over some regions. The ulama succeeded in branding the Western Qarakhanid ruler a heretic, resulting in his execution and allowing the encroaching Seljuks to make inroads into the Qarakhanid political structure (Golden 1990:366-

367; Davidovich 1998:130-31).

In addition to increased internal conflict, the expansionary campaigns of foreign states degraded Qarakhanid political stability and territory. The Seljuks played the Qarakhanids and Khorezmshah off of each other, weakening both (Bregel 2003:26-27). The Seljuks' military power allowed them to expand and take over large portions of the Qarakhanid state in the 11th century, until in 1089, the Seljuks captured Bukhara and Samarkand and the Qarakhanids became their vassals. There was periodic resistance to Seljuk rule, especially in the Eastern Khanate, but with little success (Bregel 2003:30-31). The final blows to the Qarakhanid dynasty as a territorial and military power came from the Qara Khitay. In the 12th century, the Qara Khitay invaded Qarakhanid territory, making them a vassal state and pushing back the Seljuks (Biran 2001:77-79). Eventually, the Qarakhanids existed only as figureheads, surrendering the remainder of their domain in the early 13th century (Davidovich 1998:130).

2.3 Problematizing Medieval Central Asian History

Historians have compiled an impressively comprehensive record of the chronologies, rulership, and military campaigns of the political dynasties of medieval Central Asia. However, this scholarship speaks very little to the experiences of individuals beyond the political and scholarly elite. This is in part due to the limitations of the historical texts from the period, as well as the nature of archaeological research on medieval sites.

The experiences of diverse communities are important to understanding the religious and social landscapes of this period. In Central Asian history, political entities have often been equated with entire cultures and in turn populations. However, even in cases when these groups are said to have arrived with large numbers of followers, as was the case with the Qarakhanids, it is unlikely that the previous population would assimilate to all material and social identifiers of their new rulers. The court culture of ruling dynasties had little to do with the lives of those under their rule. Elsewhere in the ancient world, the maintenance and even intentional emphasis of local identity in the face of even powerful empires is well documented (Crossley et al. 2006; Millar 1968). A nuanced scholarship of the medieval period must therefore take into account the social practices of diverse groups within these regimes. identities outside of these political regimes.

Here I am interested in examining religious and biological communities to address the growth of Islamic practice and ethnic identities of groups across Central Asia. Current scholarship focuses on the role of formal institutions in these processes, especially the conversion of ruling dynasties, taxation practices, and military campaigns. To investigate the ways in which Islam and ethnic identities became embedded in the social landscapes of the region, it is important to identify pathways that are identifiable in the archaeological record. In the next chapter, I address why and how I investigate biological affinity and mortuary ritual to investigate religious and ethnic identities, and propose kinship and mortuary communities-of-practice as more productive ways of addressing landscapes of social identity.

Chapter 3: New Approaches to Investigating Identity and Practice in Medieval Central Asia

This chapter provides the theoretical framework for my research. Current understandings of social identity in medieval Central Asia focus on ethnicity and religion, inferred from historical and archaeological sources. This focus arises from the impact of the spread of Islam and the movement of groups during this period on the political landscapes of Central Asia. Discussions of ethnicity and religion have defined these categories through the identification of shared biological, linguistic, and architectural characteristics. Here I document mortuary ritual and biological affinity to discuss social identities surrounding religion and kinship.

3.1 Social Identity in Archaeology

The study of social identity in archaeology is complex, and constantly evolving. The interpretation of social identity in archaeology must contend with chronological, as well as cultural distance, while pursuing what Gosden (1994:166) has described as, a “search for the things that bind and divide human groups locally and globally.” The creation of an identity category in the archaeological record is inherently etic. Beyond choosing appropriate proxies for identity, archaeologists must also acknowledge the issue of projecting modern assumptions about identity into the past (Insoll 2007:4; Meskell 2002:281). Historically, archaeologists have defined social identities, such as gender, ethnicity and age, through the creation of categories associated with subsets of material culture. As Insoll (2007:13) notes, the concept of identities as monolithic and applicable to broad populations was an idea that emerged from the Enlightenment. In the first half of the 20th century, archaeologists assigned social identity to cultures in ways that essentialized behavior and nature of groups, using terms such as "primitive" and "energetic" (e.g., Hawkes and Hawkes 1942). In the second half of the 20th century, there was increased interest in identity among archaeologists, particularly surrounding the study of ethnic identity in the archaeological record. During this period, archaeological cultures were often equated with ethnic groups (Díaz-Andreu García and Lucy 2005:3). Since the 1990s there has been a resurgence in the study of social identity in archaeological record (Meskell 2002: 282). Recent work still draws on categories such as ethnicity and gender, but has moved away from identification of monolithic groupings often based on modern social analogies, and toward defining social identity expression as a plurality of experience and something created through practice rather than a social manifestation of innate or ascribed roles (Brumfiel 1998; Joyce and Gillespie 2000; Meskell 2007).

Here, I follow Meskell and others who define social identity as relationships created through repeated affirmation of similarity and differences between individuals. As Meskell notes, "identities are multiply constructed and revolve around a set of iterative practices that are always in process, despite their material and symbolic substrata" (2002:281). Social identity, therefore, describes a set of practices performed by individuals that continually construct ascribed and achieved social relationships. Individuals practice multiple social identities, which may change throughout a person's life, and that define how they interact with others and construct relationships (Casella and Fowler 2005). Drawing on this definition of identity, scholars such as Insoll (2007) and Johnson (1999) have suggested that archaeologists focus on identities that can be reconstructed from practices recoverable in the archaeological record. This approach guides my research and analysis, which describes religious and kinship identity in medieval Central Asia through analysis of mortuary ritual and biological affinity.

3.1.1 Previous Work on Ethnicity in medieval Central Asia

In previous work on medieval Central Asia, the term ethnicity is employed in several different ways. The primary uses of ethnicity refer to groups by language, political affiliation, and subsistence pattern. The description of culture groups in Central Asia has a long history of entanglement with ethnicity. During the Soviet-era, there was a strong academic interest in identifying ethnicity and ethnogenesis in Eurasian populations (Bromlei 1974; Bromlei and Kozlov 1989). Ethnicity was often equated with material culture, particularly for prehistoric populations. This perspective has continued to be exhorted by some scholars even in recent decades (Kuz'mina 2007: 67). The discussion of ethnicity in medieval Central Asia shifts away from material culture to a focus on equating ethnicity with language groups and subsistence strategies (Golden 2006). In medieval Central Asia, ethnic identities are also ascribed to medieval Central Asian political regimes and occupations (Bregel 2003).

According to historians, beginning with the Turkic Qaghanates of the 6th-7th c., there was a shift in Central Asia from being ethnically Iranian to ethnically Turkic (Golden 2006, Bregel 2003). This shift occurred on two levels: that of overall population composition, and that of ruling dynasties. The association of ruling dynasties with ethnicities stemmed largely from linguistics. For the Samanid dynasty, the epic tales of the Shahnameh celebrated their ethnic roots by drawing on Iranian heroes and stories, many thought to be quite ancient (Dankoff 1992, Negmatov 1998). One of the only remaining pieces of Qarakhanid literature is the Diwan Lughat at-Turk. This work was a compendium outlining the geographic and political positions of various Turkic tribes and their relationships to each other. It also includes a dictionary of Turkic words and descriptions that also serves as an anthology of Turkic folklore and culture (trans. Dankoff 1982-85). This work was written in Arabic between 1072 and 1094 by al-Kashgari, and was aimed at introducing the caliphal elite to the politics, culture, and language of the peoples who ruled Central Asia. It declares the superiority of Turks over other peoples and even their divinely endowed right to rule. The other piece of Qarakhanid literature that survives is the Qutadghu bilig, written in 1069 by Yusuf Balasaghuni. The volume is a narrative in the "Mirror for Princes" style (trans. Dankoff 1983). This text gives advice to a ruler using allegorical characters who espouse Islamic virtues and wisdom. The Shahnameh and Qutadghu bilig have been noted for being written in the native tongue of those who commissioned them. After the Arab invasions, Arabic was adopted in Central Asian courts as the language of politics, scholarship, and literature. The use of Persian by the Samanids and then Turkic by the Qarakhanids, therefore, has been seen as a statement of ethnic identity.

Ethnicity has also been equated with occupation and social role. Many scholars note that dating back to the Sassanians, there was a strong Iranian secretarial class. These individuals were often employed in the governments of not just Iranian dynasties, but also Turkic courts (Johnson 2006). Their value lay in their intimate knowledge of land taxation systems, which involved a deep understanding of land and crop quality. This knowledge was closely kept, and passed on through inheritance, limiting those who could enter their ranks (Bosworth 1998:39). Sogdians are described as often engaged by courts to act as ambassadors and diplomats. In terms of military positions, historical records note the dominance of Turks and particularly Turkic slave soldiers in armies from the Middle East and across Central Asia no matter what the ethnic background of the ruling class and general population (Sinor 1990). Language was also used to group individuals ethnically and spatially. During the Arab invasions, Persian language was used to distinguish Central Asian Muslims (largely Iranian) from Arabs and "pagan" Turkic nomads (Negmatov 1998:84). One common statement made is that most urban areas in medieval Central

Asia were Persian speaking, despite an influx of Turks. This has been used as evidence that Turkic peoples migrating into the region at this time did not sedentarize (Bregel 2003:28).

The focus on ethnic identity in medieval Central Asia extended into biological anthropological analyses as well, particularly craniometrics. Changes in cranial shape were assumed to be driven by migration and indicative of shifting ethnic identity (Hodjaiov 1987). It was assumed that the ethnic groups identified from historical documents and archaeology would be reflected in biological affinity. The majority of biological affinity studies looking at ethnicity in medieval Central Asia used linear craniometric analysis to distinguish the distribution of two broad ethnic categories: “mongoloid” and “caucasoid". T.K. Hodjaiov and colleagues conducted most of these types of studies with Central Asian populations, particularly those in Uzbekistan and Tajikistan. These studies do not show clear cut distinctions of “mongoloid” and “caucasoid” populations in different regions of Central Asia, but rather a gradient across time and space (Hodjaiov 1987; Kiyatkina 1976). Yet despite these results, the narrative of distinct eastern and western populations still permeates much of the scholarly literature and national dialogues of the Central Asian republics. The recently published work on skeletal biological variation in medieval Central Asian samples was written by Hodjaiov. His 2015 publication, however, uses the same samples and standards for ethnic identification as his monographs from the 1980s (Hodjaiov and Hodjaiova 2015).

Another set of studies uses ancient DNA to sort medieval Central Asians into ethnic categories. These studies map biological composition of Central Asian populations using molecular genetics approaches that cover broad time periods, some of which include the medieval period (Martinez-Cruz et al. 2011; Comas et al. 2004; Unterländer et al. 2017). The methods employed in these studies have the ability to show biological variation and affinities.

Yet, most have focused on associating ancient samples with modern large scale biological groups and ethnicities ("western peoples," "Eastern Eurasian groups," "East Asian"). An increasing number of these studies supplement modern samples with ancient DNA extracted from archaeological samples, the majority of which are derived from Bronze and Iron Age collections (Unterländer et al. 2017; Haber et al. 2016). A limited number of ancient DNA studies specifically include medieval Eurasian samples derived from Mongolian or Eastern European individuals, but Central Asia has largely been overlooked.

I address ethnicity here because it is important to how people have conceptualized political, religious, and linguistic change during the medieval period. However, I argue that the equation of ethnicity with politics, linguistics, and religion, has led to misinterpretation of archaeological data as indicative of ethnic identity. This issue of conflation of ethnic groups with culture groups is addressed by Stovel in the context of Andean archaeology (2013), where the term ethnicity has been used in a similarly ambiguous way as in medieval Central Asia. In both contexts, historical documents are invoked in the identification of ethnic groups (Stovel 2013:4-5). Andean archaeology has already begun to struggle with how to reframe ethnic identity as "a reflexive, perhaps intentional, political identity that develops due to specific economic and political circumstances" (Stovel 2013:4). In this study, I will use my data to examine whether ethnicity in medieval Central Asia conforms to the traditional narrative in which ethnicity is equated with biological similarity and religious practice, or whether the narrative of Central Asia should be reoriented towards an acceptance of ethnicity as a self-defining system not necessarily bound by biological affinity (Barth 1969; Jones 1997).

3.1.2 Previous work on Religious Identity in medieval Central Asia

The literature on medieval Central Asia also conflates religion with social identity.

Scholars describe a shift from a diverse set of religions to a progressive spread of Islam. Similar to ethnicity, religion was equated with political regimes. Unlike ethnicity, historical and archaeological records emphasize the diversity of religious identities across the region. While changes in ethnic identity in Central Asia are presented as the result of the migration of people and dynasties changing the linguistic and biological landscapes over time, changes in religious identity, particularly Islam, are framed as instigated initially through force, then from political and economic motives.

Archaeological and textual evidence from the centuries leading up the medieval period document a diverse religious landscape across Central Asia. The "global" religions of Manichaeism, Zoroastrianism, Christianity, Judaism, and Buddhism all had followers in Central Asia in the 7th century. There was regional patterning to the practice of these religions. Buddhism was popular in eastern regions around the Tarim Basin, but also had a strong following in Bactria (Bosworth 1998:28). Buddhism was present more broadly across the region, but as the pilgrim Hsüan-tsang noted, by the mid-7th century, Buddhism was losing ground to Zoroastrianism in areas such as Transoxiana and Khorasan, thanks to Sasanian influence. Christianity was known at least in Khoresan by the 4th century, by which time there was a bishop in Merv. By the 7th century, Nestorian, Jacobite, and Melkite Christian sects were present in Tansoxania and Khorezm (Bosworth 1998:28). Manichaeism was popular during this period among Uighur populations in Western China. Textual history has less to say about local religions, especially those of the populations inhabiting the steppe and highland regions. What texts we do have often portray these groups as having no religion, or practicing animistic beliefs, both of which are framed as barbaric or at least undesirable states (Di Cosmo 1994). Based on archaeological evidence - especially burial practices and Turkic runic inscriptions - scholars have described nomadic peoples' religions in the 7th-9th centuries as expressions of the Tengri-cult, shamanism, and ancestor worship (Golden 1998). Accounts of travelers such as al-Idrīsī (d. 1166) and some Turkic inscriptions also indicate some incorporation or adherence to Buddhist, Nestorian Christian, and Manichaean practices (Golden 1998:184-185).

The arrival of Islam with the Arab invasions had a significant, if not immediate, impact on the diversity of religions in Central Asia. Adherence to Islam can be deduced from the actions and statements of political regimes, and from the physical correlates of Islam including architecture and burial practice. The built environment of large urban centers (Islamic cemeteries, mosques, madrasas, and hospitals) reflects their role as centers of Islamic culture. It was in these centers that caliphal and then indigenous governments funded building projects for mosques, madrasas, and other Islamic institutions. Many of these public Islamic works were established early. Arab sources claim that by 715 mosques had been established in all major cities in Central Asia (Bosworth 1998). Taxation based on professed faith originated with the Arab invasions. Initially, the poll tax, jizya, was enforced on all non-Arabs in Central Asia, even those who converted to Islam. This was eventually removed by the governor of Khurasan, 748, Nasr b. Sayyār al-Kinān I, so that only non-Muslims were required to pay this tax (Bosworth 1998:41).

In the wake of new ties entangling Central Asia politically, economically, and ideologically to the Umayyad and then Abbasid Caliphates, Islam became an important element in many dynasties' bids for power. The Qarakhanids enacted this with their statement of mass conversion under Sartuq (Davidovich 1998). Ghaznavid rulers sought legitimacy directly from the Caliph, and buttressed this relationship with gifts to the Caliph (Bosworth 1998:111; Bregel 2003:26). The relationships between Central Asian rulers and the Caliph also had military consequences. In official declarations, the defense of Islam was commonly used as a rallying cry or justification for military action. The call to defend Islam was used by nearly every medieval Central Asian dynasty at some point. The Samanids' defense of their border against incursions of the Qarakhanids was aided by influxes of soldiers said to have been motivated by a desire to defend Dār al-Islām from the pagans. When the Qarakhanids converted to Islam, this motivation disappeared, which may have contributed to the subsequent territorial gains by the Qarakhanids (Golden 1990:347). The call to defend the lands of Islam against outsiders arose again with the arrival of the Qara Khitai. These campaigns resulted not just in the mobilization of troops for battle, but also the establishment of border forts (Sinor 1990).

According to historical studies, religious diversity persisted within and outside of Islam. In the mid-8th century, there were still many Zoroastrian and neo-Mazdakite communities in Central Asia, especially in the mountains and rural areas (Bosworth 1998:54). At the site of Frinkent, there is evidence for Zoroastrian burial into the 13th century (Suleimanov 2007:208). Despite the extensive conversion to Islam, a diverse range of Islamic sects gained popularity in Central Asia. Sufi missionaries gained extensive followings in the area. Some researchers attribute this to parallels between Sufi mysticism and shamanic practices (Mélikoff 1996). Other sects, such as the Kharijites were also popular (Starr 2013). Complicating the spread of Islam was the region's long history of religious syncretism. Even after the introduction of global religions, some of which espoused strict doctrine, archaeological evidence from burials, temples, and altars reflect a religious landscape in which symbols and practices were regularly borrowed (Mélikoff 1996; Suleimanov 2007). There is indirect evidence for syncretism in the Qarakhanid period in the Kitab al-siyar, from the legal works of Qadi Khan, which refers to individuals who both read the Qur'an and worship idols (Biran 2001).

Scholars have also argued that practice of Islamic religion differed between urban and rural settings. The introduction of Islam into Central Asia saw its earliest successes in the region's urban centers. Arab invasion efforts focused on these cities as strategic and ideological targets (Sinor 1990:344). From a logistical standpoint, urban and agriculturally intensive regions were easier to control than to nomadic regions where populations and resources could more readily mobilize. Ideologically, urban regions may have also been more receptive to Islam due to the presence of large communities of Christians, Buddhists, Zoroastrians, and Manicheans in the region for centuries before the arrival of Islam. Many of these "universalist" religions preached similar core values such as kindness, truth, the existence of heaven and hell, and a binary of good and evil (Suleimanov 2007).

There is not much evidence that speaks to the status of Islam in rural areas. The disdain seen in writings about steppe and highland peoples from the earlier period continues in later texts discussing Islam or lack thereof in these regions. As mentioned above, religious diversity and syncretism may have been more widely maintained in highland and steppe regions. Zoroastrian and neo-Mazdakite communities are noted in Central Asia, especially in the mountains and rural areas at least as late as the mid-8th century, and in some areas as later as the 13th century (Bosworth 1998:54; Suleimanov 2007:208). There was also at times direct opposition to Islam in these regions. In the late 8th century, a preacher named Hāshim b. Hakīm began a peasant rebellion. Historical records say that his supporters hailed primarily from regions of Transoxiana where Buddhism and Manichaeism persisted, and from highland regions where Islam had not yet taken hold (Bosworth 1998:41). This movement at its height captured towns near Bukhara and even gained control of Samarkand for a time. The defeat of this rebellion is noted by some historians as the point of victory for Islam in Central Asia broadly.

The current narrative of religion in medieval Central Asia reflects the tension between political, personal, and social motives, but on a broad scale. Diversity is acknowledged at the level of religion, or religious sect, but the practice of religion is rarely discussed. The one place medieval religious practice is recorded archaeologically in detail is burial practice. Scholars have noted variation in mortuary ritual within sites, but this variation is only acknowledged at the level of religion or is not discuss beyond description or analogy to earlier burial types (Amirov 2010). This approach leaves us with little understanding of religious practice and its relationship to personal and group identities during this period. As I argued above, identity is continuously created through practice. To understand religious and social identity in medieval Central Asia therefore, it is necessary to document religious practice. Religious classification in past archaeological studies of medieval Central Asia focused on similarity of form in religious architecture and burial (Amirov 2010; Nemtseva et al. 1977). This study explores heterogeneity in religious identity by examining ritual practice in mortuary contexts within a communities-of-practice framework. This framework, elaborated below, allows examination of mortuary ritual as an expression of diverse intentional religious identity.

3.2 Practice and Identity in Mortuary Ritual

Diverse evidence of religious practice exists in the archaeological record. In medieval Central Asia, mosques, mausolea, and shrines are widely cited as evidence of religious practice (Nemtseva et al. 1977; Dawut 2009). These contexts however, are often sites of limited access (mausolea) or periodic engagement (shrines). Others may represent more consistent practice but the scale of population involvement cannot be assessed archaeologically (mosques). In contrast, formal disposal of the remains of the dead is an act that through practical necessity affects all members of society. Death is universal. Therefore, the disposal of the dead since the earliest evidence of our species, and even before (Trinkaus et al. 2014; Rendu et al. 2016). Study of mortuary ritual therefore can capture this aspect of religious practice of a large portion of society. In addition, many of the dominant religions of medieval Central Asia, including Islam and Zoroastrianism, placed importance on the disposal of the dead in a specific manner. Mortuary ritual is therefore a productive avenue to document religious practice in the past.

3.2.1 Mortuary Theory in Archaeology

In the early days of anthropology, mortuary practices were seen as reflections of the religious or spiritual beliefs of a group, especially in groups deemed "primitive" or "non-complex" (Garstang 1907; Tylor 1889). In archaeology, prior to the 1960s, burials and their contents were largely analyzed through a diffusionist/historical (e.g., Elliot-Smith 1911) or evolutionary (e.g., Childe 1946) approach. Diffusionist approaches considered burials objects shaped by their material culture which was derived from contact with other societies. Evolutionary interpretations of burial ranked rituals on the basis of their perceived progression from earlier forms (Renfrew et al. 1974). The advent of processual archaeology in the 1960s brought on new perspectives in mortuary analysis. Researchers such as Binford (1971) and Saxe (1970) began to examine burials as a reflection of social organization, integrating their analyses into broader discussions of the social, political, and economic order of societies. Processual studies of burial argued that mortuary ritual could reveal social organization of societies (Goldstein 1981; Saxe 1970; Peebles 1972). Post-processual archaeology emerged in the 1980s and introduced an emphasis on ideology to mortuary analysis (Hodder 1985). Rather than burials being a direct reflection of the complexity of a society's structure, burials were framed as representing complex interactions between individual agency and social power structures (Parker Pearson 1982, 1999).

Reactions emerged against the post-processual tendency to avoid assigning analytical value to burial ritual elements. Running through these new approaches is an emphasis on context. Contextual approaches require understandings of histories of burial practice and other relevant archaeological and bioarchaeological information to establish the significance of objects and practice (Goldstein 2001; Brown 2007). Privileging context allows an integrative approach to mortuary analysis that addresses both social organization and ideology, as well as social identity (Chesson 1999; Gamble et al. 2001; Schwartz 2007). This approach takes into account the social contexts of both the dead being buried and the living conducting the burial. New perspectives have also emerged in mortuary archaeology that focus on specific social identities. Feminist and queer archaeology have emphasized the role social identities, especially gender, may play in burial (Blackmore 2011; Joyce 2001; Robb and Harris 2018), Marxist approaches have looked at burials as reflections of class and economic tensions (Lull 2000, MacDonald 2001), and other researchers are pursuing burial analysis through specific analytical lenses such as social memory and life-history reconstruction (Knudson et al. 2012; McAnany 2010). Current mortuary theory has been neglected in medieval Central Asian contexts. In this study, I use an integrative approach to mortuary analysis that uses a communities-of-practice framework to discuss mortuary ritual as reflective of religious practice, identity, and community organization.

3.2.2 Communities-of-Practice

Communities-of-practice (hereafter denoted as CoP) is a concept that was first developed by Lave and Wenger (1991) to examine the relationship between knowledge transfer and local social structures. Lave and Wenger define a CoP as “a system of relationships between people, activities, and the world; developing with time, and in relation to other tangential and overlapping communities of practice” (1991:98). The underlying prerequisite for the emergence of a CoP is mutual engagement by individuals in a joint enterprise (Roberts 2006). This mutual engagement may arise from the need for multiple individuals to complete a task or from the need to teach skills for future completion of a task. As individuals interact, they develop norms and expectations, sets of behavior that have been compared to Bourdieu's concept of habitus. Bourdieu defines practice as the continual production of new states of habitus (1977). A CoP is therefore a group of individuals (community) interacting around a shared objective that requires a continual creation of technical knowledge and social understanding (practice). These practices, reflecting both the pursuit of enterprises and the associated social relations, can be considered the property of the community that created them (Wenger 1998:45). These practices may encompass language, techniques, and lore, as well as access to physical resources and individuals (Wenger 1998:72–84). Another important property of CoP is the physical translation of knowledge into physical form ("reification") (Kimble and Hildreth 2005:104). "Reification" generates and sustains CoP, because creation requires a community, and the need to continue producing requires a suite of practices that can be transferred between individuals. "Reification" is also what allows archaeologists to study CoP, as it leaves behind physical objects, tools, and production spaces that can be used to recreate activities and relationships.

The concept of CoP has gained traction in recent decades in archaeological disciplines concerned with craft production, including ceramic (Sassaman and Rudolphi 2001; Dupuy 2016), textile (Peters 2014), and stone tool manufacturing (Arthur 2010). CoP allows archaeologists to move beyond simple technical descriptions of production and investigate the social elements of craft production and learning. Objects and contexts recovered in the archaeological record contain layers of information about the creation and function of CoP. The artifact or context itself reflects the shared enterprise that resulted in the CoP. The form, style, and technical aspects of the context reflect the knowledge produced and cultivated by the CoP. The location of a context or deposition of an object can give additional information on the origins, organization, and extent of a CoP. A CoP approach to crafts in the archaeological record requires that scholars deconstruct not just the knowledge enacted in artifacts, but the social contexts within which this knowledge was produced and passed down. Many archaeologists have approached this by integrating technical analyses with ethnoarchaeological studies of chaîne-operatoire and apprenticeship (Kohring 2011; Wendrich 2013). These studies show the diversity of social structures, associated with CoP. Knowledge production and practice can occur within almost any social category, and many archaeologists have argued that CoP can be related to social identities such as ethnicity, gender, and religion (Minar 2001; Eckert et al. 2015). Often, membership and practice is guided by these identities. For example, in certain groups of the American Southeast, pottery is a gendered craft, produced by women (Sassman and Rudolphi 2001: 408). CoP surrounding pottery production were additionally shaped by social organization in which there was geographic continuity for women. In this case, gender identity structured CoP membership, while social organization influenced modes of knowledge transfer from mother to daughter (Sassaman and Rudolphi 2001). In the archaeological record, these identities may be reconstructed from aligning technical and stylistic elements of a craft with contextual data on biodistance, residency patterns, or ethnographic analogy.

3.2.3 Mortuary Communities of Practice

Archaeologists have primarily applied CoP to craft production; however, the concept can be used to interpret a wide range of archaeological contexts. It can be an especially strong tool for analysis of mortuary ritual. Current literature argues that rituals are not simple the embodiment of beliefs, religious, social, or political, but instead act to construct, create, or modify beliefs (Bell 1992; Humphrey and Laidlaw 1994). This approach has been used by archaeologists such as Bradley (1991, 2002, Bradley and Williams 1998), Rowlands (1993), and others (Chesson 2001; Meskell 2002; Pauketat et al. 2002; Van Dyke and Alcock 2003). The same rituals may be performed for long periods of time, but their meaning is constantly negotiated depending on social contexts. Practice theory emphasizes the experiential aspects of ritual and the effects of ritual on the social relations between participants (Fogelin 2007). This approach is similar in many ways to CoP. In CoP, the experiential aspects of an objective and social relations are what create and sustain the community. Mortuary analysis is an appropriate context to bring ritual practice theory and CoP together. Burial of the dead is an act that occurs repeatedly, affects all members of society, and is often the location of social, political, and religious negotiation. A CoP approach allows us to inquire about the community of participants and knowledge surrounding mortuary ritual, while asking how the practice of this rite affects the participating community. It presents the possibility that the practice of mortuary rituals fosters a sense of community that interprets and transforms rather than directly echoing existing social communities, and that these communities hold interest beyond their ability to execute these rituals. This also allows us to move beyond reconstruction of ritual to defining a mortuary CoP.

A mortuary CoP is comprised of the individuals performing the burial ritual, the deceased, the relationships between the living participants and between the living participants and the deceased, and the knowledge on how to perform the mortuary ritual. These communities can be detected by identifying shared, repeated practice in burials. Archaeologists use a range of criteria to identify social groups from mortuary practice: spatial location, structural form, grave goods, and body treatment. The categories for identifying groups depend on contextual knowledge relating to ideology and social organization. Analysis is also guided by data available, which is constrained by burial treatment, taphonomic processes, and excavation techniques. A CoP approach works to deconstruct the entire process of creating a burial and the social context surrounding the knowledge of how to properly bury the dead. From this perspective therefore, we are not limited by typical indicators of status and wealth, but instead are directed to think about nuances of syntax based on norms that on the one hand are guided by the prescriptions of the community being served, and at the same time reflect nuances of relationships and practices. By examining a broad range of elements of mortuary ritual, CoP can be applied to diverse mortuary contexts.

Spatial Elements

Spatial variables relate to the location and spatial organization of cemeteries and individual graves. The placement of the dead and creation of mortuary spaces on the landscape can contain several layers of meaning. We can look at the location of the dead on several scales and interrogate each of these for their own level of meaning. The landscape location of a burial ground can reflect the relationship between the living and the dead (Goldstein 2002; Parker Pearson 1999:124). The placement of dead may reflect the desire to separate the living from the dead, as is seen at Stonehenge where there are bounded, separate spaces for living and burial (Pearson 2013). In contrast, burial in the walls or floors of domestic structures can be indicative of sustained relationships between the living and the dead (Gillespie 2002). Location of burials on the landscape can also impact visibility. The visibility of burials has been associated with the projection and negotiation of power (Goldstein 2002). Visibility is especially important when considering the relationship between burials and territoriality. Saxe's hypothesis 8 stated that when access to resources are grounded in ties to the dead, we would expect there to be permanent, visible areas for the disposal of the dead (Saxe 1970:119). In diverse contexts including Bronze Age Mongolia (Honeychurch 2013), 12th c. Brazilian highlands (Iriarte et al. 2008), and Iron Age Thessaly (Georganas 2002), archaeologists have argued that highly visible burial monuments were in part designed to validate or reaffirm territory claims through creating a literal connection between a lineage and landscape.

Internal organization of burials within cemeteries on the other hand, has been shown to be more closely associated with social position, or perceived position, of the deceased or deceased's family in society (Ensor et al. 2017; Stojanowski and Larsen 2013). Patterning of different types of burials can therefore be interpreted as reflecting social organization (Peebles and Kus 1977; Goldstein 1981; Carr 1995). Clustering of burials, central-peripheral burial placement, or other organization that imposes spatial separation or ranking has been interpreted as demonstrating social distance between individuals or groups (Tainter 1975; Howell and Kitntigh 1996). Examination of the spatial construction of landscapes for the dead can thus reveal the ideological and social organization within which communities-of-practice functioned. This contextual information is important to interpreting mortuary ritual.

Burial Architecture

Burial architecture refers to all above and below-ground structural elements associated with mortuary ritual and interment of the dead. Until the second half of the 20th century, archaeologists believed the size and wealth of a burial to directly reflect the wealth of an individual during their life (e.g., Kendrick 1940). In the second half of the 20th c., the idea of burial architecture as energy expenditure was developed (Saxe 1970; Tainter 1975, 1978). According to this line of argument, the larger, more complex a burial, the more resources and labor required, and therefore, the more power, influence, or status, could be ascribed to the deceased. Recent work on mortuary architecture has worked to contextualize energy expenditure within particular cultural and geographic contexts (Flad 2001; Allard 2001). Additional work has also shown that energy expenditure is not necessarily reflective of status (Bloch 1971; Braun 1981; Carr 1995). Using ethnographic and archaeological examples, scholars have shown that energy may be expended in the transformation of status, for example to an ancestor, rather than the reflection of status in life.

Another important component of burial architecture is the difference between below and above-ground structures. Above-ground structures are in part related to concerns of visibility, discussed above (Honeychurch 2013; Iriarte et al. 2008; Georganas 2002). Below-ground components on the other hand, are only briefly visible, and then only to those individuals involved in burial. Documenting burial architecture is crucial to a CoP approach to mortuary ritual. By constructing a grave, members of a mortuary community of practice are building a space for the dead. This practice draws on ideological and religious understanding of what a proper place for the dead is. Furthermore, below-ground components of burial architecture are the most likely to reflect community practice as they are not within the public eye.

Body Treatment

Body treatment includes how the body of the deceased is processed and placed in the grave, as well as any grave furniture and goods accompanying the body. Much of the literature related to the inclusion of grave goods in burial has seen a similar trajectory as the analysis of burial architecture. Greater amounts and quality of objects and personal adornment in burials was initially considered indication of high social status and wealth, but more recent work emphasized the need to interpret the adornment of the body and grave within the relevant cultural context

(Tainter 1975; Carr 1995). In recent decades, there has been increasing interest in what grave goods, and especially adornment reveal about both social and individual identity in the past (Joyce 2005; Meskell 2000). Personal adornment in society is an important means of non-verbal communication. The arraying of the body in death functions in a similar way, signaling to those present and able to read the body, information about who the deceased was in life and is in death. Treatment of the body also includes positioning in the grave and any post-mortem processing such as defleshing. Whereas adornment has been hypothesized to be primarily related to the social identity of the deceased, arrangement and modification of the corpse in burial has been more often documented as reflective of societal perceptions of the body (Bazelmans 2002; Carr 1995:157; Boyd 2002; Joyce 2005). According to Carr's cross-cultural work, body orientation and position was most commonly associated with beliefs about the afterlife and the order of the universe (1995:157).

3.2.4 Burial Practice in Medieval Central Asia

In this study, I will use components of mortuary ritual to identify and discuss mortuary CoP in medieval Central Asia. Islamic burial practice dominated mortuary practice in medieval Central Asia. Islam dictates that individuals should be equal in death (Halevi 2007). In Islam, this includes prescriptions against burying the deceased with grave goods, or raising elaborate structures above graves. Islamic burials have not garnered the same attention from mortuary archaeologists, as it is often assumed that there is no notable variation in Islamic mortuary practice, or that practices are easily attributed to Islamic burial prescriptions. This narrative of homogenous, simple burial practice is presented either implicitly (Insoll 1999; Halevi 2007) or explicitly (Zakrzewski 2010:193) in much of the literature specifically addressing Islamic burial. The one element that scholars consistently note as a source of variability and debate in early

Islamic burial is the building of external structures over graves (Brand 1993:325; Halevi 2007; Insoll 1999). This debate however, only applies in a significant way to members of the elite, saints, and others with enough political or religious power to merit construction of mausolea.

Recently, there have been some archaeological investigations of Islamic burial variability beyond the question of external structures. Gorzalzcany (2007) records variation in grave axis orientation in Late Islamic cemeteries of Israel/Palestine. Schultz (2006) and Zias (2000) describe Islamic Bedouin graves at the 15^{th}-19^{th} c. cemeteries of Qumran and Tell el-Hesi, Israel, noting the inclusion of grave goods as divergent from non-Bedouin burial in this period. These studies document the presence of variation in grave structure, orientation, and grave goods across the ancient Islamic world and within Islamic cemeteries. However, much research focuses on justifying burial variation within the scope of Islamic prescriptions. For example, Zakrzewski (2010) and Gleize et al. (2016) document Islamic burials in Spain and France, comparing them to examples known from Southwest Asia, and conclude that despite variation in practice, they fall within Islamic prescriptions and thus do not merit further investigation.

Other widely practiced religions from the medieval period in Central Asia, including Zoroastrianism and Buddhism, also have burial prescriptions that do not include many of the typical markers of social status and wealth such as grave goods and elaborate structures. The other significant limiting factor is a lack of broadly published data on burial practice in medieval Central Asia. My study documents variability in mortuary ritual, focusing on burial architecture and body treatment to identify mortuary CoP. I then contextualize these communities within current knowledge of Central Asian religions to discuss religious identity and practice in medieval Central Asia.

3.3 Biological Affinity

Social identity and bodies are intimately intertwined. As much as the interpretation of bodies is socially constructed, this interpretation is still laid over a biologically constituted entity (Insoll 2005:4). As Caldwell (2005:30) observed, "our bodies need to be biological bodies if they are also to be social ones." In this study, I use cranial shape to model biological affinity between individuals in my sample. Biological affinity is a relative term that refers to degree of genealogical closeness between individuals and groups (Steele and Bramblett 1988). Biological affinity is the result of reproductive practices rooted in social negotiations, which literally reproduce biological bodies out of social relationships. The social relations that may lead to reproduction are basically innumerable. However, most reproduction is guided by preferences or prescriptions generated by social groups. As discussed above, social identity is created and reproduced through iterative practice. When people reproduce according to social prescriptions, over time the practice and social identity, becomes embedded in the biology of its practitioners. The resulting relationships between individuals constitute kinship networks. It is possible to reconstruct elements of kinship identity from biology, but cultural and biological context is critical to interpretation.

3.3.1 Kinship

Kinship is a term with a long and often contentious history in anthropology. Many early scholars, including Durkheim (1898) and Morgan (1871) placed heavy emphasis on the relationship between kinship and procreation. Early ethnographic studies sought to identify rules governing kinship and reproduction, to classify different groups by marriage practice (endogamy vs. exogamy), post-marital residency, and matrilineal vs. patrilineal descent (Murdock 1949; Richards et al. 1950). Work during the 20th century included a significant amount of discussion about the function of kinship. Levi-Strauss (1949) argued that kinship functioned to generate reciprocity through exchanges of women. Another school of thought focused on how kinship can shape societies. Radcliff-Brown pioneered the structural functional school of thought, which Evans-Pritchard and others used to examine how kinship contributed to and helped maintain social structure (Shenk and Mattison 2011). The number of kinship studies in anthropology fell significantly in the 1970s and 80s, in part because of critiques arguing that kinship studies were not useful for anthropologists because they relied too much on ethnocentric concepts of biological relatedness (Shenk and Mattison 2011). Current ethnographic works explore the intersection of biology and culture extensively across modern societies (Howell 2009; Mason 2008). Some of the new approaches attempt to provide a broad way of conceiving of the experience of kinship (Sahlins 2011), while others focus on how to deconstruct specific case studies of group kinship through quantitative or theoretical models (Shenk and Mattison 2011).

Kinship describes complex social systems that link both biology and socially related individuals. Some of the strongest proponents for the biological basis of kinship are from evolutionary psychology, which argues that reproductive fitness is served best through the mutual aid of relatives, and this extends to social support networks (Dunbar 2011). Other theories argue that kinship arose out of a need to prevent incest, a role that can only be fulfilled when social relationships account for biological affinity (Read 2014). Whatever the origins, ethnographic studies reflect the ubiquity of biologically derived kinship, cross-cultural and cross-chronological (Höllinger and Haller 1990; Madsen et al. 2007; Shanas 1973). Even in cases, such as adoption, in which kin relations are created outside of biological affinity, the bonds are often fictive emulations of biological relations. Adoption occurs to initiate an individual into a role otherwise reserved for bonds of biological affinity or reproduction (Howell 2009; Ibsen and

Klobus 1972). Since the mid-20th century, there has been debate over relative contributions of cultural and biological affinity to kinship (Howell 2009; Carsten 2000). I would argue however, that the social relationships defined by some as kinship but not related to biological affinity, belong to a different category than those addressed here.

Archaeologists examine human remains, associated materials, and iconography to reconstruct kinship in the past. Archaeological studies often frame kinship in terms of its impact on political, social, and economic organization such as structures of power and residency patterns (Gillespie 2000). Processual archaeology and its advocates emphasized spatial organization and material culture as reflections of kinship (Goldstein 1980; Pearson 1993). Spatial proximity and body treatment or orientation were argued to reflect social affinity, often synonymous with kinship. In early archaeological kinship studies assessment of kinship was based on physical proximity of buried individuals (Allen and Richardson 1971; Ucko 1969). Joyce (2001) and Pilloud and Larson (2011) integrate several lines of evidence, to speak about kinship as social negotiation of relationships more than as a rigid, codified system. Many archaeological and ethnographic studies now examine the impact of gender, inequality, and other social identities on kinship relations (Joyce 2001; Shenk and Mattison 2011).

Bioarchaeologists have entered into dialogues on the study of kinship with approaches integrating biological and mortuary data sets. As craniometric and non-metric analyses were developed to estimate biological distance, archaeologists now had the ability to assess biological relatedness between individuals (Finnegan 1978). Techniques for assessing biological affinity have continued to increase in resolution, bolstered by new geometric morphometric, computational, and biomolecular methods (Brown and Brown 2013; Haak et al. 2008). Biological affinity studies have addressed a range of topics, from migration to population divergence (Irish 2010; Neves and Pucciarelli 1991; Pietrusewsky 2008, 2014). Bioarchaeologists also use biological affinity in studies of kinship. Although some of these studies rely solely on biological affinity data (Fuchs et al. 2016), most current kinship studies integrate multiple lines of evidence from archaeological and bioarchaeological contexts (Johnson and Paul 2016).

Here, I define kinship as social relations based on or in imitation of biological affinity and marriage. I use kinship as an interpretive framework to discuss patterns in biological relatedness as reflecting social practices guiding reproduction. I use a quantitative approach to examine biological affinity at the site and regional level through analysis of cranial shape. Kinship is created through repeated social practices that include knowledge production and maintenance about group membership and structure, shared resources, and "reification" of knowledge in the form of new kinship relationships (e.g. marriage and children). "Marriage rules prohibit random mating and thus channel patterns in gene flow among corporate groups. Because marriage systems govern the distribution of alleles, they are cultural practices guiding the creation of phenotypes and their frequencies within and among populations. Within populations, marriage systems may prevent the exchange of alleles among some groups while encouraging their distribution among others. Certain marriage systems create biological linkages among only a few members of corporate kin groups in a way that prevents other biological relationships within and across groups from developing." (Ensor 2017:748)

In this way, kinship groups can also be thought of as CoP, generating a social identity based in and designed to reproduce biological affinity. While kinship is generally used to refer to local genealogical networks, here, I extend the concept to regional level as well. I do this for two reasons: 1) it is possible for lineage networks to span large distances, and 2) regions may display similar kinship systems. I investigate these kinship phenomenon by examining both the presence of affinity clusters, as well as patterns in distribution of affinity.

3.3.2 Quantitative Approaches

Osteological and biomolecular methods have been used since the mid-20th century to estimate biological affinity in archaeological samples (Relethford and Blagero 1990; Ensor 2017). Biomolecular genetic methods allow researchers to examine specific affinity patterns such as matrilineal and patrilineal groups (Gilbert et al. 2008; Zhao et al. 2010). These methods also allow examination of specific genetic traits. However, craniometric methods, especially those employing geometric morphometric analysis have been shown to have similar levels of accuracy to common genetic studies examining SNPs (short nucleic polymorphisms) (Smith 2009). For archaeological samples, the nature of the research sample is a particularly important consideration and in deciding what methods are appropriate or possible.

Genetic and morphological variation can be visualized and measured. Principles of population genetics and gene theory allow differences between individuals and groups to be used to examine genetic admixture and isolation (Relethford 2016). Calculated differences, while derived from absolute variation in either genetic code or skeletal morphology, are relative measures. These differences between individuals and groups are referred to as biological distance or biodistance (Buikstra et al. 1990; Pietrusewsky 2014). There is no set threshold demarcating specific biological relations. Fewer genetic or morphological differences are generally indicative of closer genealogical relations, but just how close these relationships are, depends on the underlying variation of a population. Compared to most species, humans overall have low between group genetic variation (Fujimura et al. 2014; Lewontin 1972). Furthermore, human populations show different amounts of genetic variation depending on population size, chronology, and geneflow (Prugnolle et al. 2005). Interpretations of biological affinity must take these facts into consideration.

Using population genetics theory, bioarchaeologists have developed expectations for patterns of biological distance based on kinship and population interaction. Isolation and admixture are only visible in a population when compared to other populations (Long 1991; Pfaff et al. 2001). If a sample shows less biological variation than others of similar size and history, this is interpreted as admixture (Pinhasi and Pluciennik 2004). Relative levels of variation in males and females have also been used to look at questions of marriage patterns. Higher variability of females compared to males has been interpreted as evidence of patrilocal post-marital residency, with females dispersing to their husband's natal home (Konigsberg 1988; Cook and Aubry 2014; Ensor et al. 2017). If the reverse pattern is observed, this is interpreted as evidence of matrilocal post-marital residency.

Beyond these patterns, biological distances are usually used to speak generally about the presence of lineages, but rarely about specific kinship structures. Recently, Ensor et al. (2017: 745) and Stojanowski and Schillaci (2006) outlined specific biodistance expectations for different types of kinship organization, including descent and residency patterns (e.g. bilocal residential-household group under bilateral descent). These studies are especially useful as they also describe relative expectations such as higher homogeneity or heterogeneity of one sex or the other. Archaeological samples are not equivalent to living populations. There are biases in deposition of individuals in cemeteries, preservation, and curation. Despite this, general trends in variation, presence of similarity or difference between populations can still be identified. The addition of more samples can always add more resolution to data, and here I argue that this work represents a large enough sample to begin to speak about patterns of biological affinity in medieval Central Asia.

3.3.3 Kinship in Central Asia

Scholars have documented genetic, archaeological, ethnographic, and historical evidence that kinship and lineage structures play an important role in the social identity and organization of nomadic Central Asian societies (Barfield 1990; Chaix et al. 2007; Sneath 2007). During the medieval period, architectural and coin inscriptions show that lineage was emphasized at the dynastic level, while the texts of historical scholars, such as al-Kashgari, reflect the importance of kinship to many aspects of Turkic, nomadic life including marriage and trade (Dankoff 1972; Davidovich 1998).

Scholars have also documented associations between Islam and certain kinship structures. In most modern Islamic societies, cousin marriage is professed as the ideal condition. Specifically, patrilateral, parallel cousin marriage (FBD). There is no prescription for marriage in the Qur'an. Marriage is dealt with in the Qur'an primarily with regards to the legal status of women (Coulson and Hinchcliffe 1978). There are some scholars who believe that this form of marriage pervaded the Islamic world from early on. There is little historical evidence to tell us whether this is true, as the only surviving marriage records relate to ruling dynasty members. Their arguments therefore, rest on contextual evidence. One line of evidence is the current geographic distribution of FBD. A study by Korotayev (2000) shows that there is a correlation between regions that were conquered during the Caliphal conquests of the 7th and 8th centuries CE and the distribution of FBD across the globe. This is held as evidence that from its inception, Islam precipitated a shift toward the practice of FBD. The other evidence cited is the perceived necessity of FBD in light of inheritance laws implemented under Islam. Qur'anic prescriptions include the granting of inheritance to women. In the largely patriarchal societies of the Arabian

Peninsula and Central Asia, parallel cousin marriage provided a means to keep resources within the patrilineal control (Korotayev 2000).

3.4 Testing Current Narratives

Beyond kinship, biological distance and mortuary data, when combined and interpreted with other relevant cultural information, can help us understand patterns in social, economic, and political systems that most strongly impacted people's lives. This can in part be accomplished by comparing my biological affinity and mortuary data against expectations based on current narratives of ethnic groups and the spread of Islam.

Expectations for ethnic categories:

1. If current narratives of ethnicity in Central Asia hold true, I would expect that samples would cluster into multiple large, fairly homogenous groups on a regional scale, reflecting reproduction along ethnic identity lines. On a site scale, I would expect the presence of several fairly homogenous groups, especially in large urban centers that are reported to have been ethnically diverse.

2. If ethnic identity did not structure biological relationships between individuals, then I would expect no regional level separation of groups in the biological affinity data. Instead, both regional and site level data should show overlapping variation.

Expectations for the spread of Islam:

1. If current narratives of the spread of Islam are accurate, I would expect mortuary data to reflect closer adherence to Islamic burial prescriptions in lowland urban centers, and rural sites to display greater syncretism or divergence from Islamic burial prescriptions.

2. If Islam did not spread according to current narratives, then I would expect burial ritual to pattern based on other social and economic forces. Understanding the nature of these forces will require and analysis of patterns of burial practice. These potential patterns are too numerous to describe here and will instead be discussed in chapter 7.

3.5 Synthesizing Mortuary and Biological Affinity Data

Mortuary practice and biological affinity as separate sets of data each offer a set of possibilities for how people enacted social identity. By synthesizing these data, however, important trends in social networks and their influences can begin to be understood. I will accomplish this by comparing mortuary and biological affinity data to discuss kinship, and by discussing what broad economic, political, and social forces could promote the patterns of genetics and burial practice seen in my data.

The biological affinity expectations outlined above are derived from idealized conceptions of biological affinity and kinship. While there are theoretical biodistance configurations for different kinship systems, these patterns may be very subtle and more complex than simple clusters of closely related individuals or relative variation (Ensor et al. 2017:744-746). Moreover, Fix (2005) addressed the impact that kin-structured migration can have on patterns of biological affinity, acting as a force of genetic drift rather than admixture. The work of these scholars demonstrates the importance of distinguishing kinship structured biological variation from stochastic and other social and environmentally mediated impacts. There is a long tradition of combining mortuary and biodistance data to investigate kinship in the archaeological record. Residential burials have been the focus of many kinship studies (Pilloud and Larsen 2011). Because residency is a common element of kinship expression, combining burial location with biological affinity allows archaeologists to discuss post-marital residency in more detail. For extramural burials and cemeteries, burial location can also be used to investigate kinship. Clusters of burials of individuals with close biological affinity can be interpreted as reflective of kinship (Stojanowski and Schillaci 2006). In absence of relevant spatial information, other elements of mortuary practice, such as grave goods or grave structure are used to trace kin relationships (Howell and Kintigh 1996).

Chapter 4: Study Area and Research Sites

In this chapter, I introduce the sites from which the skeletal samples in this dissertation are derived. The sites are all located in modern day Uzbekistan, Tajikistan, and Turkmenistan, and can be grouped into six regions: Ferghana Valley, Soghd, Chach, Ustrushana, Khorezm, and Tokharistan. These regions are based on historically recognized entities that were present during the medieval period (8th-13th c.) and also correlate to general geographic areas. My study area encompasses diverse geography and environments, from mountains to lowland river valleys, and includes sites of both urban and rural character. Sites were chosen for this study based on chronology, geographic location, and availability of crania for study. My goal was to have a sample that covered as much of the geographic and cultural diversity of Uzbekistan as possible. A summery table of site regions and chronologies is included below (figure 4.2). Full demographic information (age and sex) is included in the appendix.

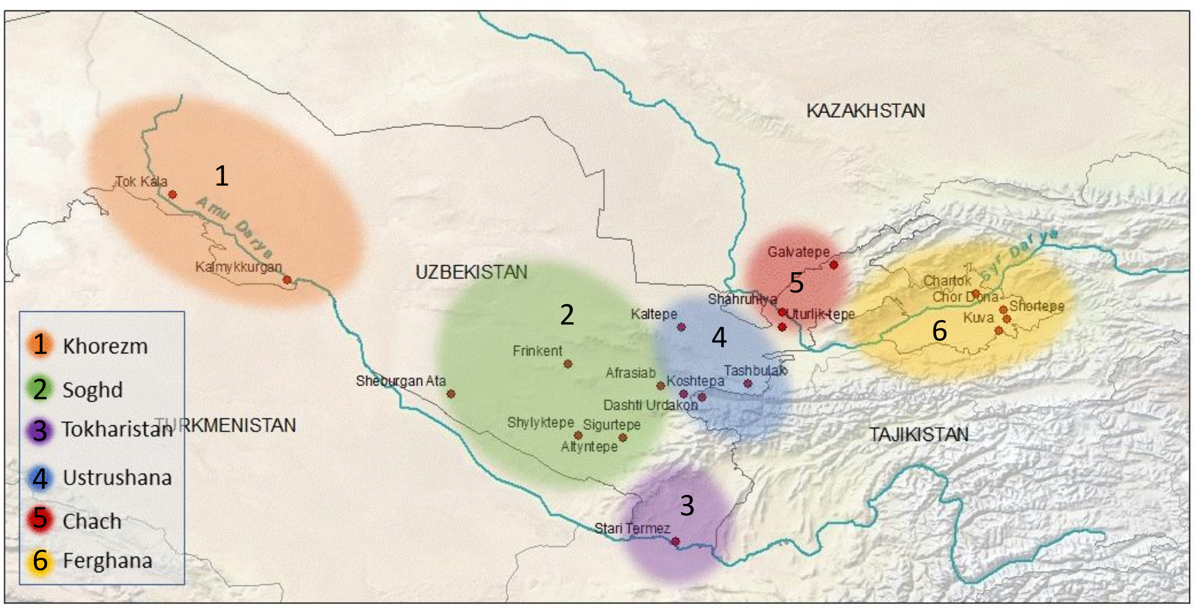

Figure 4.1 Map showing locations of study sites and regions.

Region	Site	Chronology
Ferghana	Chartok	12th c.
	Chor Dona	11-13th c.
	Kuva	10-13th c.
	Shortepa	8th c.
Chach	Shahryhiya	14th c.
	Galva-tepe	12th c.
	Uturlik-tepe	9-12th c.
Khorezm	Kalmyk-krylgan	12-13th c.
	Tok-kala	9-11th c.
Tokharistan	Stari Termez	10th-13th c.

Region	Site	Chronology
Soghd	Altyntepe	12th c.
	Sheburgan-Ata	11-13th c.
	Afrasiyab	11-12th c.
	Frinkent	10-13th c.
	Shulluktepa	9-13th c.
Ustrushana	Kal-tepe	12th c.
	Tashbulak	8-10th c.
	Koshtepa	8th c.
	Dashti-Urdakon	8th c.

Figure 4.2 Study regions and sites with site chronologies.

4.1 Ferghana

The Ferghana Valley is located in modern day eastern Uzbekistan (figure 4.1). The oasis is fed by the Kara Darya and Naryn Rivers, tributaries of the Syr Darya River, that create a well-watered region for agriculture. The valley sits between the Tien Shan mountain range to the north, and Gissar-Alai range to the south. The region was an important passageway along trade routes passing to and from western China through the city of Kashgar. The region was also an important producer of trade goods. Since antiquity, Ferghana was known for many highly sought-after agricultural and trade products, including wine and horses (Forbes and Henry 2011). For most of its history, control of the valley in its entirety passed from one political entity to the next (Bregel 2003). This long history of unification lent the region a unique cultural and political trajectory. During the period of the Arab invasions, many cities in Ferghana were centers of anti-Arab resistance, often led by Sogdian princes (Bulatova 1972). Beginning in the early 9th century, the region was under the control of the Samanid dynasty, but in the 10th century was conquered by the Qarakhanids, who held it until the 13th century when it served as the last holdout of that dynasty.

Chartok (Чартак)

The site of Chartok is located in the northern Ferghana Valley in the Namangan region (Hodjaiov 1987:18) (figure 4.1). The cemetery dates to the 12th century CE (Hodjaiov 1987:66).

Chor Dona (Чордона)

Chor Dona is located in the southeastern region of the Ferghana valley, in the northwestern part of the rabat of medieval Andijan, along the Dalverzni-arik (Abdulgazieva 1991:132) (figure 4.1). Excavations in 1983-1984 indicated that the site was primarily occupied during two periods: from the 7th-8th centuries and 14th-16th centuries. The end of the first occupation is marked by a thick burned layer. There is evidence of agricultural production and large-scale flour milling at the site (Abdulgazieva 1991:136). Chor Dona's proximity to Andijan would have put inhabitants of the site in consistent economic and social contact with this large urban center.

Between the two major occupation sequences at Chor Dona, the site was used as a cemetery during the 13th and 14th centuries. The cemetery is located in the northwestern region of the greater Andijan area. Thirty-one burials have been excavated at this cemetery. There are several trends in grave structure and body treatment at the Chor Dona cemetery. Twenty-six of the graves were built with a simple rectangular grave-pit structure or niche (Abdulgazieva 1991:99). Within these grave structures, bodies were laid out in one of two positions: extended supine or laid on the right side with legs bent slightly at the knees. Individuals of all ages and both sexes were found in the first position, while the second position was reserved for females and children. Heads of all individuals from these two positions were oriented to the north-west. Two burials of females contained small jewelry items (one contained beads, the other, earrings)

(Abdulgazieva 1991:99).

Five burials depart from these general trends. Four maintain the same orientation of head to the northwest, but in one (burial 26) the head of the deceased was oriented to the southwest. These burials differed in grave construction and contents from the rest of the cemetery. Burial 2 was of oval pit form, and burial 21 seems to have been sealed with a layer of clay. The individuals in both burial 2 and 21 were buried with weapons (arrows, projectile points, knives) and horse tack (saddles, stirrups, bits). This burial type appears to be transitional between a form seen in Eurasian steppe areas in the 8th to the 10th centuries, where heads of the deceased are oriented to the northeast, and later steppe burials that are oriented to the northwest (Abdulgazieva 1999:99-100).

Kuva (Кува)

The site of medieval Kuva is on the eastern outskirts of the modern city of the same name, along the banks of the Kuva-Sai River, a tributary of the Kara Suu River (figure 4.1). During the medieval period, it was the second largest site in the Ferghana oasis (Bulatova 1972:3-5). The site included a citadel, shahristan, and rabat that had a radius of at least 1.5km. The city of Kuva was located on one of the main trade routes between the Ferghana Valley and Kashgar. Excavations in the 1950s, as well as historical documents, show that in addition to its role as an important trade center, Kuva was home to industrial-scale production of bricks, various crafts, and was also the location of a Samanid mint (Bulatova 1972:8). According to wall construction, there were four primary occupation periods at Kuva: 5th-6th century, 9th-10th century, 12th century, and 13th century.

In the 7th century, the Arab invasions destroyed a large part of the residential sector of the site, including a Buddhist temple. Over this area, located on the western slope of the site, a cemetery was established and used during the 10th to 12th centuries. These burials were dug into the remains of the earlier structures, including a Buddhist temple. The fill of many graves contains fragments of bricks and even of a large Buddha sculpture (Bulatova 1972: 20). Many of the burials overlap each other, forming three layers of deposited graves, the lowest of which is dug into the burn layer that marked the end of the first occupation phase of the site. Burial form was of chamber construction. A rectangular grave shaft was dug and lined with bricks on the side, with the deceased laid directly on the ground. The deceased was laid in an extended position, with heads to the northwest, faces to the southwest. The chamber was then closed with more bricks. Earlier burials are also known from Kuva, including burials in “hum” vessels dating to the 7th-8th centuries, which have been associated with Zoroastrian practice (Bulatova 1972: 57, 71).

Shortepa (Шортепа)

Shortepa is located 7km southwest of Andijan, west of the 4P11 road running from Andijan to Asaka, close to the town of Akhtachi (Abdulgazieva 1987:66-67) (figure 4.1). Today the site remains form a mound whose diameter reaches 70m, and rises to a height of 7m. Architecturally, Shortepa is divided between a fortified area and a settlement area, both of which appear to have been densely occupied. Despite the relatively small size of the settlement, the presence of specialized areas for agricultural processing has been interpreted as an indication of production not just for local populations, but also for export. The material culture and architectural organization of the site date it to between the 7th and 8th centuries. The structure of the site places it within the typology of small fortified sites surrounded by agricultural fields common during the early medieval period (Abdulgazieva 1987:160).

4.2 Ustrushana

Ustrushana encompasses the regions fed by and surrounding the Zerafshan river, a tributary of the Amu Darya, that runs through the southeastern region of Uzbekistan (figure 4.1). This region's ecology is highly diverse and includes mountain ranges such as the Turkestan and Zarafshan, as well as the arid territories of Kattakurgan and Navoi. Ustrushana, perhaps due to its mountainous nature and dense network of fortified outposts, was one of the last regions to submit to Arab control after the invasions in the 7th-8th centuries (Gritsina et al. 2014). At the time of the Arab invasions, Penjikent was the capital of the region (Bregel 2003:16). Throughout the medieval period, Penjikent continued to be a major urban and trading center.

Dashti-Urdakon (Дашти Урдакон)

The site of Dashti-Urdakon is located 1 km to the southeast of the city of Penjikent (figure 4.1). The site includes an 8th-century necropolis (Belenitskii et al. 1977:559). Hodjaiov (1987: figure 1) shows it to the east of the site of Penjikent. The site includes both Islamic burials as well as ossuaries buried in grave pits and catacombs. Incised on one of the hum ossuaries was a depiction of a person kneeling in front of a cross (Belenitskii et al. 1977:559). An additional bronze cross was found in another grave (Belenitskii et al. 1977:559).

Kal-tepe (Каль-тепе)

This site is a large caravanserai located in the Farish region of the Jizzakh province, that was in use during the 11th and 12th centuries. It lies along the road from Chach (Tashkent) to Bukhara by way of Uturlik-tepe (Hodjaiov and Mustafakulov 2009:233). The site is noted for its large size – 82m x 86m, and reaching a height of 6m (Gritsina et al. 2014:87). The site is noted for being at the edge of the "hungry steppe" (Nemsteva 1989:43), west of Lake Tyzkan, north of the pass to Khanbanditag, where there is a stone dam, 27 km from the district center Yangyshlak. It was part of a network of caravanserai in this transitional zone (Nemsteva 1989:43).

Koshtepa (Коштепа)

The site of Koshtepa is located northeast of Urgut, on the left bank of the Dargom Canal, near the villages of Akmachit and Utama (figure 4.1). Excavations on the site began in 1973 under the direction of the Afrasiab detachment of the Institute of Archeology of the Academy of Sciences of the Uzbek SSR (Isakov et al. 1977:88). During the medieval period, the area around the site was densely populated, as evidenced by the presence of several mounded sites and cemeteries. The site of Koshtepa encompasses approximately 10 hectares and consists of two mounds, the first of which reaches a length of 50m and the second of which is 80m in length (Isakov et al. 1977:88; Gritsina et al. 2014:14). Coins recovered at the site date it to between the 7th and 8th centuries. The site was located close to Zaamin, which was Ustrushana's largest urban center in the medieval period. Mortuary practice at this site consists of several types of burial: burial in ossuaries, burial in ceramic vessels, and pit burials (Gritsina et al. 2014:14-5). Though there is poor preservation for the pit burials, those that are preserved are oriented in a north-south direction, with faces to the west. Most of the ossuaries recovered are adorned with Zoroastrian motifs. It has been hypothesized that because ossuaries are rare in Ustrushana, that Soghdians are buried in the ossuaries, and that local Ustrushanans are buried in the vessels (Gritsina et al. 2014:16).

4.3 Soghd

The region of Soghd (also known as Soghdiana or Soghdia) encompasses the primarily marshy, lowland inter-riverine areas bordered to the north by the Zerafshan river, to the southwest by the Amu Darya, and to the east by the Zerfshan mountain range (Lurje 2017) (figure 4.1). Soghd had a long history of urban development, dating back at least to the 4th century BCE, and was home to some of the major cities of the medieval dynasties, including Samarkand and Bukhara (Bregel 2003:16). These cities were important trade hubs along the Silk Roads, and also served as centers of scholarly religious and scientific learning (Starr 2013). The cities were also home to some of the oldest mosques and other Islamic architecture in Central Asia (Lurje 2017). The economy of the region was largely dependent on irrigated agriculture, as evidenced by the extensive canalizing of the region's major rivers (Mantellini 2014:38).

Afrasiyab (Афрасиаб)

Afrasiyab is the name given to the ancient and medieval portions of what is today the city of Samarkand. The site covers a total of approximately 220 hectares and includes cultural layers dating back to as early as the 6th century BCE. From the 3rd to the 8th century, the city traded hands several times between Turkic and Iranian regimes. During this tumultuous period, Afrasiyab became an important center for many religions, including Manichaeism, Buddhism, and Zoroastrianism. The city was conquered by the Arabs in 710, with textual sources reporting the commensurate conversion of most of the population to Islam. The city then passed into Samanid control in the mid 9th century, and until 1000 CE, it served as a capital of the dynasty. It was also a major trade center during this period, and continued to be so under the Qarakhanids, who captured the city in 1000 CE.

Sheburgan-Ata (Шебургаи-Ата)

Sheburgan-Ata is located in the Bukhara Oasis, in the Qorako'l region which lies southwest of the city of Bukhara (Hodjaiova 1991:222) (figure 4.1). The site is approximately

15km northwest of the modern-day city of Qorako'l, and site includes multiple mausolea.

Frinkent (Фринкент)

The site of Frinkent, also known as Afarinkend, is located in the lowlands of the Zerafshan valley, in the interfluve between the Kara-Darya and Ak-Darya rivers, 55 km northwest of Samarkand (figure 4.1). The site was identified during a survey of the Samarkand region in 1936 by a team from the Uzbek History Museum. The site, delineated by a wall, includes a fortress complex, cemetery, and settlement area covering approximately 14 hectares (Grigorev 1939:144). There is evidence of occupation of the area dating back to the Neolithic, but the main settlement was founded much later. Historical records document the founding of Frinkent in the 7th century by Afârûn, the brother of the Ghuruk, prince of Samarkand and a famed Arab military leader (Bacqué-Grammont 1970:441). And other accounts suggest Frinkent may have been an important site during the Timurid period as well.

On the northern edge of the site, excavations revealed a large cemetery of ceramic vessel burials. Excavations in 1937 by the State Hermitage museum recovered the remains of 203 of these burials, but local accounts of ceramic vessels and human bone being found in surrounding fields indicates the cemetery would have originally been much larger (Grenet 2015:145). The burial vessels are tightly packed together, and some rest on top of others, often damaging the ceramics and bones below. This tightly packed organization may indicate that these vessels originally stood in a large chamber, rather than being individually deposited. The vessels are large, some as tall as a meter, and often decorated with applique lines and rosettes, and in some cases, painted decoration. Evidence of burning on these vessels has been used to suggest these were not vessels made especially for burial, but were simply repurposed containers that had been in daily use. Vessels were often intentionally broken, and some scholars suggest this may have been to prevent looting. The skeletal remains were found disarticulated, sometimes with elements missing, and sometimes a vessel would contain the remains of more than one individual.

Shulluktepa (Шуллуктепа)

Shulluktepa is located 5 km northwest of the modern city of Qarshi, on the left bank of the Kashkadarya River (figure 4.1). The site includes a raised citadel, surrounded by shahristan and rabat areas (Sagdullaev 2005). The city was founded in the 4th c. CE, but was destroyed in the 6th century during conflict between the Sassanians and Hephthalites. The site was captured by the Arabs in 710. At the end of the 8th century, a rebellion was instigated by Mukanna against the Arabs. The city was gradually rebuilt, but in the 9th century development rapidly increased and Shulluktepa reached a total extent of 220 hectares by the tenth century. Shulluktepa is also mentioned in many historical documents under the name of Nakhshab or Nasaf. The site was part of the flourishing urban and economic life of the Qarshi oasis during the 11th-13th centuries (Sagdullaev 2005).

Altyntepe (Алтынтепе)

Altyntepe is in the western part of the Karshi Oasis, along the Kyzl-Darya, near the modern-day city of Karabag (Lunina 1984:25) (figure 4.1). Excavations began in 1967 and continued annually for at least a decade. Altyntepe was first occupied in the 6th century, growing into a significantly sized site during the 7th-8th centuries. The site reached its peak in the 10th-13th centuries when its area of settlement and production grew to cover around 40 hectares. The city consisted of a fortified inner-city citadel of about 2.5 hectares, with surrounding sprawling settlements. The remains of several different craft workshops have been recovered, including some of industrial scale for brick production (Lunina 1984:31). The southwest edge of the site is bordered by Altyntepe's cemetery. Graves at Altyntepe consisted of rectangular pit burials with a brick lined inner chamber. In the cemetery, the graves are organized into rows and columns (Lunina 1984).

4.4 Chach

The region of Chach is located in the upper reaches of the Syr Darya, in an area that covers parts of modern-day eastern Uzbekistan and south-central Kazakhstan (Bregel 2003: figure 2) (figure 4.1). The region takes its name from the city of Chach, now Tashkent, which served as the economic and political capital of the region. While Chach itself is centered in the well-watered Tashkent oasis, this region abuts the arid Qizil-Qum desert of the middle Syr Darya to the northwest, and mountainous foothills of the Tien Shan (Chatkal and Qurama ranges) to the east and northeast. Because of the nature of its location, Chach has been seen as a point of interaction between agricultural oasis groups, and nomadic pastoralists (Fedorov 2010:59). In the period before the Arab invasions, the region was ruled by the formerly nomadic Chionite tribe (Fedorov 2010:59). The region, therefore, has a long tradition of interaction with nomadic peoples. Economically, the region played a significant role in the mining industry of medieval Central Asia. Its proximity to highland areas gave it control over gold and silver mines (Merkel et al. 2013:63). During the Samanid period, over half of the dynasty's coins were minted in the Ilak region of Chach.

Uturlik-tepe (Утурликтепа)

The site of Uturlik-tepe sits on the left bank of the Syr Darya River in the northern

Syrdarya region (figure 4.1). The ancient site and surrounding region was known as Chach in historical documents. It lies along the road from Chach (Tashkent) to Bukhara (Hodjaiov and Mustafakulov 2009:233). The total site area covers approximately 60 hectares and was occupied from the 6th to 12th centuries (Buryakov et al. 1979:91). A large medieval cemetery dating to between the 9th to 12th centuries is located on the western side of the site and is estimated to contain around 4,000 graves. The graves are arranged in straight rows oriented north-south that span the entire length of the cemetery (Buryakov et al. 1979:91). Grave structure is consistent across the cemetery and consists of a narrow rectangular pit lined and closed with bricks. These bricks were produced according to dimensions common during the Qarakhanid period. Bodies were placed in graves on their right side, with heads to the north, and faces oriented to the west. A large number of child and adolescent burials were recovered, all of which conform to the same mortuary practices as adult burials. The large area of the settlement and cemetery at Uturlik-tepe have led researchers to estimate a total population of between 8,000 and 10,000 people at its peak (Buryakov et al. 1979:91).

Galva-tepe (Гальва-тепе)

The site of Galva-tepe is located on the eastern outskirts of the Tashkent Oasis, in the upper reaches of the Chirchik River, near the modern-day city of Chirchik (Rostovtsev 1974:488) (figure 4.1). The site consists of a large rectangular fortress sitting on a hill, without any associated permanent settlement construction. The earliest phases of wall construction at the site date to the 1st-5th centuries CE, but the site has several layers of use, continuing through the 12th century. Galva-tepe was part of a system of fortresses constructed in the Chirchik valley to protect the region’s extensive irrigation systems. Historians in the 10th century wrote that these sites were used to protect the oasis specifically from nomadic Turks. Also recovered at the site were many storage vessels, and the remains of a metallurgical furnace (Rostovtsev 1974:489).

The upper layers dating to the 10th-12th centuries contain five burials. These graves are oriented north-south and have a podboy (niche form). The remains were found oriented in a north-south position, laid either on their right side or backs with bent legs. One burial contained a three-lobed arrowhead and a stone cup, while the others yielded fragments of ceramics (Rostovtsev 1974:489).

Shahryhiya (Шахрухия)

Shahryhiya, also known as Benakent, was a large medieval settlement located in the Chach region at the confluence of the Ahangaran and Syr Darya Rivers, 80 km southwest of Tashkent (Bregel 2003: figure 2) (figure 4.1). The site covered 400 hectares which included a citadel, shahristan, and rabat. There is evidence of occupation at the site as early as the 3rd century CE, but the site became an especially important center during the 11th-12th century CE when it was home to the mint of the local Qarakhanid rulers (Bregel 2003:32; Federov 2010:63). The city was destroyed by the Mongols, but was rebuilt by Amir Timur and renamed after his son, Shahrukh in 1392.

4.5 Khorezm

The region of Khorezm is located in northern modern-day Uzbekistan, in the semi-autonomous Karakalpakstan province (figure 4.1). It is separated from the majority of other large urban medieval centers by the Qara Kum desert. Today the region is facing problems with aridification from the draining of the Aral Sea through intensive irrigation drawn from the Amu Darya (Jin et al. 2017). This region was also arid in the past, and archaeological research shows the construction of agriculture irrigation canals dating back millennia (Brite 2016). Medieval populations, like those before and after them, would have relied on the Amu Darya for water, concentrating mobile and sedentary groups within the relatively lush river delta.

Khorezm is noted in historical records and archaeological investigations as being different from the rest of Central Asia, including during the medieval period. Khorezm was ruled by its own dynastic line, even when ostensibly under the control of empires or the caliphates (Bosworth 1998:107). The urban centers of the region are also noted as having long term interaction with nomadic groups, interaction that supposedly shaped the material culture and genetic profile of the region's population.

Tok-kala (Ток-кала)

The site of Tok-kala is located in the northern reaches of Khorezm, 14km northwest of the modern-day city of Nukus, in the Amu Darya delta (figure 4.1). Excavations began at the site in 1959, under the auspices of the Karakalpak Institute of Science, as associated with the UzSSR. The fortress, settlement, and cemeteries that comprise the remaining site cover approximately 8 hectares and are located on a raised hill above a floodplain (Gudkova 1964:7-8). An ancient river channel runs along the base of the hill and there is evidence of multiple flooding events throughout its history, which destroyed much of the settlement. The site shows a long occupation sequence, beginning in antiquity and continuing until the 12^{th}-13^{th} century. Archaeological materials recovered at Tok-kala indicate significant interaction with nomadic groups in the region. Despite its relatively small size, Tok-kala is sometimes known as a "besh-kala" or mother-city, of Khorezm, denoting past cultural significance (Gudkova 1964:150).

Besides a modern Muslim cemetery, there are three known cemeteries at Tok-kala. The first is an early medieval (7th-8th century) burial ground, located on the northeastern edge of the site, just downslope from the fortified citadel, that covers approximately four hectares. In this cemetery, individuals are buried in ossuaries placed in naoses, small niches excavated into a wall. The ossuaries range in design from “hum” storage vessels to painted alabaster and ceramic forms (Gudkova 1964:88). This practice is similar to Zoroastrian cemeteries elsewhere in Central Asia during the medieval period. Excavations indicate that the use of the naos came to an abrupt end, as evidenced by the chaotic arrangement of the last-placed ossuaries, and the damage to many ossuaries and human remains. This coincides with the break in occupation of the settlement (Gudkova 1964:48).

The other two cemeteries are medieval (9th-13th century) Muslim cemeteries. One hundred and sixty-seven burials have been excavated from these burial grounds (Amirov 2010:64). One of these cemeteries overlaps and covers the earlier Zoroastrian burials. There are two types of grave structures present at the later Tok-Kala cemeteries. The first is less common, with only nine burials of this kind recovered, and consists of a rectangular grave pit with a chamber at the bottom formed out of bricks lining the sides of the pit. The chamber is closed with more bricks (Amirov 2010: figure 2). The second burial type, which was the dominant form, found in 158 burials, consists of a rectangular pit with an additional small chamber excavated at the bottom. The internal chamber is closed with a series of bricks (Amirov 2010: figure 3). Individuals in all burials were laid on their right side, in an extended position with knees slightly bent. Heads are oriented to the northwest, and faces are to the southwest. Children were buried in a manner similar to adults, however, very young children were buried in simple pits closed with a few bricks. In one burial a female was buried with an infant (Gudkova 1964:145). No grave goods were recovered from any burials, but in three graves, geometric shaped bricks were recovered, which may have been headstones (Gudkova 1964:figure 40, 146).

Kalmyk-krylgan (Калмыккрылган)

The site of Kalmyk-krylgan is located in the southern reaches of the Amu Darya delta, on the left bank of the river (Mambetullaev 1984:80) (figure 4.1). There is no evidence of a large settlement associated with this burial ground, indicating the rural nature of the site. The burials are found 1.5 kilometers to the south-east of the settlement of Manaha. Fragments of ceramic bowls and jars typical of 12th century Khoresm were found in the fields around the cemetery, so there was likely some occupation of the area, but no large structures are reported (Mambetullaev 1984:80-81). The remains of the cemetery at Kalmyk-krylgan cover approximately two hectares, but surface finds of bricks, ceramic, and human bone indicate that portions were disturbed by plowing in the past. In the 1980s, 128 square meters of earth were removed, and 58 burials were excavated. These burials have been dated by comparisons of material culture and grave form to between the 12th and 14th centuries (Amirov 2010: table 2).

Three primary types of grave structure and mortuary practice can be identified at this site. The first type is represented by 10 graves that are of a rectangular pit form. At the bottom of the grave shaft, a smaller chamber was excavated with just enough space for the body. Above the internal chamber, bricks were laid to form a small raised roof. In a few cases, bricks lined the bottom of the chamber or were placed under the head of the deceased. Individuals were laid out in an extended position, either on their backs or in on their right side, with their heads pointed to the northwest, and faces to the south (Mambetullaev 1984:88). Seven burials are categorized in the second type, which is similar in structure to type 1, but in which the whole burial chamber is lined with bricks, and is closed with large ceramic tiles. Bodies were positioned in the same manner as those of type 1. Similar burials have been noted in the Semirech'ye region of Kazakhstan (Mambetullaev 1984:88). The last burial type is the most numerous, 41 were recovered from the cemetery. These burials are of rectangular pit form and there is no additional internal chamber for the body. Bricks line the walls of the bottom of the shaft, and bricks form a roof to create a protected cell for the body. Body orientation and position in these graves is the same as the other types. This last grave form is one commonly seen across Muslim burials in Khorezm and Uzbekistan more broadly.

Small, personal items and jewelry, consisting of bronze earrings and a variety of bead types were recovered from five burials (Mambetullaev 1984:82-83, figure 3). There is also one case of two skeletons interred in a single grave, and an additional grave that looks like it was constructed to fit two bodies. A few of the burials are grouped into complexes in which the graves share walls, and in one case, a grave was found to be empty, with no evidence of later disturbance (Mambetullaev 1984:91).

4.6 Tokharistan

The region of Tokharistan is located in the upper reaches of the Amu Darya, bordered by the Hindu-Kush Moutains to the south and the Hissar, Kulab, and Badakhshan ranges to the north and east, and the Qara-qum desert to the west (Bregel 2003:2) (figure 4.1). Tokharistan is the central region of the area that was known as Bactria, dating back to the Hellenistic period. Buddhist influence was strong in this region in the period before the Arab invasions. Tokharistan was one of the first regions of Central Asia to be invaded during the Arab conquests, which defeated the ruling Hephthalites in 667 CE. During the medieval period, the region was home to the major cities of Balkh and Termez. The region experienced frequent shifting borders, as various polities vied for control over the area (Bregel 2003:16, figures 8-10).

Stari Termez (Старый Термез)

Stari Termez, or Old Termez, is located on the north bank of the Amu Darya, 12 kilometers west of the modern-day city of Termez (Bloom and Blair 2009). Termez has been a major city of Central Asia for centuries, with evidence of occupation dating to the Greco-Bactrian period (3rd-2nd c. BCE) and major settlement construction during the Kushan period (1st-4th c. CE). As early as the 7th century, there are historical accounts describing the city, and it is mentioned in the Persian epic, the Shanamah (Masson 1940:6). The ancient city supposedly covered 10 square kilometers and was home to many important Buddhist monasteries, including Kara Tepe and Fayz Tepe, making it a center of pilgrimage (Staviskovo 1975).

The city was brought under Caliphal rule in 689 CE, and flourished as an urban center until 1220 when it was captured by the Mongols. At its height in the 10^{th}-13^{th} century, the city covered 550 hectares, and was a major trade center for caravans moving north into Central Asia and south into Afghanistan and India. The political importance of the city during this period is evidenced by the palaces of the Samanids, Qarakhanids and local rulers built there. It was also a center for Islam, with many large Friday mosques, and mausoleums dedicated to important Sufi mystics (Bloom and Blair 2009). There are several Islamic cemeteries located in Old Termez (Masson 1940:88).

4.7 Tashbulak

Here, I discuss the site of Tashbulak in particular depth. As a part of my research, I was involved in the excavation and analysis of materials from Tashbulak. I directed cemetery excavations at Tashbulak during the summers of 2015 and 2017. Tashbulak, therefore, provides a large mortuary and skeletal collection for which I have detailed osteological, and mortuary data. This site also represents a unique geographic and social context. Tashbulak is located in the highlands of the Malguzar Mountains, but unlike the other rural sites in this study, Tashbulak does not appear to be a specialized site or isolated cemetery. It has areas dedicated to production and settlement, and the complexity of its organization has many elements indicative of urbanism.

4.7.1 Discovery and Initial Study at Tashbulak

The site of Tashbulak (site 3049) was identified in 2011 by Michael Frachetti and Farhad Maksudov, at approximately 2100m, in the Malguzar Mountains in Jizzakh Province, southeastern Uzbekistan (figure 4.1). This range runs east-west from the Syr Darya basin to the northwestern zone of the Pamir Mountains. The site was discovered during survey work of the Zaamin Archaeological Pilot Project (ZAPP) (Frachetti and Maksudov 2014). This project's goal was to survey valleys of the Malguzar Mountains to assess spatial and chronological patterns of occupation and subsistence. Archaeological work in nearby valleys indicates that individuals and groups living in these Central Asian highlands from the Bronze Age up through the early modern age engaged primarily in vertical transhumant lifestyles. Subsistence strategies in this region were dominated by sheep/goat pastoralism (Frachetti and Maksudov 2014). Archaeological survey indicates that this region has been continuously occupied since the Bronze Age (c. 3000-1000 BCE). For most of prehistory and history, the Malguzars, like much of the Central Asian highlands, were populated by mobile and semi-mobile groups maintaining seasonal territories. Today, little evidence of the presence of these groups remains beyond burial mounds and small seasonal camps (Frachetti 2012; Frachetti and Maksudov 2014). On a high plateau, in a shallow depression surrounded by low ridges (termed at the time "Uzunsay Plateau") (figure 4.3) the team identified a dense concentration of ceramic sherds spread over an area of 4 hectares. A 20x20m grid was assigned to this region and intensive surface collection was conducted. Particularly interesting was a small concentration of wheel-thrown ceramics (figure 4.4). Despite only making up 10% of the surface assemblage (the other 90% was handmade ceramics), these wheel-thrown forms are important as they are not normally observed at nomadic pastoralist sites. Preliminary survey also identified wall lines and a large anthropogenic mound.

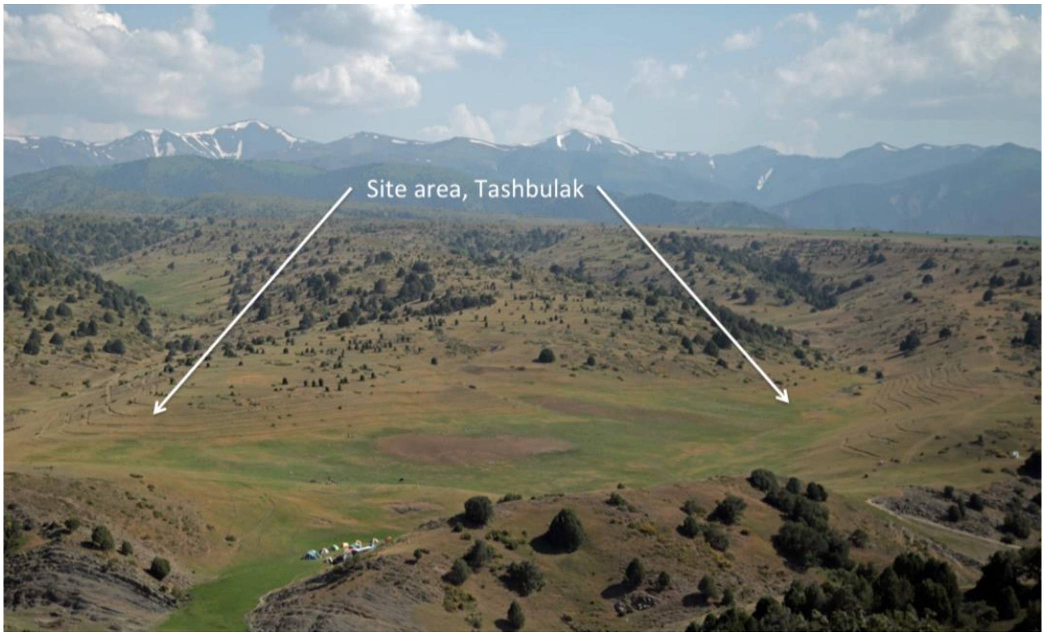

Figure 4.3 View looking south over the site area of Tashbulak toward the Tajik border (photo: Thomas Malkowicz).

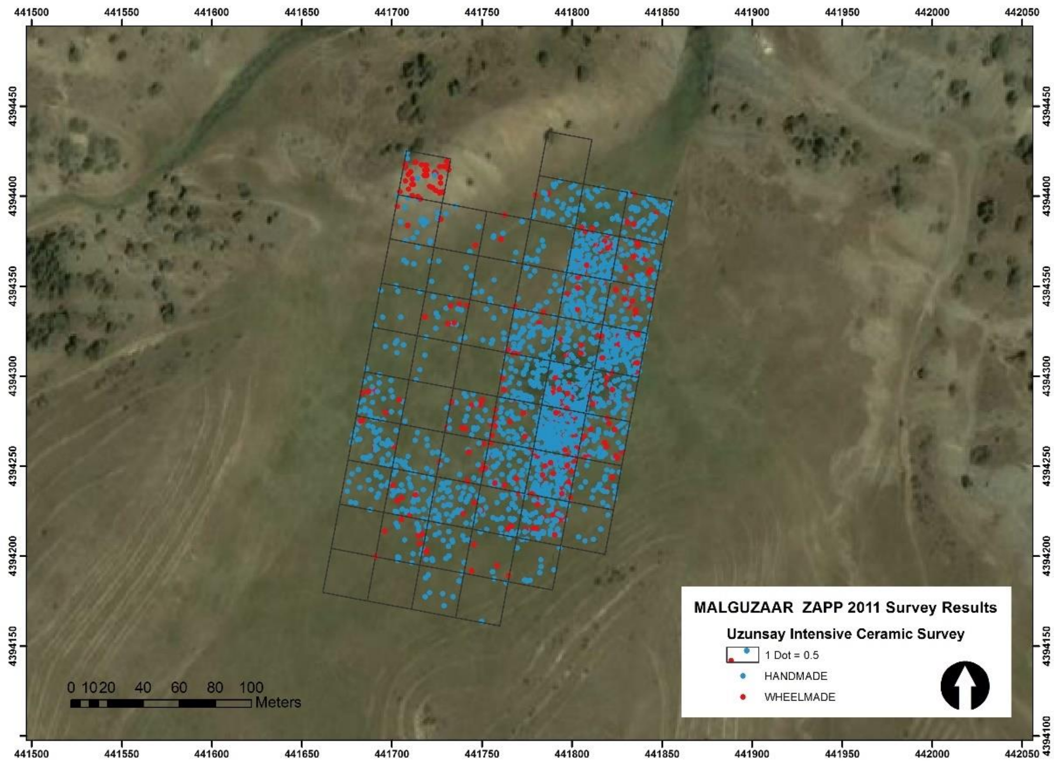

Figure 4.4 Map showing distributions of handmade and wheelmade ceramics recorded during the 2011 ZAPP surface survey (image: Michael Frachetti, ZAPP 2011 field report).

In 2012, the ZAPP team conducted systematic ground survey, topographic mapping, and test excavation at Tashbulak. As part of this work, a bi-scalar site-wide grid was established for Tashbulak. The large-scale grid units measure 10m x 10m and cover the entirety of the site area. These units are labeled south-to-north using letters (A-Z…) and in the west to east direction using numbers (1-33…) (figure 4.5). Each larger unit is divided into 1m x 1m grids. The columns of grids are labeled south-to-north using letters a-j, and the rows of these grids are labeled west to east using numbers 1-10. Topographic mapping was conducted using a TopCon Theodolite to collect three-dimensional points across the core of the site. During the summer of 2012, two test trenches were placed in the center of the site. Excavations at Tashbulak were carried out according to identified stratigraphic layers rather than arbitrary levels. Sequential numbers were given to contexts, which were assigned to soil horizons and archaeological features. Three-dimensional coordinate data (X, Y, Z) was recorded for contexts and finds using a TopCon theodolite. Preliminary excavations revealed massive stone structures and indicated a single occupation phase. This work revealed an architectural core of the site covering at least 6 hectares.

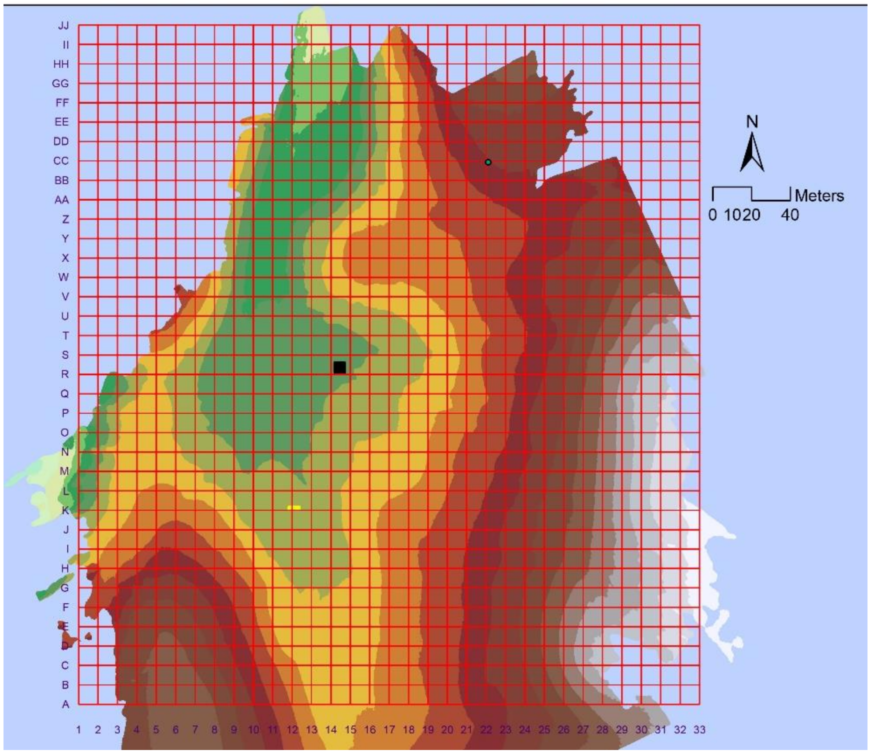

Figure 4.5 10m Quadrat systems at Tashbulak (image: Michael Frachetti, ARQ Project field report 2015).

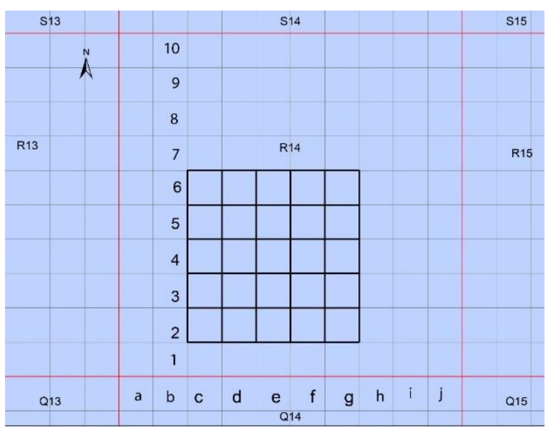

Figure 4.6 1m-grid system (within Quadrat R14) at Tashbulak (image: Michael Frachetti, ARQ Project field report 2015).

In the summer of 2013, additional topographic mapping as well as geophysical survey were conducted. Topographic survey was completed for the entire area of the site. Edward Henry conducted magnetometry and ground penetrating radar (GPR) survey. The magnetometry survey focused on the site core, covering the valley lowland as well as a mounded area believed to be anthropogenic in origin. This revealed extensive stone structures and architectural features, such as a citadel, towers, and residential/industrial sectors (figure 4.7). In the southwest region of the site, on the slope overlooking the site, the magnetometer revealed at least 280 regular rectangular pits laid out along the eastern slope of the western ridge (figure 4.8). Each pit is approximately 1-2 meters by 2-3 meters in size, and all are oriented approximately north-south. GPR survey was limited during this field season and focused on two spots that were identified as anomalies in the magnetometry map, potential indicators of areas with high metal content. Investigations yielded mixed results, but generally indicated the presence of complicated architectural sequences.

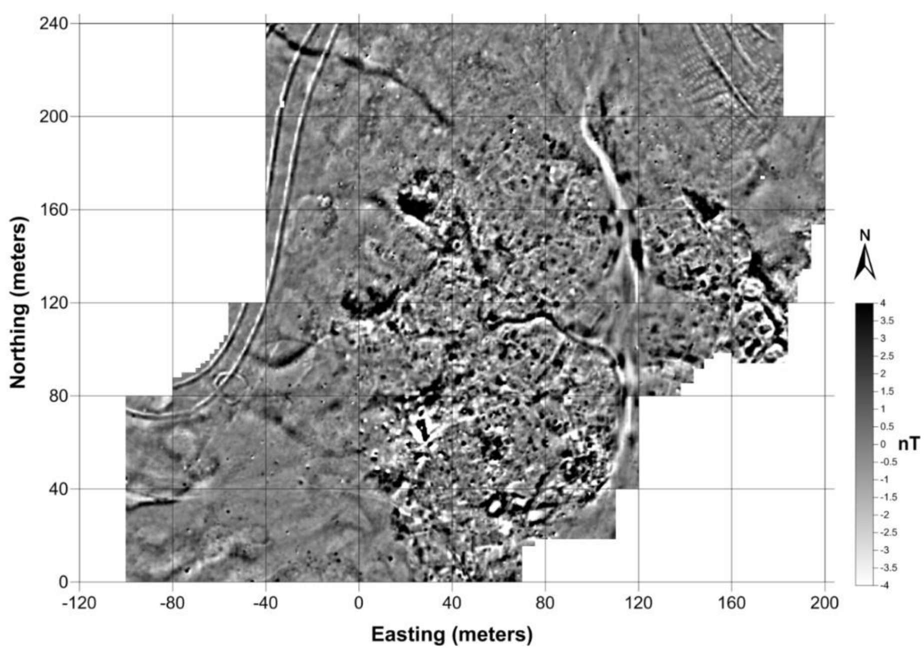

Figure 4.7 Magnetometry map of the site of Tashbulak (image: Edward Henry, 2013).

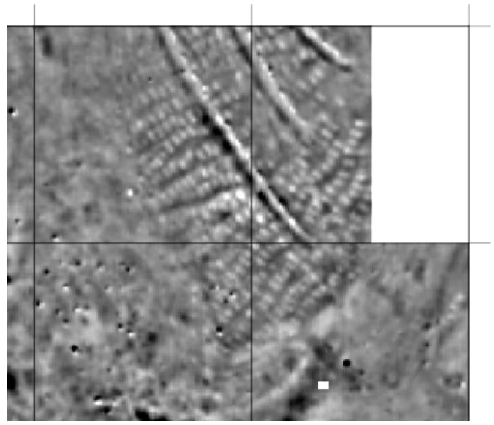

Figure 4.8 Detail image of magnetometry survey of the Tashbulak cemetery (image: Edward Henry, 2013).

4.7.2 Intensive Excavation

In 2015, a joint Uzbek-US team (Uzbek Institute of Archaeology project and Washington University in STL) launched the ARQ project (Archaeology Research of the Qarakhanids) at Tashbulak (Michael Frachetti and Farhad Maksudov, co-directors). In the summer of 2015, excavations, geoarchaeological testing, dendrochronological collection, and continued geophysical mapping were conducted across Tashbulak and the surrounding region. The goals for this season were 1) to complete GPR survey of the site, to acquire a more detailed map of the architecture and construction sequence, 2) to examine the sequence of site establishment, occupation, and decline through both a structural and ecological lens, and 3) to investigate the role of Tashbulak in regional trade, production, and politics. Geophysical survey resulted in a detailed map showing the total extent of structures at Tashbulak, which cover roughly 7 hectares. Several trenches were excavated across the site. An "L-shaped" unit (X19/W19) was placed on the citadel structure located on the anthropogenic mound in the southern portion of the site. Excavations here revealed a single-phase construction sequence of large stone foundations, approximately 60-70cm in width. The surface below the foundations appears to have been intentionally leveled. There was evidence of structural collapse and burning in this unit as well.

The second excavation unit (R14) was placed over a circular anomaly identified in both magnetometry and GPR survey. Work in R14 revealed a semi-subterranean room approximately 2m x 2m. A large number of slag fragments were recovered, many of which were recovered in hearth/firepit contexts. These findings have led to the hypothesis that this represents a workshop area, potentially for processing iron or even steel. A trench was also placed in an area identified as a midden. This excavation yielded a large amount of faunal remains and ceramic sherds.

4.7.3 Site Chronology

Work is still ongoing to resolve the chronological sequence at Tashbulak. Current understandings of chronology at the site are based on radiocarbon dates from several contexts, as well as ceramic and numanistic analysis. All dates were derived using Accelerator Mass Spectrometry (AMS) techniques. Four dates were derived from samples of wood charcoal fragments collected from test excavations in 2012 (TBK 2012CB11, TBK 2012CB8, TBK 2012CB5, TBK 2012CB10). Four more dates were derived from charred seeds. Two seeds were collected from the midden (one from the top - TBK-AMS-3 - and one from the bottom - TBK-AMS-4), and two were collected from the R14 trench (TBK-AMS-1, TBK-AMS-4). An additional wood sample was collected and dated from R14 (TBK-AMS-5). Six dates were collected from bone collagen derived from six individuals in the Tashbulak cemetery (EB_01, EB_02, EB_03, EB_04, EB_05, EB_06). The resulting calibrated dates cover a period from approximately 650-1050 CE. Four coins were recovered during excavation of trench R14. One coin recovered in the turf level dates to the Timurid period (15th century). The other three coins were found in secure contexts in trench R14, and their inscriptions date to the 10th-11th centuries. Ceramic analysis has identified styles, particularly from glazed sherds, that are associated with both the Samanid (819-999) and Qarakhanid (850-1212) dynasties. Considering these data, current estimates place the occupation of Tashbulak between the 7th and 11th centuries CE.

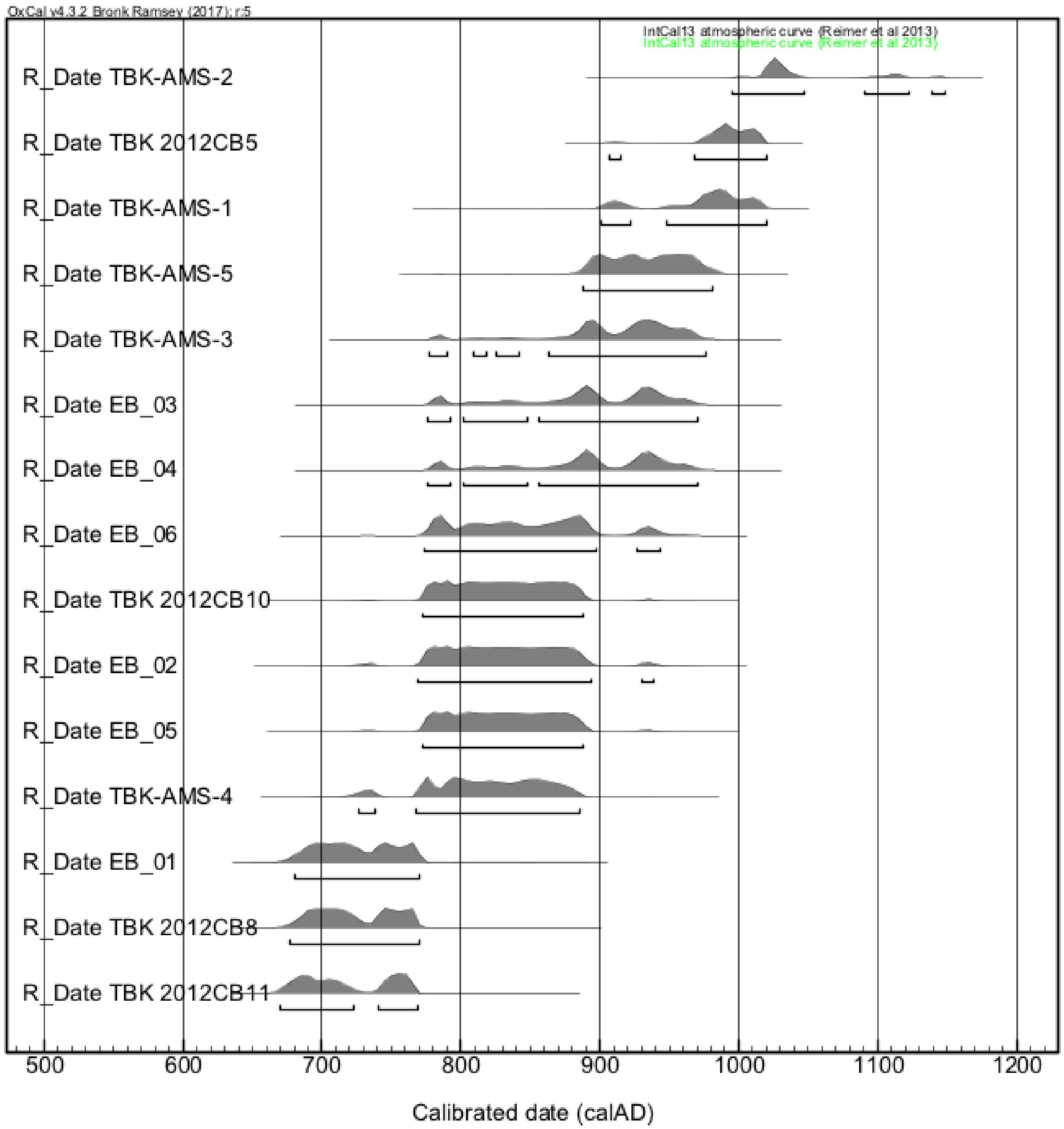

Figure 4.9 95% Probability distributions for calibrated radiocarbon dates from Tashbulak. Dates were calibrated with IntCal13 using OxCal v. 4.3 (Bronk Ramsey 2018).

4.7.4 Tashbulak Cemetery

The cemetery at Tashbulak is located in close proximity to areas of the site believed to be used for habitation and production. The cemetery is located on a slope approximately 40 meters from the western edge of the settlement of Tashbulak. Burials are organized into east-west columns of 5 to 25 graves (figure 4.8). Approximately 14 columns were recorded by the 2013 magnetometry survey. During the 2015 field season, together with a small team, I excavated five burials in the Tashbulak cemetery. Using a georeferenced version of Edward Henry's magnetometry map in ArcGIS, I placed units so that each trench would cover two burials. Units were laid out according to the side-wide grid, and each initial trench covered 3m x 4m. These units were placed to capture two different contexts, to test for spatially differential preservation and burial practices. One unit (J6) was placed near the top of the slope, at the most northerly extent of the cemetery (figure 4.10). The other unit (F6) was placed midway down the slope (figure 4.10).

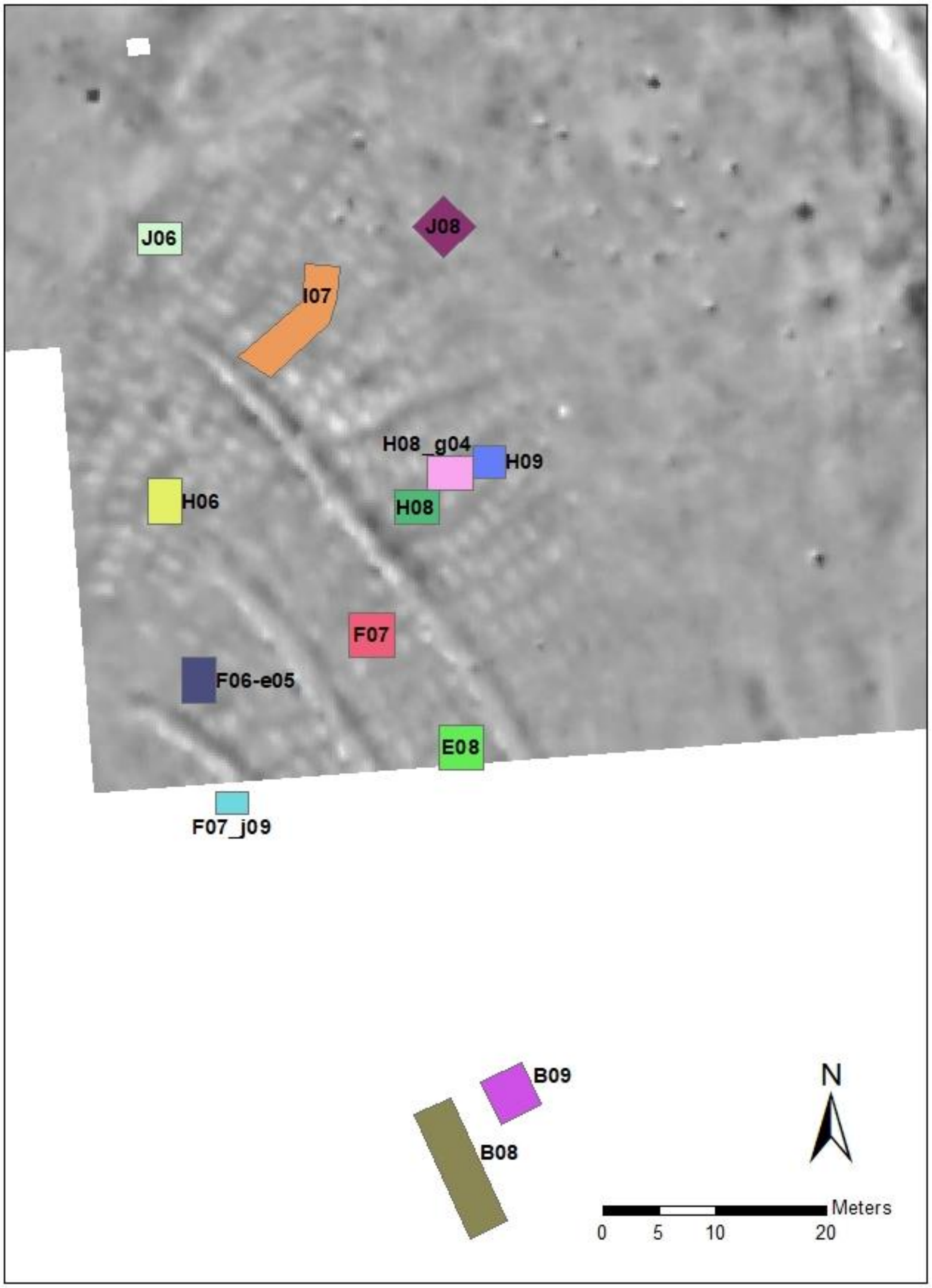

Figure 4.10. Map showing location of cemetery excavation units at Tashbulak during summer 2015 and 2017.

Excavations of the first trench (J6a5) placed in the cemetery proceeded with a high level of caution as the structure of the burials and potential materials within were completely unknown. The burial team began by removing the turf and then proceeded to excavate with shovels in 10-15cm levels. Every third bucket of soil was screened through 5mm mesh. Very little was recovered from this screening which yielded fewer than 20 ceramic sherds, and a small number of faunal remains. Excavations continued like this until a depth of 80cm (as measured from the southwest corner) at which point the tops of two burial shafts were exposed. Excavations were briefly interrupted when the tibia and ilium of an infant were uncovered in the western wall of the unit. These remains were covered until excavation of the two adult burials was completed.

Excavations proceeded so that each successive level removed a smaller section of the unit so that by the time we reached the bottom of the shafts, only the burials and a small section between them were being removed. All soil from within the shafts was screened. At approximately 120cm below the surface (about 50cm below the ancient surface) we reached the bottom of the burial shafts, having recovered only a few scattered human carpals in rodent burrows. We also uncovered a linear segment of gravel along the east side of the more eastern burial (burial 2), approximately 2m long and 15cm wide. Excavations revealed a section of loose, dark brown soil. Careful work in this section revealed the nearly complete remains of an adult individual (burial 2, individual 1) at a depth of 152cm below the southwest corner of the unit. A similar line was found along the east side of burial 1. Excavations of this section revealed a row of mud bricks behind which was a similar layer of dark soil and another set of adult skeletal remains (burial 1, individual 1). Once the adult remains were recorded, photographed, and removed, the infant remains were excavated. Sections of gravel rich soil around the infant suggest that its burial included the use of mudbricks.

Figure 4.11. Photo of exposed remains of Individual 1 in Burial 1, unit J6a5.

The first cemetery excavation trench had revealed a deep layer of colluvium covering the ancient surface. This knowledge led us to take a slightly different approach with the excavations of the second trench (F6e5). The turf and colluvium were removed without screening or sublayers being cleared. This allowed us to reach the burial shafts after only about a day of work. From there, excavations proceeded in a similar method to the first trench, although soil from within the burial shaft was only selectively screened until excavations reached the level of the mudbricks. Burials 4 and 5 had the same grave form as the first two burials. Excavations revealed a nearly identical burial practice for all four adults: a rectangular grave shaft, approximately 50-80cm deep (from ancient surface) with no additional structural elements, leading to a niche excavated out of the western wall of the shaft. This niche was excavated slightly below the level of the bottom of the initial shaft, and the entrance blocked by 4-5 mudbricks, each with nearly identical dimensions of c. 42 x 10cm. All adults were laid out in an extended position on their backs (supine) with their heads to the north and faces turned toward the west. No burial goods were found with any individuals. Nearly all remains were found in anatomical position, and the preservation of all remains was excellent across all bones. Geochemical analysis conducted by T.R. Kidder indicates high levels of calcium carbonate across the site that promote basic soil and good conditions for the preservation of bone (Gordon and Buikstra 1981). No grave goods were recovered from any of the burials.

Figure 4.12. Photo of exposed remains of Individual 1 in Burial 4, unit F6e5 in the foreground, with the fully excavated Burial 5 in the left of the photo.

In the summer of 2017, the ARQ project conducted additional excavations at the Tashbulak cemetery. The sampling strategy for excavation at the Tashbulak cemetery was designed to capture a representative set of graves sufficient to discuss variation and patterns in burial practice across the cemetery. There is no a priori way to determine how the Tashbulak burials are grouped as the burials are laid out in consistent, continuous rows and columns (figure 4.8). Therefore, I attempted to capture potential chronological or spatial variation by placing excavation units at the extreme extents of each end of the mapped cemetery (upslope, downslope, up-valley, down-valley). Units were also distributed as evenly as possible within the cemetery. Each unit was placed over at least two burial shafts, as this allowed for more efficient excavation and space for excavators to work. In several cases, large units were opened up over large portions of burial columns and rows, or smaller units were expanded to capture more burials. Excavation trenches at Tashbulak are laid out according to the arbitrary grid described above (datum E1000, N1000, Z2000). Using the arbitrary grid projected over the magnetometry map of the site, I was able to identify burials suitable for excavation. Coordinate points for units were extracted using ArcMap GIS. Units were then shot in on site using a Topcon theodolite. Because the cemetery is located on a slope, in some cases, unit corners were altered to reflect the topography to preserve the size and shape of units intended (figure 4.13). At times, it was necessary to expand sections of units to expose the entirety of burials. If a unit was modified from its original coordinates, the outline of the unit was rerecorded with the theodolite. Units were assigned designations according to the sitewide grid, based on the grid position occupied by the majority of the unit.

An additional goal of my sampling strategy was to determine the extent of the cemetery beyond what had been mapped during magnetometry survey. The majority of the northern extent of the cemetery had been mapped, but the southern extent of the slope was not completely covered. Therefore, this was the area targeted for additional testing. Test units were placed 160m, 70m, and 40m north from the edge of the last burials mapped by magnetometry to investigate the extent of the cemetery. These test units add a minimum of four additional columns to the known burials, as revealed by a test trench 40 meters beyond the mapped edge of the cemetery that contained an additional column of burials. This brings the total number of burials at Tashbulak to approximately 400 graves.

Figure 4.13. Overview of Tashbulak cemetery, looking west, showing 2017 excavation units.

Geoarchaeological survey conducted during the 2015 season informed the excavation practices used in 2017. The geological and structural properties of the Tashbulak cemetery result in variation in the depth of the top of burial shafts, burial cists/niches, and skeletal remains. However, there are some general trends. Below a thin turf layer, there is a 40-100cm layer of soil across the cemetery slope that is characterized as dark brown colluvium with no evidence of ancient or modern anthropogenic layers. There is variation in the total depth of this colluvium due to variation in flow patterns across the slope as well as movement of soil by forestry terracing practices. Due to the sterile nature of this layer, the first 40-50cm of topsoil and colluvium was excavated without screening. At 50cm the floor of units were cleaned and scraped to expose any potential burial shafts and to examine for the presence of the C horizon. The C horizon soil is lighter in color than the colluvium due to the presence of abundant calcium carbonate (CaCo3) throughout. The tops of burial shafts are characterized by a soil change to a mottled matrix of yellowish-tan clay and dark brown soil with ~10% gravel inclusion. Burial shafts are also identifiable by their rectangular shape and dimensions that range in size from approximately one meter by two meters in some adult burials, to approximately 50cm by 30cm in some infant burials. If burial shafts were not exposed at 50cm below the modern surface, soil was removed in 15cm increments until the shafts were identified. The magnetometry map was used to help direct the uncovering of shafts. The locations and depths of the tops of burial shafts were recorded with the theodolite. The surface of burial shafts was also photographed, either individually or together with other shafts in the unit. Burial shafts were excavated with trowels and handpicks, and removed soil was selectively screened (every 3rd-4th bucket) through a 5mm mesh screen. The soil matrix outside of the burial in the unit was cleared without screening in areas immediately around burials to provide sufficient space for excavators to work, and to expose niches and cists as these often occupied space offset from or extending beyond the burial shaft.

Two burial structure types were identified at the Tashbulak cemetery: cist burials and niche burials. Each type has unique indicators and requires slightly different excavation approaches. Niches burials are usually first identified by a line of mudbricks running the length of the western side of burial shaft. The mudbricks are significantly more compact than the surrounding matrix and have 70%+ gravel composition. Behind the mudbricks – usually upslope (to the west), the niche itself is identified by dark brown soil that is less compact than the surrounding natural matrix or burial shaft soil. In some cases, mudbricks were significantly deteriorated and only evident in trace amounts. In these burials, niches could still be identified by the softer, darker matrix. Cist burials are identified by the presence of stones (mostly sub-angular, c.10-20cm diameter) along the perimeter of the burial shaft (see figure 4.15). The soil within the cists is similar to that in the burial niches.

Figure 4.14. a) Burial 21 – niche burial containing the remains of an infant; b) burial 28 – niche burial of an adult, showing multiple layers of mudbricks.

Figure 4.15. Photo of burial 6, a cist burial containing an adult individual, showing stone lining and wooden beams lining the burial chamber.

The internal structures of burials were excavated using trowels until human bone was exposed, at which point wooden picks, dental tools, and brushes were used to expose the bones. All soil removed from the niche area was screened with 5mm mesh screens. Skeletal remains were uncovered in situ as much as possible. Rodent burrows are common throughout the area, and isolated finds of small human bones (especially phalanges, carpals, and tarsals) reflect some degree of bioturbation in the burials. In certain burials, especially cist graves, bioturbation was more extensive with larger bones, including ribs and clavicles, displaced. In these cases, bones were left in situ if possible. However, if their presence made it difficult to expose remaining remains that were in situ, these bones were removed after their position was recorded. Once uncovered, skeletal remains were photographed and total station points were taken on the top of the cranium and between the ankles of individuals. After in situ recording was complete, skeletal elements were removed and inventoried. As remains were removed, they were wrapped in acid free tissue paper and labeled according to side, skeletal element, and burial. The remaining soil from the niche or cist was then removed and screened. All materials collected, including human remains, were transported to and are currently stored and curated at the Institute of Archaeology, Samarkand in the ARQ program lab.

In total, 41 burials were excavated from the Tashbulak cemetery, five in 2015 and 36 in 2017. Osteological analysis of remains indicates that 21 of the individuals recovered were adults, twelve were juveniles or adolescents, and eight were infants. Twelve of the adults were estimated to be female, and 9 were estimated to be male (for detailed age and sex estimation standards see ch. 5). All burials mapped and excavated at the Tashbulak cemetery were constructed perpendicular to the slope so that the long edge of each grave is oriented roughly N-S. Two types of grave structure have been identified at the Tashbulak cemetery: niche burial and cist burial. Both burial types lack evidence of permanent external structural elements that would have been present on the ancient surface. It is likely that graves were marked by wooden or other perishable materials, as the regular organization of the cemetery indicates knowledge of the placement of burials. Internally, these burial types share similar shaft construction: rectangular shafts were dug straight down into the slope-side to a depth of between 50 and 120 cm. No additional structural elements were added to the shaft for support or embellishment.

The burial chamber containing the body is the segment where these burial types differ. For niche burials, the burial chamber was excavated along the entire length of the western side of the grave shaft, to a level below the grave shaft floor. After the body was placed in the chamber, it was closed with mudbricks. Usually this was done by laying a row of mudbricks flat along the length of the niche and then propping another row upright to seal the chamber off from the grave shaft, which was then filled in (see figure 4.14b). In cist burials, at the bottom of the grave shaft a smaller rectangular chamber was excavated and lined with large natural, usually flat, stones. Inside these stones, wooden beams were laid along all sides of the chamber, but not on the floor. After the body was placed in the chamber, it was covered with a layer of more wooden beams and the grave shaft was filled in. The exact size of these beams is hard to tell because of issues with preservation. However, from what was recovered, it appears that the wood beams ranged from c. 10-50cm long, with diameters as small as 10cm and as large as 30cm. The largest beams were most often used to line the burial chamber, while smaller ones were used to roof the chamber.

All individuals no matter what their estimated age or sex were oriented with their heads to the north (ranging between NNE 20°-0° and NNW 335°-0°). Most individuals were found with their faces oriented toward the west. In three cases, individuals were arranged so that their faces were pointed straight up, toward what would have been the ceiling of the burial. The dominant body position in the Tashbulak cemetery was extended supine. There was only one exception to this body arrangement: burial 8. This individual was interred in a semi-flexed position. However, this appears to have been necessitated by a joint condition which would have made it difficult if not impossible to lay this individual out in an extended position (figure 4.16). Excavations at the Tashbulak cemetery recovered a single individual definitively buried with grave goods. One bronze earring, one bronze bead, and 7 shell and glass beads were recovered from the cist of burial 28. Body treatment does not appear to have differed between sex or age categories. Infants were slightly more likely to be buried with their faces oriented straight up rather than to the west.

Figure 4.16. Photo of burial 8, cist burial with individual interred in flexed position due to degenerative joint disease.

Chapter 5: Bioarchaeological Methods

This chapter provides detailed descriptions of the bioarchaeological methods used in this study to collect and analyze data. I first describe my approach to general osteological data collection, including generating skeletal inventories and sex and age estimation. I then outline the variables collected for mortuary analysis and my standards for identifying patterns in practice. Finally, I provide detailed descriptions of my cranial geometric morphometric data collection, management, and statistical analyses.

5.1 Osteological Analysis

5.1.1 Skeletal Inventory

Skeletal inventories were generated for Tashbulak individuals excavated during the summer 2015 and 2017 ARQ project seasons. During excavation, isolated and disassociated bones were inventoried as they were uncovered and collected (many of these were the result of rodent bioturbation). If these elements were found in the niche or chamber fill of a burial or could be associated with the remains in a delineated grave, they were assigned the same burial number. If not, bones were assigned unique designations (e.g. burial 5, individual 2). In situ skeletal elements were inventoried as they were removed after photographs and additional measurements were taken. Inventories were marked on standardized sheets based on those generated by Buikstra and Ubelaker (1994:attachement 1) (Appendix B). Skeletal elements were marked for presence/absence by a “c” for complete or “x” for absent. Any evidence of damage was denoted using the standard notation used by Buikstra and Ubelaker (1994) (1=complete, 2=partially complete, 3=heavy damage). Overall photographs were taken of all individuals in situ, and remains of individuals showing osteological abnormalities were laid out again in the lab for overall and detail photographs.

For individuals in this study that had been previously excavated, inventories were not generated because these samples almost exclusively consisted of crania disassociated from post-cranial remains. Conditions of crania were recorded in terms of elements missing and damaged, the extent of damage, and whether damage caused any warping of the shape of the skull that might affect landmark data. These descriptions were filed with the demographic and geometric morphometric data. Descriptions and inventories are supplemented with photographs of all individuals. Crania for all individuals in this study were photographed from six different perspectives (anterior, posterior, left profile, right profile, inferior, superior) with a Nikon D90 camera fitted with an 18-55mm lens. These photographs and descriptions aided in assessment of morphometric results, especially in the case of identifying whether outliers were the result of damage.

5.1.2 Sex Estimation

Demographic data on sex and age of all individuals was collected. Collection of demographic data for Tashbulak individuals was conducted in the field and in the ARQ lab at the Institute of Archaeology, Samarkand. Demographic data on previously excavated individuals was conducted in the ARQ lab at the Institute of Archaeology, Samarkand. Sex estimation of individuals was based primarily on os coxae morphology when available. Individual were scored for traits on the left and right os coxa using standard techniques (Klales et al. 2012; Phenice 1969, Walker [in Buikstra and Ubelaker 1994], Milner 1992, and Ubelaker and Volk 2002). Cranial morphology of individuals was also scored for sex estimation, based on descriptions and illustrations by Walker [in Buikstra and Ubelaker 1994], Graw (2001), and Walrath et al. (2004).

Cranial and post-cranial measurements based on those described by Ubelaker and Buikstra 1994 were recorded for a small number of individuals from Tashbulak (Burials 1, 2, 4, 5, and 8). These measurements were used with cranial (Giles 1970; Giles and Elliot 1963) and post-cranial (Işcan and Steyn 2013; Robinson and Bidmos 2009) discriminant functions to estimate sex. This allowed me to evaluate the accuracy of my sex estimations based on os coxae and cranial morphology. Additionally, individuals from Tashbulak were scored for os coxae and cranial traits by two other members of the ARQ bioarchaeology team during the 2017 season. Sex estimates for previously excavated individuals are based solely on cranial morphology scores, because os coxae and other post-cranial elements were not available. Final estimates were made as: probable female, possible female, probable male, possible male, and unidentified.

5.1.3 Age Estimation

Age estimations are important for the morphometric portion of this study, because only fully adult crania can be used for the biodistance analyses applied here. This is because cranial growth is not complete until adulthood. Adult and non-adult designations were assigned based on post-cranial epiphyseal closure, especially of the medial clavicle (Cameriere et al. 2013; Shirley and Jantz 2011), and on cranial synchondrosis closure (Bassed et al. 2010; Işcan and Steyn 2013; Madeline and Elster 1995). For individuals without associated post-cranial remains, cranial synchondrosis closure was used exclusively for adult/non-adult designations.

Age for adults was primarily estimated by scoring changes to the pubic symphysis, using the Suchey-Brooks (1990) and Todd (1920) systems, and auricular surface areas of the os coxae, using the Meindl and Lovejoy phases (1989). Degree of cranial suture closure was scored and used to estimate age as described by Meindl and Lovejoy (1985). For those individuals missing post-cranial elements, cranial suture closure and tooth wear (Smith and Knight 1984) were used to estimate age. For Tashbulak individuals with well-preserved os coxae and crania, transition analysis was used to increase precision of age estimates (Boldsen et al. 2002; Milner and Boldsen 2012). I limited age estimates for individuals without post-cranial remains to three categories with a minimum of 15 year ranges: young adult (18-35 years old), middle adult (35-50 years old), and old adult (50+ years old).

I estimated age for infant, juvenile, and adolescent individuals using a combination of: tooth eruption and formation sequences (AlQahtani et al. 2010; Ubelaker 1984), epiphyseal closure (Scheuer and Black 2000), and long bone length (Scheuer and Black 2000). Selection of criteria depended on the age range of individuals and skeletal preservation. I relied more on tooth eruption sequences for infants and young juveniles, and more on epiphyseal closure for older juveniles and adolescents. The length of age ranges assigned also differs between pre-adult groups, with infants assigned ranges as narrow as 2 months, while older adolescents may have ranges as large as 5 years. For the purposes of this study, large age categories are appropriate. My morphometric analysis does not require me to distinguish between age categories beyond adult and non-adult. My mortuary analysis investigates the possibility that burial practice varied with age of individuals. However, current literature on Islamic burial and medieval Central Asian burial does not indicate that highly specific age categories were a significant factor in mortuary practice (Halevi 2007). I evaluated my age estimates for both adults and sub-adults by comparing my results for the individuals from Tashbulak to those of other ARQ bioarchaeology team members.

5.2 Mortuary Analysis

Mortuary contexts are multifocal, with the potential to reflect and embody multiple meanings and identities. This makes them an important source of ideological and social data. Burials are contexts in which social processes and institutions are often asserted or renegotiated. That is, burials are an opportunity for surviving individuals to embrace their world order, refute it, or change it (Binford 1971; Brown 1971; Pearson 1982). Burial practices vary widely across time and space, but the death of an individual seems to be a time in which social order is in limbo. The role of the deceased in life must now be filled, eliminated or changed in order to maintain social order and balance (Gillespie 2001:90). This negotiation can be performed through innumerable practices, whose nature is dictated by the ideologies and material resources available to those directing burial ceremonies (Laneri 2007:5). Burial is also an opportunity for public display, allowing ideological and power dynamics to be negotiated on the scale of community or group. Mortuary contexts are therefore, the product of a series of decisions of the part of surviving individuals acting on diverse motivations from the interest of the deceased, to self-interest and promotion to community cohesion (Hodder 1982; Verdery 2005). Because of this, burials represent material evidence of community and individual ideals and practices. Examining patterns of practice and correlating these with potential biological and spatial differences between groups of individuals can help elucidate social identities and divisions (Agarwal and Glencross 2011; Joyce 2005; Knudson and Stojanowski 2008).

The goal of mortuary analysis in this study is to evaluate the presence of communities-of-practice and implications for religious identity. In Chapter 3, I discussed the theoretical basis underpinning the creation and maintenance of mortuary communities. Here, I will outline how I collect data related to these communities from my sample. By evaluating the geographic extent and religious associations of these communities, I will work to construct a framework for the role of such communities in the spread of Islam in Central Asia.

5.2.1 Mortuary Components

To identify shared traits of practice within and between sites, I recorded a range of burial components. Components were chosen because of their relevance to what is currently understood about mortuary practice in medieval Central Asia and their cross-cultural importance in burial. This allows me to more accurately capture the different types of identity embodied in different components, as discussed in chapter 3. I did incorporate contextual knowledge of the period into my data collection strategies. I collected data on variables identified as important to Islamic burial practices (e.g., orientation of head and body) (Halevi 2007), and other religions and traditions present in the region during the medieval period (8th-13th centuries) (e.g., grave goods). These mortuary components fall into three broad categories: location and spatial distribution, burial architecture, and body treatment.

Spatial Variables

The two spatial variables recorded in this study are: location of burials on the landscape and organization of burial grounds. The first of these, where a burial is located on the greater landscape, I define through its relation to the closest settlement. Location of burial is an important element of Islamic burial practice. Although Mohammad was buried in his house, he expressed a preference for burial in cemeteries to his followers while he was alive (Halevi 2007, 146-147). In Zoroastrianism, there is a similar tendency to bury the dead in large concentrations, but instead of inhumation, Zoroastrian practice involves exposure and disarticulation followed by deposition in ossuaries within or adjacent to settlement areas (Lerner 2011). Pre-Islamic burial practice of nomadic groups in Central Asia is characterized by kurgan-style burials, often located in small burial clusters, not necessarily associated with settlements (Borisenko and Hudiakov 2008).

The second spatial variable, organization of burials within burial grounds, includes information both on patterns in placement of burials on the landscape and how burials are placed in relation to each other (overlapping, clustered, etc.). Overall burial pattern is another useful variable for distinguishing religious affiliation. Islamic cemeteries are generally laid out in a row-and-column pattern, and grow organically (Halevi 2007:147). Zoroastrian burial organization is not as standard. Ossuaries and charnel houses may have complicated internal structures or no apparent organization at all. Layout of burials with regard to other graves can be used as one potential indicator of mortuary community. Physical association between burials has been shown in many cases to be related to social identities including kinship, sex, and age cohorts (Pearson 1999; Ensor et al. 2017). Location of burial within the cemetery is often an important component of mortuary practice. I only have these data for my Tashbulak sample and therefore will not address burial location in this study.

Burial Architecture

In my analysis, I document three elements of burial architecture: orientation of the grave (cardinal direction), internal grave structure, external grave structure. The structural elements of burial differed significantly between the religious traditions of medieval Central Asia. In Chapter 3, I described the traditional and prescribed elements of construction in an Islamic grave. The immutable elements of construction are that the grave be large enough to house the deceased body in an extended position and that the grave be created in such a way as to protect the face of the dead from having soil thrown on it. I would expect specific internal structural elements to vary across all religious traditions. According to previous research, Zoroastrian burials exhibit a range of internal structures (Lerner 2011). Archaeological research on pre-Islamic nomadic cemeteries indicate that inhumation in burial mounds was the most common form, with variable internal structures, including chamber and niche styles (Muzio 2009). As discussed in Chapter 3, such variation can be taken as more explicit evidence of CoP, as these are out of the public eye and cannot simply be imitated.

Body Treatment

In my examination of the treatment of bodies in burial, I include both the manipulation of intrinsic (corporeal) elements, and well as the adornment of the body with extrinsic materials. The intrinsic variables recorded are: head and face orientation, body position (flexed, extended, etc.), and post mortem alterations of the body. The extrinsic variables recorded are: type of grave goods, placement of grave goods, and deposition of the body in a container. In Islamic burial tradition, the dead are prescribed to be buried unaccompanied by any material goods beyond their burial shrouds. Burial goods are also not a part of Zoroastrian burial tradition, but are common in pre-Islamic nomadic burials of the region. Primary interment is mandated in Islamic burial, because the body's intact nature is believed to be sacred. Primary inhumation was also typical for pre-Islamic burial practice among nomadic groups (Muzio 2009; Cleary 2015). In Zoroastrian burial however, the body was treated quite differently. After death, bodies were exposed to animals and the elements. Once de-fleshed, bones were collected and deposited in containers or chambers (Lerner 2011).

5.2.2 Mortuary Data Collection

Data collection for mortuary practice consisted of identifying and recording information related to the variables described above. My data are derived from both primary excavations and previously documented sites. Information was gathered from primary excavations of the cemetery at Tashbulak through first-hand observation during summer 2015 and 2017. Mortuary data from previously excavated sites was collected from published data, government yearly reports, and site reports. These secondary sources were accessed either in the archives at the Institute of Archaeology in Samarkand's archives during summer 2016 and 2017, or electronically through sources shared by Uzbek colleagues or Washington University in St. Louis library resources. The majority of these sources were in Russian, requiring extensive translation, and varied widely in the amount of data included. Data for as many components as possible was collected at as high a level of detail as possible. In cases where sources were unclear about the nature of a mortuary component data was either assigned to a more general category, or not included. If there were contradictory reports, components were recorded according to the report with the most corroborating evidence (photos, illustrations, measured dimensions).

Spatial data on the Tashbulak cemetery is derived from magnetometry, GPR, and topographic maps of the site. The geophysical surveys conducted at sites allow for the exact measuring of distances between burials as well as between the cemetery and various landmarks in the settlement. The magnetometry additionally allows for examination of cemetery organization beyond what was recorded through excavation. The spatial data for the rest of the sample was derived from published maps and descriptions in reports about the locations of cemeteries and graves relative to settlements. Settlements are defined as areas with documented sedentary habitation or production activity.

Burial architecture and body treatment data from the Tashbulak cemetery was recorded during excavation of burials. During excavation, measurements of grave depth and dimension were taken by hand and with the theodolite. External and internal structures and grave orientation were described and documented through photographs. The dimensions of well-preserved structural components such as mudbricks and wooden beams were additionally taken. As described above, human remains were exposed in situ, allowing for assessment of body position and post-mortem processing. I collected data on grave structure and body treatment at the other sample sites from monographs and excavation reports. This information was taken from both written descriptions as well as interpreted from illustrations and photographs.

Based on these data, I compiled a list of all of the configurations of components present at each site in my sample. Because of the variation in information detail, mortuary components were marked for presence or absence rather than frequency. Notable patterns in frequency are described in the results section when relevant. Some general categories are included for cases of limited site description.

5.2.3 Evaluating Mortuary Practice

In my evaluation of mortuary variables, I use qualitative description and comparisons of discrete variables and suites of variables to analyze practice within and between sites. As with stylistic analysis in other materials (ceramics, textiles, architecture), in mortuary analysis a close observation of patterns of ritual can reveal repeated behavior, and knowledge transfer. I use two scales of evaluation in my mortuary analysis. The first scale addresses whether a burial or burial ground can be identified as part of an Islamic community and the second evaluates its participation in a mortuary community of practice.

I identify mortuary communities-of-practice from repeated suites of shared burial elements. A CoP approach focuses on elements that are not easily imitated, that require cultivated knowledge to execute (Knappett 2010; Wasko and Faraj 2005). In the case of mortuary contexts, I argue that the best candidates for such elements are those that would not have been visible publicly, and which do not fall within the realm of specifically prescribed Islamic burial practice. The variables that fall into this category are: body position, internal grave structure, grave good presence and type, and location of burial within cemetery. These are variables that would be difficult to imitate from simple observation, as all but external structures are not visible after the completion of burial. The final element, location of burial, would be publicly visible, however, it is also a variable that could likely be controlled by communities if they so choose. In addition, there is a considerable amount of variation that can be embodied in these elements without violating any of the immutable Islamic prescriptions for burial.

In this study I am also interested in examining what CoP reveal about the practice of Islam in medieval Central Asia. To accomplish this, I analyze burial contexts to determine adherence to or deviation from Islamic prescriptions for burial, rather than identifying the source of non-Islamic practices, unless they are readily documented or apparent (e.g., ossuaries with Zoroastrian imagery). I determine participation in an Islamic CoP based on the presence of a series of defining elements, chosen based on my analysis of Islamic texts and traditions (see Chapter 3). To be considered Islamic, burials should include: orientation of the head and grave with respect to Mecca, an extended body position, an absence of burial goods, lack of post-mortem processing, and evidence of a structure around the body to protect the face of the deceased. Non-Islamic elements, which directly contradict burial prescriptions include: inclusion of burial goods, post-mortem processing of the body, placement of body in a container, and arrangement of the body in a non-extended position.

5.3 Geometric Morphometric Methods

5.3.1 Use in evaluating biological variation

In this study, biological relatedness and variation in the population of medieval Uzbekistan is examined through variation in cranial shape. Current scholarship in developmental biology, genetics, and statistical analysis shows correlations between genetic relatedness and cranial shape in humans (Kohn 1991; Smith 2009; Sherwood et al. 2008; Cole et al. 2017). Humans have relatively low intra-species genetic variation compared to most species. This can make the detection of genetic affinity difficult. It is necessary therefore, to identify and record variation in skeletal elements that demonstrate detectable inherited genetic variation. Other skeletal elements demonstrate inherited morphological variation; however, cranial shape shows the highest morphological variation (Cole et al. 2017). Cranial shape is the result of a complex combination of environmental and genetic factors. Compared to many other bony structures, the cranium receives relatively little mechanical stress (Smith 2009). Research on the developmental plasticity of cranial regions with regards to mechanical and other environmental stresses have shown the complicated relationship between genes and environment that result in final cranial shape (Katz et al. 2016; Maddux et al. 2017). Overall, however, studies of cranial shape and molecular genetic methods indicate that the former can be effective as an approximation of biological distance between individuals (Hughes et al. 2013; Relethford 2009; Smith 2009).

Despite the relationship between biological affinity and cranial shape, in humans this relationship can be difficult to study because of the relatively low levels of inter-populational cranial shape variation compared to levels of intra-population variation (Relethford and Harpending 1994). To capture inter-group variation, researchers have turned toward the use of geometric morphometric methods and away from the linear analysis of traditional craniometrics (Adams et al. 2004). Geometric morphometrics is the quantitative study of shape based on Cartesian landmark coordinates. The field emerged with the development of a coherent mathematical theory of shape. Shape, in GMM, is defined as "all the geometric information that remains when location, scale and rotational effects are filtered out from an object" (Kendall 1977). Geometric morphometric (GMM) approaches capture subtle shape differences by recording and preserving the geometry of complex structures (Bookstein 1985). Linear craniometric measurements can be measured in a series using multivariate statistical methods, but geometric relationships between these measurements are not preserved, limiting their ability to detect variation in these relationships (Roseman and Weaver 2004).

Morphometric cranial analysis is also appropriate for this study considering the samples available to me for study. The majority of the medieval skeletal samples that I was able to access were limited to adult crania. This is due to selective collection of remains as well as the nature of their curation. The majority of the sites in my sample were excavated decades ago when post-cranial remains were often not collected. Since their excavation, many crania have also become disassociated from their post-cranial elements. While most of the crania are clearly labeled with site and project data, and have been kept in relatively accessible order, post-cranial remains were less well documented and curated. Dental morphometrics is an alternate approach that uses cranial elements to examine biological distance. There has been much research showing that dimensions of teeth, especially molars can also be used to estimate biological distance (Perez et al. 2006; Pilloud and Hefner 2014). In my original proposal, I considered collecting morphometric data on teeth from my sample as an additional source of biological distance data. I was not able to conduct this data collection as a majority of the crania in my sample were either missing molars or had extensive wear on their molars.

5.3.2 Data collection

I collected three-dimensional cranial geometric-morphometric data of individuals from my sample to calculate biological affinity measures. There are several approaches to collecting morphometric data which makes GMM a versatile method, able to be applied to a wide range of mediums. Cartesian coordinate data can be collected in either two or three dimensions. Data can also be digitized either on the original object or on an image or scan of the object (Bookstein et al. 1985). Advances in scanning technology allow thousands of data coordinates to be collected on samples. The nature of GMM therefore, allows approaches to be readily tailored to the materials and questions of a study. In this study, I chose a data collection strategy that accounted for the fact that I was collecting my data in Uzbekistan from a sample of the crania of a few hundred individuals. For my research, I collected three-dimensional landmark and semi-landmark data with a Microscribe digitizer. The Microscribe is portable and easily deployed in the institute in Samarkand. Because it runs off of a USB connection to a laptop, it is also possible to use even if the power is out, a situation that is not unusual in Samarkand during the summer. Because data collection with the Microscribe only produces excel files, it is also easy to store a large amount of data on small, portable hard drives. Since my total sample size is only a few hundred individuals, the Microscribe was sufficient in its capacity for collection of landmark points. A three-dimensional scan of each cranium, for example, would produce shape data that was too high resolution to be accurately analyzed statistically for the size of my sample.

Lanmark #	Landmark	Description
1	Basion	The midline point on the anterior margin of the foramen magnum
2	Condyle posterior	The most posterior points on the occipital condyles

3	Inferior nuchal	Midline point on the inferior nuchal line
4	Opisthion	Midline point at the posterior margin of the foramen magnum
5	Infranasion	The point of intersection of the nasofrontal, nasomaxillary, and maxillofrontal sutures
6	Frontomalare temporale	Most laterally positioned point on the fronto-zygomatic suture
7	Glabella	The most anterior midline point on the frontal bone
8	Nasion	Point of intersection between the frontonasal suture and midsagittal plane
9	Dacryon	Point on the medial orbit at which frontal, lacrimal and maxilla intersect
10	Asterion	Point corresponding to the posterior end of the parietomastoid suture, where pariotomastoid, lambdoid, and occipito mastoid sutures meet
11	Zygion	The most lateral points on the lateral surface of the zygomatic arches
12	Entoglenoid	Most inferior point on the entoglenoid process
13	Mandibular fossa	Deepest point within the mandibular fossa
14	Porion	Most superior point of the external auditory meatus
15	Postglenoid	Most inferior point on the postglenoid process
16	Tympanic	Most inferolateral point on the tympanic element of the temporal
17	Jugular	The most inferior, lateral point on the margin of the jugular foramen
18	Krotaphion	The most posterior extent of the sphenoparietal suture
19	Lateral ovale	Most lateral point on the margin of the foramen ovale
20	Bregma	Ectocranial midline point where the coronal and sagittal sutures intersect
21	Frontotemporale	The point where temporal line reaches its most A-M position on frontal bone
22	Lambda	Ectocranial midline point where the sagittal and occipital sutures intersect
23	Sphenion	The most anterior extent of the sphenoparietal suture
24	Stephanion	The point where the coronal suture crosses the (inferior) temporal line
25	Jugale	The point in the depth of the notch between the temporal and frontal process of the zygomatic bone
26	Frontomalare orbitale	The point where the zygomaticofrontal suture crosses the orbital rim/margin
27	Alare	The most lateral point on the nasal aperture taken perpendicular to the nasal height
28	Ectomolare	The most lateral point on the outer surface of the alveolar margin of the maxilla
29	Prosthion	The most anterior point on the maxillary alveolar process between the two central incisors
30	Zygomaxillare	The most inferior, anterior point on the zygomaticomaxillary suture
31	Zygoorbitale	The point where the zygomaticomaxillary suture intersects with the inferior orbital margin
32	Staphylion	The midpoint of the posterior edge of the hard palate
33	Nasospinale	The point where a line drawn between the inferiormost points of the nasal (piriform) aperture crosses the midsagittal plane
34-39	Bregma-Lambda	Line along the sagittal suture from Bregma to Lambda
40-45	Nasion-Bregma	Midline line along the frontal bone between Nasion and Bregma
46-53	Frontomalare orbitale-Frontomalare orbitale	Line traced along the internal edge of the orbit beginning and ending at Frontomalare orbitale
54-59	Opisthion-Lambda	Line traced along the midline between Opisthion and Lambda on the occipital bone
60-63	Nasion-End of Nasal suture	Line traced along the nasal suture from nasion to the end of the nasal bones

64-69	Posterior fronto-zygomatico suture-Superior temporo-zygomatico suture	Line traced along the superior border of the zygomatic between the fronto-zygomatico suture and temporo-zygomatico suture

Figure 5.1. Table showing three-dimensional landmarks and semi-landmarks recorded in this study with anatomical descriptions.

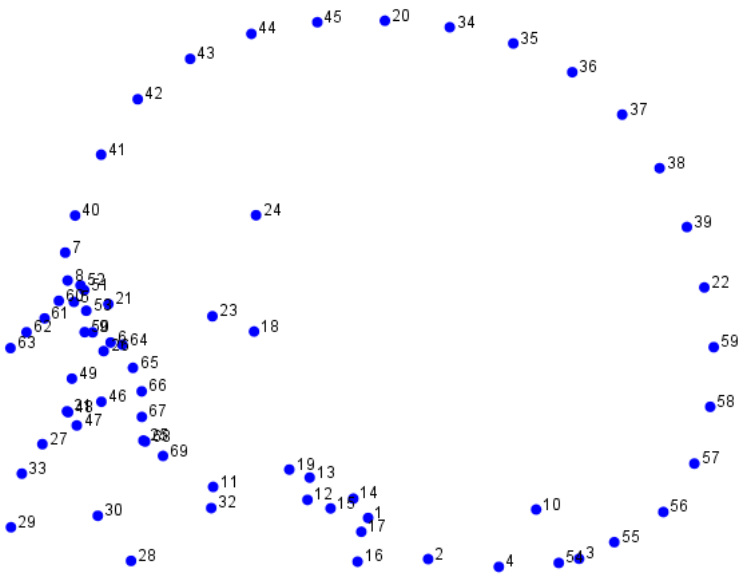

Figure 5.2. Location of landmarks according to average shape of the sample projected onto the midsagittal plane. Landmark numbers correspond to the first column of figure 5.1.

I recorded thirty-three three-dimensional landmarks and six semi-landmark curves (figure 5.1, 5.2). This number compares well to other recent studies with similar sample sizes and geographic coverage (Buck and Viđarsdóttir 2012; Humphries et al. 2013; Hens and Ross 2017; Stull et al. 2014). I chose landmarks based on three criteria: 1) their established identification as biologically significant landmarks, 2) their reflection of overall cranial shape, and 3) my ability to record them consistently and accurately. I initially chose landmarks for this study by reviewing a wide range of previous and current literature on craniometrics (Bräuer 1988; Cooke and Terhune 2015; Hauser and DeStefano 1989; Spradley and Jantz 2016; von Cramon-Taubadel et al. 2007). I included landmarks that appear in multiple studies and that have clear biological correlates to homologous anatomical loci.

As mentioned above, cranial shape can be an accurate reflection of biological distance. Studies have shown that some regions of the cranium reflect genetic molecular distances more than others due to pressure from environmental variables and restrictions of integration (Bruner et al. 2013; Klingenberg 2013). The regions that are most reliable indicators of genetic relatedness are: basiocranium, temporal, bone, upper face, and entire cranium (Smith 2009; Šešelj et al. 2015; von Cramon-Taubadel 2009). In comparison, the maxilla and cranial vault are not as closely correlated with genetic distance. In this study, landmarks were chosen to capture overall cranial shape data with especially dense data collection of landmarks in the temporal and upper face regions.

The chosen points include Type I, II, and III landmarks. Type I landmarks are discrete points at the juxtaposition of tissues, and are the most likely to be homologous structures (Bookstein 1997). Type I landmarks, are the most easily and consistently recorded landmarks (Baab et al. 2012; Sholts et al. 2011). Type II landmarks are points located at the local minima or maxima curvature of a structure. Type III landmarks are not defined by local structures but instead by their maximum distance from another point or structure (Bookstein 1997). The final type of point data collected is semi-landmarks, which are used to capture the shape of curves rather than single points. These curves are usually bounded on either end by landmarks, but points between may not be. This can make semi-landmarks difficult to record consistently. Some of these potential inconsistencies are addressed in resampling procedures (described below). I tried to maximize the number of Type 1 and 2 landmarks compared to Type 3 landmarks and semi-landmarks to maximize my ability to accurately and consistently collect data. To further ensure the precision of my data collection, I conducted an error study after all data was collected and removed from analysis any landmarks that I could not collect with precision.

Landmarks and semi-landmarks were digitized in the ARQ lab at the Institute of Archaeology, Samarkand, using a G2X Revware microscribe belonging to the Washington University in St. Louis Anthropology department. Points were recorded using Microscribe Utility Software (MUS) with Microsoft Excel to record points. Landmarks were recorded at least twice per individual to calculate intraobserver error to ensure precision of data points. Landmarks were recorded on crania oriented in approximately the same orientation for each individual (figure 5.3). To ensure access to all landmark points and curves, data was collected first with the cranium laid on its right side, with the left parietal and temporal regions facing up, the basal region pointed toward myself, and the cranial vault oriented away. The digitizer was positioned approximately 6 inches behind the top of the cranial vault. After recording of the left side was complete, the cranium was reoriented to expose the right side. All points and curves were recorded in both orientations, which means that bilateral traits were each recorded once, and midline traits were recorded twice.

Figure 5.3. Photo showing MicroScribe setup in the ARQ lab at the Institute of Archaeology in Samarkand.

5.3.3 Data Management

Once landmark and semi-landmark data was collected for all individuals, sets of coordinate data needed to be transferred into a form comparable between individuals. Data management for this this portion of my study consisted of four computational processes: resampling of semi-landmark curves, alignment of point clouds, filling in of missing points, and averaging bilateral landmarks.

Resample curves

When semi-landmark curves are recorded, a line is traced along the curve as the recorder rapidly takes points. Because these points are not based on specific landmarks, the number and location differs between each round of recording. To be comparable between individuals, however, each data set must have the same number of points. In this study, I used the program resample.exe (The resample.exe program was written by David Reddy and Johann Kim and reprogrammed by Dr. Ryan Raaum) to resample my semi-landmark curves.

1. The first step in resampling curves is to determine the end desired number of points. This number should not exceed the total number of points collected for any individual, but should be enough to accurately describe the curve. Once these numbers have been determined a .txt file is created with curve names, the number of points to resample, and saved as "resamplecontrol.txt." Curves are named according to the landmarks that delineate the beginning and end of the semi-landmark.

Text of resamplecontrol.txt:

BregLamL 8

NasBregL 8

FrontoL 10

OpisLamL 8

NasNasalL 5

FrontoTempZyL 6

2. The raw curve points from each individual are then cut and pasted into a text file. The same curve name as in control file is included at end of first line of each curve.

Example text:

-116.1725 -242.1057 93.8959 NasBregL

-115.0792	-238.5405	94.4914
-113.8329	-235.5693	95.4629
-110.8043	-231.0701	96.0343
-106.3595	-226.1463	98.1521
-50.2096	-199.8939	92.7808
-38.5112	-201.1719	91.5358
-28.9727	-203.2234	90.7737
-22.1646	-205.0108	91.0549
-104.6176	-266.4219	140.6527 FrontoL
-108.5863	-270.4989	139.1286
-114.5896	-273.7264	137.4848
-118.9046	-274.3677	133.6685
-121.7087	-274.2242	128.0459
-121.5712	-269.4205	109.1075
-120.5935	-265.0139	104.8486
-114.9586	-259.255	102.422

3. Command prompt is then opened and the directory is set to the resample.exe location:

Example command pathway:

C:\Users\Elissa\Documents\DIS\Stats>cd resampled

4. Start resample.exe in command prompt:

C:\Users\Elissa\Documents\DIS\Stats\resampled\resample>resample.exe -c resamplecontrol.txt -m curvessite.txt

This program functions as follows:

1. The length of each curve is calculated by summing the distance between each of the original points and their neighbor.
2. This length is divided by the number of desired semilandmark points.
3. New points are placed evenly along the curve according to the above calculation. These positions are calculated as averages of the two closest original semilandmarks weighted by proximity to the resampled landmark position.
4. The endpoints of the curves remained unchanged in all cases.
5. Once it has run, the program sends a .prn (formatted text, space delimited) file of the resampled points to a folder titled "resampled".
6. Create a new file for each individual with all original landmark points as well as the newly resampled semilandmark points. In this file remove redundant landmarks and those that overlap with semilandmark curves.
7. Do this for both right and left sides.

Generalized Procrustes Analysis (GPA)

In this study, Generalized Procrustes Analysis of landmarks is used to separate shape from size, rotation, and location, allowing for subsequent morphometric analysis. Procrustes Analysis isolates shape from these other variables using three sequential processes:

1) Landmark configurations are translated so that all point sets share a common centroid. The centroid is a point equal to the coordinate-wise average of the

landmarks of one point cloud. This step ensures that all point data are in a shared space.

2) Landmark configurations are scaled to have the same centroid size. The centroid size is the square root of the summed, squared deviations of the coordinates from their centroid. This step ensures that all point data are the same size.

3) Landmark configurations are rotated around the centroid until the sum of the squared Euclidian distances between landmarks is minimized. This is done as an iterative algorithm (Gower 1975; Rohlf and Slice 1990) where point sets are first rotated to an arbitrary configuration and the resulting coordinates are averaged. Point sets are then rotated to fit this average configuration and the process is repeated until convergence is reached.

I used the R package LOST (Arbour and Brown 2017) to perform Generalized Procrustes Analysis on my sample. This package is ideal for my data set because it allows landmark point clouds to be aligned even if they are missing landmarks. This is important because missing landmarks are estimated from consensus of aligned individuals with full landmark sets. I aligned points using the align.missing function. This function conducts a Generalized Procrustes Analysis on all complete landmark sets and produces a consensus configuration (using "Shapes" procGPA). Each incomplete specimen is then rotated and aligned with the consensus configuration based on their available landmarks (using "Shapes" procOPA). The resulting landmarks are in the same shape space as the original dataset. My workflow was as follows:

1. Save landmark and curve data for all specimens (complete and incomplete) in one .csv file with no headers (Just raw data, no spaces).

2. Open R Studio, load LOST package.

3. Run “align.missing”

```
read.csv("TashkTest.csv",header = FALSE,stringsAsFactors = FALSE)
x=read.csv("TashkTest.csv",header = FALSE,stringsAsFactors = FALSE)
align.missing(x,37)
```

Fill in Missing Points

My sample includes crania that are in various states of preservation. Some crania have sustained damage that affected my ability to collect complete sets of landmark and semi-landmark data. For those individuals with complete landmark data, the only data management necessary before statistical analysis was resampling the semi-landmark curves and performing a Procrustes alignment. Multivariate morphometric methods require that all specimens have complete data sets (Arbour and Brown 2013; Mitteroecker and Gunz 2009). For individuals with missing landmark points, it is necessary to manage their data in a way that allows for them to be compared to other individuals. There are different potential approaches to this problem: removing incomplete individuals from the data set, removing any landmarks that have missing data, or estimating the coordinates of missing landmarks. Studies have shown that the removal of landmarks or specimens from a sample can have a statistically significantly negative impact on the accuracy of subsequent analyses compared to including specimens with estimated missing landmarks (Clavel et al. 2014). I excluded samples with more than 7 missing landmarks (c. 20% of 33 landmarks), because error residuals increase steeply beyond this threshold for Bayesian Principal Components Analysis (BCPA), the method of missing landmark estimation used in this study (Clavel et al. 2014). Bayesian PCA (BPCA) estimates missing values by performing: 1) a principal component regression, 2) Bayesian estimation and 3) an expectation/maximization iterative algorithm to estimate missing data (Oba et al. 2003). My workflow for missing landmarks is as follows:

1. Open R Studio, load LOST package.

2. Run "MissingGeoMorph"

```
MissingGeoMorph(x, nlandmarks, method = "BPCA")
```

3. Save resulting coordinates

Averaging bilateral landmarks

In human crania, left and right bilateral landmarks tend to be genetically correlated. Because of this, bilateral landmarks should not be treated as independent data points to avoid an over-representation of these points compared to midline landmarks (Klingenberg et al. 2002). To address this issue, landmarks can simply be taken on one side, but this does not account for the asymmetry, slight though it may be, that is usually present and may be an important element of cranial variation. In this study, I employ a method by which each set of bilateral landmarks are averaged:

1. All coordinates of the right sides of bilateral landmarks are reflected by multiplying by -1

2. Perform a Generalized Procrustes Analysis on new set of landmarks

3. Average each of the bilateral landmarks by adding the left side coordinates to the reflected right side coordinates and dividing by 2

4. Perform a Generalized Procrustes Analysis to get final coordinates

5.3.4 Statistical Analysis

My research goal for the geometric morphometric portion of this study was to document the variation and relatedness of medieval Central Asian populations. To accomplish this, I will use Principal Components Analysis and Canonical Variate Analysis to document variation, and Mahalanobis and Procrustes distances, and Cluster Analysis to explore relatedness of individuals and sites.

Principal Components Analysis (PCA)

Once all remaining landmark point sets were aligned, I performed a Principal Components Analysis (PCA) on the GPA-transformed coordinates of all sites. I also performed a PCA on the transformed coordinates of just those individuals from Tashbulak. PCA is a technique that 'identifies orthogonal linear combination of the original variables that most efficiently reproduce sample variability' (Slice 2007:268). Conducting the PCA reduces the dimensionality of variation, allowing me to examine the variation of my sample and to identify the main features of shape variation in a simplified format (Klingenberg 2011). The PCA 'cleans' the dataset by re-expressing the data set along axes of principal components (PC) that are derived from the most important components of variation and ranked by their contribution to overall variation. This is helpful because the high number of landmarks and three-dimensionality of my data set make it difficult to identify how variable the sample is, and what the source of this variation is. I used the PCA therefore as an exploratory tool to evaluate what successive analyses would be helpful depending on the variation present. The PCA also identified the most variable regions of the crania in my data set, allowing me to selectively analyze those elements to see if isolating them altered the overall pattern of variation.

I performed PCAs in the program MorphoJ (Klingenberg 2011). To explore population variation and structure in the PCAs, I also projected confidence ellipses at probability 0.9. Ellipses were projected for samples based on assigned site and region for the total data set. They were also projected for the total data set and Tashbulak sample based on sex and religious association. Confidence ellipses can be used to visualize the variability of a mean point, and therefore are helpful when exploring total variation of a defined sample as well as how much of the variation overlaps with other samples.

Canonical Variate Analysis (CVA)

Canonical Variate Analysis is a discriminant function analysis, a class of procedures designed to maximize differences between groups. This is done by weighing and combining variables (in this case landmark positions) so that the ratio of between-group variance to within-group variance is maximized (Pietrusewsky 2008). Canonical variate analysis is used to find the shape features that best distinguish among multiple groups of specimens, when group membership is known a priori (Klingenberg 2011). By combining these analyses with my PCA results, I will be able to describe the cranial elements that are most responsible for any regionally distributed variation.

Mahalanobis and Procrustes Distances

Mahanalobis' generalized distance or D2 (Mahalanobis 1930; McLachlan 1999) is a common method for measuring biological distance. Mahanalobis distance maximizes the difference between pairs of groups by maximizing the ratio of between-group variance to the pooled within-group variance. I employ this method at the scale of region, not site. This is because large differences in sample size or small sample sizes can bias results. Procrustes distances are calculated from the Euclidian distance between two configurations of Procrustes coordinates as a metric measure of shape difference (Mitteroecker and Gunz 2009). To calculate the Procrustes distances between groups (in this case between sites and between regions), group means are computed from Procrustes aligned coordinates. The Procrustes distance is calculated between these means to create the distance matrix.

I use the Mahalanobis distance and Procrustes distance matrices generated by the CVA function in MorphoJ (Klingenberg 2011). After generating these matrices, MorphoJ performs a permutation test on these pairwise distances. I set the number of iterations for this test at 10,000. Given a distance between the means of two groups, this test calculates the probability that both groups derive from the same mean. This is done by first randomly assigning specimens to two new groups, from which new means are calculated, and Procrustes distances computed (SAS Institute Inc.). This randomization is repeated through many iterations (in this case, 10,000) to generate a probability distribution of sample mean differences in this combined population. Based on this distribution, the likelihood that the difference between the two initial groups could have been sampled from the same population can be evaluated. This gives me a way of evaluating how close individuals from different sites and regions are biologically.

Cluster Analysis

Cluster Analysis allows me to examine biological relatedness on several scales. Instead of only allowing pairwise comparisons, this analysis allows me to rank biological distance between multiple sites and regions. For this study, I generate phenograms by performing a cluster analysis in PAST (Hammer et al. 2001). This program uses Euclidean distances (in this case, Procrustes distances between Procrustes aligned coordinates of individuals, and Procrustes differences between the means of site and region groups). The resulting phenogram is a tree diagram summarizing the similarity relationships of the multivariate dataset. The distance among specimens in the tree is proportional to their shape differences. The most similarly shaped specimens are on neighboring branches, the most dissimilar ones are isolated next to the root (Viscosi and Cardini 2011).

Chapter 6: Analysis and Results

This chapter lists the results of my mortuary and geometric morphometric analyses conducted on the study sites. The results for my mortuary study are presented first and include the complete list of burial components recorded in my sample, followed by my data on the distribution of these components within and among sites. The second section of this chapter presents the results of my cranial geometric morphometric analyses. Results are organized by spatial level (region, site, individual). Trends in results are discussed for each spatial level as well as for chronology and demography. The final section of the chapter presents qualitative analysis of similarities in mortuary practice and biological affinity between sites and regions.

6.1 Mortuary Analysis Results

The results of my mortuary data collection are presented in the following data tables. My goal was to include mortuary data on all of the sites from which I collected craniometric shape data. However, information on mortuary ritual was not available for all sites. In total, I was able to collect data on mortuary ritual from eleven sites: two from Ferghana (Chor Dona and Kuva), two from Ustrushana (Koshtepa and Tashbulak), three from Soghd (Afrasiyab, Frinkent, and Altyntepe), two from Chach (Uturlik-tepe and Galva-tepe), and two from Khorezm (Tok-kala and Kalmyk-krylgan).

6.1.1 Identification of Burial Components

The first step of my mortuary analysis was to identify the burial components and the different forms present in the sample. I grouped components based on the categories listed in chapter 5. Component forms are as specific as possible, but some variation is allowed for elements that seem to have high levels of variation in all samples (e.g., arm position and personal adornment type).

Distance from Settlement	Within Settlement	Cemetery located within the walls of a settlement or are directly adjacent to habitation or production areas
	Less than 0.25km	Cemetery located less than 0.25km from habitation or production areas
	Close proximity to settlement, exact location unknown	Cemetery described in association with permenant habitation or production areas but location within or outside of this area is not explicitely designated
	No associated settlement	Cemetery not associated with permenant habitation or production areas
Cemetery Organization	Row and Column	Graves are placed in relation to one another to form rows and columns, with no
	Catacomb	Remains interred in a large shared structure
	Collective, organization not known	Graves are described as located in the same cemetery but the organization is not specified
Overlapping	Other burials	Graves overlap other burials, either placed above or intruding into the structure of other burials
	Structural remains	Graves are dug into architectural remains
	Absent	Graves do not overlap each other or any other structures

Figure 6.1. Table showing spatial components present in sample.

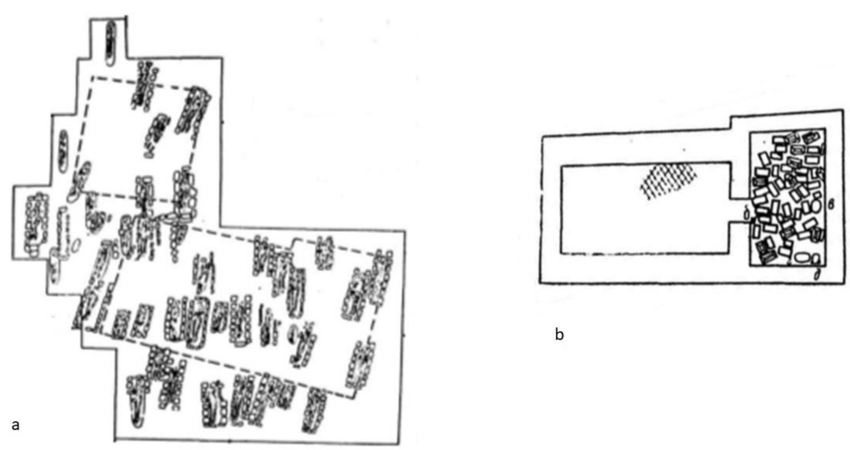

Figure 6.2. Illustration of types of cemetery organization found in sample: a) row and column, b) catacomb (after Gudkova 1964: figure 22).

Grave Structure	(1a) Internal pit closed with bricks	Rectangular shaft, with a small body sized pit excavated in the middle of the bottom of the shaft, pit is closed with a single layer of bricks laid overlapping the edge of the pit
	(1b) Pit with arch	Rectangular shaft, with no additional excavated chamber for the body, body is sealed off from rest of pit with an arch of bricks
	(1c) Oval Pit	Oval shaft with no additional excavated chamber and not closed with bricks
	(2) Chamber (general)	Internal brick structure over body, no additional excavated pit, exact structure is not specified
	(2a) Chamber (brick box)	Burial chamber is lined on all sides with bricks stood up on their tall end, the top and bottom of the chamber are lined with bricks laid flat
	(2b) Chamber (sides and top)	Burial chamber is lined on all sides with bricks laid flat, chamber is closed with a single line of bricks laid flat
	(2c) Internal cist	Rectangular shaft, with a small pit excavated at the bottom, pit is lined with large natural stones and wooden beams, body laid on ground, pit is closed with wood beams
	(3) Niche	Rectangular shaft, chamber excavated along the western wall of the shaft to a level below the bottom, chamber is closed with one or more rows of bricks
	(4a) Ossuary	Remains are interred in a ceramic container purposely built for burial
	(4b) Hum	Remains are interred in a large ceramic vessel
Grave Orientation	N-S	Primary alignment of the longest axis of the grave is North-South, with the head of the deceased to the north
	NW-SE	Primary alignment of the longest axis of the grave is northwest-southeast, with the head of the deceased to the northwest
	SE-NW	Primary alignment of the longest axis of the grave is southeast-northwest, with the head of the deceased to the southeast
	None	Grave is not oriented according to cardinal directions

Figure 6.3. Table showing burial architecture components present in sample.

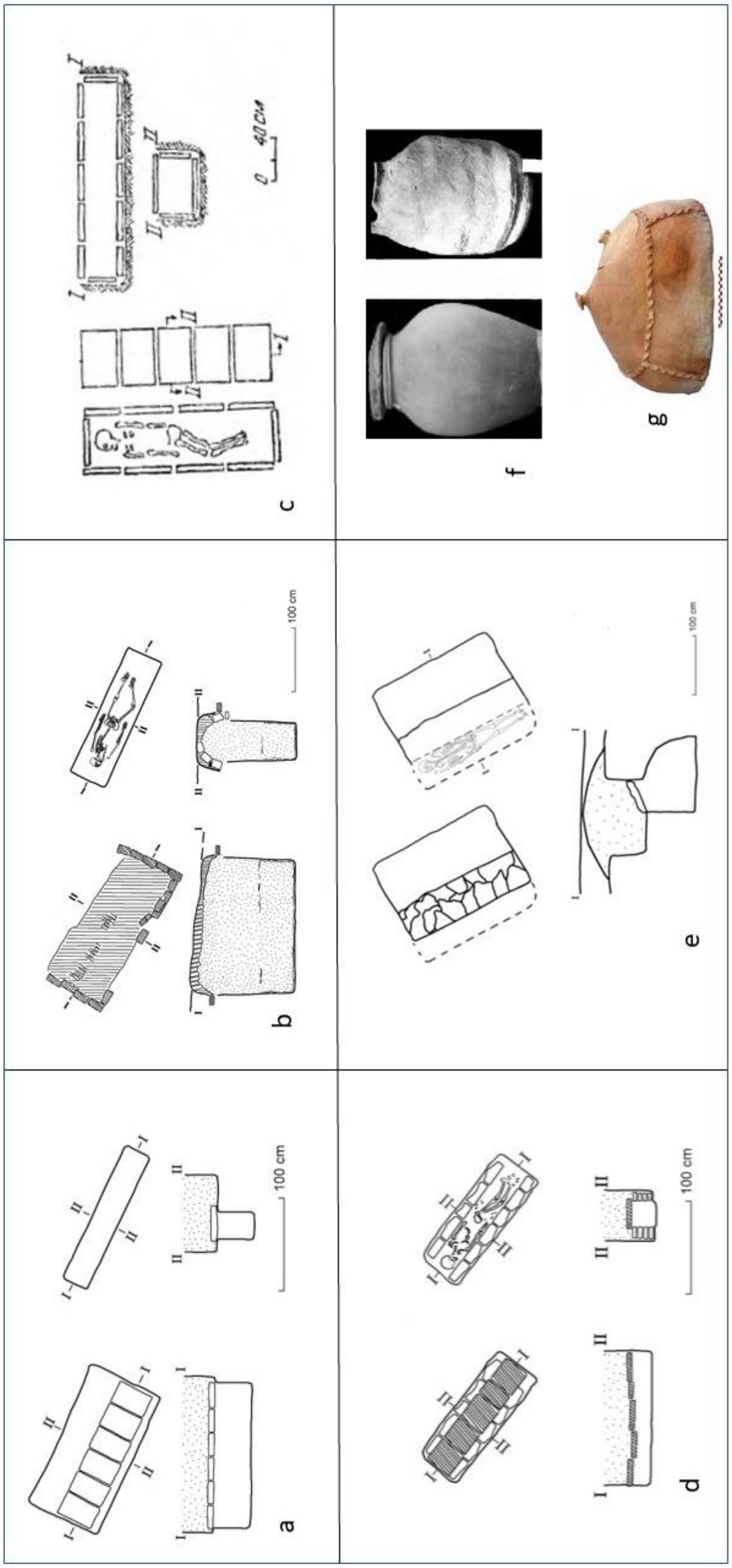

Figure 6.4. Grave structures present in sample: a) internal pit closed with bricks (after Yagodin and Hodjaiov 1970: figure 22), b) pit with arch (after Yagodin and Hodjaiov 1970: figure 17), c) chamber (brick box) (after Mambetullaev 1984: figure 2), d) chamber (sides and top) (after Yagodin and Hodjaiov 1970: fig. 22), e) niche (after Amirov 2010: fig. 4), f) hum, g) ossuary (after Gritsina et al. 2014: fig. 4, 9).

Frace Orientation	West	Face of the deceased is turned toward the west
	SW	Face of the deceased is turned toward the southwest
	Superior	Face of the deceased is turned toward the sky
	None	Cranium is disarticulated and not intentionally oriented
Body Position	Extended supine	Body is laid in the burial on its back with torso and legs extended, position of arms varies but usually extended along body or laid on pelvis
	Extended on right side, legs bent	Body is laid on right side, torso is extended along length of burial, legs are slightly bent at the knees, arms usually extended along body
	Extended on right side, legs straight	Body is laid on right side, torso is extended along length of burial, legs are slightly bent at the knees, arms usually extended along body
	Disarticulated	Remains are disarticulated and not laid out in any order
Number of Individuals	Single	Grave contains only a single individual
	Multiple Adults	Grave contains the remains of multiple adults
	Adult with infant/child	Grave contains the remains of at least one adult and child or infant
Grave Good Presence	Present	Grave contains objects not associated with architectural elements intentionally placed with the interred remains
	Absent	Grave does not contain any objects interred with the body
Grave Good Type	Weapons	At least one object that can be classified a s a weapon (knife, projectile point, etc.)
	Personal Ornaments	Items of personal adornment (jewelry), usually small, of varied materials
	Ceramics	Vessels or other small ceramic objects
	Horse tack	Objects used in horse riding and adornment
	Headstone	Stone and ceramic objects placed near the head of the deceased or grave, various forms

Figure 6.5. Table showing body treatment present in sample.

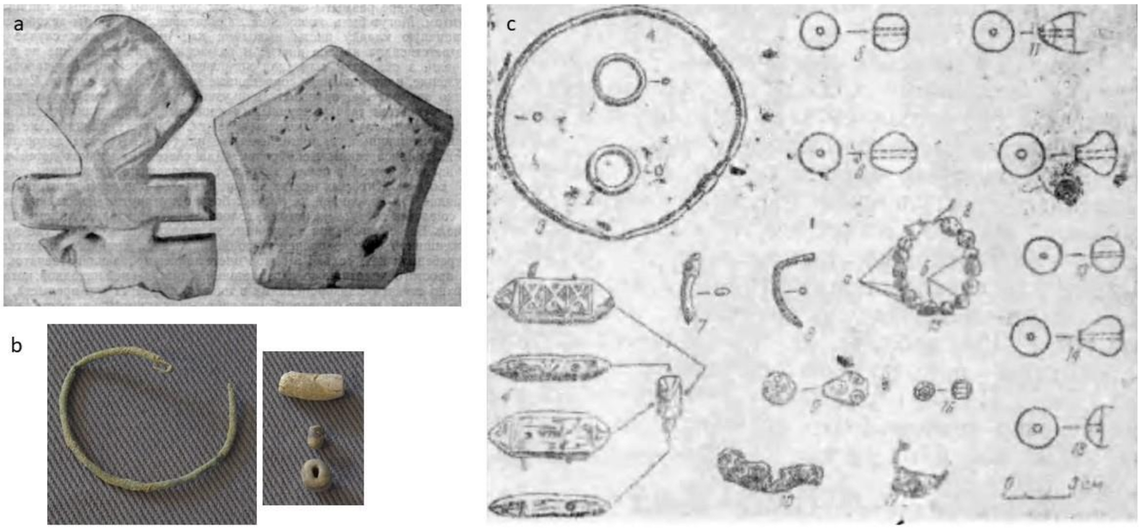

Figure 6.6. Illustration showing example grave goods from sample sites: a) headstones found at Tok-kala (after Gudkova 1964: figure 40), b) bronze earring and beads found at Tashbulak, c) beads and bronze jewelry recovered from burials at Kalmy-krylgan (after Mambetullaev 1984: figure 3).

The results of data collection on mortuary ritual show several different forms for each component. Grave structure is the most variable component, with ten different types represented in the data set. Grave goods are the next most variable component, with five different types found in the data set. For all other components (other than grave good presence/absence), there are three or four types represented in the data. In this next section, I will present data on how these components are distributed according to different scales and variables.

6.1.2 Mortuary Components by Region and Site

Each table contains the results of a site, organized according to all burial configurations present. Different configurations co-occurrences are recorded in separate columns. Variation in grave goods and number of interred individuals is recorded within the same column.

Ferghana Sites

Chor Dona			Chor Dona (A)	Chor Dona (B)	Chor Dona (C)	Chor Dona (D)	Chor Dona (E)	Chor Dona (F)
Spatial Variables	Distance from Settlement	Within Settlement	x	x	x	x	x	x
		Less than 0.25km						
		Close proximity to settlement, exact location unknown						
		No associated settlement						
	Cemetery Organization	Row and Column						
		Catacomb						
		Collective, organization not known	x	x	x	x	x	x
	Overlapping	Other burials						
		Structural remains						
		Absent						
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks	x	x				
		(1b)Pit with arch						
		(1c) Oval Pit					x	x
		(2) Chamber (general)						
		(2a) Chamber (brick box)						
		(2b) Chamber (sides and top)						
		(2c) Internal cist						
		(3) Niche			x	x		
		(4a) Ossuary						
		(4b) Hum						
	Grave Orientation	N-S						
		NW-SE	x	x	x	x	x	
		SE-NW						x
		None						
Body Treatment	Frace Orientation	West						
		SW						
		Superior						
		None						
	Body Position	Extended supine	x		x		x	x
		Extended on right side, legs bent		x		x		
		Extended on right side, legs straight						
		Disarticulated						
	Number of Individuals	Single	x	x	x	x	x	x
		Multiple Adults						
		Adult with infant/child						
	Grave Good Presence	Present	x		x		x	x
		Absent	x	x	x	x		
	Grave Good Type	Weapons					x	x
		Personal Ornaments	x		x			
		Ceramics						
		Horse tack					x	x
		Headstone						

Figure 6.7. Co-occurrence of mortuary component types at Chor Dona.

Kuva			Kuva (A)	Kuva (B)
Spatial Variables	Distance from Settlement	Within Settlement	x	x
		Less than 0.25km		
		Close proximity to settlement, exact location unknown		
		No associated settlement		
	Cemetery Organization	Row and Column		
		Catacomb		
		Collective, organization not known	x	
	Overlapping	Other burials	x	
		Structural remains	x	
		Absent		
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks		
		(1b)Pit with arch		
		(1c) Oval Pit		
		(2) Chamber (general)		
		(2a) Chamber (brick box)	x	
		(2b) Chamber (sides and top)		
		(2c) Internal cist		
		(3) Niche		
		(4a) Ossuary		
		(4b) Hum		x
	Grave Orientation	N-S		
		NW-SE	x	
		SE-NW		
		None		
Body Treatment	Frace Orientation	West		
		SW	x	
		Superior		
		None		x
	Body Position	Extended supine		
		Extended on right side, legs bent		
		Extended on right side, legs straight	x	
		Disarticulated		x
	Number of Individuals	Single		
		Multiple Adults		
		Adult with infant/child		
	Grave Good Presence	Present		
		Absent		
	Grave Good Type	Weapons		
		Personal Ornaments		
		Ceramics		
		Horse tack		
		Headstone		

Figure 6.8. Co-occurrence of mortuary component types at Kuva.

Ustrushana Sites

Koshtepa			Koshtepa (A)	Koshtepa (B)	Koshtepa (C)
Spatial Variables	Distance from Settlement	Within Settlement			
		Less than 0.25km			
		Close proximity to settlement, exact location unknown	x		
		No associated settlement			
	Cemetery Organization	Row and Column			
		Catacomb			
		Collective, organization not known	x		
	Overlapping	Other burials			
		Structural remains			
		Absent			
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks			
		(1b)Pit with arch	x		
		(1c) Oval Pit			
		(2) Chamber (general)			
		(2a) Chamber (brick box)			
		(2b) Chamber (sides and top)			
		(2c) Internal cist			
		(3) Niche			
		(4a) Ossuary		x	
		(4b) Hum			x
	Grave Orientation	N-S	x		
		NW-SE			
		SE-NW			
		None		x	x
Body Treatment	Frace Orientation	West	x		
		SW			
		Superior			
		None		x	x
	Body Position	Extended supine	x		
		Extended on right side, legs bent			
		Extended on right side, legs straight			
		Disarticulated		x	x
	Number of Individuals	Single	x		
		Multiple Adults			
		Adult with infant/child			
	Grave Good Presence	Present			
		Absent			
	Grave Good Type	Weapons			
		Personal Ornaments			
		Ceramics			
		Horse tack			
		Headstone			

Figure 6.9. Co-occurrence of mortuary component types at Koshtepa.

Tashbulak			Tashbulak (A)	Tashbulak (B)	Tashbulak (C)	Tashbulak (D)
Spatial Variables	Distance from Settlement	Within Settlement				
		Less than 0.25km	x	x	x	x
		Close proximity to settlement, exact location unknown				
		No associated settlement				
	Cemetery Organization	Row and Column	x	x	x	x
		Catacomb				
		Collective, organization not known				
	Overlapping	Other burials				
		Structural remains				
		Absent	x	x	x	x
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks				
		(1b)Pit with arch				
		(1c) Oval Pit				
		(2) Chamber (general)				
		(2a) Chamber (brick box)				
		(2b) Chamber (sides and top)				
		(2c) Internal cist			x	x
		(3) Niche	x	x		
		(4a) Ossuary				
		(4b) Hum				
	Grave Orientation	N-S	x	x	x	x
		NW-SE				
		SE-NW				
		None				
Body Treatment	Frace Orientation	West	x		x	
		SW				
		Superior		x		x
		None				
	Body Position	Extended supine	x	x	x	x
		Extended on right side, legs bent				
		Extended on right side, legs straight				
		Disarticulated				
	Number of Individuals	Single	x	x	x	x
		Multiple Adults				
		Adult with infant/child				
	Grave Good Presence	Present			x	
		Absent	x	x	x	x
	Grave Good Type	Weapons				
		Personal Ornaments			x	
		Ceramics				
		Horse tack				
		Headstone				

Figure 6.10. Co-occurrence of mortuary component types at Tashbulak.

Soghd Sites

Afrasiyab			Afrasiyab
Spatial Variables	Distance from Settlement	Within Settlement	x
		Less than 0.25km	
		Close proximity to settlement, exact location unknown	
		No associated settlement	
	Cemetery Organization	Row and Column	
		Catacomb	
		Collective, organization not known	
	Overlapping	Other burials	
		Structural remains	
		Absent	
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks	
		(1b)Pit with arch	
		(1c) Oval Pit	
		(2) Chamber (general)	
		(2a) Chamber (brick box)	x
		(2b) Chamber (sides and top)	
		(2c) Internal cist	
		(3) Niche	
		(4a) Ossuary	
		(4b) Hum	
	Grave Orientation	N-S	
		NW-SE	
		SE-NW	
		None	
Body Treatment	Frace Orientation	West	
		SW	
		Superior	
		None	
	Body Position	Extended supine	
		Extended on right side, legs bent	x
		Extended on right side, legs straight	
		Disarticulated	
	Number of Individuals	Single	
		Multiple Adults	
		Adult with infant/child	
	Grave Good Presence	Present	
		Absent	
	Grave Good Type	Weapons	
		Personal Ornaments	
		Ceramics	
		Horse tack	
		Headstone	

Figure 6.11. Co-occurrence of mortuary component types at Afrasiyab.

Frinkent			Frinkent (A)
Spatial Variables	Distance from Settlement	Within Settlement	x
		Less than 0.25km	
		Close proximity to settlement, exact location unknown	
		No associated settlement	
	Cemetery Organization	Row and Column	
		Catacomb	x
		Collective, organization not known	
	Overlapping	Other burials	x
		Structural remains	
		Absent	
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks	
		(1b)Pit with arch	
		(1c) Oval Pit	
		(2) Chamber (general)	
		(2a) Chamber (brick box)	
		(2b) Chamber (sides and top)	
		(2c) Internal cist	
		(3) Niche	
		(4a) Ossuary	
		(4b) Hum	x
	Grave Orientation	N-S	
		NW-SE	
		SE-NW	
		None	x
Body Treatment	Frace Orientation	West	
		SW	
		Superior	
		None	x
	Body Position	Extended supine	
		Extended on right side, legs bent	
		Extended on right side, legs straight	
		Disarticulated	x
	Number of Individuals	Single	x
		Multiple Adults	x
		Adult with infant/child	x
	Grave Good Presence	Present	
		Absent	x
	Grave Good Type	Weapons	
		Personal Ornaments	
		Ceramics	
		Horse tack	
		Headstone	

Figure 6.12. Co-occurrence of mortuary component types at Frinkent.

Altyntepa			Altyntepa (A)
Spatial Variables	Distance from Settlement	Within Settlement	
		Less than 0.25km	x
		Close proximity to settlement, exact location unknown	
		No associated settlement	
	Cemetery Organization	Row and Column	x
		Catacomb	
		Collective, organization not known	
	Overlapping	Other burials	
		Structural remains	
		Absent	
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks	
		(1b)Pit with arch	
		(1c) Oval Pit	
		(2) Chamber (general)	x
		(2a) Chamber (brick box)	
		(2b) Chamber (sides and top)	
		(2c) Internal cist	
		(3) Niche	
		(4a) Ossuary	
		(4b) Hum	
	Grave Orientation	N-S	x
		NW-SE	
		SE-NW	
		None	
Body Treatment	Frace Orientation	West	
		SW	
		Superior	
		None	
	Body Position	Extended supine	
		Extended on right side, legs bent	
		Extended on right side, legs straight	
		Disarticulated	
	Number of Individuals	Single	
		Multiple Adults	
		Adult with infant/child	
	Grave Good Presence	Present	
		Absent	
	Grave Good Type	Weapons	
		Personal Ornaments	
		Ceramics	
		Horse tack	
		Headstone	

Figure 6.13. Co-occurrence of mortuary component types at Alytyntepa.

Chach Sites

Uturlik-tepe			Uturlik-tepe (A)
Spatial Variables	Distance from Settlement	Within Settlement	
		Less than 0.25km	x
		Close proximity to settlement, exact location unknown	
		No associated settlement	
	Cemetery Organization	Row and Column	x
		Catacomb	
		Collective, organization not known	
	Overlapping	Other burials	
		Structural remains	
		Absent	
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks	
		(1b)Pit with arch	
		(1c) Oval Pit	
		(2) Chamber (general)	
		(2a) Chamber (brick box)	
		(2b) Chamber (sides and top)	x
		(2c) Internal cist	
		(3) Niche	
		(4a) Ossuary	
		(4b) Hum	
	Grave Orientation	N-S	x
		NW-SE	
		SE-NW	
		None	
Body Treatment	Frace Orientation	West	x
		SW	
		Superior	
		None	
	Body Position	Extended supine	
		Extended on right side, legs bent	x
		Extended on right side, legs straight	
		Disarticulated	
	Number of Individuals	Single	
		Multiple Adults	
		Adult with infant/child	
	Grave Good Presence	Present	
		Absent	
	Grave Good Type	Weapons	
		Personal Ornaments	
		Ceramics	
		Horse tack	
		Headstone	

Figure 6.14. Co-occurrence of mortuary component types at Uturlik-tepe.

Galva-tepe			Galva-tepe (A)	Galva-tepe (B)
Spatial Variables	Distance from Settlement	Within Settlement	x	x
		Less than 0.25km		
		Close proximity to settlement, exact location unknown		
		No associated settlement		
	Cemetery Organization	Row and Column		
		Catacomb		
		Collective, organization not known	x	x
	Overlapping	Other burials		
		Structural remains	x	x
		Absent		
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks		
		(1b)Pit with arch		
		(1c) Oval Pit		
		(2) Chamber (general)		
		(2a) Chamber (brick box)		
		(2b) Chamber (sides and top)		
		(2c) Internal cist		
		(3) Niche	x	x
		(4a) Ossuary		
		(4b) Hum		
	Grave Orientation	N-S	x	x
		NW-SE		
		SE-NW		
		None		
Body Treatment	Frace Orientation	West		
		SW		
		Superior		
		None		
	Body Position	Extended supine	x	
		Extended on right side, legs bent		x
		Extended on right side, legs straight		
		Disarticulated		
	Number of Individuals	Single	x	x
		Multiple Adults		
		Adult with infant/child		
	Grave Good Presence	Present	x	x
		Absent		
	Grave Good Type	Weapons	x	x
		Personal Ornaments		
		Ceramics	x	
		Horse tack		
		Headstone		

Figure 6.15. Co-occurrence of mortuary component types at Galva-tepe.

Khorezm Sites

Tok-kala			Tok-Kala (A)	Tok-kala (B)	Tok-kala (C)	Tok-kala (D)
Spatial Variables	Distance from Settlement	Within Settlement				
		Less than 0.25km	x	x	x	x
		Close proximity to settlement, exact location unknown				
		No associated settlement				
	Cemetery Organization	Row and Column	x	x		
		Catacomb			x	x
		Collective, organization not known				
	Overlapping	Other burials	x	x	x	x
		Structural remains				
		Absent				
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks	x			
		(1b)Pit with arch				
		(1c) Oval Pit				
		(2) Chamber (general)				
		(2a) Chamber (brick box)				
		(2b) Chamber (sides and top)		x		
		(2c) Internal cist				
		(3) Niche				
		(4a) Ossuary			x	
		(4b) Hum				x
	Grave Orientation	N-S				
		NW-SE	x	x		
		SE-NW				
		None			x	x
Body Treatment	Frace Orientation	West				
		SW	x	x		
		Superior			x	x
		None				
	Body Position	Extended supine				
		Extended on right side, legs bent	x	x		
		Extended on right side, legs straight				
		Disarticulated			x	x
	Number of Individuals	Single	x	x	x	x
		Multiple Adults			x	
		Adult with infant/child			x	
	Grave Good Presence	Present				
		Absent	x	x	x	x
	Grave Good Type	Weapons				
		Personal Ornaments				
		Ceramics				
		Horse tack				
		Headstone				

Figure 6.16. Co-occurrence of mortuary component types at Tok-kala.

			Kk (A)	Kk (B)	Kk (C)	Kk (D)	Kk (E)	Kk (F)	Kk (G)
Spatial Variables	Distance from Settlement	Within Settlement							
		Less than 0.25km							
		Close proximity to settlement, exact location unknown							
		No associated settlement	x	x	x	x	x	x	x
	Cemetery Organization	Row and Column	x	x	x	x	x	x	x
		Catacomb							
		Collective, organization not known							
	Overlapping	Other burials	x	x	x	x	x	x	x
		Structural remains							
		Absent							
Burial Architecture	Grave Structure	(1a) Internal pit closed with bricks						x	x
		(1b)Pit with arch							
		(1c) Oval Pit							
		(2) Chamber (general)							
		(2a) Chamber (brick box)	x				x		
		(2b) Chamber (sides and top)		x	x	x			
		(2c) Internal cist							
		(3) Niche							
		(4a) Ossuary							
		(4b) Hum							
	Grave Orientation	N-S							
		NW-SE	x	x	x	x	x	x	x
		SE-NW							
		None							
Body Treatment	Frace Orientation	West							
		SW	x	x	x			x	
		Superior				x	x		x
		None							
	Body Position	Extended supine	x	x		x	x		x
		Extended on right side, legs bent			x			x	
		Extended on right side, legs straight							
		Disarticulated							
	Number of Individuals	Single	x	x	x	x	x	x	x
		Multiple Adults							
		Adult with infant/child							
	Grave Good Presence	Present	x	x	x				x
		Absent	x	x	x	x	x	x	x
	Grave Good Type	Weapons							
		Personal Ornaments	x	x	x	x			x
		Ceramics							
		Horse tack							
		Headstone	x	x					

Figure 6.17. Co-occurrence of mortuary component types at Kalmyk-krylgan.

6.1.3 Trends in Mortuary Practice by Burial Component

Spatial Patterns

In all but one site, burials are located in close proximity (<0.25km) to habitation areas. Kalmyk-Krylgan is the one exception to this case, as a burial ground with no apparent associated settlement. At a few of the sites, multiple associated cemeteries have been identified (Stari Termez, Tok-Kala, Koshtepa, Kuva). At Tok-Kala and Stari Termez, these include multiple cemeteries with Islamic style graves. At Kuva and Koshtepa, Islamic style grave and burials in vessel are interred in different locations. At Tok-Kala, the burial ground located on the southeastern edge of the site contains both Islamic style and vessel burials (Gudkova 1964). Differences in material culture and burial practice, especially grave structure, have led scholars to suggest that many of these cemeteries are chronologically distinct (Amirov 2010). At all sites for which there is burial organization data, the majority of known burials are interred in a communal burial ground. In two cases, ossuary (Kuva) and Islamic-style graves (Tok-Kala) were found apart from primary burial grounds, in the remains of habitation areas. The majority of sites for which there is data on cemetery organization display a row and column organization (5 out of 9). Interment of vessel burials (ossuary or hum) when noted, was usually in a collective site, in a catacomb-style chamber (Tok-Kala, Frinkent). No internal spatial divisions are noted for any of the burial grounds.

The intrusion and overlap of burials into earlier graves and structures is fairly common and not concentrated in a single area or burial style, being present in sites in Ferghana, Soghd, and Khorezm. The exact manifestation of this intrusion differs by site, however. At Tok-Kala, pit and chamber style burials overlap with other pit and chamber graves as well as vessel burials. At Kalmyk-Krylgan, some pit and chamber graves appear to have been intentionally designed for the interment of multiple individuals, while others were reopened to deposit remains at a later date. This practice of reopening and deposition is something seen in the vessel burial collections at Frinkent. Several reasons for this overlap have been proposed, including large populations putting strains on burial space, and the fact that burials may be difficult to see from the surface (Gudkova 1964).

Burial Architecture

There are two main categories of architecture present across my sample: pit-based graves, and ceramic vessel burials. Within these categories there are structural variations in internal construction and form. For vessel burials, distinctions can be made between deposition of remains inside "hum" vessels that resemble large storage vessels, and ossuaries, which take the form of a ceramic box. Pit-based graves can be divided into several types, distinguished by the presence and configuration of the burial chamber within the grave. Six of the eleven sites with burial data contain multiple types of grave structures, and these cover three of the geographic regions (Khorezm, Ferghana, Ustrushana). Of these, four sites display multiple pit burial types within the same burial ground (Chor Dona, Tok-Kala, Kalmyk-Krylgan, Tashbulak). All but two types of architecture are found at multiple sites. Oval pit burials are found only at Chor Dona, while pit burials with stone and wood linings are found only at Tashbulak.

Grave orientation does not factor into structural elements for ceramic vessel burial, but is a notable element for pit-based graves. There is regional consistency in the orientation of pit-based graves. In five of the eleven sample sites, burials are all oriented along a north-south axis. In four other sites, burials are oriented along a northwest-southeast orientation. Chor Dona is the only site in my sample in which a pit-style burial deviated from either of these orientations. At

Chor Dona, a single burial is oriented along a southeast-northwest axis.

Several of the pit burial types present in my sample fit the typology of burials described by Amirov (2010), and Yagodin and Hodjaiov (1970). These include: niche burials, pit burials closed with bricks, pit burials closed with wood planks, and chamber burials with body laid directly on the ground. These typologies were established from analysis of sites in Khorezm, but the site types also overlap with burials in my sample found in Ustrushana, Ferghana, and Chach. Niche burials are found in Ferghana (Chor Dona), Chach (Galva-tepe), and Ustrushana (Tashbulak). While they are not present in either of the sites in Khorezm in my burial sample, niche burials are noted in Yagodin and Hodjaiov's (1970) analysis of the medieval site of Mizdakhan in Khorezm. Chamber burials with the body laid directly on the ground are found in Khorezm (Tok-Kala and Kalmyk-Krylgan), and Chach (Uturlik-tepe). Pit burials closed with bricks have been recovered in Ferghana (Chor Dona) and Khorezm (Tok-Kala and Kalmyk-Krylgan). One burial type not mentioned in the Amirov typology, are those where bodies are interred in a brick cyst, or chamber where all sides are lined. This type has been recorded in Ferghana (Kuva), Soghd (Afrasiyab), and Khorezm (Kalmyk-Krylgan). This shows a geographic distribution of grave structures that while not ubiquitous, is shared across far distances.

Body Treatment

The body treatment of individuals in my sample can also be divided into primary and secondary interment. Primary interments are associated with pit-based burials, while ceramic vessel burials contain disarticulated secondary interments of remains. Primary interments display a limited amount of variation in body position. Remains were recovered in extended positions with complete articulation, with the exception of those damaged by taphonomic processes or overlapping burials or structures. Individuals were either laid on their backs or right side. Individuals interred on their side had extended or bent legs. At four sites (Chor Dona, Kuva, Galva-tepe, Kalymyk-Krylgan) there are cases of both supine and side body placements. Both types of body position are found in Ferghana, Chach, and Khorezm. Both Ustrushana sites for which there is data have only individuals in supine position recorded, while Soghd only displays burials on the right side. Secondary ceramic vessel burials were all found in disarticulation, with no consistent placement of bones within vessels.

The majority of primary burials contained single individuals. The most common type of multiple burial was an adult interred with a child, although even this was recorded only in a single context at three sites (Frinkent, Tok-Kala, Kalmyk-krylgan). Overall, grave goods are rarely included in burials in this sample. No vessel burials were noted to contain any grave goods. Four of the sites with pit-burials had at least one burial that contained burial goods. For the most part, very few items were interred with the dead. These items tend to be small, with the majority being personal adornments such as beads and earrings. Weapons were also included in several of the burials in my sample, although they are not as common as items of personal adornment. Ceramic sherds and headstones were also recovered from a small number of burials. Horse equipment was only recovered from graves at Chor Dona of oval pit type.

6.1.4 Regional, Chronological, and Demographic Trends in Mortuary Components

Region and Site Specific Trends

The majority of variation in burial practice occurs within regions, but there are some trends that differ somewhat between regions. Burials with a north-south orientation are limited to the regions of Ustrushana, Soghd, and Chach. In terms of structure, in this sample, graves with burial chambers that are enclosed on all sides are only recorded in the region of Khorezm. There are some trends that are limited to one site as well. As mentioned above, oval pit burials are found only at Chor Dona, while pit burials with stone and wood linings are found only at Tashbulak. Also noted above were regional trends in body position: both Ustrushana sites for which there are data have only individuals in supine position recorded, while Soghd only displays burials on the right side.

Chronological Trends

The most prominent chronological trend in the mortuary data is that ceramic vessel burials tend to have earlier chronological dates, and pit-style burials are later. This trend is not absolute, however, as evidenced by burials at Frinkent, where hum vessel burials occurred until the 13th century. Amirov (2010) outlined chronological estimates for several medieval grave types, including three types that overlap with my data set. Chambers burials are estimated to date from 11th to the 14th century, and pit burials closed with brick or wood covers are estimated to date from the second half of the 8th c. to the 10th c. Niche burials are estimated to be present from the 9th to the 14th century. These chronologies were established from analysis of sites in Khorezm, but the site types also overlap with burials in my sample found in Ustrushana, Ferghana, and Chach.

The sites with niche burials span from the 8th c. (Tashbulak) to the 13th c. (Chor Dona), which matches Amirov's chronology fairly closely. Chamber burials are found at sites dating from the 9th (Uturlik-tepe) to the 13th century (Chor Dona). Sites recorded to have pit burials date between the 9th c. (Tok-Kala) and the 13th c. (Kalmyk-Krylgan, Chor Dona). Overall, it seems that my sample shows an expansion of the chronology of Islamic burial types to both earlier and later periods. This also shows the overlap of pit-based burials across the entire medieval period.

Demographic Trends

Demographic information on burial is limited for many of the sites in my sample, however, enough data exist for some discussion of trends. Overall, there are no strong demographic associations between burial type and age or sex. There are some site-specific relationships between age, sex, and body treatment. In the burials recovered from Chor Dona, children are interred on their right sides, males on their backs, and females both on their backs and right sides. At no other sites are there any correlations between age, sex and body position. As mentioned above, the most common type of multiple burial is an adult buried with a child.

Grave goods do display some patterning based on sex, but the low number of occurrences makes it difficult to argue for consistent trends. The two graves with carnelian beads and bronze earrings recovered at Chor Dona contained female individuals. At Kalmyk-Krylgan, burial 8 contained a female with two bronze rings, and burial 18 contained an older female interred with two beads and small bronze loops. Personal items were included in six additional burials for which the sex of the interred individuals was not identified. All of the Kalmyk-Krylgan burials containing grave goods were of adult individuals. At Tashbulak, only one individual recovered was found to be interred with burial goods. This individual was an adolescent of unknown sex. The inclusion of grave goods, therefore, mostly reflects site specific behaviors, with a slight preference for personal adornments to be interred with women, and for all types of grave goods to be interred with adults.

6.2 Geometric Morphometric Results

The results of my geometric morphometric data collection are presented in the following data tables. All graphs are the result of analyses performed on Procrustes transformed coordinates. Results are presented by scale of analysis, and then statistical analysis.

Region	Abbreviation	Site	Abbreviation	Crania Sampled (n)
Ferghana	FERG	Chartok	Chartok	19
		Chor Dona	ChD	5
		Kuva	Kyba	3
		Shortepa	ShT	1
				Regional total: 28
Ustrushana	USTR	Kal-tepe	KalT	4
		Tashbulak	TBK	23
		Koshtepa	KoshT	1
		Dashti-Urdakon	DY	2
				Regional total: 30
Soghd	Soghd	Altyntepe	Altyn	1
		Sheburgan-Ata	Sheb-ata	3
		Afrasiyab	Afr	2
		Frinkent	Frinkent	1
		Shulluktepa	Shylyk	7
				Regional total: 14
Chach	Chach	Shahryhiya	Shahr	10
		Galva-tepe	GalT	1
		Uturlik-tepe	YT	4
				Regional total: 15
Khorezm	KZM	Kalmyk-krylgan	Kk	15
		Tok-kala	TK	20
				Regional total: 35
Tokharistan	Tokh	Stari Termez	CT	9
				Regional total: 9
				Sample Total: 116

Figure 6.18. Table showing codes for regions and sites used in graphs, as well as cranial sample numbers.

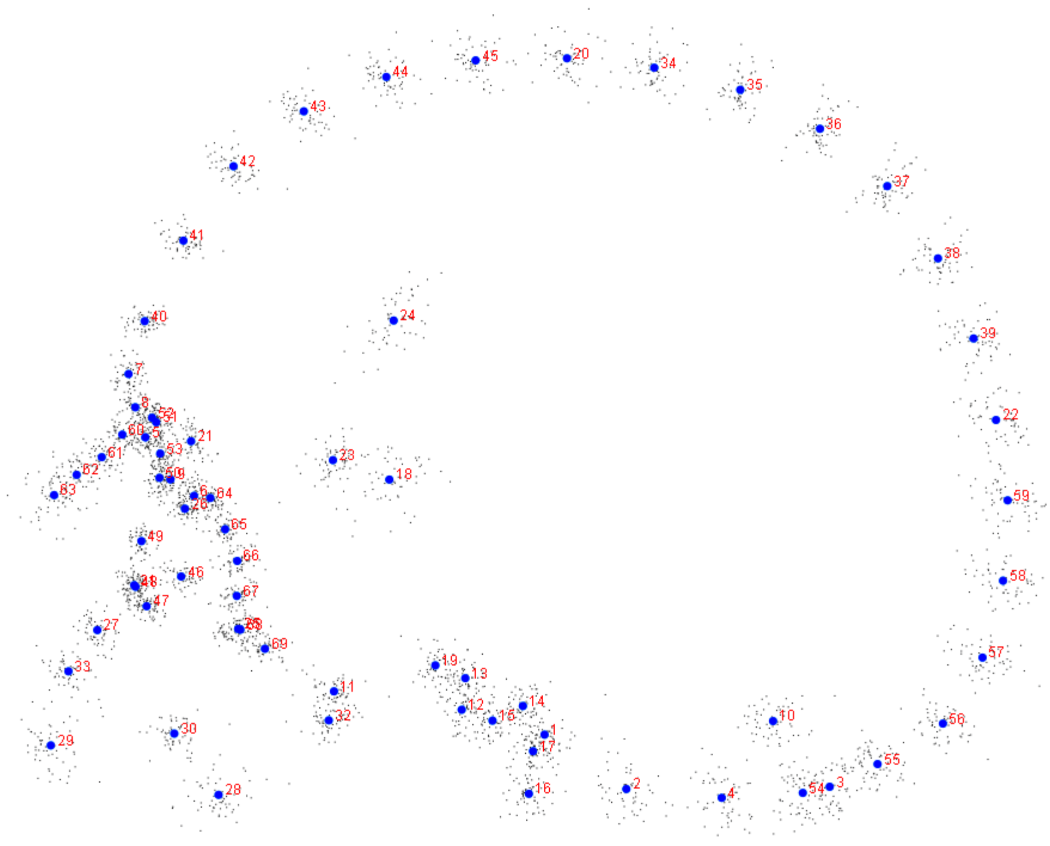

Figure 6.19. Image showing composite positions of Procrustes aligned three-dimensional landmarks for all individuals in this study.

6.2.1 Regional Level Trends

Principal Components Analysis (PCA)

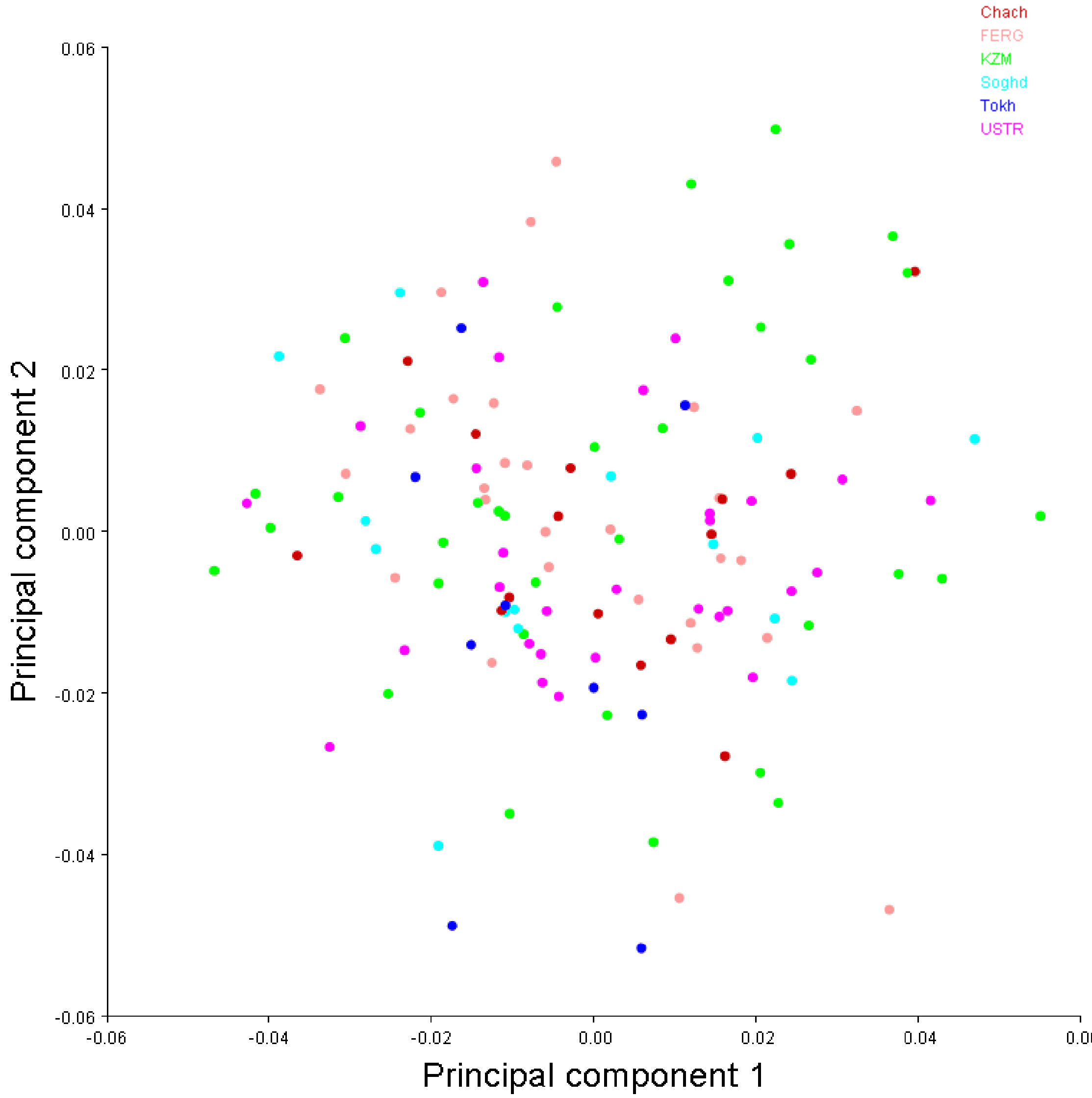

Figure 6.20. Graph showing PC1 and PC2 of Procrustes Aligned individuals from all sites, colored according to region.

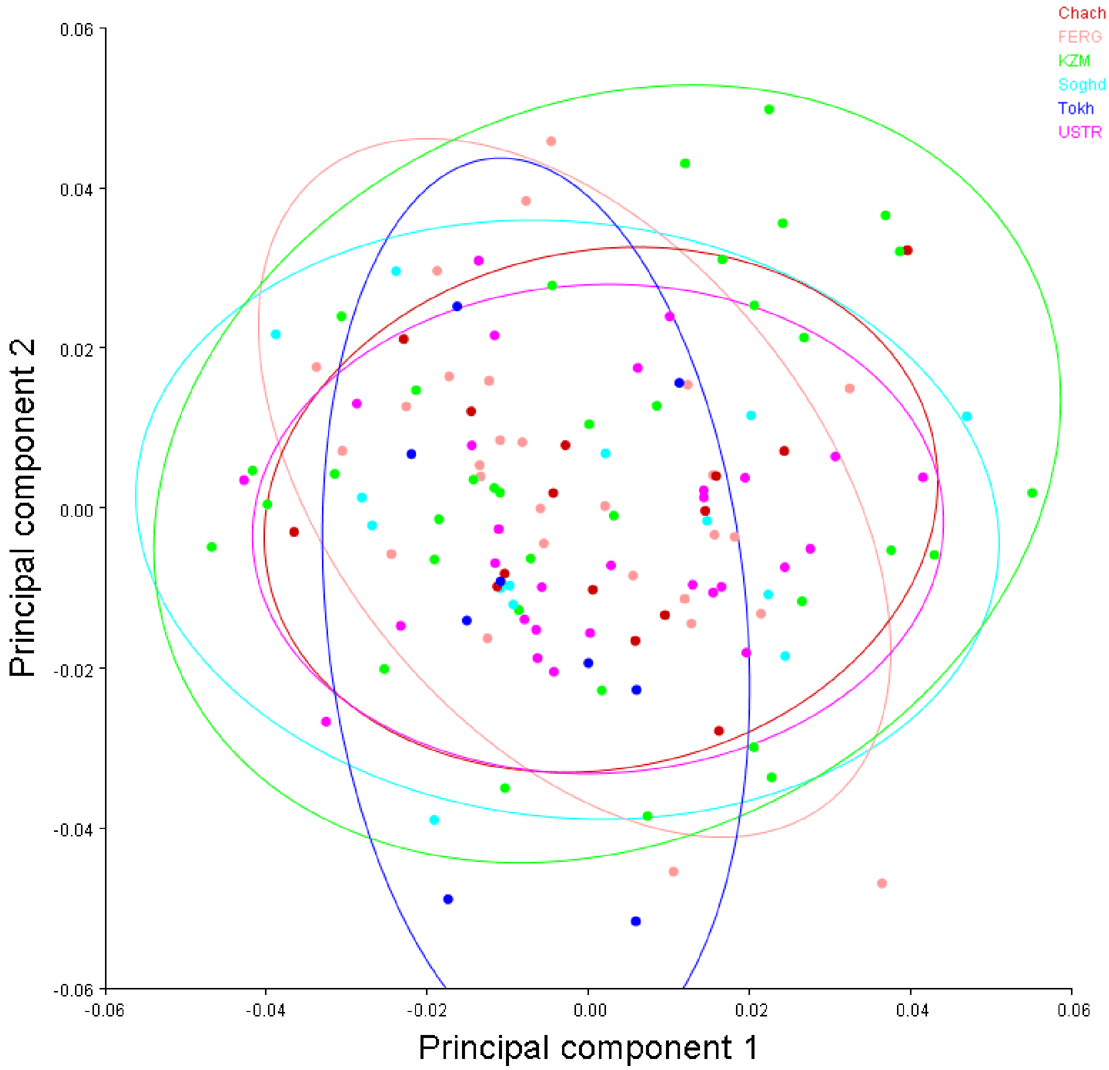

Figure 6.21. Graph showing PC1 and PC2 of Procrustes Aligned individuals from all sites. Individuals are color coded by region with corresponding confidence ellipses (0.9 probability).

The first two principal components account for 25.13% of total variance, and the majority of variance (53.07%) is spread out over the first seven components. Beyond this point, each principal component explains less than 1% of variance. Principal components analysis shows broad overlapping cranial variation between all regions. Projected 0.9 probability confidence ellipses indicate that the majority of variance in every region in this study is shared by every other region. There are differences between regions in terms of the total variation of the samples.

Khorezm displays the most variation, fairly evenly distributed across the first two principal components. Chach and Ustrushana show more restricted variation along both axes. Tokharistan has fairly high relative variation along the second principal and relatively restricted variation along the first component. Ustrushana and Chach have very similar regions of variation covered by their confidence ellipses. Ferghana shows a strongly negative correlation between PC1 and PC2, while Khorezm and Chach show slight positive correlations between PC1 and PC2.

Canonical Variate Analysis (CVA)

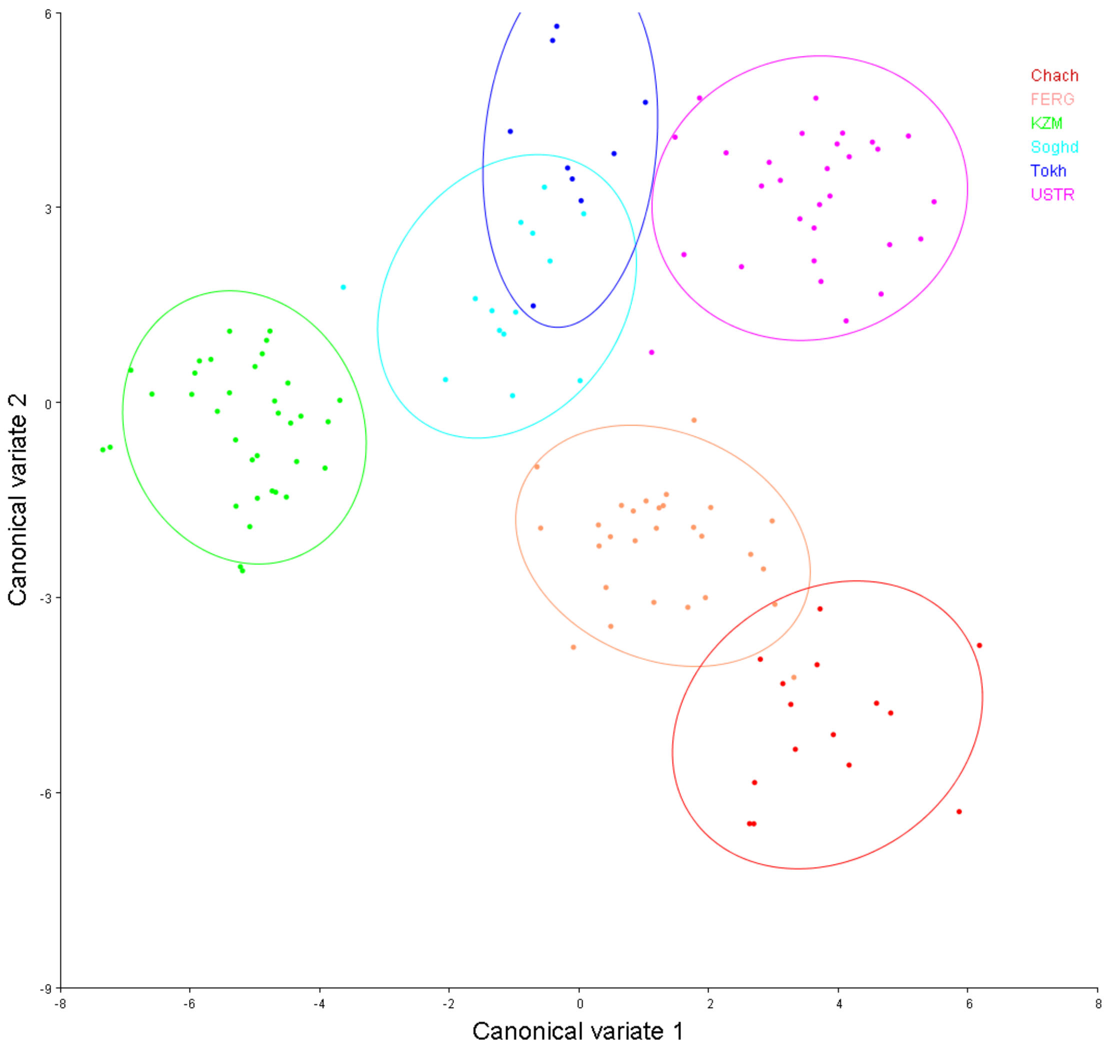

Figure 6.22. Canonical Variate analysis showing CV1 and CV2 generated by using region as classifying group. Individuals are color coded by region with corresponding confidence ellipses (0.9 probability).

Canonical variate analysis maximizes differences between designated groups. It is expected therefore, that groups would show more separation in this analysis compared to principal components analysis. While PC analysis is useful to evaluate the relative variability shared by sample populations, CVA is valuable for highlighting whether specific morphologies are shared within and between sites. While overall cranial morphology is the best predictor of genetic distance (Smith 2008), the identification of unique elements that differ can help filter out some of the noise in the data created by low overall intra-specific variation in humans. The samples from Khorezm form the most tightly clustered and morphologically distinct group according to the first two canonical variates. The most overlap occurs between the Tokharistan and Soghd samples. There is also overlapping variation between the Chach and Ferghana samples. As with the PCA, the majority of the variation in the Tokharistan sample is distributed along the second variate, while the rest of the samples are distributed relatively equally between the two variates.

Permutation Tests

	Chach	FERG	KZM	Soghd	Tokh
FERG	6.9992				
KZM	10.6329	7.6674			
Soghd	9.8839	8.2179	7.8879		
Tokh	12.3993	10.0462	10.9345	10.2893	
USTR	9.1507	7.1908	9.4969	8.3974	10.6051

Figure 6.23. Mahalanobis distances between groups by region.

	Chach	FERG	KZM	Soghd	Tokh
FERG	<.0001				
KZM	<.0001	<.0001			
Soghd	<.0001	<.0001	<.0001		
Tokh	<.0001	<.0001	<.0001	<.0001	
USTR	<.0001	<.0001	<.0001	<.0001	<.0001

Figure 6.24. P-values from permutation tests (10000 permutation rounds) for Mahalanobis distances among groups.

	Chach	FERG	KZM	Soghd	Tokh
FERG	0.0175				
KZM	0.0226	0.0228			
Soghd	0.0251	0.0238	0.0221		
Tokh	0.0328	0.0314	0.0284	0.0238	
USTR	0.0244	0.0207	0.0200	0.0200	0.0235

Figure 6.25. Procrustes distances among groups.

	Chach	FERG	KZM	Soghd	Tokh
FERG	0.4987				
KZM	0.0775	0.0044			
Soghd	0.0820	0.0474	0.1456		
Tokh	0.0065	0.0097	0.0753	0.5095	
USTR	0.0086	0.0065	0.0218	0.1682	0.1471

Figure 6.26. P-values from permutation tests (10000 permutation rounds) for Procrustes distances among groups.

Similar to PCA and CVA, the Mahalanobis and Procrustes distances generated based on region show different levels of inter-group differentiation. Mahalanobis distances between groups are relatively high and reach levels of statistical significance according to their p-values. In contrast, Procrustes distances between regional samples are relatively low, and do not reach levels of statistical significance ($p<0.0001$).

A large percentage (15 out of 17) individuals recovered from the cemetery of Kalmyk-krylgan display some degree of cranial modification. Twelve individuals exhibit occipito-parietal flattening, and three exhibit occipito-parietal-frontal flattening (crania modification analysis completed with the help of David Hansen, Masters graduate student, Nazerbayev University). Cranial modification negates the usefulness of cranial vault data to estimate biological distance, as shape reflects either intentional or incidental modification, not underlying genetics. To determine the effect the inclusion of the Kalmyk-krylgan sample had on the results of my geometric morphometric analysis, I performed a PCA analysis of all samples except those from Kalmyk-krylgan (figure 6.27). In this PCA, the distributions are more constricted along the first Principal Component compared to the PCA including the Kalmyk-krylgan samples (figure 6.21). However, the overall pattern of overlap of variation across all regions remains the same.

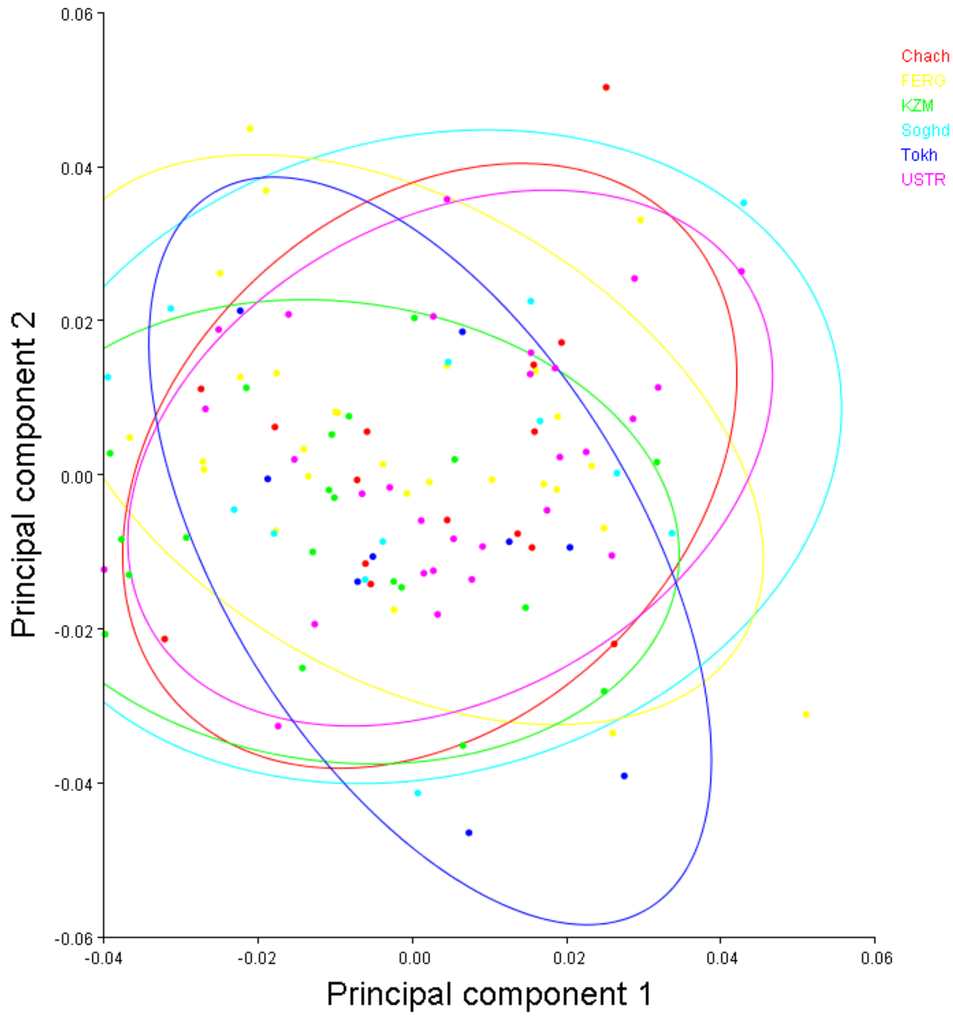

Figure 6.27. Graph showing PC1 and PC2 of Procrustes Aligned individuals from all sites except Kalmyk-krylgan. Individuals are color coded by region with corresponding confidence ellipses (0.9 probability).

6.2.2 Site Level Trends

Principal Components Analysis (PCA)

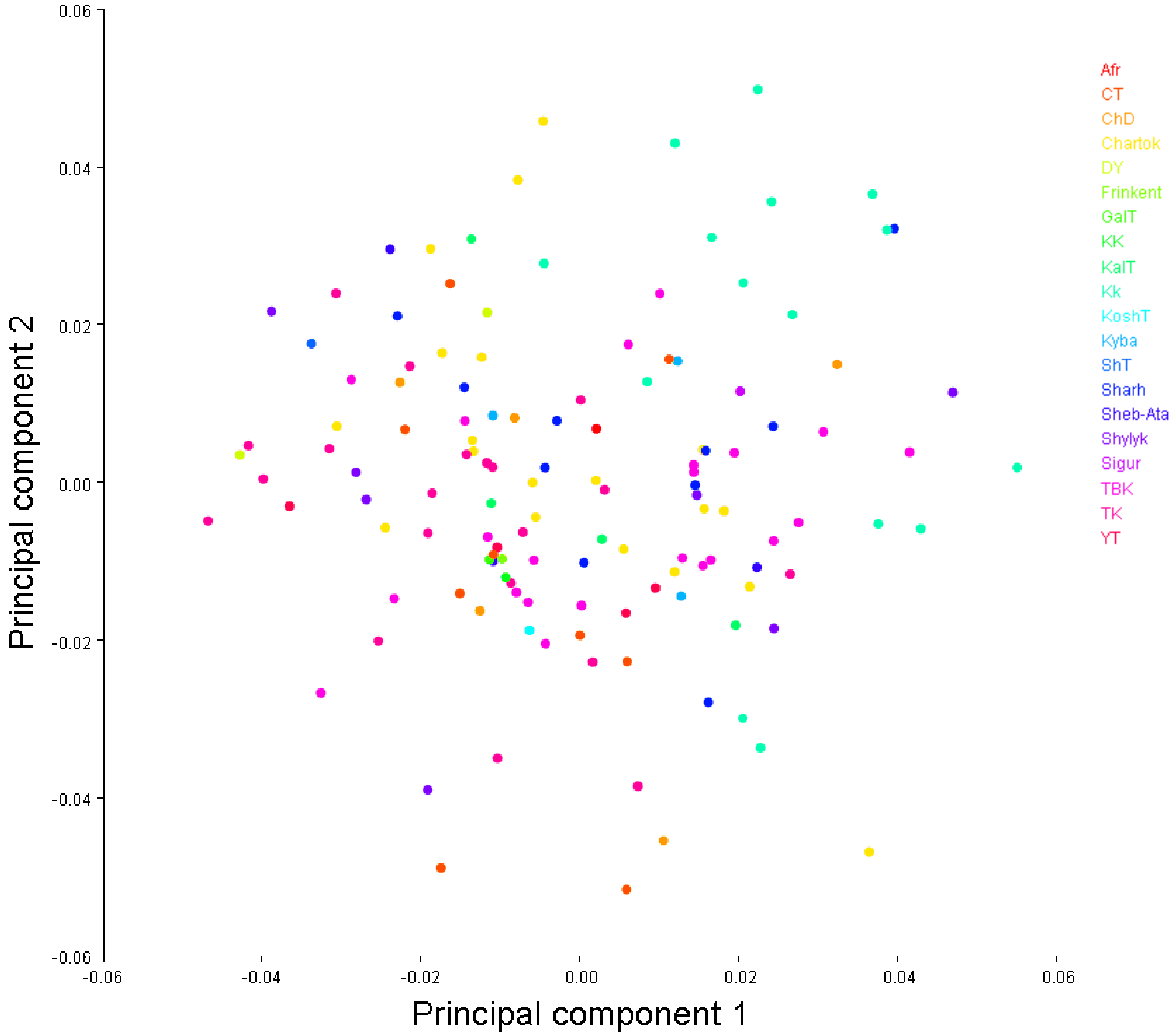

Figure 6.28. Graph showing PC1 and PC2 of Procrustes Aligned individuals from all sites. Individuals are color coded by site.

When analyzed on the level of site, the Principal Components Analysis shows high levels of overlapping variation (figure 6.27). There is much greater variability in the total variation encompassed in the confidence ellipses describing sites as opposed to regions (figure 6.28). This is not surprising considering the much higher variation in sample size between sites as opposed to between regions. However, some sites with relatively small sample sizes, such Sheb-Ata (n=3), still have relatively high variation in the sample. Every site displays at least some degree of overlapping variation with every other site.

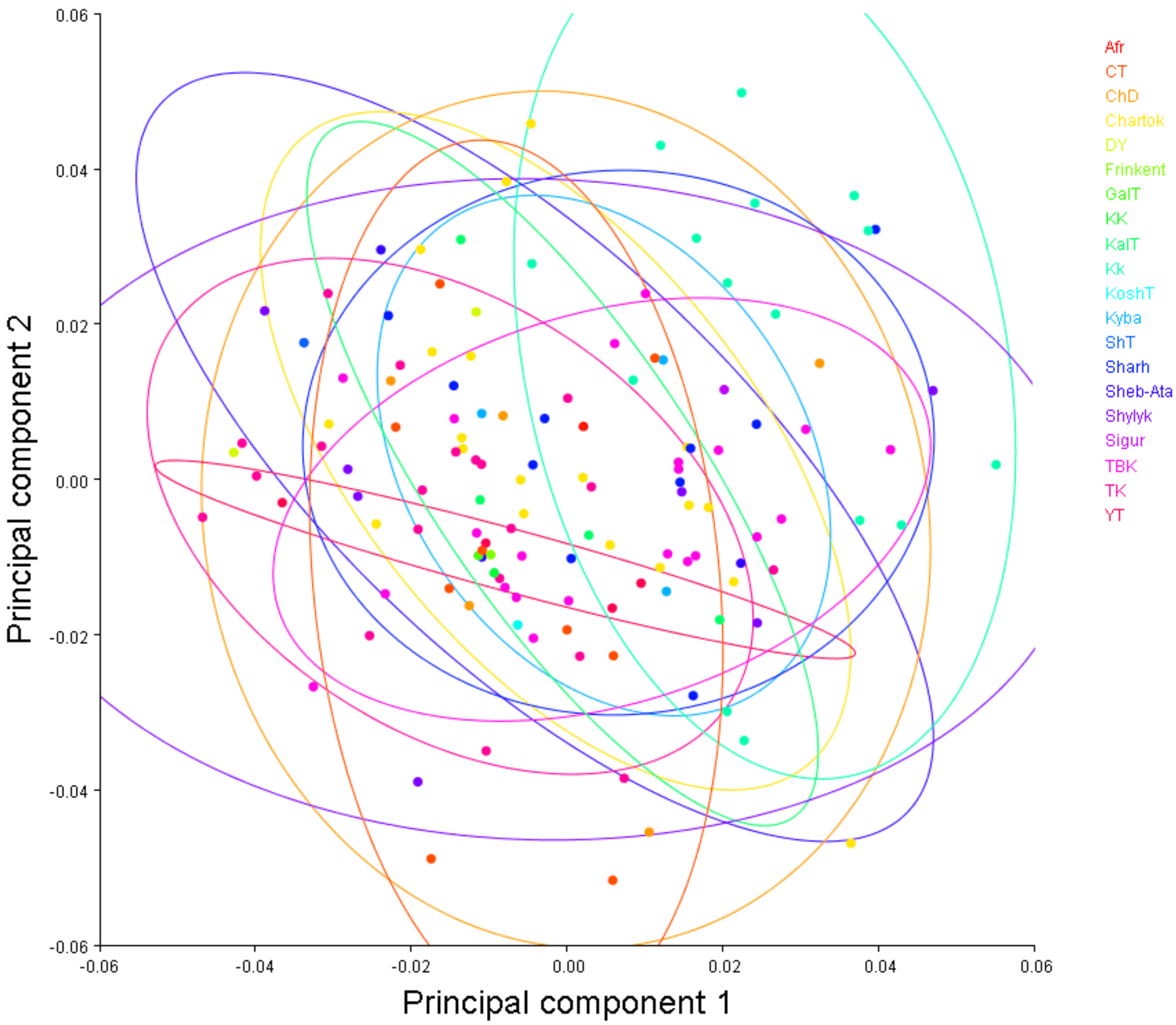

Figure 6.29. Graph showing PC1 and PC2 of Procrustes Aligned individuals from all sites. Individuals are color coded by region with corresponding confidence ellipses (0.9 probability).

Canonical Variate Analysis (CVA)

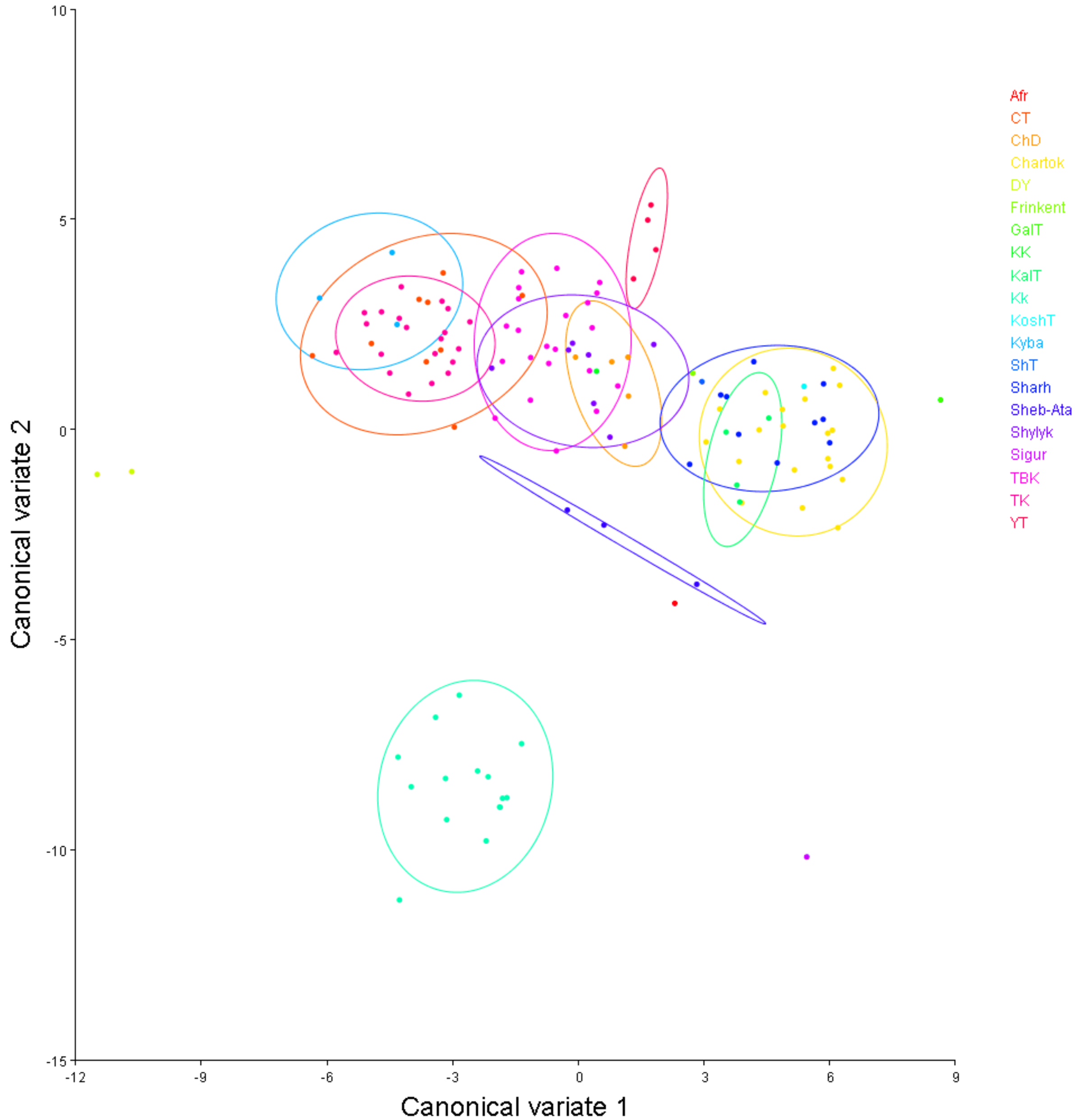

Figure 6.30. Canonical Variate analysis showing CV1 and CV2 generated by using site as classifying group.

Canonical variate analysis results show moderate separation of variation by site, although not as much as CVA of samples grouped by region. Kalmyk-Krylgan stands out as the farthest separated from all other sites. Sheb-Ata and Uturlik-tepe also do not overlap with any other sites.

When canonical variate 1 is projected against canonical variate 3 however, these instances of isolated site samples disappear, and Kalmyk-Krylgan overlaps significantly with several other sites. This is indicative of the fact that while Kalmyk-Krylgan has some morphological shape elements unique unto itself, there are other elements of shape, important to distinguishing groups, that are not unique to this site, or any one site. This speaks to the broad overlap in shape variation seen in the PCA. Unlike in the region-based CVA, where there was little shape variation overlap, at the level of site, we see a great deal of overlap between sites. Overlap between sites does not appear to be related to geographic proximity.

Permutation Tests

Mahalanobis distances were not calculated between sites due to problems applying this method to very small sample sizes. Procrustes distances between sites follow a similar trend to Procrustes Distances between regions. Results of this analysis show relatively low distances between sites. Distances between Chartok – Kalmy-Krylgan, Chartok – Tashbulak, Chartok – Tok-Kala, Kalmyk-Krylgan – Tashbulak, and Kalmyk-krylgan – Tok-kala were low enough to reach statistical significance. The largest distances occurred between Frinkent – Afrasiyab (0.0821), Afrasiyab – Shortepa (0.0893), Kuva – Dashti Urdakon (0.08), and Afrasiyab – Galva-tepe (0.0815). All other distances were less than 0.08.

Procrustes distances among groups:

	Afr	CT	ChD	Chartok	DY	Frinkent	GalT	KK	KalT	Kk	KoshT	Kyba	ShT	Sharh	Sheb-Ata	Shylyk	Sigur	TBK	TK
CT	0.0622																		
ChD	0.0602	0.0343																	
Chartok	0.0630	0.0372	0.0356																
DY	0.0750	0.0578	0.0616	0.0611															
Frinkent	0.0821	0.0532	0.0501	0.0424	0.0696														
GalT	0.0815	0.0536	0.0505	0.0535	0.0780	0.0619													
KK	0.0701	0.0428	0.0422	0.0471	0.0707	0.0622	0.0533												
KalT	0.0693	0.0455	0.0427	0.0271	0.0630	0.0409	0.0566	0.0521											
Kk	0.0673	0.0500	0.0432	0.0415	0.0715	0.0612	0.0647	0.0616	0.0452										
KoshT	0.0740	0.0379	0.0438	0.0439	0.0703	0.0523	0.0489	0.0512	0.0479	0.0572									
Kyba	0.0575	0.0382	0.0354	0.0438	0.0607	0.0639	0.0590	0.0503	0.0487	0.0408	0.0487								
ShT	0.0893	0.0661	0.0634	0.0682	0.0800	0.0751	0.0734	0.0774	0.0738	0.0774	0.0776	0.0704							
Sharh	0.0632	0.0378	0.0309	0.0204	0.0642	0.0477	0.0502	0.0487	0.0303	0.0318	0.0450	0.0391	0.0683						
Sheb-Ata	0.0628	0.0350	0.0396	0.0385	0.0596	0.0555	0.0482	0.0472	0.0482	0.0469	0.0494	0.0472	0.0695	0.0389					
Shylyk	0.0606	0.0237	0.0368	0.0359	0.0586	0.0565	0.0479	0.0400	0.0423	0.0464	0.0413	0.0356	0.0669	0.0357	0.0294				
Sigur	0.0758	0.0655	0.0565	0.0579	0.0762	0.0796	0.0765	0.0695	0.0629	0.0542	0.0719	0.0568	0.0937	0.0536	0.0630	0.0605			
TBK	0.0579	0.0243	0.0317	0.0313	0.0587	0.0520	0.0560	0.0462	0.0410	0.0388	0.0404	0.0310	0.0697	0.0310	0.0342	0.0261	0.0571		
TK	0.0645	0.0247	0.0303	0.0379	0.0521	0.0511	0.0487	0.0417	0.0441	0.0499	0.0402	0.0360	0.0552	0.0377	0.0352	0.0260	0.0662	0.0293	
YT	0.0699	0.0362	0.0407	0.0399	0.0582	0.0516	0.0466	0.0478	0.0392	0.0519	0.0414	0.0459	0.0724	0.0388	0.0420	0.0362	0.0687	0.0391	0.0355

Figure 6.31. Procrustes distances between sites.

P-values from permutation tests (10000 permutation rounds) for Procrustes distances among groups:

	Afr	CT	ChD	Chartok	DY	Frinkent	GalT	KK	KalT	Kk	KoshT	Kyba	ShT	Sharh	Sheb-Ata	Shylyk	Sigur	TBK	TK
CT	0.4745																		
ChD	0.8198	0.3357																	
Chartok	0.2918	0.0022	0.0620																
DY	1.0000	0.0519	0.1915	0.0135															
Frinkent	1.0000	0.8875	0.7335	0.8535	1.0000														
GalT	1.0000	0.8945	0.7753	0.4070	0.6673	1.0000													
KK	1.0000	0.9713	0.8744	0.6639	1.0000	1.0000	1.0000												
KalT	0.1967	0.0286	0.2396	0.5954	0.0993	0.8352	0.6970	0.8034											
Kk	0.2002	0.0001	0.0185	<.0001	0.0067	0.5646	0.2925	0.6180	0.0137										
KoshT	1.0000	0.9831	0.9429	0.8156	1.0000	1.0000	1.0000	1.0000	0.7718	0.7252									
Kyba	0.6667	0.3598	0.9099	0.0519	0.0971	0.4909	0.4938	0.6675	0.0897	0.1965	0.7438								
ShT	1.0000	0.2826	0.6726	0.1044	0.6693	1.0000	1.0000	1.0000	0.1337	0.0599	1.0000	0.4112							
Sharh	0.3582	0.0049	0.5071	0.5247	0.0130	0.8652	0.7260	0.8530	0.6190	0.0180	0.8760	0.2149	0.0819						
Sheb-Ata	1.0000	0.6193	0.8027	0.2090	0.4093	0.8357	0.9120	0.7522	0.2116	0.0594	0.8394	0.3530	0.4963	0.3184					
Shylyk	0.7009	0.9116	0.4062	0.0161	0.1704	0.8272	0.8732	0.9335	0.1642	0.0006	1.0000	0.7825	0.3907	0.0672	0.9622				
Sigur	1.0000	0.1985	0.6715	0.3664	1.0000	1.0000	1.0000	1.0000	0.4078	0.7402	1.0000	0.7518	1.0000	0.6414	0.3376	0.5977			
TBK	0.2774	0.1035	0.0744	<.0001	0.0058	0.3839	0.3418	0.5900	0.0028	<.0001	0.8620	0.4410	0.0123	0.0007	0.2582	0.1786	0.2898		
TK	0.2212	0.2304	0.2897	<.0001	0.0722	0.7039	0.8070	0.9995	0.0028	<.0001	0.9778	0.3362	0.5131	0.0001	0.4490	0.3720	0.2343	0.0001	
YT	0.4023	0.2643	0.4023	0.0370	0.2007	0.6188	0.6169	0.7850	0.3017	0.0017	1.0000	0.1713	0.2755	0.1016	0.5612	0.5253	0.3749	0.0135	0.1240

Figure 6.32. P-values from permutation tests from Procrustes distances between sites.

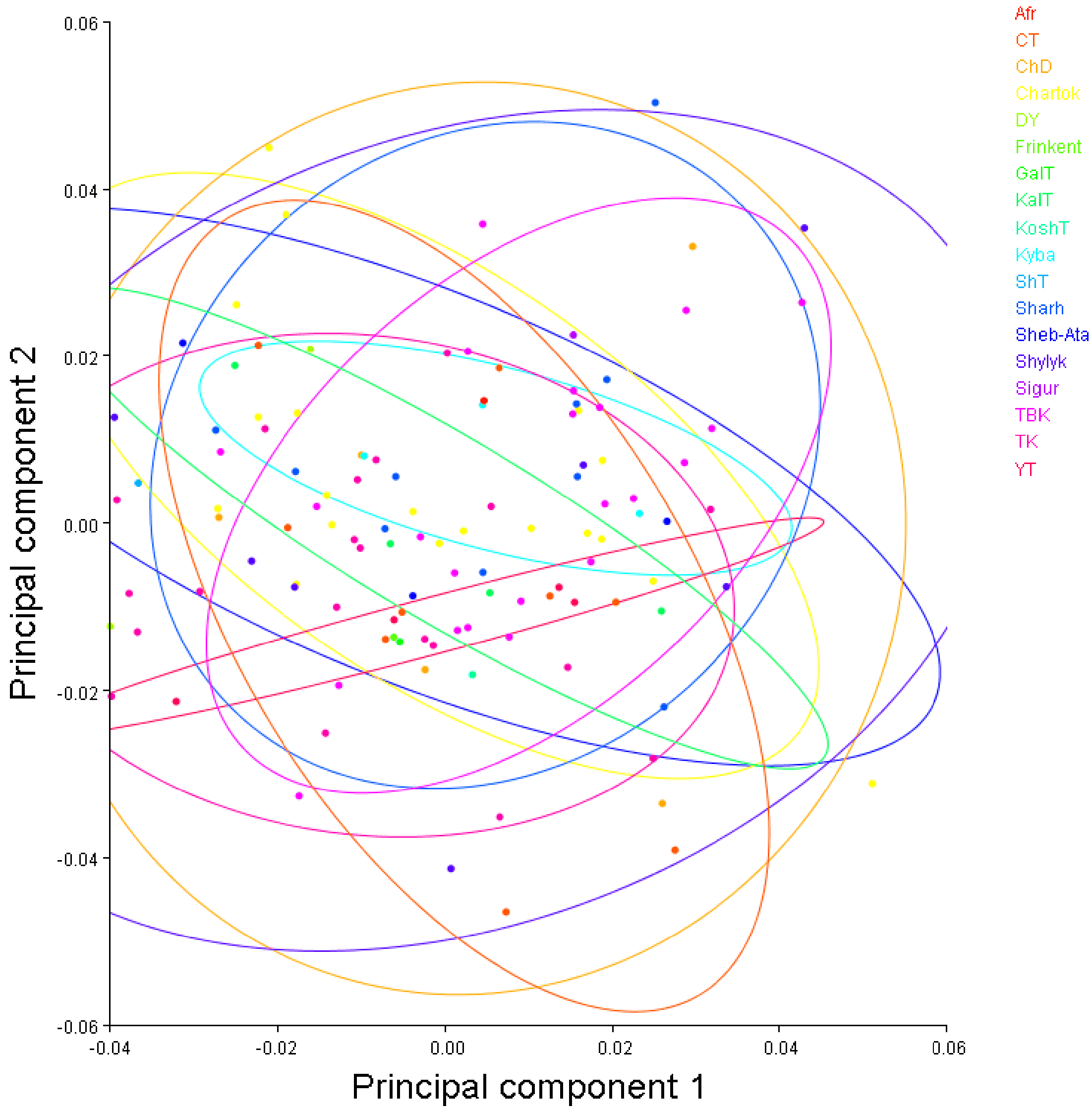

Figure 6.33. Graph showing PC1 and PC2 of Procrustes Aligned individuals from all sites except Kalmyk-krylgan. Individuals are color coded by region with corresponding confidence ellipses (0.9 probability).

To determine the impact of the cranially modified Kalmyk-krylgan sample on biological affinity between sites, I performed a PCA on all individuals except those from Kalmyk-krylgan and projected confidence ellipses at 0.9 probability (figure 6.33). Compared to the PCA including all individuals (figure 6.29), this PCA shows similar degrees of overlap and distribution of cranial variation.

6.2.3 Individual Level Trends

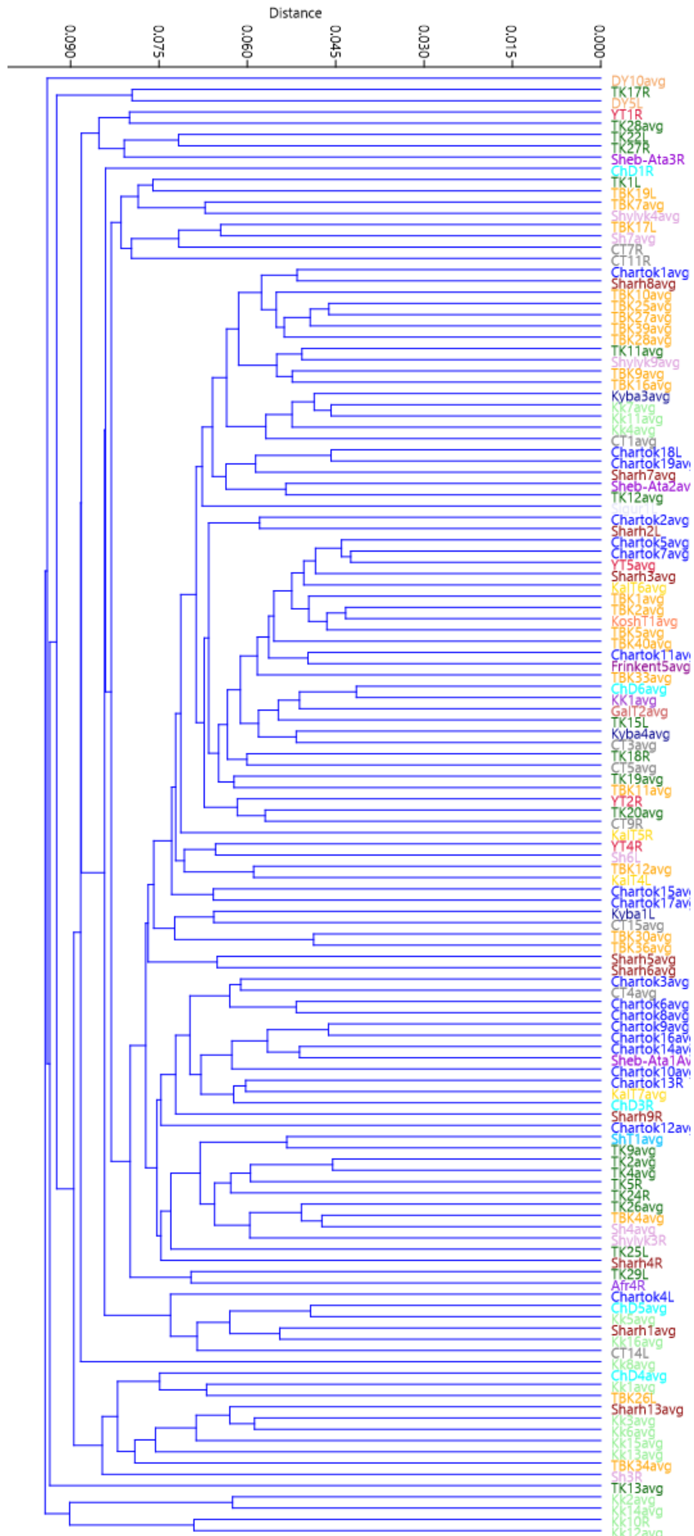

Figure 6.34. Hierarchical clustering analysis based on Euclidean distances using a paired group (UPGMA) algorithm. Individuals are color coded by site.

Hierarchical cluster analysis helps clarify the biological affinity between individuals in my sample. The creation of these clusters are based on Procrustes distances between individuals. Splits occur at the point where an individual's Procrustes distance is the smallest between it and its joining neighbor, relative to all other individuals. The smaller the distance at which this occurs, the more closely related the individuals. Overall, individuals from sites with more than one specimen are more likely to cluster with at least one other individual from their site. The largest bifurcation in the data occurs around 0.082, with most of the samples falling to the lower half of the split. A select number of individuals split off from the rest of the sample before this bifurcation. This includes two clusters of samples from Kalmyk-Krylgan, totaling nine individuals, that fall at the bottom of the graph. There is also a cluster of three individuals from Tok-Kala that split off from the bifurcation at the top of the graph. There is no clear regional or site split between which individuals fall on either side of the bifurcation. There are some very broad regional patterns in the distribution of sites, with individuals form Khorezm more likely to fall in the bottom third, individuals form Ferghana in the middle third, and individuals from Ustrushana in the top half.

6.2.4 Demographic Patterns

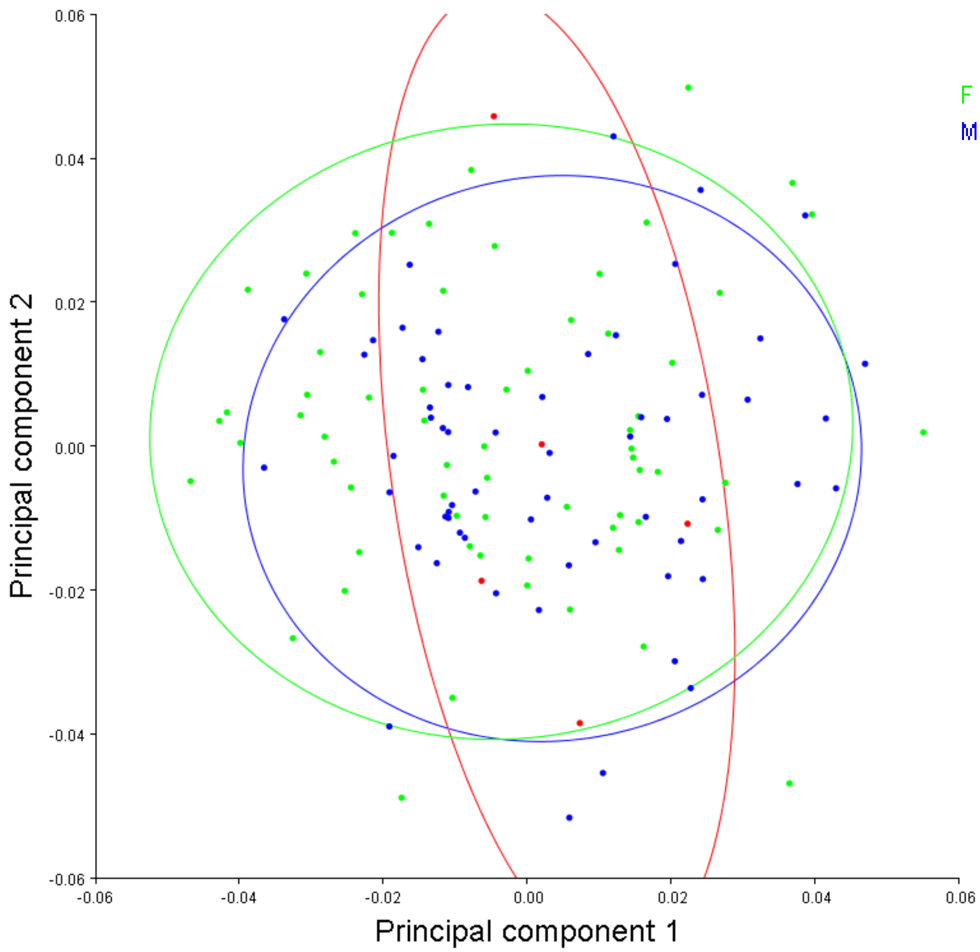

Figure 6.35. Graph showing PC1 and PC2 of Procrustes Aligned individuals from all sites. Individuals are color coded by sex (indeterminate are in red) with corresponding confidence ellipses (0.9 probability).

The majority of variation in male and female cranial morphology in this sample is shared by both sexes (Figure 6.33). Females show a slightly wider spread of variation along PC1 and PC2 than males. It is possible that this is due to a slight difference in sample size; there are 67 females and 62 males in the sample. Males and females are fairly evenly distributed across the cluster analysis (figure 6.34). Individuals are more likely to neighbor at least one individual of the same sex, and this neighbor is usually an individual from the same site.

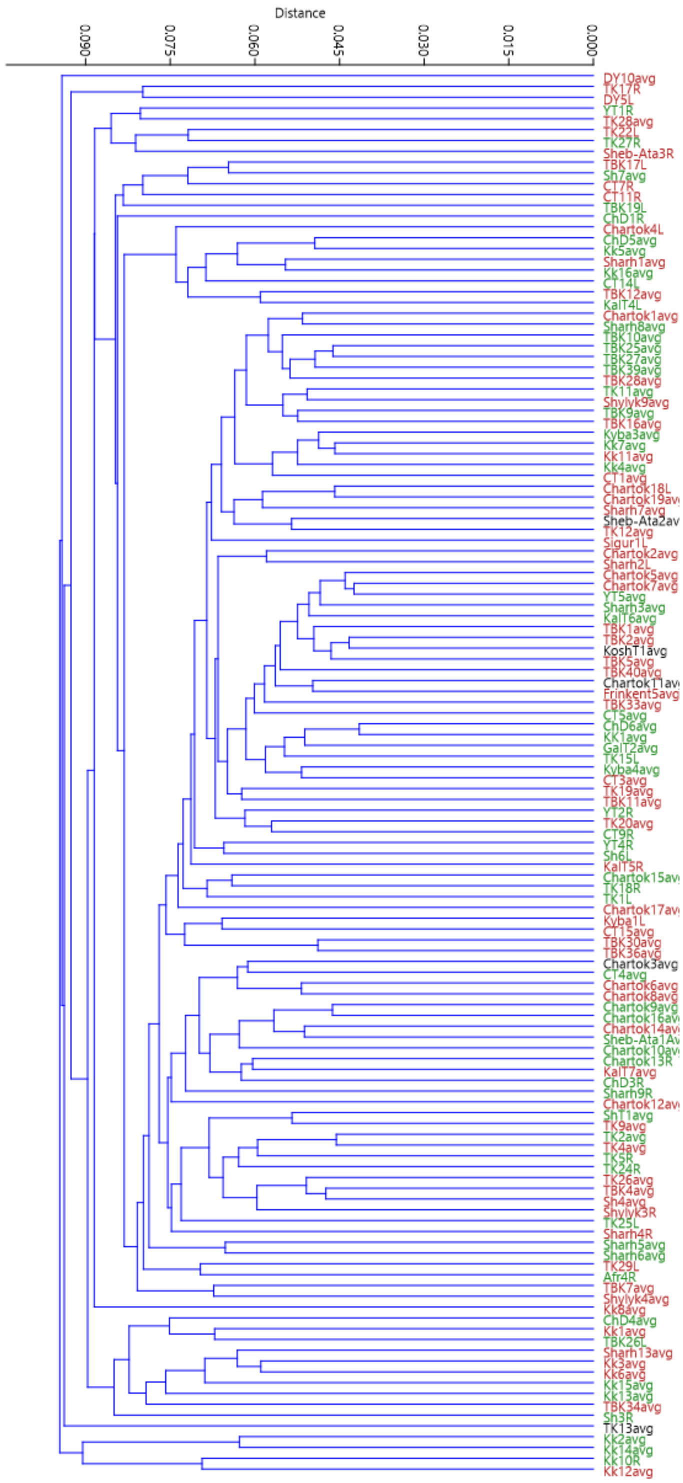

Figure 6.36. Hierarchical clustering analysis based on Euclidean distances using a paired group (UPGMA) algorithm. Females are coded red and males are coded green.

6.2.5 Chronological Patterns

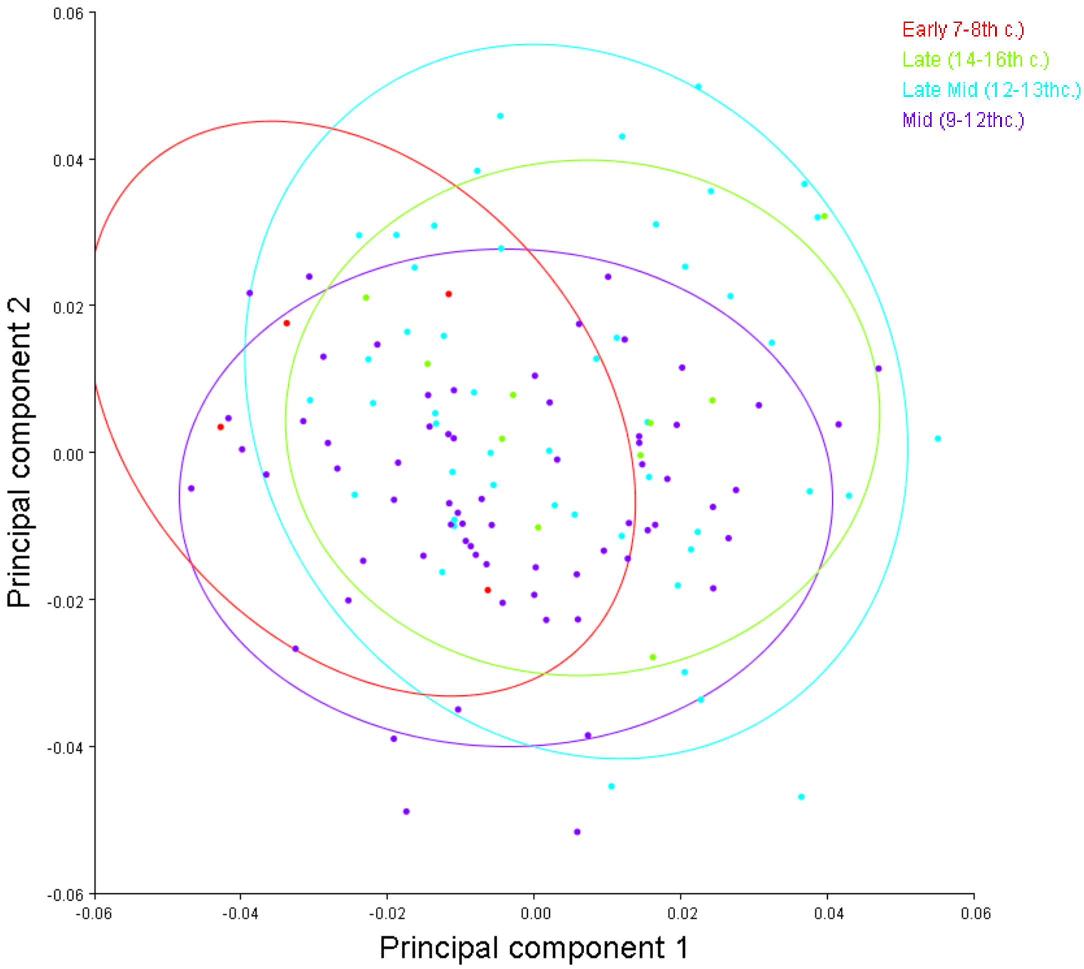

Figure 6.37. Graph showing PC1 and PC2 of Procrustes Aligned individuals from all sites. Individuals are color coded by sex (indeterminate are in red) with corresponding confidence ellipses (0.9 probability).

Sites dating to 9th to the 14th century share a majority of morphological variation. Individuals from earlier sites, dating to the 7th-8th c. show a shift to the right relative to later sites, and have variation in morphology primarily defined by PC2. Overall, there is not a great difference between the four chronological periods represented in my samples. I take this as an indication that analyses on the complete sample are valid and not greately biased by chronological differences in population complosition. Future studies should seek to include a greater number of samples, especially from earlier and later periods.

Chapter 7: Discussion and Synthesis

This chapter synthesizes and interpret the results of my mortuary and GMM analysis to address my research goals of documenting homogeneity and heterogeneity of biological affinity and mortuary ritual in medieval Central Asia. In the first part of this chapter, I argue that mortuary ritual in my sample demonstrates both diverse inter-site CoP as well as a shared framework of practice rooted in religious identity. In the second part of the chapter, I address common geographic and social explanations for the heterogeneity seen in my biological affinity results, and present kinship as a framework through which to interpret these data. In the final section of this chapter, I discuss how this study helps reshape our understandings of the narratives around Islam, movement, and identity in medieval Central Asia.

7.1 Mortuary and Religious Identity in Medieval Uzbekistan

7.1.1 Mortuary Communities-of-Practice

In chapter 6, I presented data on mortuary ritual at the sites in this study and identified the co-occurrence of traits in burials. Here, I interpret these data to argue for the presence of 18 distinct mortuary communities-of-practice. The documentation of communities of practice helps us describe the diversity of religious practice and identity. In addition, the nature of mortuary ritual diversity can be explored by evaluating the ideological and "fashion" basis of different components. This can help us understand religious and social underpinnings of social identities built through these CoP.

Across the eleven sites for which I was able to record mortuary ritual data, there were thirty-one different sets of mortuary components (figures 6.7-6.17). When these sets of components are grouped across sites, based on burial architecture, burial orientation, body position, and face orientation, we are left with eighteen sets of burial practice (figure 7.1)

#	Grave Structure	Grave Orientation	Body Position	Face Orientation	Grave Goods	Sites
1	Internal pit closed with bricks (1a)	NW-SE	Extended on Right Side, legs bent	SW	none	Chor Dona (B), Tok-kala (A), Kalmyk-krylgan (F)
2	Internal pit closed with bricks (1a)	NW-SE	Extended Supine	Superior	personal adornment	Chor Dona (A), Kalmyk-krylgan (G)
3	Pit with arch (1b)	N-S	Extended Supine	West		Koshtepa (A)
4	Oval pit (1c)	NW-SE	Extended Supine		Weapons, horse tack	Chor Dona (E)
5	Oval pit (1c)	SE-NW	Extended Supine		Weapons, horse tack	Chor Dona (F)
6	Chamber (brick box - 2a)	NW-SE	Extended on Right Side, legs straight	SW		Kuva (A)
7	Chamber (brick box - 2a)	NW-SE	Extended on Right Side, legs bent			Afrasiyab
8	Chamber (brick box - 2a)	NW-SE	Extended Supine	SW	personal adornment, headstone	Kalmyk-krylgan (A)
9	Chamber (sides and top - 2b)	N-S/NW-SE	Extended on Right Side, legs bent	West/SW	none	Uturlik-tepe; Tok-kala (B); Kalmyk-krylgan (C)
10	Chamber (sides and top - 2b)	NW-SE	Extended Supine	SW	personal adornment, headstone (Kk)	Kalmyk-krylgan (B)
11	Chamber (sides and top - 2b)	NW-SE	Extended Supine	Superior		Kalmyk-krylgan (D)
12	Internal cist (2c)	N-S	Extended Supine	West	Personal adornment	Tashbulak (C)
13	Internal cist (2c)	N-S	Extended Supine	Superior		Tashbulak (D)
14	Niche (3)	N-S/NW-SE	Extended Supine	West	Personal adornment (ChD)	Tashbulak (A), Galva-tepe (A), Chor Dona (C)
15	Niche (3)	N-S/NW-SE	Extended Supine	Superior		Tashbulak (B)
16	Niche (3)	N-S/NW-SE	Extended on Right Side, legs bent		Weapons (GalT)	Chor Done (D), Galva-tepe (B)
17	Ossurary (4a)	none	disarticulated	none		Koshtepe (B), Tok-kala (C)
18	Hum (4b)	none	disarticulated	none		Kuva (B), Frinkent, Tok-kala (D), Koshtepa (C)

Figure 7.1. Table of all grave component configurations present in the data set.

Burial architecture is the most variable mortuary component in my sample. In the division of burials into mortuary communities-of-practice, burial architecture is giving the most weight as a defining feature. That is, even with all other components being identical, two burials with different burial architecture are considered as belonging to two different communities-of-practice. Burial architecture is a particularly salient component for examining communities-of-practice because of the labor and planning required. All of the burial types recorded in this sample require the preparation of graves or vessels for burial. In addition, all types except for the oval pit burials at Chor Dona involve additional materials to complete burials beyond the excavation of dirt (bricks, clay, wood). An important element of CoP is the shared access to resources or knowledge of resources. Muslims are ideally buried as soon as possible after death, to protect the living from the contamination of the dead, and to hasten reunion with Allah (Petersen 2013:244). It would have been necessary to be a part of a community with access to resources and knowledge to perform this burial in a quick fashion. The burial architecture in the sample is also all located below the surface. This makes it less likely to be subject to form being dictated by displays of power or status.

Body position shows less variation overall than burial architecture, but is still an important distinguishing component between CoP. Unlike burial architecture, the positioning of the body is a single event, and only requires the labor of a few individuals. According to Islamic tradition, the body is supposed to be prepared for burial and buried by the closest family members (Halevi 2007:43-44). During preparation, the deceased are wrapped in shrouds after having been washed. It would be at this point that the arms would have to be arranged, either on top of, next to, or underneath the body, and it is possible that there could be some movement during the transportation and deposition of the body in the grave. Because of this placement of arms was not a distinguishing factor in identifying different mortuary practice.

Two burial components merit specific discussion: face orientation and grave goods. Above, I included face orientation as a distinguishing element of mortuary CoP. There are two cases in which the orientation of the face is the only distinguishing characteristic between two sets of burial practices (figure 7.1: #'s 12&13 and 14&15). At Tashbulak, one of the sites of type 14&15, there are only four individuals facing upward. It is possible, that differences in face orientation are less the result of intentional positioning, and more due to accidental arrangement of a shrouded body during burial. Grave goods are a rarely included component of mortuary ritual in my sample. The percentage of individuals buried with grave goods does vary between sites and CoP. Patterns in grave goods indicate that there were differences between mortuary communities. The site with the highest number of burials with weapons was a fortified kala. At all other sites, personal adornment was the most common type of grave good. The inclusion of grave goods is directly opposed to Islamic burial prescriptions

In distinguishing mortuary communities-of-practice from each other, there are some burial components that I omit: distance from settlement, cemetery organization, the presence of overlapping elements, and the number of individuals interred in a grave. These components are not included because they are elements that either appear to not have not been under the control of mortuary communities, or were determined by circumstantial factors, more than planned practice. I do not consider distance from settlement and cemetery organization in my discussion of CoP. Both of these elements display low variation in the sample. In addition, in the majority of sites, multiple sets of burial components are present in the same cemeteries, distributed throughout a shared burial organization. This indicates, that in this sample, the resources of individual mortuary communities-of-practice did not extend to control of large territory.

At five of the sites (Kuva, Frinkent, Galva-tepa, Tok-kala, and Kalymyk-krylgan), burials overlap with other burials or structural remains. These overlaps seem less to do with ideological prescription and more with contextual factors. At Tok-kala, Kalmyk-krylgan, and Frinkent overlap of burials was likely due to space constraints, and in the case of pit burials, potentially due to a lack of markings for burial location. At Kuva and Galva-tepe, intrusive burials seem to be the result of later occupations repurposing abandoned areas (Bulatova 1972:20).

In this sample, the number of individuals interred in a grave is likely dictated by situational need and constraints. There is only one instance of a burial in this sample being noted as being large enough for multiple individuals, a burial at Kalmyk-krylgan that contained the remains of a child (Mambetullaev 1984:88). In all other pit style burials, multiple individuals were placed in a grave made for a single individual. In consideration of need for expedited burial, it is possible then that these graves with multiple individuals are the result of the deaths of two individuals in rapid succession. In cases where the remains of multiple individuals were recovered in a single ossuary or hum burial, it is likely to do with exposing bodies for defleshing in collective spaces and the mixing of remains that can happen in these cases.

The mortuary data presented here represents a small sample of known medieval sites in Uzbekistan. However, even within the limitations of data and study sample, my results capture both variation and similarity on multiple geographic scales. There are seven sets of cooccurring burial components that are found at multiple sites, all of which include at least two sites from different regions. Similarities in mortuary ritual are not related to geographic distance, at least in any linear way. Mortuary ritual was instead structured by cultural, political, or economic forces. The limited public display and wealth input in this sample, dominated by Islamic and Zoroastrian practice, make them unlikely sites for political or economic negotiation. I have argued that shared mortuary ritual is the result of the practices of groups deploying shared knowledge, resources, and traditions, as mortuary communities-of-practice. I will discuss the geographic extent of mortuary CoP in the last section of this chapter. But below I will first discuss how the variation of mortuary ritual was still largely constrained and structured by religious prescriptions.

7.1.2 Implications of Mortuary Ritual for Religious Identity

Having described the composition and potential origins of the mortuary communities-of-practice in my sample, it is now possible to discuss implications for religious identity. Overall, Islamic burial prescriptions are the primary influence on mortuary ritual in my sample. Early Islamic texts discuss burial as an important marker of religious identity. Mortuary ritual was a context in which Muslims were exhorted to distinguish themselves from members of other religions (Halevi 2007; Zaman 2001: 32-33). For Muslims in the past, as today, burial practice is guided by a set of prescriptions interpreted from the Qur'an and Hadith by religious scholars (Ebrahim 1998:189). Other early scholarly and literary works, such as the prophet Muhammad's biography by Ibn Ishaq, or the qisas al-anbiya (stories of the prophets) were also sources that people looked to for guidance in burial practices (Zaman 2001:27). These sources provide general requirements of the handling and burial of the dead. The majority of variation in burial practice recorded in my sample exists within the bounds of these requirements. This includes elements both within and outside the purview of components shaped by mortuary CoP.

For all sites with information on burial locations, burials were located in collective burial grounds. The jurist al-Shāfi'ī, the first contributor of the principles of Islamic jurisprudence, recommended burying the dead in cemeteries, so as to protect them from desecration by having a designated, recognizable area (Echevarria 2013; Halevi 2007:146-147). Zoroastrian traditions included the exposure and successive deposition of bodies in collective locations (Hartman

1980:16).

According to the Qur'an (41.39, 2.259, 35.9), when the deceased are first interred they will be interrogated and evaluated by angels, and then when the world ends, souls will be reunited with dead bodies which will be reanimated (Halevi 2007:212). The grave must therefore allow space for the body to sit up and eventually leave. One of the most important elements of an Islamic grave is its orientation in relation to Mecca. In terms of internal structure, there are two primary configurations: *shaqq*, a pit grave with a body sized trench at the bottom, and *lahd*, a pit grave with a body sized niche dug into the side of the grave. Because of connotations between soil and hell, the face was not supposed to be covered with earth. All of the pit style burials (types 1a-3), with the exception of the oval pit burials, contain structures to protect the faces of the deceased, through the construction of niches and protected cists and chambers. An additional element of Islamic prescription relevant to grave structure is the tradition that the body be laid directly on the ground (Halevi 2007:92).

Orienting the body could be done by arranging the corpse so that the deceased's face pointed toward Mecca, or by laying the body with either the feet or head in the direction of Mecca (Petersen 2013:248). For all sites with documented pit-style burial, most individuals are laid in a position oriented relatively towards Mecca, which is west/southwest of Uzbekistan. There are some individuals whose faces do not follow this alignment, and are instead pointed up.

The majority of burials did not include grave goods. This is in accordance with what is generally known for both Islam and Zoroastrianism. The inclusion of grave goods directly contradicts widely accepted prescriptions about equality of the dead. Most of the burial goods are small items of personal adornment which would not have been visible after the individual was wrapped in shrouds. Personal relationships therefore likely played a role in the practice of adorning the dead, as family members prepared the body for burial. It is also possible that because of the private nature of these objects, it was a subtle way of continuing earlier traditions of adorning the body for burial.

While Islamic prescriptions are the dominant framework within which burial variability was expressed in the sample, it is possible that the variation allowed by prescriptions also left room for the expression of beliefs of religious and social identities otherwise masked by Islamic burial prescriptions. For example, burial types 2a and 2b in which the burial chamber is with bricks forms a vault has been suggested as a reference to Zoroastrian practices of placing remains in brick catacombs (Abdulgazieva 1991:100; Amirov 2010:61). Graves in which the floor of the grave is covered violate the tradition of laying the body directly on the ground. There have also been scholars who suggest that the niche form of burial in Islamic cemeteries is a holdover from pre-Islamic nomadic burial practice (Yagodin 2008:59-60) This is an interesting hypothesis, especially because niche burials are common at the sites of Tashbulak and Galva-tepe, both of which are located on the edge of territories occupied by nomadic groups (Frachetti and Maksudov 2014; Rostvtsev 1974:489). However, the niche form of burial is also mentioned in early Islamic texts, and was purported to be the favored style of the prophet Muhammed (Halevi 2007:189).

The burials in my sample that fall outside of the bounds of these prescriptions, conform largely to Zoroastrian practice. The *Videvdat*, a post-Sassanian text on Zoroastrian traditions, describes the requirements for burial as follows: “An ossuary shall be made out of reach of dogs and foxes and wolves, not to be rained on from above by rainwater. If they shall be able, these Mazda-worshippers, (let it be) among stones or chalk or clay” (Darmesteter 1895:61 in Trinkaus

1984:676). The Videvdat along with other early Zoroastrian texts, also describe the use of collective spaces for the exposure and deposition of the dead (Trinkaus 1984:676). These prescriptions are met in the vessel burials in this sample, which are all ceramic or alabaster containers.

There are also five pit-style burials at Chor Dona have been previously identified by scholars as pagan graves of nomads (Abdulgazieva 1991:99). These graves are found in the same cemetery as those identified as Muslim, and are oriented along the same axes. However, their grave form is a simple pit with no structure in place to protect the face of the deceased. In addition, large amounts of horse equipment including a saddle and bridle were interred with the dead. These burials demonstrate the difficulty in delineating distinct religious identity from burial practice. There is clear overlapping practice between these five graves and the others at Chor Dona in terms of orientation and body position. However, the lack of internal structure and inclusion of horse tack are notable departures from Islamic prescriptions.

Considering the patterns described above, the majority of the burials in this sample should be considered expressions of Islamic identity. While the current evidence cannot directly speak to religious beliefs of the interred, I argue that the repeated act of burial in this case reflects the embodiment of an identity by communities across Uzbekistan. This study shows that this practice even extends into regions previously thought to be on the periphery of Islamic influence until later periods. The site of Tashbulak exemplifies this. Chronologies of burials at Tashbulak date to as early as the 8^{th} c. CE, when Islam was thought to be limited beyond the urban stronghold captured early by Arab invasions. Considering the diversity of Islamic sects during this period (Daftary 1998), it is somewhat essentializing to group the diverse practices under the umbrella of “Islam” writ large. Future studies should work to explore connections between these diverse Islamic ideologies and burial practice.

The burials discussed in this study also contain examples that fall outside of Islamic burial traditions, or show signs of syncretic practice. Most of the vessel burials for which there is specific chronological data, date to the early medieval period (7^{th}-8^{th} c.), and are found at sites with later Islamic burial traditions. Frinkent is a notable exception. The exceptional nature of Frinkent may be evidence of the power and influence that a mortuary community-of-practice can cultivate in the face of broad cultural change. Burial practice at Frinkent and Chor Dona is evidence that religious identity in medieval Central Asia did not shift uniformly to Islamic practice. Some communities seem to have adopted some elements and retained other existing components, while others completely rejected the influence of Islamic burial. Overall, burial practice in this sample shows plurality of religious identity on regional and individual burial scales. Burials were sites of not just expression of religious affiliation, but of negotiation of local and global, past and present religious identities.

7.2 Biological Affinity and Kinship in Medieval Uzbekistan

The results of my biological affinity analysis show high levels of heterogeneity at a regional and site level. This heterogeneity in my data is reflective of high variation in cranial shape. Importantly, this variation is distributed relatively evenly among regions and sites. To discuss the implications of the distribution of morphological variation on kinship, I will address patterns at the regional and site level.

7.2.1 Regional Biological Affinity and Evidence of Ethnic Boundaries

Overall, the majority of variance in cranial morphology is shared by every region (figure 6.21). There are however, differences between regions in terms of the magnitude of variation of the samples. Khorezm displays the most variation, while Chach and Ustrushana show more restricted variation along both axes. Tokharistan has fairly high relative variation along the second Principal Component and relatively restricted variation along the first Principal Component. Overlap of variation between regions does not appear to be related to geographic or cultural distance. Khorezm is the most geographically distant area in the sample, yet individuals from the region show greater morphological variation and overlap than any other region. The extent of Khorezm's variation includes complete overlap with samples from Ferghana, the region that is most geographically distant from Khorezm (figure 6.21). Tokharistan is separated from the other regions by both linear geographic distance as well as mountainous terrain. However, individuals from Tokharistan still overlap with all other regions in PCA results. Recent work has shown the extensive use of mountains as thoroughfares for movement and trade (Frachetti et al. 2017).

In the regional CVA analysis, the explanatory power of geography is stronger than in the PCA results. In the first two canonical variates, Khorezm separates out from the other regions. Chach and Ferghana have slight overlapping variation, as do Tokharistan and Soghd. Soghd sits intermediate between Ferghana, Tokharistan, Ustrushana, and Khorezm. The major cities of Soghd were important centers for trade, and were often the focus of military campaigns and dynastic power struggles (Bregel 2003). It would make sense therefore, that its population would be the most intermediate between other regions. The neighboring regions of Chach and Ustrushana, while showing significant separation along CV2, occupy similar space along CV1.

If biological distance was structured along the ethnic lines professed by scholars, individuals in the sample should display separation along lines not associated with regional geography. This pattern is not present in either the PCA or CVA results. This does not mean that ethnic identity was not important in this period, simply that it did not create reproductive boundaries presumed by the current narratives about the region.

7.2.2 Site Level Biological Affinity and Kinship

Morphological variation at sites shows a similar pattern of overlap as with regional-level analysis. There is greater variability in the total variation encompassed in sites compared to regions, which is likely due to vastly different sample size between sites. Some sites with small sample sizes, such Sheb-Ata (n=3), have relatively high variation along one principle component, but very little along the other principle component. Every site displays at least some degree of overlapping variation with every other site (figure 6.28).

When looking at morphological variation within sites, clusters of individuals of close biological affinity begin to become apparent. Cluster analysis of all individuals (figure 6.23) show that individuals tend to neighbor others from the same site, provided multiple individuals were sampled. However, overall, individuals were distributed throughout the cluster model. Endogamous marriage patterns, or isolation of sites would result in relative homogenous morphology compared to overall regional and total sample variation. When examined in the context of the whole sample, sites display both patterns of internal biological affinity, as well as close affinity with other sites.

What can this relative heterogeneity tell us about kinship? Many of the sites do not have enough individuals represented to look at within site patterns of affinity through PCA. However, looking at Tashbulak, Chartok, Kalmyk-krylgan, and Tok-Kala, it is possible to discuss preliminary patterns in affinity at the site scale.

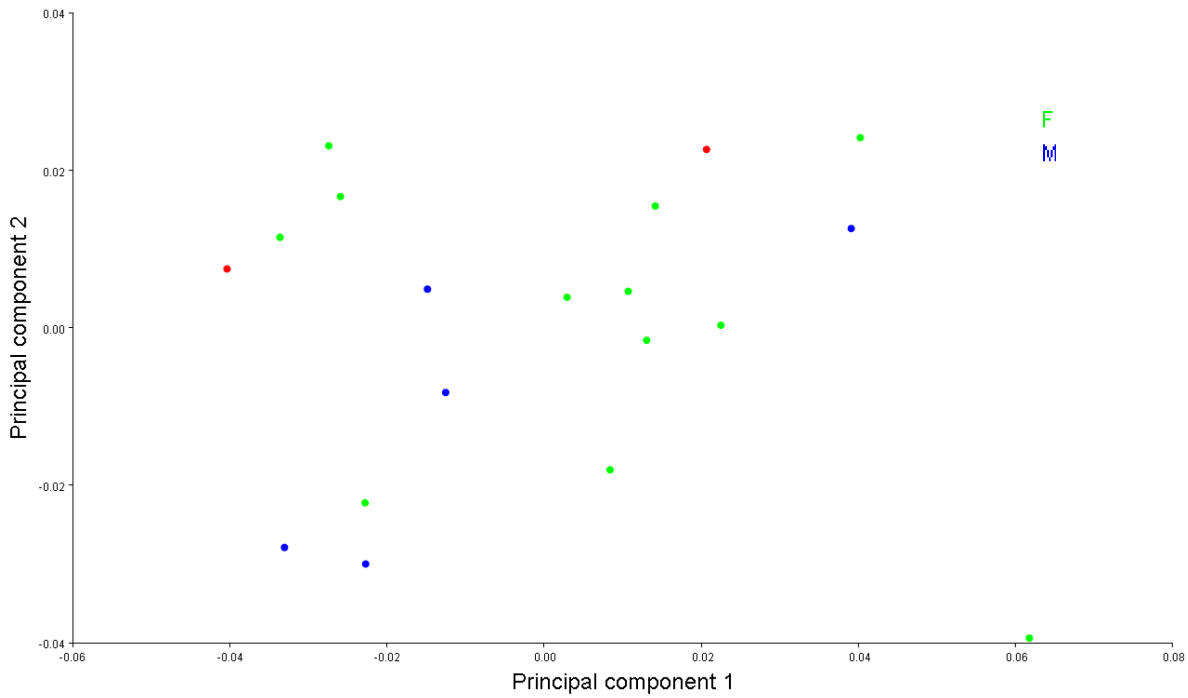

Figure 7.2. PCA of individuals from Chartok with individuals colored by sex (red indicates indeterminate).

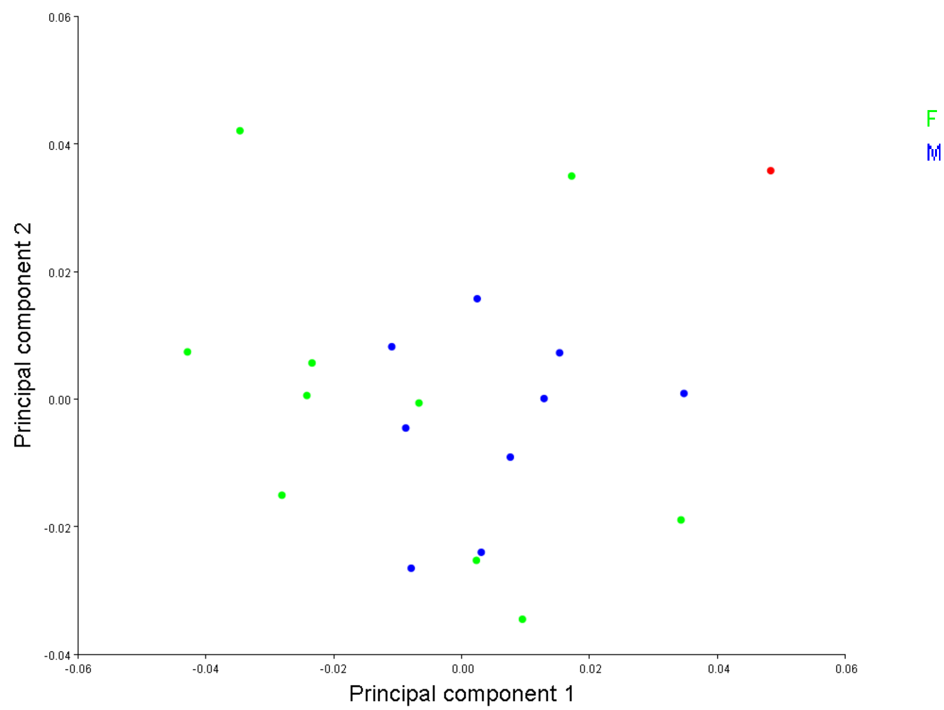

Figure 7.3. PCA of individuals from Tok-kala with individuals colored by sex (red indicates indeterminate).

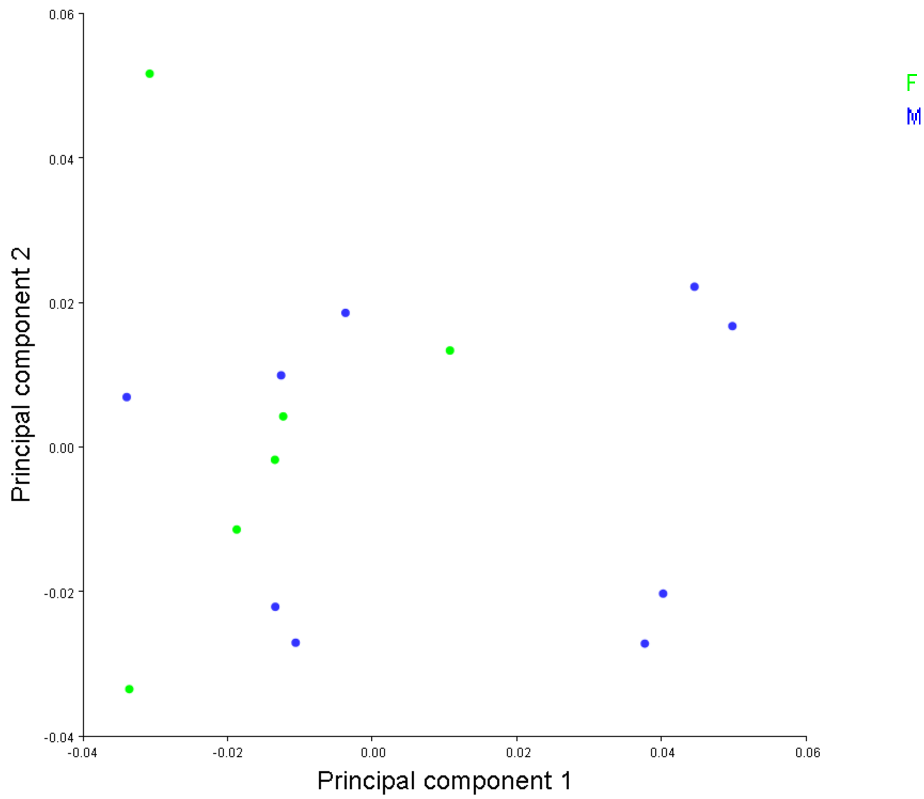

Figure 7.4. PCA of individuals from Kalmyk-krylgan with individuals colored by sex.

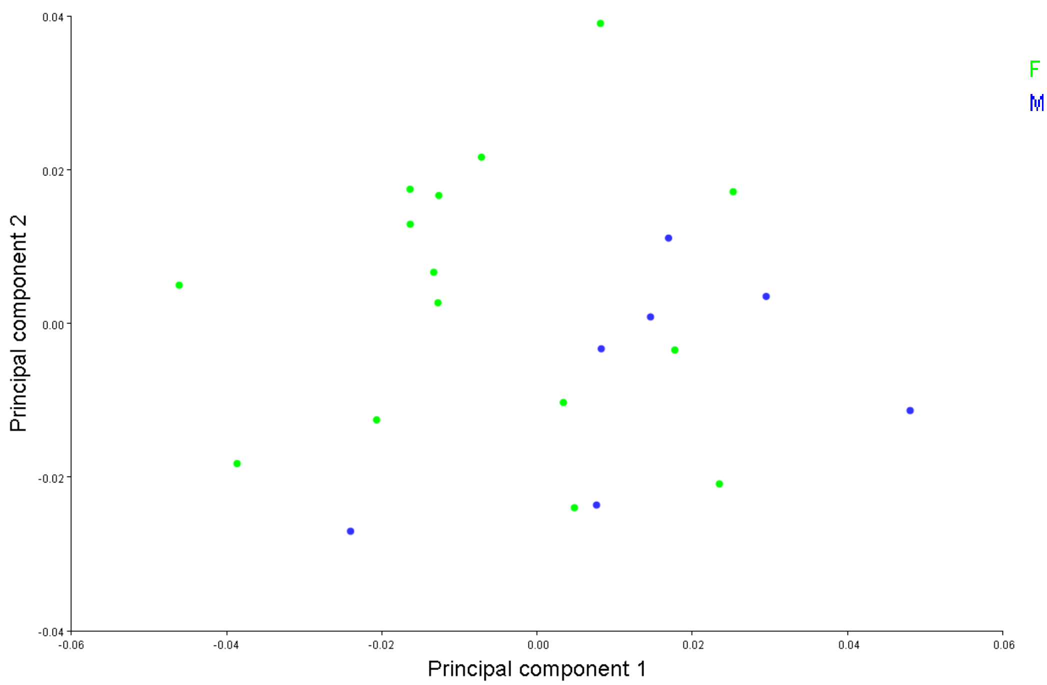

Figure 7.5. PCA of individuals from Tashbulak with individuals colored by sex.

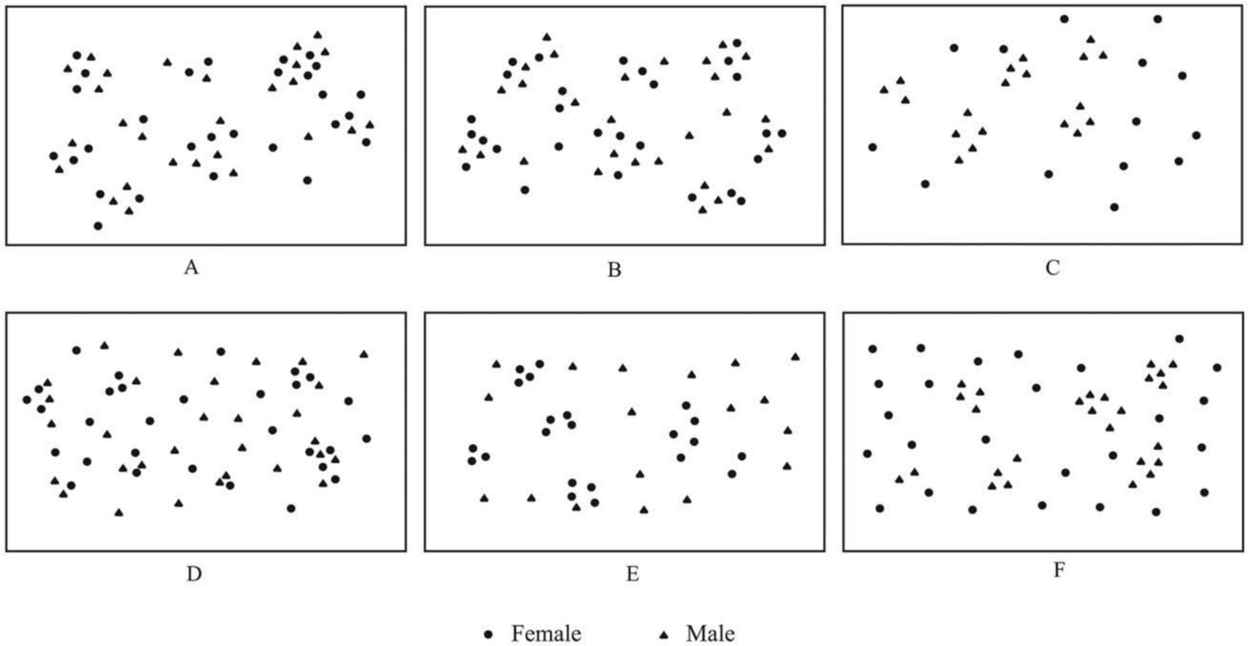

Figure 7.6. Idealized expectations for biodistances of individuals in large cemeteries for: a matrilineal descent group (A), a patrilineal descent group without wives' transfer of membership (B), a patrilineal descent group with wives' transferred membership (C), multiple bilocal residential-household groups under bilateral descent (D), multiple matrilocal residential groups under bilateral descent (E), and multiple patrilocal residential groups under bilateral descent (F) (after Ensor et al. 2017: figure 2).

In the PC graphs of Chartok (figure 7.2) and Tashbulak (figure 7.5), there is at least one cluster of female individuals who share close biological affinity, with males distributed more evenly. This pattern fits closest with Ensor's model for matrilocal residential groups under bilateral descent (figure 7.6: E). The PCA graphs of these sites also share similarities with Ensor's model of bilocal residential-household groups under bilateral descent (figure 7.6:D). In bilateral descent models, there are no descent groups, and kinship is defined instead at the level of household (Ensor 2017:744).

A trend of apparent bilateral descent in these cemeteries makes sense assuming Islamic burial traditions of immediate interment of the dead. This tradition means that individuals would not be returned to their natal lineage locations, even if earlier kinship practices would have dictated this. It is possible that such burial traditions could have over time shaped kinship structures as well. If practice is what defines identity, then this site level evidence supports a model of kinship shared in at least three regions and four sites, in which kinship was primarily defined at the level of household. Some closely related individuals would have stayed in their natal homes, and the clustering of some individuals within sites speaks to this. However, a lack of strong descent claims would have provided less motivation to promote marriage and reproductive practices that maintain either the patriline or matriline. This form of kinship diversifies household relationships as kinship is not defined by a single lineage, but by the affinities of all members (Gjessing et al. 1975; Pasternak 1976).

The evidence from Chartok, Tok-kala, Kalmyk-krylgan, and Tashbulak also questions the idea that parallel cousin marriage within a patrilineal system was introduced with Islam to the region. This type of marriage should promote greater clustering of both male and female individuals than is seen is examples from this sample (figure 7.6: A). While preliminary, this evidence suggests that kinship in medieval Central Asia was primarily defined at the household level, rather than at the supra-regional level of ethnicity, or site level of extended lineage formation. In the next section, I will suggest some hypotheses as to what social and economic processes could have promoted this type of kinship.

Kinship describes complex social systems that link both biology and socially related individuals. This study cannot address specific marriage or lineage forms in all sites. However, it does give a sense about the strength and influence of local versus regional networks of related individuals.

7.3 Reevaluating Narratives of Identity in Medieval Central Asia

Throughout this study, I have presented mortuary ritual and biological affinity as means to examine two different types of social identity: religious and kinship. Reevaluating these two identities is important as they underlie much of the narrative of cultural change attributed to this period. Examining these two data sets together can also give us a glimpse into whether and how these two identities were entangled in similar or separate networks of connectivity across the region. Understanding these landscapes of interaction also allows me to address questions of movement during this period.

7.3.1 Patterns in Diversity in Burial and Morphology

Patterns of mortuary ritual and biological affinity reveal more heterogeneity and homogeneity than expected from historical narratives, depending on the scale examined. At the scale of site, most samples exhibit multiple suites of mortuary practice and diverse biological affinities. To understand whether these diversities are the result of similar or divergent social processes and the extent of these processes, it is necessary to compare relative biological and mortuary diversity.

If diversity in burial practices are related to diversity in other social identities, then we would expect sites with more diverse burial practices to also have more diverse kinship networks, and therefore greater morphological variation. Chor Dona and Kalmyk-krylgan have the greatest number of burial component suites (six and seven respectively). Both of these sites do display relatively broad ranges of morphological variation according to the PCA results (figure 6.28). At the other end of the spectrum, Uturlik-tepe has only one type of burial recorded at the site, and a narrow range of morphological variation. Sites such as Tashbulak and Tok-kala that have moderate levels of burial diversity, show levels of morphological variation intermediate between Chor Dona and Kalmyk-krylgan, and Uturlik-tepe.

At the scale of region, patterns in similar morphology and burial practice emerge in their respective analyses. These two data sets can be compared to see if similar burial practice between sites is associated with greater biological affinity between sites. Unlike with relative diversity, the analysis of specific affinities shows a more complex association between sites. If mortuary ritual and biological affinity are shaped by the same long distance networks, we would expect sites with shared burial elements should overlap more in terms of morphological variation. One big split in burial practice at sites is between the "Islamic-type" pit-based burials, and the secondary burial inside vessels associated with Zoroastrian. If we compare the CVA results of all sites at which vessel burials are present, we see overlapping of individuals from Tok-kala and Kuva, but Koshtepa and Frinkent do not show close affinity (figure 6.29). Analyses of other burial forms show similar mixed patterns of affinity.

7.3.2 Social Connectivity in Medieval Central Asia

The comparison of mortuary and biological affinity indicates that sites show overlapping mortuary practice and biological affinity. Biological and mortuary diversity is not concentrated in any one region, but shows similar patterns across medieval Uzbekistan. The discussion above argues that these patterns in shared biology and burial practice were the result of social systems that did not act as a direct line of biological and religious input, but rather functioned as a facilitator for both elements to spread independently. While the exact basis for these connections is beyond the scope of this study, I would suggest that the spread of urbanism and market-based economies during this period could have promoted the spread of social identities and the maintenance of diversity within these identities.

Although Central Asia has a history of urbanism stretching back centuries, during the medieval period, the size and number of urban sites increased greatly (Maksudov 2012;

Maksudov et al. in press). Social scientists have long recognized that urbanism has a significant impact on structures and expressions of social identity (Wirth 1938; Childe 1950; Jennings 2016). These transformations are thought to be a result of increased interaction between groups and individuals, mediated through the particular ideologies, politics, and economics of cities. One school of thought that has dominated archaeological studies of urbanism emphasizes a top-down organization of cities and their populations. According to this model, urban contexts act as an integrative force, creating new social identities that crosscut previous social divisions. These new urban social identities form along economic or religious divisions resulting from centralizing hierarchies (Smith 2007). For example, Trigger (1976) argues that in early dynastic Egypt, centralized control went as far as to have state regulatory systems governing the status of economic groups. In the Inka Empire, the state mandated certain economic roles, such as weaving, for large groups that included individuals from many different communities (Costin 1998). Studies of proto-urbanism often highlight structural elements such as restricted access to areas or patterns of storage as evidence for centralized institutions and social inequality at the expense of diversity (Adams 1966; Smith 2007; Wheatley 1970; Zeder 1988).

A second model argues that aggregation of populations in cities perpetuates and solidifies preexisting social configurations. The new social environment encountered by groups in a city can lead to a desire to draw on familiar social structures to cope with unfamiliar surroundings. This emphasis on traditional identities may entail the materialization of group identity through overt public displays such as body modification (Hoshower et al. 1995; Torres Rouff and Yablonski 2005). Visually obvious manifestations could serve as signals to members and non-members, communicating a shared or differentiated identity. In urban contexts, these signals can be important as the scale and complexity of cities may make it difficult to identify group members (Galle 2010; Tiesler 2013). This phenomenon is seen in the city of Tihuanacu, where archaeologists have uncovered ritual spaces correlating to lineage groups believed to have preceded the founding of the city (Jennings and Earle 2016). As Tihuanacu grew with the inclusion of more groups, physical division between neighborhoods increased through the building of walls (Jennings and Earle 2016).

Archaeologists have become increasingly interested in cities as seedbeds of social diversification. Urban sites pull groups into new institutional and spatial configurations. Through these new contacts and contexts, unique economic, religious, and social niches can emerge within communities (Janusek 2004; Zukin 1998). Diversification can be especially evident in proto-urban sites, when hierarchical social identities replace kinship and more egalitarian relationships (Kuijt 2002). This dynamic has also been detected by archaeologists in large multi-ethnic states and cities such as the city of Teotihuacan through the proliferation of new artifact styles and technologies (Clayton 2011).

These different social configurations produce biological, spatial, and material evidence of the types of interaction which they foster or prevent. From the perspective of religious adherence, my mortuary data best support the theories that argue that urbanism can introduce new, top-down social identities to populations. Across Uzbekistan, no matter what the previous mortuary practice in a region, Islamic prescriptions for burial came to dominate during the medieval period. However, I also document local diversity of mortuary ritual, within these prescriptions, that cross-cuts sites. This pattern of mortuary communities-of-practice could be reflective of social diversification processes associated with urbanism. If this were the case, we would expect that the larger the city, the more diverse the burial practices, or the newer the city the higher the diversity. However, this is not the pattern documented in the mortuary data. In fact, in some cases, larger cities, such as Afrasiyab, display lower diversity of mortuary ritual than small sites, such as Koshtepa (see figure 7.1). It is possible, therefore, that the rise in urbanism was a catalyst for breaking down previous social identities, but that the creation of new identities did not occur in a predictable scaler way according simply to size of site.

My biological affinity data do not show any conclusive evidence for kinship structures on a site level, none of the sites show clustering of more than a few individuals. Nor is there any large-scale clustering within the total sample that would indicate biologically based ethnic groups. This breakdown of kinship and ethnic categories does match with the predictions that urbanism can break down social boundaries. As kinship and ethnic boundaries break down, we would expect there to be increasing overall homogeneity in biological affinity data, and a lack of distinct clusters. It is difficult to distinguish this pattern from an initial lack of these structures acting as boundaries between reproduction in the first place. There is no evidence that there is more homogeneity at large urban sites compared to smaller rural, nomadic sites or caravanserai such as Kalmyk-krylgan, Tashbulak, or Koshtepa. Greater chronological control will help tease out these questions.

The rise of reliance on market economies could have also contributed to the patterns in biological affinity seen in this study. Long-distance trade routes, though long established, were bolstered by the founding of market towns during the medieval period (Stark 2010; Frachetti et al. 2017). Several of the sites in this sample are either known to be directly related to trade routes, such as the caravanserai of Koshtepa, or are thought to have been built out of need to control resources necessary to support the market economy, such as Tashbulak. Both kinship networks and communities-of-practice have important social functions in securing access to resources for members (Ensor et al. 2017; Wenger 1998:72–84). In a market economy, based on a monetary system, these relationships may not be as crucial to gain access to necessary resources that can now just be purchased (Ensor et al. 2017:744). Under this situation, the motivation to form extended kin networks is not as strong. This would explain the lack of clustering of individuals based on biological affinity in this study.

Increasing urbanism and reliance on market economies could have also played a role in

This model has interesting implications the site of Tashbulak which has relatively high diversity of practice and biological affinity, compared to other sites in this study, but is a small urban site. The apparent connectivity of Tashbulak, coupled with the early evidence of Islamic burial, exemplifies the need for a reexamination for modes of connectivity and their impact on social identity in medieval Central Asia.

The literature left to us by ruling dynasties effuses the power of lineage, ethnic identity, and religious unity. However, the social identities of the majority of the medieval Central Asian populace were shaped more by local interpretations of religious ideology and communities formed by cultural practice rather than biological descent. This localized expression was coupled with broadly shared similarity across regions.

Chapter 8: Conclusions

This dissertation is my effort to combine data from archaeological excavations with existing osteological collections and recorded archaeological data to build models for social identity and connectivity in medieval Central Asia. In this conclusion, I discuss the theoretical and methodological insights resulting from this project, revisit my research questions to present final thoughts on social identity, religion, and movement in medieval Central Asia, and suggest future directions for work.

I began this dissertation with a discussion of my research themes and goals which focus on documenting mortuary ritual and biological affinity in medieval Central Asia to explore social identity across diverse landscapes. Background sections of this dissertation (chapters 2 and 3) outlined the current political, cultural, and ideological narratives about medieval Central Asia. Chapter 2 focused on political succession, while chapter 3 reviewed how scholars have framed identity, burial, and biology broadly and in medieval Central Asia. In chapter 3 I also set up the theoretical framework to my approach. I argued that social identity, when defined through practice theory, can identified in the archaeological record through reconstructing mortuary communities-of-practice and patterns of biological affinity.

I then presented my study approach. Chapter 4 described the geographic, cultural, and when available, mortuary contexts of my study sites. This chapter included a detailed description of excavations at the site of Tashbulak. Chapter 5 described how to implement my theoretical framework to my sample through mortuary and geometric morphometric data collection and analyses, and chapter 6 contained the results of these analyses. These results were discussed in chapter 7, where I propose models of identity practice that maintain both local diversity and regional connectivity.

8.1 Results and Broader Impacts

This dissertation contributes important new information and approaches to the study of medieval Central Asia, while also reexamining existing data and narratives. This is the first systematic archaeological study to integrate both biological and mortuary data on medieval Central Asia. Aside from Amirov's 2010 chapter, there has been almost no mortuary analysis conducted on burials from medieval Central Asia. What has been done focuses on single regions or sites. By using a wider geographic range of sites, this study systematically documents similarities across distances only mentioned in passing in previous work.

In addition, this dissertation comprises the first geometric morphometric study of Central Asian populations. Previous work on biological variation in Central Asia has been conducted in the form of either limited craniometric analysis, or genetic analysis on limited sample sizes. My approach allows a larger sample than current genetic analyses, and a more nuanced examination of biological diversity than previous craniometric studies. My approach to biological affinity also makes methodological contributions in its scaler approach. I examine these elements at an individual, site, regional, and supra-regional scales. By examining patterns of affinity at multiple scales, I am able to see patterns at different levels of connectivity. This is important when considering both biological and ritual processes. An outlier at the scale of site, may in fact be representative of widespread practice when examined regionally.

My study also presents the first systematic bioarchaeological study of a highland medieval cemetery. The site of Tashbulak represents a unique social context and broadens our understanding of the geographic, political, and economic landscapes of medieval Central Asia. My work on Tashbulak is additionally important because it documents some of the earliest directly dated Islamic style burials in a nomadic region of Central Asia. This evidence contributes greatly to breaking down conceptions about the spread of Islam in Central Asia and the populations impacted.

Broadly, the most important impact of this dissertation is its demonstration of social networks connecting distant regions. Medieval Central Asia is usually presented as a period of unrest, movement, and shifting boundaries of identity. My data suggest that while there may have been movement on the landscape, it occurred less in the form of large migrations, and more likely at a scale of individuals or small groups. It also shows that despite changing political boundaries and dynastic sponsorship of religious and ethnic ideology, most populations maintained shared practices across long distances, even traversing these top-down borders. Analyses also show an important element of diversity in social identity practice. Within sites, diverse groups cultivated kinship relations that kept some biologically close individuals together, and practiced shared mortuary traditions. Both mortuary and biological affinity data show overlapping, broad variation that speaks to diversity maintained within broad systems of religious and kinship identity.

8.2 Outstanding Questions and Future Research Directions

This study made contributions in the area of how people in medieval Central Asia interacted to create mortuary contexts and patterns of biological affinity that reflect religious and kinship identity. Results of analyses showed both large scale connections between groups as well as local diversity in both mortuary and biological practice. However, there are still outstanding questions about the origins of this diversity. Further work needs to be done to establish the underlying biological variability in ancient and historical Central Asian populations. Expanding my current sample to include a broader chronological frame would help establish if the diversity seen in the medieval period was a uniquely promoted by the context of the period, if was simply maintained from earlier level, or if in fact the medieval period represents a decrease in biological diversity.

Additional data on mortuary practice would also make the results of this study more robust. Currently, my mortuary data are limited by lack of information on individual burials within sites. The excavation and systematic documentation of other medieval sites, as well as the addition of sites beyond my osteological sample would allow additional analyses on patterns of relatedness within sites, as well as a more nuanced understanding of how distinct and similar burial practice is between sites. Combining these mortuary data with a detailed analysis of sectarian ideologies in medieval Central Asia will be an important step in understanding potential ideological underpinnings of burial practice variation.

To address new questions emerging from the results of this study, the analytical methods and approach applied to the sites in this study need to be applied to a chronologically and geographically broader and more detailed mortuary and osteological data set. This will allow research to move beyond general patterns of identity, to speak to the origins of identity and its role in broader social processes shaping medieval Central Asia.

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Appendix A: Demographic Profiles

Identification and demographic information for individuals in GMM study. Age key: YA=young adult (18-35 years), MA=middle adult (35-50 years), OA=old adult (50+years).

Site	Region	Individual #	Other ID info	Age	Sex
Chartok (Чартак)	Ferghana	1	12 дв, р 1	MA/OA	F
		2	7 дв, р 10	YA	F
		3	Чартак-85, р-I, п-16	OA	?
		4	Чартак-85, р-I, п-23, 13 дв	YA	F?
		5	1 дв, р 47	YA	F
		6	4 дв, р 40	YA/MA	F
		7	3 дв, р 36	MA/OA	F
		8	5 дв, р 19	YA/MA	F
		9	Чартак-85, 15 дв, р-I, п-20	YA/MA	M
		10	14 дв, 50 р	YA/MA	M
		11	11 дв, 4 р	OA	?
		12	17 дв, 18 р	OA	F
		13	6 дв, 3 р	YA/MA	M
		14	20 дв, 18 р	YA/MA	F?
		15	Чартак-85, р-I, п-46, 16 дв	MA	M
		16	21 дв, 37 р	MA	M
		17	18 дв, 35 р	OA	F?
		18	19 дв, 29 р	MA	F
		19	23 дв, 39 р	MA	F
		20	N 13	OA?	?
Chor Dona (Чор Дона)	Ferghana	1	14-06	Adult	M
		2	14-07, п. 16	Adult	M?
		3	14-03, п. 17	YA	M
		4	14-01, п. 19	YA/MA	M
		5	14-05, п. 14	MA	M
		6	14-04, п. 20	MA	M
Kuva (Кува)	Ferghana	1	р 19, N 1	OA	F?
		2	N2	MA/OA	M
		3	m 38	YA	M
		4	N2 , XI-XII	MA/adult	M?
		5	Кува, ворхотос?	OA	M
Shortepa (Шортепа)	Ferghana	1	1971	YA/MA	M
Galva-tepe (Гальва-тепе)	Chach	1	00-03, р 3	YA	F
		2	00-02	YA/MA	M

Uturlik-tepe (Утурликтепа)	Chach	1	22	Adult	M
		2	Утурлик, 77 (71?)	YA/MA	M?
		3	УТ. 1974, п. 45	Adult	F?
		4	1974 Утурлик п. 40	Adult	M
		5	УТ. 74 п. 35	YA	M
Шахрухия	Chach	1	25-22, Шахр-я 88, р 13/4, п. 14	OA	F
		2	25-24, Шахр-я 88, р 13/4, п. 15	MA/OA	F?
		3	25-17, Шахр-я 88, р 13/4, п. 12	Adult	M
		4	25-18, Шахр-я 88, р 13А, п. 1	MA/OA	F
		5	25-23, Шахр-я 88, р 13, п. 5	MA	M
		6	25-16, Шахр-я 88, р 13/4, п. 1	MA/OA	M
		7	25-21, Шахр-я 88, р 13/4, п. 11	MA	F
		8	Шахр-я 87, р 13, об2	MA	M
		9	25-20, Шахр 88, р 13, п. 3	MA/OA	M
		10	25-19, Шахр-я 88, р 13, п. 8	OA	F
		11	25-25, Шахр 88, р 13 пг 4, п. 5	OA	F
		12	Ш-а/87, р-13 (0-3), п. 1	Adult	F?
		13	25-15, Шахр 88, р, п. 4?	OA	F
Tok-kala (Ток-кала)	Khorezm	1	1964 Т-К. Н р. IV п. 8	OA	M
		2	1964 Т-К. Н р. IV Н.8 п. 33	MA	M?
		3	1964 Т-К. Н р. IV Н.3 п. 19	MA/OA	M
		4	1964 Т-К. Н р. IV Н.8 п. 39	MA/OA	F
		5	1964 Т-К. Н р. IV Н.8 п. 20	MA	M?
		6	1964 Т-К. Н р. IV Н.3 п. 9; N 42	MA/OA	M?
		7	1964 Т-К. Н р. IV Н.3 п. 22	MA	F?
		8	п 36, N 22	Adult	F?
		9	1964 Т-К. Н р. IV Н.8 п. 32	MA	F?
		10	1964 Т-К. Н р. IV Н.3 п. 26	Adult	F
		11	1964 Т-К. Н р. IV Н.8 п. 24; N4	OA	M
		12	1964 Т-К. Н р. IV Н.8 п. 15; N11	Adult	F
		13	1964 Т-К. Н р. IV Н.8 п. 29; N9	MA	?
		14	1964 Т-К. Н р. IV Н.3 п. 1; N 20	MA	F

		15	1964 T-K. H p. IV H.8 п. 40; N 26	YA/MA	M?
		16	1964 T-K. H p. IV H.8 п. 12; N 30	Adult	F?
		17	1964 T-K. H p. IV H.8 п. 13; N 38	YA	F
		18	1964 T-K. H p. IV H.3 п. 5; N 25	MA	M?
		19	1964 T-K. H p. IV H.8 п. 37; N 17	YA/MA	F
		20	1964 T-K. H p. IV H.8 п. 22; N 3	YA/MA	M
		21	N 22; p. V	Adult	?
		22	1964 T-K. H p. IV H.8 п. 17; N45	MA/OA	F
		23	1964 T-K. H p. IV H.8 п. 14, N10	OA	M?
		24	1964 T-K. H p. IV H.8 п. 23, N 1	MA/OA	M?
		25	1964 T-K. H p. IV H.8 п. 28, N 27	MA	M
		26	1964 T-K. H p. IV H.8 п. 18, N 8	MA/OA	F
		27	п. 9	OA	M
		28	p. V п. 77	MA/OA	F
		29	p. VIII N 37	YA/MA	F
		30	p. VIII N 62	OA	M?
Kalmyk-krygan (Калмыккрылган)	Khorezm	1	04-?0, K-K-74, п. 1, N2	MA	F?
		2	04-06, K-K-74, п. 2	MA/OA	M
		3	04-00?, K-K-73/1, N8	MA	F
		4	04-02, K-K 74, п. 10, N5	Adult	M?
		5	03-99, K-K-74, п. 43, N9	OA	M
		6	K-K-74, п. 9, N7	OA	F
		7	04-16, K-K-74, п. 36, N6	MA	M
		8	03-96, K-K-74, п. 42, N12	MA/OA	F
		9	04-13, K-K-74, п. 17, N7	Adult	F
		10	04-12, K-K-74, п. 55, N18	MA/OA	M
		11	04-10, K-K-74, п. 21, N20	YA/MA	F?
		12	04-09, K-K-74, п. 28, N21	MA	F?
		13	04-03, K-K-74/2, 4	YA/MA	M
		14	04-15, K-K-74, п. 21, N15	MA	M
		15	04-14, K-K-74, п. 49, N16	OA	M
		16	03-98, K-K-74, N11	YA/MA	M?
		17	03-94, п. 44, N14		
Tashbulak	Ustrushana	1	J6 Br 1 indv 1	OA	F

		2	J6 Br 2 indv 1	YA/MA	F
		4	F6 Br4 indv 1	MA/OA	F
		5	F6 Br5 indv 1	YA/MA	F
		F	H6_b1	MA	F
		8	H8_g4	Adult	M
		9	E8_h9	MA/OA	M
		10	E8_h9	YA	M
		11	I7	MA	F
		12	I7	YA/MA	F
		15	H9_a5	MA	F
		16	H9_a5	MA	F
		17	I7	MA	F
		19	C9	MA	M
		25	H8	YA/MA	M
		26	H8	MA	M
		27	H8	MA	M
		28	F7_j9	MA/OA	F
		30	F7_j9	YA	F
		33	B8	MA	F
		34	B8	YA/MA	F
		36	F6	Adult	F
		39	F6	YA/MA	M
		40	F6	MA	F
Kaltepa (Каль-тепе)	Ustrushana	1	25-10; 86 г., п. 26	OA	F
		2	25-02; п. 10	OA	F
		3	25-03; п. 11	YA/MA	M
		4	25-07; п. 19	adult	M?
		5	25-09; п. 24	OA	F
		6	25-01; N 8	OA	M
		7	25-11; п. 28	MA/OA	F
Dashti-Urdakon (Дашти Урдакон)	Ustrushana	1	п. 75, m 2, n. 1	Adult	M
		2	п. 2, m 2	OA	?
		3	п. 75, m 2, n. 1	Adult	F
		4	п. 76, n. 1-76	YA	M?
		5	m 14	MA	F
		6	m 10	OA	M?
		7	п. 75, m 2, n. 2	YA	F
		8	m 16	OA	M
		9	m 18	MA/OA	F?
		10	п. 81, m 26	OA	F
		11	п. 81, m 27	OA	F
Koshtepa (Коштепа)	Ustrushana	1	00-04, Кош-Тепа 73, погр. N 5	MA/OA	?

Frinkent (Фринкент)	Soghd	1	Фринкент, 81, п. 3, N3	MA/OA	M
		2	Фринкент, 81, п. 4	YA/MA	F
		3	Фринкент, 81, погр. 5	MA/OA	F
		4	Фринкент, 81, погр. 1	MA/OA	M
		5	Фринкент, 81, п. 2	OA	F
Shylyktepa (Шуллуктепа)	Soghd	1	ш-87, 33, Тр. 7	OA	F
		2	ш-87, р. VII, 45	MA/OA	M
		3	ш-87, р. VII, 33	MA/OA	M
		4	ш-87?, р. VI-5	MA	F
		5	ш-87, р. VII, 38	MA/OA	F?
		6	ш-87, п. 32	YA/MA	M?
		7	ш-87, себарн. Угайok(?), Тр. 2, XI-XII bb.	OA	M
		1	Шуллук 82, п. 43	OA	F?
		2	ш-82, п. 70, Шуллук	Adult	M?
		3	00-16, череп N5	YA	F
		4	Шуллюк - 87, цитадель, подбои, XVIII-XIX bb?, югорс	YA/MA	F
		5	Шуллук, п. 2	YA	F?
		6	ш-82, п. 72-Ф	MA/OA	?
		7	Шуллук 82, п. 3(?)	YA/MA	F?
		8	Ш 82, п. 1	YA/MA	F?
		9	00-12, Шуллук, череп N1, Кашкадаря,	OA	F
Afrasiyab (Афрасиаб)	Soghd	1	1975, Афрасиаб,	Adult	M?
		2	N1, 1959, Афрасиаб, п 3	MA/OA	M?
		3	Афрасиаб 1968, Ташгу, раскоп 1, могила	OA	F?
		4	N8, 1958, Афрасиаб, Афр-1958, р-3, N8	MA	M?
Sheburgai-Ata (Шебургаи-Ата)	Soghd	1	34-80, N2	YA/MA	M?
		2	34-84, N1	YA/MA	?
		3	34-86, N5	MA	F
(Altyntepa) Алтынтепа	Soghd	1	03-85, 1976, КАТэ, Алтынтепа, XII bek	MA/OA	?
Stari Termez (Старый Термез)	Tokharistan	1	00-09, 1974, Ст. Термез, Кешк., N4	MA	F
		2	00-07, N2	YA/MA	F
		3	00-10, 1974, Ст. Термез, N5	Adult	F
		4	154, N2, ...Термез...11-12 beka	OA	M
		5	00-08, N3	MA/OA	M
		6	45-19, Ст. Термез, п17	Adult	F

	7	45-17, Ст. Термез, п27	MA/OA	F
	8	45-18, m-x Ст. Термез 87, п1	Adult	F
	9	45-27, Ст. Термез, pVIII	MA/OA	M
	10	45-31, Ст. Термез	OA	M
	11	45-13, Ст. Термез 87, нярус, М-9	Adult	F
	12	45-23, Ст. Термез, п16	Adult	M?
	13	45-24, Ст. Термез, п32	Adult	F?
	14	45-16, Ст. Термез-87, p IX нярус, п32	MA/OA	M
	15	45-12, Ст. Термез-87, М 49	MA/OA	F?

Appendix B: Osteological Data Collection Forms

INVENTORY RECORDING FORM FOR COMPLETE SKELETONS

Site Name/Number ____________/____________ Observer ____________

Feature/Burial Number ____________/____________ Date ____________

Burial/Skeleton Number ____________/____________

Present Location of Collection ____________

CRANIAL BONES AND JOINT SURFACES

	L(left)	R(right)		L	R
Frontal	___	___	Sphenoid	___	___
Parietal	___	___	Zygomatic	___	___
Occipital	___	___	Maxilla	___	___
Temporal	___	___	Palatine	___	___
TMJ	___	___	Mandible	___	___

POSTCRANIAL BONES AND JOINT SURFACES

	L	R		L	R
Clavicle	___	___	Os Coxae		
Scapula			Ilium	___	___
Body	___	___	Ischium	___	___
Glenoid f.	___	___	Pubis	___	___
Patella	___	___	Acetabulum	___	___
Sacrum	___	___	Auric. Surface	___	___

VERTEBRAE (individual)

	Centrum	Neural Arch
C1	___	___
C2	___	___
C7	___	___
T10	___	___
T11	___	___
T12	___	___
L1	___	___
L2	___	___
L3	___	___
L4	___	___
L5	___	___

VERTEBRAE (grouped)

#Present/# Complete

	Centra	Neural Arches
C3-6	___/___	___/___
T1-T9	___/___	___/___

Sternum: Manubrium ___ Body ___

RIBS (individual)

	L	R
1st	___	___
2nd	___	___
11th	___	___
12th	___	___

RIBS (grouped)

#Present/# Complete

	L	R	Unsided
3-10	___/___	___/___	___/___

CHAPTER 2: Attachment 1

ADULT SEX/AGE RECORDING FORM

Site Name/Number ____________/____________ Observer ____________

Feature/Burial Number ____________/____________ Date ____________

Burial/Skeleton Number ____________/____________

Present Location of Collection ________________________

SEX

Pelvis	L	R
Ventral Arc (1-3)	____	____
Subpubic Concavity (1-3)	____	____
Ischiopubic Ramus Ridge (1-3)	____	____
Greater Sciatic Notch (1-5)	____	____
Preauricular Sulcus (0-4)	____	____

Skull	L	M	R
Nuchal Crest (1-5)	____	____	____
Mastoid Process (1-5)	____	____	____
Supraorbital Margin (1-5)	____	____	____
Glabella (1-5)	____	____	____
Mental Eminence (1-5)	____	____	____

Estimated Sex, Pelvis (0-5) ______

Estimated Sex, Skull (0-5) ______

Comments:

Series/Burial/Skeleton________________

Observer/Date ________________

AGE

Pubic Symphysis	L	R		L	R
Todd (1-10)	____	____	**Auricular Surface** (1-8)	____	____
Suchey-Brooks (1-6)	____	____			

Suture Closure (blank = unobservable; 0 = open; 1 = minimal; 2 = significant; 3 = complete)

External Cranial Vault	1. Midlambdoid	_____	**Palate**	11. Incisive	_____
	2. Lambda	_____		12. Anterior Median Palatine	_____
	3. Obelion	_____		13. Posterior Median Palatine	_____
	4. Anterior Sagittal	_____		14. Transverse Palatine	_____
	5. Bregma	_____	**Internal Cranial Vault**	15. Sagittal	_____
	6. Midcoronal	_____		16. Left Lambdoid	_____
	7. Pterion	_____		17. Left Coronal	_____
	8. Sphenofrontal	_____			
	9. Inferior Sphenotemporal	_____			
	10. Superior Sphenotemporal	_____			

Estimated Age: Young Adult (20-35 years) ________

Middle Adult (35-50 years) ________

Old Adult (50+ years) ________

Comments:

	test 1 (L)					test 1 (R)		
landmark	x	y	z			x	y	z
Basion								
Condyle posterior								
Inferior nuchal								
Inion								
Opisthion								
Ectoconchonion								
Orbitale								
Infranasion								
Frontomalare temporale								
Glabella								
Nasion								
Dacryon								
Asterion								
Zygion								
Entoglenoid								
Mandibular fossa								
Porion								
Postglenoid								
Tympanic								
Jugular								
Krotaphion								
Lateral ovale								
Bregma								
Frontotemporale								
Lambda								
Opisthocranion								
Sphenion								
Stephanion								
Jugale								
Frontomalare orbitale								
Alare								
Ectomolare								
Prosthion								
Zygomaxillare								
Zygoorbitale								
Staphylion								
Nasospinale								
Bregma								
Lambda								
Nasion								
Bregma								
Frontomalare orbitale								
Frontomalare orbitale								
Opisthion								
Lambda								
Nasion								
End of Nasal suture								
Posterior fronto-zygomatico suture								
Superior temporo-zygomatico suture								

Data collection sheet for three-dimensional GMM landmarks and semi-landmarks.

Appendix C: Landmark and Semi-landmark Data

Three-dimensional landmark and semi-landmark coordinates were collected according to the procedures described in chapter 5 and input into the forms in Appendix C. All landmark and semi-landmark coordinates from all individuals included in this study will be stored in their original, unaligned form in Washington University in St. Louis' Open Scholarship repository (https://openscholarship.wustl.edu/) under the title: "Biological Affinity in Medieval Central Asia." Photos of the individuals in this sample are also stored in the Open Scholarship repository under this title. A ReadMe file describing file structure and content is provided. These files will be stored there permanently and will be openly accessible for future study and use.