Examining Household Identity Through Lithic Technology at the Harris Site

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EXAMINING HOUSEHOLD IDENTITY THROUGH LITHIC TECHNOLOGY AT
THE HARRIS SITE

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ABSTRACT

Utilitarian technology is often studied by archaeologists to understand what specific functions and activities these items represent in a past population’s daily life. However, it is important not to forget that technology manufacture, use, and discard is embedded in a social context. Flintknapping is a skill that requires close instruction and training so that the desired outcome can be achieved. This training requires daily mentoring from other individuals in the community, many times within one’s own family (Bamforth and Finlay 2008; Hayden and Cannon 1984). These daily interactions create learning frameworks through which craft knowledge is transmitted (Stark et. al 2008). Technological style and domestic processing activities can be used as an indicator of social identity, therefore enabling archaeologists to trace these learning frameworks (Clark 2001; Stark 1998).

It has been hypothesized that the Harris Site, a Late Pithouse period (A.D. 500-1000) Mimbres Mogollon community in southwestern New Mexico, has evidence of corporate group organization (Roth 2012a). This is supported by clusters of pithouses sharing similar household traits and extramural areas. This thesis seeks to add to this research by investigating if learning frameworks exist within these clusters of households by examining the lithic artifacts recovered from the contexts of these pithouses. If the clusters show distinct differences in technological style and household activities, then the hypothesis of separate learning frameworks within each corporate group can be supported. If the clusters show similar patterns to each other, it would suggest that the learning framework is on the level of the community.
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CHAPTER 1

INTRODUCTION

Archaeologists often study utilitarian technology to understand what specific functions and activities these items represent in a past population’s daily life. These technologies can be used to provide information on food processing techniques, diet, raw material procurement strategies, etc. However, technology manufacture, use, and discard is embedded in a social context. Technological style can thus be used as an indicator of social identity (Adams 2010; Clark 2001; Duff and Nauman 2010; Killick 2004; Roddick 2009; Yoder 2009). Differences in household technology may reflect different learning frameworks and thus indicate social connections. This study uses data collected from the Harris Site, a Mimbres Mogollon village in southwestern New Mexico dating to the Late Pithouse period (A.D. 550-1000). Analyzing chipped stone technology found in the pithouses at the Harris Site provides an avenue for understanding potential social links between groups occupying this village. The aim of this thesis is to explore the potential of corporate group social organization at Harris by comparing the chipped stone assemblages of household clusters.

The basis for addressing this research topic comes from the idea that corporate groups made up of multiple households formed during the Three Circle phase (A.D. 750-1000) of the Late Pithouse period (Roth 2010). For this thesis, the household refers to the physical remains of the pithouse and associated extramural features. These households are defined as a unit for kinship organization that consists of individuals sharing daily domestic practices and decision-making responsibilities (Blanton 1994; Hendon 2006;
Netting et. al 1984; Wilk and Rathje 1982). Clusters of these households have been identified at the Harris Site as potential corporate groups based on shared, unique household traits (Roth 2012a). Research conducted on later Classic Mimbres (A.D. 1000-1150) pueblo roomblocks suggests that corporate groups were the main unit of social organization at many of the large Classic period pueblos, and that this organization can be seen in the spatial arrangement of structures (Hegmon 2002; Creel and Anyon 2003; Shafer 2003). It has also been suggested that this social organization did not begin with the transition to pueblo architecture in the Classic Period, but earlier during the late Three Circle Phase (Creel and Anyon 2003; Roth 2012b; Shafer 2006). Corporate group organization consists of extended family networks working as a unit, usually for economic benefit, and this would have had many implications for social life such as status accumulation, land tenure, and community identity (Hayden 1997). Exploring the possibility of the presence of corporate groups in the Late Pithouse period would help explain the agricultural intensification and the social changes that happened at the end of the Pithouse period (Creel and Anyon 2003).

Corporate groups would have likely been communities of practice through which information regarding daily life and craft manufacture was exchanged (Lave and Wenger 1991; Hayden and Cannon 1982). This shared information within groups would have had material correlates that can be seen in the archaeological record. By analyzing lithic technology from the households at the Harris Site, further insights into the learning frameworks present can be obtained. Similarities in stylistic tendencies, raw material choices, and household activities seen in the household assemblages would support the
hypothesis that information was being shared between the same networks of people at the site.

The Harris Site was one of the two sites that Emil Haury used to define the Mogollon (Haury 1936). Artifact analyses during the initial excavations were limited and focused largely on tracking architectural and ceramic changes throughout time as well as understanding the burial components. The goal of Haury’s work was to establish a basic chronology and provide evidence for the cultural distinction of the Mogollon. These goals were reached; however, the results leave many questions still lingering about the people that lived at this village. New research at this site is currently being performed by the University of Nevada, Las Vegas to obtain a more thorough understanding of the cultural dynamics of this Late Pithouse community. Although there are houses dating from each phase of the Late Pithouse period (Georgetown A.D. 550-650, San Francisco A.D. 650-750, and Three Circle A.D. 750-1000 phases; Anyon et al. 1981) at the Harris Site, many of the houses were excavated in the 1930’s and crucial household data was not collected. The pithouses excavated in the 2008-2012 field seasons have recovered intact floor assemblages dating to the San Francisco and Three Circle phases. This project will examine the lithics from these floor assemblages along with those found in associated extramural features. These contexts provide a solid association between the chipped stone implements and specific household occupations.

The following research questions guided the analysis of the lithic artifacts found in these contexts to address questions about the social organization of these pithouse inhabitants.
Research Questions and Data Requirements

1. Does the chipped stone assemblage suggest patterning in technological style between household clusters?

Technological style is the study of the chaînes opératoire, or operational sequence, that an individual used to manufacture a specific item (Leroi-Gourhan 1964, 1993). This type of style involves the decisions that the individual made during each step of the creation process, subconsciously making certain choices over other options. These choices are a useful indicator of the enculturation of an individual (Clark 2001), which can be linked to social identity. Those who share enculturative backgrounds will tend to use similar technological styles. In regards to lithics, cores and debitage are the most useful in examining the chaînes opératoire, because these are the by-products of the flintknapping process and therefore less likely to have been actively modified as a result of other social influences.

The data necessary for understanding technological style comes from the cores and debitage recovered from the households. The critical contexts used for this analysis include the floor, floor fill, and roof fall/wall fall of the houses and feature fill from the extramural features. As a result of the taphonomic processes that occur at this site, these contexts can provide a link to the occupation and use of the particular house and feature more so than the cultural fill that lies above these deposits. The cores and debitage can provide information on reduction techniques, manufacturing standardization, and flaking patterns. Looking at the variety of stone tools and their technological attributes will show how the tools were created and maintained. These data are appropriate for addressing this question because the attributes specifically illuminate decisions made during the
flintknapping process. If these decisions vary per cluster, it could indicate different learning frameworks within them.

2. **How was lithic raw material used within each cluster?**

Lithic raw material availability and quality has a great influence on the decisions made during the stone tool manufacturing process (Andrefsky 1994). Understanding the local raw material conditions around a site is crucial to fully understand assemblage variability (Bamforth 1991). In the Mimbres region, there is an abundance of different stone raw materials that are available across the landscape. The treatment of raw material between clusters can potentially show differential access to these lithic resources and differences in how these materials were worked. Attributes recorded to address this research question include material type and the percentage of remaining cortex. The percentage of cortex can help with understanding expediency in tool manufacture as well as the nature of the raw material (e.g., raw material that comes in small nodules may have more cortex due to the conservation of the material). It may also provide information on reduction preferences of certain materials (e.g., if there seems to be an attempt to initially remove all cortex from certain materials).

Understanding the role raw material played at the Harris Site is another potential avenue for linking households. If raw material is treated differently in the household clusters, it could mean that the technological decisions about how to work different raw materials were shared explicitly between the households within that cluster. The abundance of and conservation efforts in regards to particular raw materials could also lend support to identifying corporate groups because it might show differential access to resources. If corporate groups tend to have sharing relationships in regards to economic
production, consumption, and acquisition, then differential access to raw material would be a strong line of evidence supporting corporate group organization.

3. **Were there differences in the activities being performed with the chipped stone implements between clusters?**

According to Clark (2001), foodways practiced in the domestic realm are one of the best ways to see a shared enculturative background in the archaeological record. The knowledge of how to perform these household activities could be generated through the same learning frameworks as the technological manufacturing traditions. To address this question, attributes pertaining to function will be examined on the tools. Understanding patterns of tool types across the clusters can allow for interpreting the activities being performed by the inhabitants of the households.

Obtaining lithic data from the domestic contexts is ideal because these tools were used for household activities, including food processing, repairing architecture, and other daily tasks. The domestic realm also fosters the enculturation process because there is low visibility of these attributes since they are not public and therefore less likely to be affected by other social influences. Patterns in activities have potential for identifying clusters by determining if each was autonomous with their own activities or if they exhibit any evidence of specialization.

**Significance**

The primary goal of this research is to test ideas about the social organization of the inhabitants at the Harris Site during the Late Pithouse period, as well as enhance our understanding of their chipped stone technology. In doing this, it also provides feedback on the usefulness of household assemblages in understanding their subsistence practices and individual household activities. Understanding learning frameworks and
communities of practice in this pithouse village also has potential for asking more in-depth questions in the future about how other aspects of culture were learned and transmitted.

This research can also have a larger impact on Mimbres Mogollon archaeology and lithic studies. Even though there has been speculation about corporate groups in the Late Pithouse period, the archaeological data to support this is lacking. This project adds another line of evidence to the work being done at the Harris Site which is specifically geared towards examining household identity and social organization. In regards to lithic studies, style and identity are usually topics examined through the vantage point of active style. Projectile point studies have dominated studies of style with lithics due to their highly visible stylistic attributes, whereas this thesis emphasizes technological style to test ideas regarding identity. Using these aspects of chipped stone assemblages to track people provides a new avenue researchers could take to grasp social relationships in areas where not much other material culture is available, such as that of the Archaic Southwest and Great Basin.
CHAPTER TWO

THE MIMBRES MOGOLLON LATE PITHOUSE PERIOD

The concept of the Mogollon culture area is a vast topic that plays a major role in the prehistory of the Southwest United States. The scope of this project lies within the cultural context of one particular branch of the Mogollon: the Mimbres. The Mimbres refers to both a geographic and cultural setting in southwestern New Mexico. The geographic area is restricted to the Mimbres River Valley that flows south from the Gila National Forest to the Deming Plains. This river is the namesake of the branch of Mogollon that took residence here from A.D. 200-1150. Although the Mimbres River is restricted to this particular valley, the cultural entity expanded out from this setting (Figure 2.1). There is evidence of Mimbres settlements from the Gila River Valley in the west over to the Black Range and down the Rio Grande River in the east. The Mimbres Mogollon received specific attention from archaeologists due to the exquisite pottery manufactured in the Classic Period (A.D. 1000-1150) pueblo communities. Unfortunately, this has also been the same reason that the region has attracted the attention of looters throughout recent history. This has led to the destruction of many Classic Period pueblos and ruined any further chance of archaeological studies at sites across the region. Fortunately, this has not completely thwarted archaeologists and has led to many fruitful studies performed on the remaining intact assemblages (Anyon and LeBlanc 1984; Creel 2006; Roth et. al 2011; Schriever et. al 2011; Shafer 2003).

This chapter introduces the prehistoric context of the Mimbres Mogollon Late Pithouse Period as well as the previous and current research at the Harris Site. The goal
of this chapter is to provide a background framework of current research themes at the Harris Site and within Mimbres archaeology that this thesis can build upon.

Figure 2.1. Map of the major sites along the Mimbres River and surrounding area. The dotted line indicates the continental divide (Hegmon 2002).
Chronology and Material Culture

The Mimbres Mogollon Pithouse period (A.D. 200-1000; Anyon et al. 1981) represents the transition from Archaic hunter-gatherer groups to the Classic Mimbres period (A.D 1000-1150), when there was a transition to above ground pueblo architecture (Shafer 2003; Diehl 1996). During this 800-year period, these people went through significant changes in subsistence, with the intensification of irrigation agriculture (Shafer 2006) arguably being the most important. The Pithouse period is divided into two main eras: Early (A.D 200-550) and Late (A.D. 550-1000) (Anyon et. al 1981). Although this project focuses only on the Late Pithouse period, the Early Pithouse period is included in this discussion because it is the foundation from which many cultural aspects continue into later periods.

During the Early Pithouse Period, pithouse architecture was circular and the ceramic assemblages consisted of undecorated brownware. Anyon and LeBlanc (1980) acknowledge the presence of communal structures in the Early Pithouse period. They are described as being the size of large pithouses and some have a diagnostic “lobing” architectural feature. The settlement pattern was of isolated pithouse clusters on knolls throughout the valley (Diehl and LeBlanc 2001).

The shift to the Late Pithouse occurred around A.D. 550 with a shift from these isolated knolls to river terraces in this region. The Late Pithouse period is very different in regards to artifact assemblages, burial practices, and architecture as well. Even though the two periods have distinct differences in material culture, cultural continuity can still be detected in ceramic and architectural styles. It is the adaptive change in settlement pattern that is truly the distinguishing characteristic between them (Anyon 1980).
The Late Pithouse period consists of three main temporal phases: Georgetown, San Francisco, and Three Circle (Table 2.1). The names and material markers of these phases were taken from Haury’s (1936) original definitions used for distinguishing the Mogollon, but the dates were refined by Anyon et. al (1981). Ceramics change throughout the three phases, going from a plainware style in the earliest phases to using redware and red-on-brown designs by the San Francisco phase. Plainware was used throughout the duration of the Mimbres occupation, while the red-on-white and black-on-white designs develop in the Three Circle phase of the Late Pithouse period.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Dates</th>
<th>Ceramic Styles</th>
<th>House Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Pithouse</td>
<td>A.D. 200-550</td>
<td>Alma Plain</td>
<td>Circular</td>
</tr>
<tr>
<td>Georgetown</td>
<td>A.D. 550-650</td>
<td>San Francisco Red</td>
<td>Circular or D-shaped with ramp entry</td>
</tr>
<tr>
<td>San Francisco</td>
<td>A.D. 650-750</td>
<td>Mogollon red-on-brown</td>
<td>Rectangular with rounded corners</td>
</tr>
<tr>
<td>Three Circle</td>
<td>A.D. 750-1000</td>
<td>Three Circle red-on-white Styles I &amp; II black-on-white</td>
<td>Rectangular</td>
</tr>
</tbody>
</table>

Table 2.1. Dates and diagnostic markers for the phases of the Mimbres Pithouse period. Data for the table was derived from Roth (2007)

Pithouse architecture is also a diagnostic marker of the phases, changing from circular houses in the early phases to a rectangular layout in the Three Circle phase. Communal structures follow a similar evolution, going from circular in the Georgetown phase to rectangular in the Three Circle phase. These structures are distinguished from regular pithouses by their size; they are much larger than any domestic structure, especially in the later phases (Anyon and LeBlanc 1980). The presence and evolution of these structures also has important implications for the changing social environment throughout this period, which will be discussed in further detail in the following sections.
At the end of the Three Circle phase there was a shift to above ground masonry pueblo architecture, which marks the beginning of the Classic Period at A.D. 1000 (Anyon et. al 1981). Although the shift to above-ground dwellings is a significant change in the material culture of the Mimbres communities, many of the subsistence and social aspects of the Classic Period Mimbres were already in place by the end of the Late Pithouse period. The Late Pithouse/Classic Period boundary also marks the end of the occupation at the Harris Site (Haury 1936; Roth 2012b). There is no evidence of a pueblo occupation above the pithouse component, although a small pueblo occupation has been recorded just below the river terrace of the Harris Site along the Mimbres River (Woods 2012).

Sedentism and Subsistence

Subsistence intensification was a crucial element in the changes observed in the Late Pithouse period. During the Late Pithouse period, and especially the Three Circle phase, there was a spike in population throughout the Mimbres Valley. This population increase was not due to any outside migration, but appears to have involved indigenous growth (Blake et. al 1986; Creel and Anyon 2003). Intensified subsistence production occurred simultaneously with the increasing population, primarily in the form of increased agricultural production. This required more labor and storage for surplus, therefore making it necessary to remain within close proximity to the land to meet this requirement. As agricultural production increased, so did sedentism, but this relationship varied across time and space. Diehl (1996; 1997) describes this relationship as a gradual shift towards a sedentary lifestyle due to a steady increase in maize processing and more substantial architecture throughout the Late Pithouse period in upland Mogollon sites.
He concludes that the shift from a foraging and horticultural to a sedentary, agricultural lifestyle began between A.D. 650-700 and by the Classic period (A.D. 1000) the transition was complete (Diehl 1996). In a subsequent study, Diehl (1997) demonstrates that pithouse construction and maintenance gradually increased throughout the Late Pithouse period until the Three Circle Phase, when houses were occupied for most of the year. He notes that this is most likely due to the increase in agricultural production shown by his previous study. According to Anyon and LeBlanc (1984), this was the case in the Mimbres Valley as well. They used architectural data from households and communal structures at Galaz to show that the occupants decreased their mobility practices throughout the Late Pithouse at this riverine site.

Stokes and Roth (1999; also see Roth 2007 and Wills 1991) provide an additional perspective on pithouse mobility and subsistence with a theory that acknowledges internal cultural variation in the Mimbres Mogollon region. Their interpretation is that different environmental zones favor specific types of subsistence practices. The upland Mimbres sites in the Sapillo River Valley exhibited a more mobile lifestyle later into the Late Pithouse period than those in the Mimbres River Valley. They suggest that this is because the higher elevation and less predictable environmental zone of the upland sites would have supported a more mobile adaptive strategy rather than an agricultural one. The eventual intensification of agriculture in the Sapillo River Valley is attributed to population growth in the Mimbres Valley, which forced migration to this area and caused these people to accept the risks of relying on farming in a marginal environment.

Because of these opposing theories, the relationship between subsistence and sedentism is currently one of the main research questions driving the work being
conducted at the Harris Site. Understanding how these processes interact is a crucial part to understanding mixed-economy pithouse communities, especially during a time of agricultural intensification. It pertains to this thesis directly because of the effect that sedentism and subsistence had on the lithic assemblages and on the social evolution of the community.

Social Evolution

The process of settling down to intensify agricultural production has interesting ramifications on social organization. From an economic standpoint, land is crucial. This is visible in the Mimbres Valley because most of the large agricultural villages are near the best areas to farm. When becoming sedentary, families tend to build their habitation structures within close proximity to the land they are cultivating. This process builds a bond between the family, the living quarters, and the land which they work. Over time these places obtain meaning in the ideologies of these people and they tend to remain as important areas over time. These persistent places can occur at a variety of different scales from whole landscapes to very specific site features (Schlanger 1992). These same patterns have been identified in the Mimbres region (Roth 2012b; Hegmon et al. 1999; Creel and Anyon 2003). Site locations remained very stable over time to the extent that massive pueblos were placed directly over pithouse villages that also had multiple components. Site features have shown that intra-site spatial ideologies are also stable over time. For example, Burial 18 at Old Town is of a presumably high status individual who was buried with the intent to physically touch two earlier communal structures (Creel and Anyon 2003). The significance of this person having a physical connection to
these past ritual structures indicates that these spaces remain not only known to future
generations, but remain important as well.

The household plays an important role in the social landscape of the Late Pithouse
period. Although the concept of a household is not always defined by the physical
architecture of a domestic dwelling, research in the region has suggested that the
Mimbres household is composed of pithouse architecture and its associated extramural
features (Roth 2010, 2012b). This thesis uses this definition when referring to the
households and household clusters at the Harris Site. The definition relies on theories
regarding household dynamics (Wilk and Rathje 1982; Netting et. al 1984) and, as noted
earlier, can be summarized as a group occupying a bounded residential space that shares
domestic activities and decision-making responsibilities (Blanton 1994). Households
have also been described as places where social identities are defined and practiced
(Hendon 2006) and serve as a main unit for kinship organization and social order
(Hegmon 1989). Ritual items found within domestic architecture show that Mimbres
pithouses served as more than just living spaces, supporting a more meaningful
connection between identity and household (Roth and Schriever 2010; DeMaio 2010).
This link is crucial to creating a foundation for the formation of larger forms of social
organization across the community. To understand this, it is first useful to examine the
later Classic Mimbres period, since the manifestation of social organization in the
archaeological record is more visible through its architecture.

Pueblo architecture in the Mimbres region is formed by aggregated room blocks.
There are usually multiple room blocks at a typical village and this architecture allowed
for adding rooms if it was necessary. The pueblo rooms served as general living quarters
and the connectedness of these rooms signified the link of the people living in them. Shafer (2006) proposes that Classic Mimbres roomblocks were inhabited by corporate groups made up of extended family networks. Hayden and Cannon define corporate groups as exhibiting “a recognizable degree of residential coherency among two or more nuclear families within the community (1982: 135).” They also state that these groups “exert an influence on all aspects of individuals’ lives, including their marriage, their postmarital residence, their economic production, their feasting and celebrations, and their pastimes and pleasures (1982:135).” The corporate groups had a competitive economic relationship with each other for the best plots of land and Shafer (2006) states that the first families at each village laid claim to the most desirable areas. This divisive nature between groups is suggested by the use of cemeteries and separate communal structures associated with roomblocks in the Classic Period.

Understanding Classic period organization is important because researchers studying the pithouse-to-pueblo transition in the Mimbres area speculate that these corporate groups formed during the Three Circle Phase of the Late Pithouse (Shafer 2006; Creel and Anyon 2003; Roth 2012b). The transition to the Classic Mimbres period therefore involved a less dramatic change in social organization, but was more related to changes in economic production and an architectural style that would better accommodate corporate groups. Agricultural production and the degree of sedentism both spiked in the Three Circle phase, and Shafer (2006) says this was due to an increase in irrigation agriculture. A more sedentary lifestyle coupled with irrigation agriculture would have had effects on social organization. Schachner (2010) describes groups in the San Juan Basin to the north who made this transition and showed many similar
characteristics to the Mimbres Three Circle phase. Agricultural production and land clearing to create villages and irrigable farm land created a need for more labor. Extended family households would have met this need by creating sharing relationships to work the plots of land. Communities at Late Pithouse period sites used public communal structures instead of those attached to the roomblocks (Anyon and LeBlanc 1980), suggesting that communal integration was still important.

Recent investigations at the Harris Site have identified potential pithouse clusters as an example of corporate group material manifestation in the Three Circle phase based on architectural and ceramic evidence (Roth 2012a). More evidence is needed to test if these houses are truly linked, however. The stone tools analyzed for this thesis were used to test whether the learning frameworks evident in the pithouses were on the community scale or if specific households shared technological knowledge. This would help distinguish if the social identity of the pithouse inhabitants lies with the Harris community as a whole or more so within households or household clusters. If the data show assemblage patterns within the clusters, then it would lend support to the idea that corporate groups formed during the Three Circle Phase at the Harris Site.

The Harris Site

The first investigations at the Harris Site were conducted in 1934 by Emil Haury who used the data from this site and the Mogollon Village in defining the Mogollon as a distinct cultural group in the Southwest (Haury 1936). This site was chosen by Haury to study because it lacked a pueblo occupation, making the pithouses more easily accessible for excavation. Other Mimbres sites excavated in the valley at the time had pithouse components but the focus was on the Classic Period components (Bradfield 1931;
Cosgrove and Cosgrove 1932). Haury’s field season involved the excavation of 31 pithouses, 4 communal structures, and several other extramural features, all in the southern portion of the village. His research objectives were to identify the Mogollon as a distinct cultural group from the Anasazi. To do this, Haury used burial, architecture, and ceramic traits from this site and from Mogollon Village, located further west. He successfully demonstrated that the Mogollon were distinct, and using ceramic seriation, he developed a chronology that is still used today (Anyon et. al 1981). The techniques used in these excavations did not recover much of any other forms of data from the pithouses, including lithics. In fact, Haury’s lithic collection from the Harris Site excavations currently housed in the Arizona State Museum consists of four stone tools that are not projectile points (Barbara Roth, personal communication 2013). Because of this, the analysis performed for this project uses lithics recovered in the contexts of the recently excavated pithouses.

UNLV started test excavations at Harris in 2005 before hosting archaeological field schools between 2008-2012. These field seasons resulted in the excavations of 20 pithouses, 34 extramural features, and multiple burials. The focus of this current research is on household organization and its relationship to sedentism and subsistence practices at the Harris Site (Roth 2012a). These research themes are carried over from Roth’s previous work at two upland sites, Lake Roberts Vista (Roth 2007) and La Gila Encantada (Roth 2010), but with the data from the Harris Site, they can now be tested within the context of a riverine site within the Mimbres Valley. There is evidence in some characteristics of the Harris households that the village was composed of social groups that maintained their kinship identities over time while also cooperating at the village
level (Roth 2013). This evidence could be the first of its kind to suggest corporate group organization in the Mimbres Valley during the Late Pithouse period. Multiple lines of evidence are necessary to determine if this is the likely scenario, and this project seeks to provide one of these lines of evidence by analyzing the lithic assemblages from the identified “clusters” of pithouses at the Harris Site.

Roth (2012a) has identified three clusters of pithouses and associated extramural features at the Harris Site that date from the San Francisco and Three Circle Phases. These clusters are hypothesized to represent corporate groups that formed in the Late Pithouse period. Each share distinct household traits and extramural spaces (Table 2.2).

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Pithouses</th>
<th>Phases</th>
<th>Shared Traits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>37</td>
<td>Three Circle</td>
<td>Extramural space with multiple features; ceramic vessels plastered in floor behind hearth</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>Early-Mid Three Circle</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>35/36</td>
<td>Three Circle/ Three Circle</td>
<td>Superimposed; touching hearths</td>
</tr>
<tr>
<td></td>
<td>39/40</td>
<td>Three Circle/Early Pithouse</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>43</td>
<td>San Francisco</td>
<td>Extramural space with a storage pit, processing feature, and burials; jars plastered into floors</td>
</tr>
<tr>
<td></td>
<td>45/48</td>
<td>San Francisco</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.2. Pithouse cluster descriptions at the Harris Site (Roth 2012a).

Cluster #1 is composed of Pithouses 37 and 38 which were both used during the Three Circle phase. These houses share an extramural space with one storage pit and several other features. Ceramic vessels were plastered into the floors of both of these houses; a suspiciously unique trait that may have been a characteristic that we can now use as a clue to if/how these households were linked.

The second cluster is characterized by large, superimposed households with connecting hearths through the floors. This also includes Haury’s PH 23/22/30/31, but because of the lack of lithic data from Haury’s contexts mentioned previously, this analysis will only include Pithouses 35/36 and 39/40 from the UNLV excavations. This
cluster is being interpreted as the “founding households” based on the unique structural characteristics (Roth 2012b, 2013). The hearths of the upper houses were dug through the floors to physically touch the hearths of the pithouses underneath, a symbolic expression of having a connection to those that lived in those same spaces previously. This is especially interesting in the 39/40 houses because Pithouse 40 probably dates to the Early Pithouse period, based on the ceramics and architectural features of that household.

The earliest of these clusters is Cluster #3, which dates to the San Francisco phase. These houses share a large extramural space that includes a storage pit, a processing feature, and three burials. The unique household trait shared by the pithouses in this cluster is jars plastered directly into the floor of the houses. Haury’s PH 28 could also be part of this cluster because he notes a jar on the floor, but once again, it is not included in this analysis.

Exploring the possibility of corporate group formation during this time is a groundbreaking research opportunity that has potential to change our understanding of how the social organization of these agricultural societies in the Mimbres Valley evolved. It can also help us understand how people are connected to their land, homes, and communities and how this can be identified archaeologically. If the people living in these clusters were socially connected, then it should manifest in multiple ways in their material culture. Analyzing the lithic assemblages from these identified clusters can add a line of evidence supporting the existence of these corporate groups during this time, as well as providing further data for other research at this site and throughout the valley.
CHAPTER THREE

THEORY

A theoretical framework must be constructed to explain how the material culture examined in this thesis is representative of larger household and community social processes occurring during the Late Pithouse period. In order to do this, a connection must be made between the lithic artifacts, the individual flintknapper, and the social contexts in which the individual was embedded. The research questions state that for the clusters to be distinguishable in the lithic assemblage, the data must show significant variations in each cluster. This is based on the idea that these patterns are the material evidence of enculturation transmitted through learning frameworks (Adams 2010; Duff and Nauman 2010; Hayden and Cannon 1984; Stark et al. 2008). The choices made about the raw materials, activities, and manufacturing techniques were not just made as a result of the functional requirements of tools, but also how a person learned and who they learned from (Bamforth and Finlay 2008; Clark 2001; Lave and Wenger 1991; Lave 1993; Minar and Crown 2001; Tehrani and Riede 2008).

This chapter begins by focusing on the social contexts in which enculturation takes place. Those most likely to engage in interactions to share knowledge and perform flintknapping are part of a community of practice (Ingold 2000; Lave and Wenger 1991; Roddick 2009). Within this community, interactions between the novice and mentor create learning frameworks that influence individuals to share behaviors such as flintknapping techniques. Through these learning frameworks, technological styles are adopted that can be examined in the archaeological record.
The scope of the discussion then shifts to how the individual’s enculturation is embedded within the material culture produced during craft production. One method of examining this link is through technological style. Understanding technological style requires a review of how researchers have studied and interpreted the concept of style in the past and an explanation of how this can be detected with the assemblage used in this study. In addition to technological style, household activities performed in each cluster are discussed as a way to connect the stone tools and cores to identity. This approach allows the lithic assemblage to be viewed as a result of the transmission of flintknapping traditions through those with shared identities. If these traditions can be shown distinctly in each cluster, it supports the hypothesis of corporate groups at the Harris Site during the Late Pithouse Period.

Learning Frameworks and Communities of Practice

The craft of flintknapping is not one that is easily learned nor can it be perfected in a short period of time. The lithics analyzed in this thesis are the result of an accomplished skill acquired through mentorship and practice. The manufacturing process and activities performed with these implements were taught throughout the Harris community through daily performance and interaction. These regular interactions created learning frameworks, or teaching frameworks (Adams 2010; Duff and Nauman 2010). A learning framework is a system that is established between individuals that allows for the regular transmission of information. Duff and Nauman (2010) add that these frameworks are important for reproducing technological traditions. Their work at the Cox Ranch Pueblo in New Mexico shows that multiple frameworks can exist in the same community. The idea of multiple frameworks within the same community is extremely important for
the purposes of this project because learning frameworks are usually linked to the representation of whole ethnicities (Adams 2010; Clark 2001). What this suggests is that learning frameworks can exist at varying scales. This project seeks to test if this scale existed at the level of the corporate group. Since there may be multiple corporate groups within the same community, it is likely that these groups share the same ethnicity. Instead of understanding ethnicities at the Harris Site, it is more useful to use these learning frameworks to understand the communities of practice that can be teased out through the lithic assemblage.

Once learning frameworks are established between individuals, the group has become what is known as a community of practice (Lave and Wenger 1991; Wenger 2000). The important distinction between the two is that learning frameworks occur within communities of practice. The learning framework refers to the situation in which the individuals communicate their information, whereas the community of practice is not restricted to clear cases of training but instead is found in any circumstance where a skill can be developed or performed. Communities of practice can thus transcend large ethnic groups as well as divide one group up into multiple units (Lave and Wenger 1991). Roddick states that these communities are “essential in forming identities and values, but also have cognitive effects on how we each experience the world” and that archaeologists may not always be able to access these experiences but “can track how experiential clusters changed through time” (2009: 78). Membership in a community of practice does not require paying of a certain amount of “dues” to belong, but merely participating in the activity. The participation can involve learning from others, but also includes suggestions from individuals to other individuals in informal settings. Ingold (2000) explains this
participation as an integral part of the transmission between generations because it is more than just the handing over of information; it consists of real human relationships that create the bonds of the community.

A community of practice model explains how the manufacturers and users of lithic technology can share an identity. Furthermore, the learning frameworks within a community of practice suggest regular interaction between individuals, such as in a household or corporate group. Corporate group behavior would provide a sphere of interaction within the Harris community that would encourage the individuals within each group to participate in the activities associated with these tools. Assuming that corporate groups are a unit of shared identity at the Harris Site (other than the village and Mimbres ethnicity), it is possible that these groups contained learning frameworks established to share knowledge about lithic technology. Clark summarizes this best in his explanation of his research on using this theory to track migrations:

Households in traditional agricultural societies that have formed stable settlements, communities, and larger social groups often develop common frameworks for transmitting cultural knowledge. This body of knowledge represents a shared tradition that can potentially be used to track the movements of associated households whether or not this collective consciously displays its identity. Unconscious and deeply embedded aspects of enculturation are often more stable through time than displayed identities such as ethnicity and more resistant to assimilation in mixed cultural settings generated by migration. Continuity in these embedded aspects within a region can be used as a proxy measure for settlement continuity. Conversely, their abrupt appearance in another region would indicate immigration of the associated group. Thus, the material correlates of deeply embedded aspects of enculturative background can be used to track the movements of the associated groups...[Clark 2001:10]

Granted, Clark is referring to his research on identifying migrant groups across the Southwest while this project deals with family groups across one site, but it still
addresses important points in regards to the flow of knowledge through these social environments.

*Mentoring and Craft Production*

The idea of tracing the transmission of craft knowledge within a community has been a topic of research for archaeologists since the onset of “new archaeology”. The first researchers to address this issue were the “ceramic sociologists” of the 1960’s and 1970’s (Deetz 1965; Hill 1970; Longacre 1970). This school of research investigated the possibility of using ceramic styles to track the lineages of those who made them. The basis of this research was that these styles were passed down through mother-daughter interactions which could then be traced in the material culture. This original school of work spawned more research testing these ideas of prehistoric social organization (Longacre 1991; Longacre and Skibo 1994; Stark and Skibo 2007). After further testing of the causes of ceramic stylistic variation, scholars came to understand that the original assumption of the mother-daughter channel of transmission was far too simplistic. Pottery styles did not always follow this lineage-based trail, but in some cases general learning frameworks could be distinguished (Graves 1981; 1985). This thesis differs in this approach not only by analyzing lithic artifacts instead of ceramics, but it also makes no assumption of who specifically taught whom within a group, and only tries to trace these general learning frameworks within the Harris community.

Darwinian approaches to modeling cultural transmission in archaeology have been popular recently, especially with applications to lithic technology (Atkisson et al. 2012; Bettinger and Eerkens 1999; Eerkens et al. 2006). This approach, mainly utilized by evolutionary ecologists, uses theories about transmission from evolutionary
anthropology to model how artifacts and attributes would have been successfully adopted over time and space. This frequently involves testing the four kinds of human learning (guided variation, direct bias, frequency-dependent bias, and indirect bias) defined by Boyd and Richerson (1985). These studies often use statistical models to simulate how traits in material culture would be transmitted by each method of learning. For example, Bettinger and Eerkens (1999) hypothesize that these learning methods can help explain the differences seen in the adoption of bow and arrow technology evidenced by projectile point morphologies in different areas of the Great Basin. They suggest that the traits seen in the artifacts are a result of cultural transmission and selection based on these methods of learning.

Eerkens et al. (2006) expand on this using mathematical simulations to address projectile point assemblage differences in the Great Basin. They create a model to test how information is retained after being transmitted by guided variation, conformist transmission, and indirect bias transmission. Each method results in different kinds and amounts of information being passed on. These results are then compared to the projectile points from the Owens and Monitor Valleys to infer which learning method could have resulted in the differences observed in these point assemblages. Their results were unsuccessful in determining the prehistoric learning method in place for these areas, and they argue that the differences between individual points is subject to idiosyncratic variation.

Although the approaches used by evolutionary ecologists provide different ways of thinking about transmission, they have been found to be problematic. Bamforth and Finlay (2008) critique both Boyd and Richerson’s learning methods as well as their
application to the archaeological record. They state that these learning methods were made for copying ideology and language and therefore do not address the standards, techniques, and physical skills of craft production. They also argue that the social context of the learning-teaching interaction is underemphasized, and the quality of the teaching may have very important implications on craft learning. Herbich and Dietler (2008) also critique this approach, declaring that little, if any, of this work was based on primary observation of real human beings. They provide the analogy of it being “like epidemiologists speculating about the cause of disease based on population statistics without laboratory medical research to observe the actions of bacteria, viruses, and toxins” (2008:224).

The household traditions being examined in this thesis benefit more from an approach that can examine how learning interactions are taking place within a community. Stark et al. (2008) borrow the terms horizontal, oblique, and vertical transmission (Cavalli-Sforza and Feldman 1981) to describe pathways of transmission within a community. Horizontal transmission involves the transfer of knowledge between individuals of a certain generation or peer group. Vertical transmission is the transfer of cultural knowledge between parent and child, such as that of the assumption of the original ceramic sociologists. Oblique transmission is when a member of a certain generation provides knowledge to someone of another generation. This would most likely be the in the case of extended family members or formal mentors interacting with younger cohorts.

These pathways of transmission are essentially the learning frameworks that this thesis intends to examine using lithic technology. The vertical and oblique methods are
hypothesized to exist in the corporate clusters at the Harris Site. Through a review of ethnographic research, Shennan and Steele (1999) suggest that craft skill is most commonly learned between family members in traditional societies. Bamforth and Finlay (2008) add that individuals who learn skilled craft production can almost always identify a specific mentor. Frink (2009) provides an example of both vertical and oblique transmission methods occurring together in a community. Knowledge of subsistence processing is passed down through Yup’ik female gender lines by way of incorporating individuals through apprenticeship and practice. The knowledge of the tools and techniques necessary for carrying out the tasks was taught by mentors of different generations, often, but not always, from the same family.

The interaction of teaching and learning can be beneficial to both parties. One example of mentoring would be scaffolding. Scaffolding is a method used by mentors to incorporate novices into craft production by way of assisting the mentor (Greenfield 1984; Minar and Crown 2001). This direct assistance serves two purposes: giving the instructor help with completing the task, and allowing the learner to gain experience. Ferguson (2008) applies scaffolding to lithic production through examining raw material use. He states that scaffolding allows the novice to acquire flintknapping experience by performing tasks with little risk of failure while the mentor carries out the more difficult maneuvers. This also conserves raw materials because it minimizes the novice’s chances of wasting the product. These methods are also more likely to occur within the spaces of a household or between family members.

These examples draw upon the important underlying aspect of all of the social connections made between people and their material culture, and that is the relationship
between technology and identity. People who are learning or mentoring others on craft production or subsistence foodways are not strangers but usually those that share an identity or even blood. Killick (2004:573) stresses that “technology in pre-industrial societies creates persons as well as products: the world view and social persona of the apprentice are shaped by the apprenticeship, just as the clay is shaped by the potter.

Archaeological Approaches to Enculturation

The previous sections described how an identity is shared amongst members of a community of practice and how this identity is transmitted through the learning interactions that take place. The focus now shifts to how this identity can be seen in the lithic assemblage from the pithouses at the Harris Site. This begins with the enculturation process. Enculturation describes the manner of how individuals are integrated into the cultural group by observing and experiencing norms on a daily basis (Yoder 2009: 27). The way that the enculturation of an individual is forged into the material culture is useful for identifying social boundaries and learning frameworks (Clark 2001; Stark 1998; Stone 2003).

Attempts to reveal how differences in identity were seen in material culture began with approaches that dealt with looking for patterns in highly-stylized items. *Style* has a history of multiple definitions. It was first viewed as a separate entity than function, and was therefore studied as serving its own purposes, usually the exchange of information (Wobst 1977; Wiessner 1983). Wobst (1977) suggested that stylized characteristics of artifacts were added as a form of communication. According to Wobst, not all artifacts had style; these traits were added to items, costing more energy to produce. Wiessner (1983) expanded on this concept by testing the social signaling of projectile point styles.
among the Kalahari San. She proposed that the manufacturer could use style to indicate
group identity as well as that of the individual. Furthermore, Plog (1983) added
*iconographic* style to the information-exchange theory, adding that style could also signal
ideology, such as those related to Chacoan ideologies in the Southwest U.S.

These new definitions and concepts helped further the understanding of stylistic
variation and purpose, but critics of this approach believed it left style as a detached
element of technology and did little to address its production or perpetuation (Hegmon
1992). Dietler and Herbich (1989) add that stylistic properties are not always highly
visible or energy-costly and can convey information to those at multiple social distances.
Additionally, Stark states that “users of material culture routinely blur the boundaries
between technology, function, and style” and suggests to “move beyond dichotomies that
oppose style and function to embrace more holistic understandings of material culture
variability” (1998:4-5).

Almost as if to address these critiques directly, researchers began borrowing
French theoretical models that studied technological sequences and their relationship with
human behavior and culture, or *technological style* (Lechtman 1977). The pioneers of this
approach began from the idea of *chaînes opératoire* (Leroi-Gourhan 1993), which
translates to ‘operational sequence’, represents the culturally bound and embedded ways
of doing something. The knowledge of a technical process is not separate from larger
social contexts and belief systems (Lechtman 1977). In this case, the operational
sequence refers to technology but can even relate to things such as language and ritual.
Sackett (1977) branded the term *isochrestic variation*, which suggests that during
production, the artisan is faced with a constellation of choices during each step of the
process; each choice produced the same desired result but through different means. Although there are usually a wide variety of options, the consistently settled upon decisions reveal the socially encultured technological style of the individual (Sackett 1990). Isochrestic variation is possible along every step of the manufacturing process and it is the resulting decisions that make up style; isochrestic variation is merely the identification of the choices available to the individual. Gosselain (1992) reinforces this with the idea that since multiple methods can be used to achieve the same goal, the choices that a manufacturer makes are due to the social contexts in which they learn and practice their craft. Most importantly, the individual is usually unaware of these choices, which suggests that the “tampering” that occurs with highly visible stylistic traits is not necessarily an issue when it comes to technological style. Yoder (2009:17) further explains this by stating that although “the artisan may be unaware that he or she is passing cultural information through an object, the artifact none-the-less contains information that will be interpreted by other individuals (both from their own and other cultural groups)”.

The concept of habitus has been applied to technological style because of its stress on shared understandings within a cultural community rather than explicit rules (Bourdieu 1977; Roddick 2009). Habitus refers to the discursive nature of culture and the negotiations an individual makes between structure and agency. Dietler and Herbich (1998) suggest that this concept can be very useful when conceptualizing technological style because it allows for the craftsmen to be flexible in their innovation while still following general cultural tendencies. It also reinforces the communal aspect of craft production by emphasizing the importance of the social context in which the material is
being produced. After examining the interactions among potter communities, Dietler and Herbich (1998) suggest that style should not be viewed always as self-expression, but as a nexus of joint activity between members of a community.

In the majority of recent studies on technological style, it is linked to the identity of the cultural group and used to track either migrations of these groups or distinguishing different ethnicities within the same community. Adams (2010) uses technologically distinct groundstone artifact forms to examine the gendered household relations in pueblo communities in the Southwest U.S. She argues that different technological styles can reveal foreign ethnicities in a community, even when other traits of the assemblage show an intentional attempt at assimilation.

Other work uses household activities and organization to reveal enculturation and identity (Clark 2001; Stone 2003). These methods parallel the principle behind technological style by attempting to find deeply embedded operational sequences, although they do not necessary deal with studies of technology. Clark (2001) lists the study of foodways in domestic contexts as one of the best ways of identifying ethnic backgrounds in the archaeological record. He links performing day-to-day household activities to social enculturation, which can be analyzed as a potential link to the social structures of a community. This is most likely due to the fact that in small-scale agricultural societies, the household is the primary unit of enculturation (Clark 2001:9, 13). The utilitarian tasks performed in this context are usually highly patterned, rarely under social critique from others (usually due to decreased visibility), and rich in meaning. These tasks can include food, hide, and wood processing or even storage practices.
Stone’s (2003) analysis of domestic contexts in the Southwest U.S. also supports the idea that the domestic context is a prime area in which to see ethnicity and social engagements in the archaeological record. Her analysis of domestic contexts in communities with mixed ethnicities shows that people are more likely to “perform” ethnic traits in domestic contexts rather than in more public settings. This supports Clark’s argument that items found in household contexts are more likely to reveal the enculturated background. Both authors agree that mundane, utilitarian items are especially useful in obtaining the social and cultural information embedded by technological style.

Although these examples all aim to explore ethnicity, this thesis instead uses this theoretical framework to explore the identity of corporate groups. No research has yet been done to test if this is possible at this scale, or if it is possible to use lithic artifact assemblages to detect the identity of corporate groups. These examples provide information on what to look for in the artifact assemblages (attributes that can describe *chaînes opératoire* and household activities) and the contexts in which they can be found (domestic household contexts). With this information, the lithic assemblages from the household clusters at the Harris Site should provide the necessary data to test if learning frameworks existed at the corporate group level.

**Summary**

The previous research was reviewed to lay the foundation for comparing assemblages from different household clusters at the Harris Site. This research suggests that an assemblage, especially that of a utilitarian nature recovered from household contexts, can be used to observe enculturation and larger social structures such as
learning frameworks. This link involves both the technological choices made during manufacture and the activities performed within the household. The two research questions regarding raw material use and technological organization in the clusters address the concept of technological style. Raw material choices can vary highly depending on the access to materials and tool function/tool needs (Andrefsky 1994; Bamforth 1991). In the Mimbres region, the toolstone raw material in the surrounding environment is highly variable and accessible (except for obsidian) (Dockall 1991; Ferguson 2010), assuming social access is uniform. This means that the raw material choices made at the Harris Site should be indicative of not only function and access, but also of social tendencies transmitted during the enculturation process. If raw material availability is uniform across the site, then any variation between clusters could be explained by different choices that were learned during mentorship.

A more obvious application of technological style theory is in the analysis of the technological attributes of the cores and debitage. Comparing the technological attributes in these items is a comparison of the chaîne opératoire of the flintknapping process, as well as any technical preferences (hard hammer/soft hammer). One advantage to examining these items is that they are byproducts of the end result, meaning that they were not likely modified in any way to appease any other social pressures. Any variation revealed by this comparison is significant in suggesting that the individuals in each cluster differed in technological stylistic tendencies, therefore supporting different learning frameworks.

Finally, the contexts from which the artifacts in this analysis were recovered are representative of those outlined by Carr (2001) and Stone (2003). The pithouse contexts
are the realm in which the daily household activities would have taken place, including
learning and craft practice. This suggests they are less susceptible to any social pressures
of more public areas (i.e. plazas), and individuals would therefore be more likely to
“perform” their enculturated background.
CHAPTER 4

METHODS

Sample Contexts

The University of Nevada, Las Vegas has sponsored archaeological field schools at the Harris Site since 2008 and work still continues today. All of the artifacts used in this thesis come from the UNLV field seasons conducted from 2008 to 2011. These four years of excavations have yielded thousands of lithic artifacts; however only the ones found in specific contexts were used for this study. The only way to address the research questions was with strict contextual control so that the artifacts could be associated with individual pithouses. By knowing the household association, the clusters could then be tested for any differentiation which can potentially be linked to different learning frameworks.

The lithic data collected from the Harris Site comes from houses and extramural features associated with these houses. This is a unique and important dataset because the artifacts and features can be directly associated with the occupation of a particular pithouse. Dates for the house can then give a chronological context to all of these associated items. Excavation methods during the UNLV field school involved the exposure of the pithouse floors by digging stratigraphically through trash, roof fall/wallfall, and floor fill contexts until the plaster floors were reached. The fill varied depending on the house, but usually consisted of four main stratigraphic levels. The first is Cultural Fill (CF). This category contains a mix of trash fill from the site’s occupation and any recent soils that may have been deposited since its abandonment. Because of the
nature of this stratigraphic level, chronological control cannot be obtained for the
materials found within it and therefore the items recovered in it cannot be linked to the
occupation of a particular pithouse. The artifacts can be linked to the occupation of the
site overall, but could not provide the association with particular houses that was
necessary for this study, so artifacts from this level were not incorporated in this analysis.

When a pithouse was abandoned, it collapsed naturally or was ritually retired. In
either of these situations, the collapsed architecture created the layer referred to as Roof
Fall/Wall Fall (RF/WF or WF/RF). Much of the contents of this level are adobe wall
chunks mixed with what would have been the material that made up the roofing structure,
most likely wood and sod. Artifact density usually drops throughout this level since the
majority is architectural material, but the few artifacts that are recovered are assumed to
be from rooftop workspaces. This context varies with each pithouse and can start
centimeters below the ground surface or 50 cm or more in depth. Although there is
variation in depth, we assume that the levels identified within this context are linked to
each other and are not associated with the trash fill above, although it is recognized that
some trash fill may intrude into this layer. Since there is evidence of architectural
material in this category, we assume that it is associated with the pithouse occupation and
that the artifacts are representative of the activities taking place by the members of the
household. Stone tools and cores found within the RF/WF contexts were used in the
sample for this analysis because they can usually be linked to the house.

The fill above the floor of a pithouse was excavated as its own separate contextual
category called Floor Fill (FF). This layer was between the RF/WF and the floor, which
could have varied depending on how the roof fell in the pithouse. The range of the FF
could have been up to 25 cm above the floor to directly above the floor if there was evidence of the roof falling directly onto the floor. The artifacts recovered in this layer are usually items that were left behind in the house and may have been shuffled around since its deterioration. This may also include some things from the RF/WF context that fell in first during this process. The main purpose of this layer is to identify artifacts and features that were close to the floor, but not technically lying on the pithouse floor. Removing the cushion of FF during excavation allows for the revealing of items that were truly lying on the floor when the pithouse was abandoned. Its close association with the occupation of the house is the reason it was included in the sample for this analysis.

Artifacts found physically touching the floor were deemed part of the Floor context. This is the easiest context to associate with the household occupation, so the tools and cores from this layer were included in the sample. Also, when the floor is revealed, it is very common to come across floor storage features (Figure 4.1). These pits in the plaster floor could have been used for a number of purposes and many times lithics are found stashed inside. Although they are found in the floor, items in floor features were put into the category of Feature Fill (Feat. Fill). This category also includes extramural features, often found just outside of the houses. These extramural features can be associated with the nearby household occupation due to their proximity to the house and they are assumed to be the outside workspaces of the family. Because of this association, both floor features and extramural features were part of the sample for this analysis; however, their different contexts were noted.
Raw Material Identification

Raw material is technically an analysis attribute, but it is such an important and ubiquitous trait throughout this analysis that it is discussed in further detail in this section. No sourcing or procurement studies were performed for this thesis, although obsidian sourcing has been done on Harris Site material (Ferguson, n.d). This section starts with a brief introduction to the general geologic and topographic setting of the Harris Site. It then continues by providing explicit definitions and figures for guiding the identification of raw materials in any future analyses.

The Harris Site is located in Grant County, New Mexico, a region with varying landscapes and environments. To the north is the mountainous Gila National Forest, from which the Mimbres River flows to the south. Coming down the valley, it gradually
flattens into the Deming Plains (Dockall 1991). This range of topography is due to the variety in the geologic setting of the area. Throughout time, this region was carved by both tectonic activity and volcanism. These two forces are the source of the igneous (basalt, rhyolite, andesite, etc.), metamorphic (quartzite), and sedimentary (limestone, chert, etc.) materials used by the Mimbres for all of their lithic materials. The lithic analysis done at the NAN Ranch Ruin has one of the more in-depth studies of raw material and sources available from any Mimbres Mogollon site (Dockall 1991). In this study, Dockall identified potential sources of many of the lithic materials and concluded that most of them came from local sources near the NAN Ruin. Only obsidian, greenstone (used for groundstone axes), and some cherts and chalcedonies look to have been imported from a further distance. As far as procurement goes, Dockall suggests that there were mixed patterns. Local quarry sites around the NAN Ruin show that some materials (mostly rhyolites and basalts) were being procured and manufactured locally (within 2 km). Higher quality chert and chalcedony can also be found in the local vicinity. The obsidian was not procured locally, most of it coming from the Mule Creek sources (Ferguson n.d.). Many of the materials were also being naturally transported as river cobbles by the Mimbres River, from which they could have been procured as well.

The Harris Site is north of the NAN Ranch Ruin, but still within the same geologic setting so the raw materials identified in Dockall’s report are highly applicable to this analysis. Dockall outlines all of the different types of materials and their potential parent outcrops resulting in 12 main categories: andesite/basalt, rhyolite, chalcedony, chert, opal, quartz, quartzite, jasper, greenstone, latite, rhyolitic tuff, and obsidian. This thesis includes many of these same categories, but condenses a few and omits others. The
raw materials identified in this analysis were classified as follows: rhyolite, limestone, andesite, basalt, chert, obsidian, latite, chalcedony, and quartzite. The greenstone category is mainly used for groundstone implements, and was not observed in the Harris chipped stone assemblage. Opal and jasper were also not observed in the implements in this sample.

**Rhyolite**

One of the most common material types used at the Harris Site, the rhyolite category is highly variable. The colors are usually light gray or pink/red. The quality can vary from extremely grainy very fine-grained, where it can be easily mistaken for chert. The cortex does not usually vary from the color of the material, but the texture will usually be rougher from weathering. There is a certain gray, porphyritic variety that is quite common in the assemblage and this type is of the higher quality rhyolite. One characteristic that makes this material easily identifiable is the phenocrysts that are visible to the naked eye. These phenocrysts are usually darker than the rest of the matrix and can also have a reflective or translucent quality. The rhyolite found at the Harris Site could have been found in the Mimbres River, transported as cobbles being eroded from the volcanic landscape throughout the region.

**Basalt**

One of the most commonly used materials at the Harris Site, basalt is most easily identified by the dark color. Obsidian and basalt are the darkest materials but are on opposite ends of the spectrum when it comes to texture. The basalt found at the site can vary between fine-grained and vesicular. It was mainly used for expedient implements or
those that required more durability. Vesicular basalt occurs more commonly around the region and this variety is used for many of the groundstone tools found on Mimbres sites.

Andesite

Andesite is similar to basalt and rhyolite in regards to knappability, except the andesite at the Harris Site is less common and less varied than these materials. It is black but not quite as dark as the basalt. The main diagnostic trait of andesite is the faint dark bands throughout the material. The texture is grainy, which gives it good durability at the expense of being able to produce a sharp edge.

Limestone

The limestone used at the Harris Site was various shades of gray and is a coarse-grained material. It can sometimes be mistaken for rhyolite or even basalt, depending on the tint. Limestone is not known for its superior flaking ability, but would have been good for heavy duty implements that would have required more durability than a sharp edge. This material is very common across the landscape and would have also been transported as river cobbles.

Latite

Latite occurs in the same formations as some of the andesites and rhyolites in the region and is of the same knapping quality as these materials as well. The color of this material comes in variations of gray. The most diagnostic characteristic is the mottling of these gray colors. The mottling forms gray dots or even small stripes throughout the materials. Small phenocrysts are also sometimes present.
Quartzite

Quartzite is sandstone that has gone through a metamorphic process and the result is a more cemented material that is better for flaking while retaining the sugary texture of sandstone. Dockall (1991) identifies two sources of quartzite in the region but states that they make up only a small portion of the lithic assemblage from the NAN Ruin. This frequency also holds true for the Harris Site. Its most diagnostic trait is the texture. Since it comes from sandstone, the grainy matrix is made up of compacted quartz crystals, which give it a slight glimmer. The metamorphic process involves stresses such as heat and pressure that can make the color more purple or gray. This process is also to the flintknapper’s preference because it makes for better conchoidal fracturing during manufacture.

Chert

Cherts can form either from sedimentary or metamorphic processes, and since Grant County has several geologic formations created by these processes, it leaves a wide variety of cherts available across the terrain. Chert is a high quality knapping material that is more common and durable than obsidian. The fracturing capabilities rival that of obsidian and it is mainly used for the same kinds of cutting and slicing tools. Since it comes in almost any color, it is more distinguishable by its texture and transparency. It has a smooth and sometimes waxy texture and is usually opaque. The cortex is also highly variable, since chert nodules can come out of multiple kinds of formations, such as limestone. Cortex is rare on chert tools at the Harris Site. Dockall (1991) states that even though it can be found locally in small cobbles, since it is a higher quality material it was probably traded for as well.
**Chalcedony**

Chalcedony is a popular material at the Harris Site, and was primarily used to make tools that required a cutting or piercing edge because of its high quality. It is a cryptocrystalline material that accumulates in veins throughout many different formations in the region. The chalcedony used at the Harris Site is white and has a range of transparency. It has the glassy, waxy luster of obsidian and some high quality cherts, but unlike chert, it almost always has this slight transparency. The cortex of chalcedony can be misleading, as is the case with this white variety, because it may not reveal what lies underneath. The white variety has an opaque white rind, which looks like chert, but once removed the clear, glassy interior can be seen.

**Obsidian**

Obsidian is arguably the most easily identifiable material found in the assemblage. The type at Harris is almost always black and slightly translucent. The cortex takes on a rough, grainy texture, but when removed it reveals a smooth, glassy interior. This substance is a very high quality cutting material used mainly for projectile points.

Ferguson (2010) performed an XRF analysis on the obsidian from La Gila Encantada, another Late Pithouse period site in the region, to determine the geologic source of the material. He found that 95% of the obsidian at La Gila Encantada was coming from the Mule Creek source. This source produces small nodules of obsidian that would have required bipolar percussion for the initial reduction of most cores (Figure 4.2). The study also concluded that this remained the main source consistently throughout all phases of the Late Pithouse occupation of the site.
Figure 4.2. Example of an obsidian nodule from the Mule Creek source area.

Figure 4.3. Percentages of obsidian sources found at the Harris Site (Ferguson, n.d.).
Ferguson (n.d.) also performed sourcing analysis on the obsidian recovered from the Harris Site (Figure 4.3). Overall, the data showed a preference for Mule Creek obsidian sources (including Antelope Creek, Mule Mountains, and Sawmill Creek). There is a larger presence of obsidian from Gwynn Canyon (24%) in the Harris Site assemblage than from La Gila Encantada. These two source areas make up 96% of the obsidian in the Harris assemblage.

**Analysis Attributes**

With the goal of standardizing methodology, this section focuses on explicit descriptions of the attributes recorded during the analysis. All attributes were observed with macroscopic methods; only a hand lens was used for magnification. Without microwear analysis, a popular means of obtaining functional data, all functional assumptions come from typological aspects of the tool. The typological designations for the tools come from morphological attributes outlined by Andrefsky (2005) and Sliva (1997). The attributes for cores were developed as a hybrid of borrowed traits from Sliva (1997) and Dockall’s (1991) typologies. Projectile points attributes were borrowed from Roth et. al (2011) who followed Dockall’s classification.

The analysis was broken down into major categories: unifaces, bifaces, composite tools, retouched flakes, projectile points, and cores. The raw material, percentage of cortex, presence or absence of a ground surface, dimensions, weight, and volume were recorded for all categories. On the tools and cores, the percentage of cortex was created as an ordinal category, with increasing fields of percentages. These fields are: 0%, 1-25%, 26-50%, 51-75%, and >76%. This method examines if the removal of cortex was an
important goal of tool manufacture and core reduction, and serves as a proxy for stage of reduction. This attribute applies to the research question of raw material use.

The presence or absence of a ground surface on any of the implements was recorded. This was done to address tendencies or predispositions to reuse groundstone. The recycling of groundstone implements into chipped stone tools can pertain to questions regarding technological manufacturing and raw material consumption.

The weight of each implement was taken in grams using an electronic scale. The volume attribute was collected by using water displacement. This method is currently being tested as a new method for measuring size. By filling a beaker full of water and submerging the tool or core into it, it displaces water which can then be measured in milliliters. There is about a +/- 10 mL error when performing this method. It can potentially be used as a substitute for measuring length, width, and thickness, but this is still under review. Length, width, and thickness were measured in millimeters for each implement using electronic calipers. However, they were measured differently according to the category. Specifics of measuring the dimensions are discussed under each corresponding category below.

**Uniface Attributes**

Unifacial tools are defined as having “retouch scars which extend from a given margin onto only one aspect of the implement” (Sliva 1997:20). These tools were placed into data classes that explain the type of parent nodule the tool was created from: flake, core tool, cobble tool, and unknown fragment. The flake class was assigned when the tool was created from a flake previously taken off of a parent material. A core tool is assigned when a unifacial tool edge is found on a nodule that also has evidence of previous flakes
having been removed, but is not a flake itself. The cobble tool designation is when the unifacial tool edge is on a nodule with no evidence of being a flake or a core. The unknown fragment category consists of those that have no evidence of any of the previous classes, such as a broken tool with multiple break points. The data class attribute can be applied to all of the research questions because it is influenced by raw material availability and preference, the activity being performed, and the technological choices of how to make the desired tool to complete the task. The condition was also recorded as complete, distal flake, medial flake, proximal flake or fragment.

There are multiple types of tools in the uniface category and the tool designations are assigned from morphological criteria outlined by Sliva (1997). The types include: scrapers, denticulates, choppers, notches, and perforators. Scrapers are defined as having unifacial, continuous, invasive retouch. The location of the retouch and the shape of the edge can vary. Denticulates are similar to scrapers but the criteria are unifacial and continuous retouch with a tooth-edged morphology. Choppers tend to occur on larger, cobble-like stones and have invasive, continuous retouch patterns. Notches have unifacial retouch that literally creates a “notch” in the side of the edge. Tool types address the question of the activities being performed in the household and can help with technological style when correlated with many of the other attributes recorded.

Retouch attributes describe the flake scars made on the edge in order to create the tool. These are important to define because they are used as criteria for the tool typologies. These definitions are borrowed from Sliva (1997:20-21) and include: irregular, continuous, marginal, invasive, non-extensive, and extensive.
Irregular: two or more noncontiguous (not touching each other) retouch scars, but not more than two contiguous scars.
Continuous: three or more contiguous scars
Marginal: retouch scars whose lengths do not exceed 10% of the maximum dimension of the implement.
Invasive: retouch scars whose lengths exceed 10% of the maximum dimension of the implement.
Non-extensive: continuous retouch scars whose extent is not greater than 20% of the perimeter of the implement.
Extensive: continuous retouch scars whose extent is greater than 20% of the perimeter of the implement.

Although there are six attributes, only three can be used at a time because some cause a paradox with others. The attribute categories are actually irregular vs. continuous, marginal vs. invasive, and extensive vs. non-extensive. The only exception to this is the marginal vs. invasive retouch. Some edges have a combination of both flake scars, so it is possible to be both. The location of the retouch was also recorded as an attribute (end, side).

The attribute of edge shape was also included in this analysis. Categories include straight, concave, and convex edges shapes. Edge shape could pertain to the activity at hand as well as the technological style of tool types. These attributes address the question of technological style.

The edge angle was recorded as interval-scale data because, with the use of a goniometer, a fairly objective measurement can be obtained. This attribute can help with making functional assessments of the artifacts. For example, acute angles are more effective for cutting whereas wider angles are better for scraping functions (Andrefsky 2005: 160-160).

Length, width, and thickness were collected for all unifacial tools even in the case of fragments. Length was measured as the longest dimension. Width is the longest
dimension perpendicular to the length. Finally, thickness was measured as the longest dimension on a 90 degree plane from the length and width.

Non-hafted Biface Attributes

Bifaces are generally known as tools or cores having two flaked faces that form to make a single edge circumscribing the entire artifact (Andrefsky 2005: 179). The term “non-hafted” is borrowed from Andrefsky (2005) and this distinction refers to tools without a haft element. It is used here because all hafted bifaces are placed into the projectile point category. This does not assume that the non-hafted bifaces were never hafted and they could even be early stages of hafted bifaces. The bifaces in this category are also distinct from bifacial cores due to their size and morphology. The data class and condition were coded the same as the unifaces.

The bifacial tool types are Preform, Drill, and Perforator. Drills have a projectile point-like morphology but have a thinner width and have a diamond cross section at the tip. Perforators have similar retouch to drills, but with retouch forming a much smaller bit on an edge. Preforms, including those in the early stages, require a secondary attribute of the stage number. This attribute ranges from Stage 1 to Stage 5 and notes the stage of production the biface is in. The stages are outlined by Andrefsky (2005:188-190) and include:

- Stage One: Flake Blank
- Stage Two: Edged Biface
- Stage Three: Thinned Biface
- Stage Four: Preform
- Stage Five: Finished Biface

Edge angle, the retouch attributes outlined previously, and the location of retouch were recorded on bifaces the same way as the unifaces. For complete bifaces, dimensions
were measured as they were for the unifaces. For fragments, only the longest dimension was measured. Volume was measured on these tools but some issues were encountered with the small bifaces. Many of the bifaces were too small to be measured accurately by this method because of the +/- 10 mL error.

**Composite tools**

Composite tools are implements that have more than one identifiable tool. Although applicable, the term “multi-purpose tools” is avoided because tools in other categories also could have had more than one purpose. These tools have more than one edge modified in a distinguishable tool type. It is possible that one tool can have more than one of the same tool types on it, as long as they are on separate margins of the implement. The number of worked edges was recorded and never exceeded three in this assemblage. Edge types included any of the previous tool types described in addition to utilization. For example, a stone could have two denticulates and one utilized edge. In total, there were seven possible edge types: scraper, denticulate, chopper, notch, unifacial retouch (general), bifacial retouch (general), and utilization. Composite tools show are important to this study because they show intentional reuse of an implement, suggesting either a preference for the material it is made from or a technological preference of having more than one useable edge on the same tool.

**Retouched flakes**

Retouched flakes were popular tools for this farming community. The expedient process of slight manipulation to a flake blank would have been a useful method for creating a quick cutting edge. Although informal, these tools play an important role in the chipped stone assemblage. Understanding the choices behind which materials were
preferred for flake tools and the kinds of flakes used can shed light on the technological choices of the most expedient of stone implements. This category can include unifacial or bifacially flaked tools that would not have fit the morphological characteristics in the other categories. For example, a flake with two marginal, non-contiguous flake scars on the same face would not be considered formal enough to be placed in the unifacial tool category. However, there is still evidence of intentional retouch on the flake and it would therefore be considered a general retouched flake. The flake type category is similar to the data class category used for the other tools. This includes Complete, Proximal, Medial, Distal, Fragment, and Shatter. Retouch attributes remain the same as for the unifacial tools with one addition: Bifacial/Unifacial Retouch. Due to the nature of the raw materials as well as the lack of microscopic methods, utilized flakes were not included in this analysis.

The following debitage attributes were recorded on the retouched flakes to identify any patterns with which flakes were being selected for tool use. Platform types include Plain, Cortical, Crushed, Faceted, Absent. Cortical refers to the platform with cortex still remaining on it. Plain is a platform with no cortex or any evidence of modification on it. Crushed is a platform that has been damaged most likely as a result of hard hammer percussion. A Faceted platform has flake scars across its surface. When there is no evidence of a platform it was recorded as Absent. Platform Preparation refers to if/how a platform was prepared before the flake removal. This includes Trimmed, Abraded, and None. A trimmed platform has evidence of flake removals on the dorsal edge of the platform. Abraded platforms have a ground or scratched surface across the platform. Platform Width and Thickness were recorded as a proxy of flake size and
production stage. These measurements were taken along the same dimensions as the flake width and thickness, but measured on the platform. The number of dorsal scars was also recorded to help understand reduction stage.

**Cores**

Core analysis is one of the most important aspects of this study in regards to the questions of technological style and raw material use. Since cores are not the intended outcome of tool production, they give insight as to the passive style of the manufacturing process. These byproducts can show if materials were being reduced efficiently for conservation of material or specialty tool production (e.g. blade production). The lack of formal reduction can also be important and could be attributed to material abundance, the production of tools that do not require specialized core reduction, or even poor flintknapping ability.

The core types included Unifacial, Bifacial, Conical, Tested, Exhausted, Multifacial, and Bipolar. Unifacial and Bifacial refers to the number of faces from which flakes were removed instead of faces with retouch scars. When more than two flaked faces were identified the term Multi-facial was used. Conical core types are technically single platform, multifacial cores, but these are noted in this analysis because they are evidence of a more formal kind of core reduction strategy. A Tested Core has only a few flakes removed and usually the majority of cortex remaining. This indicated that the material was experimentally flaked to test the quality, then discarded if it did not satisfy the knapper’s needs or preferences. Exhausted cores are usually smaller in size with evidence of heavy use. These cores were worked until they could no longer produce adequate flake blanks and were then discarded. Bipolar cores have evidence of bipolar
reduction, a technique used to reduce small cobbles by splitting them between a hammerstone and an anvil stone.

Core Platform Type further specifies formal or informal reduction methods by identifying patterned reduction techniques or random strategies. This category includes Random, Single, 180 degree opposed, and 90 degree opposed platform types. A core with a single platform has all of the flakes removed from the same platform. It is possible for this one platform to circumscribe the entire artifact or to occur at one point, as long as the flakes were being produced from the same ridge. According to this definition, bifacial cores could technically be considered single platform cores. Platform type was not recorded for bifacial cores because of this and the fact that bifacial cores are formal core types. The 180 degree platform types indicate two main striking platforms with flakes removed from opposing platforms, towards one another. The 90 degree platform types are similar, but at a 90 degree angle from one another instead of directly opposite each other. These types were identified and borrowed from Dockall’s (1991:164-165) core analysis. Random platforms describe an opportunistic flaking pattern during reduction. This is a less planned, and therefore less formal method of reduction. This occurs when new platforms are created by other flake removals, so that there is no discernible “starting point” for flaking. This could also be referred to as “opportunistic” flaking because the patterning followed the best available platform. Core fragments were noted in a separate attribute category and these are defined by Dockall as possessing “no recognizable flake scar features or platforms” and including “aborted and broken cores and possibly fragments of core tools” (1991:165).
To further understand reduction, flake removals were counted on cores. This can be a subjective category so it would be wise to incorporate an error of +/- two removals. Only an approximation is necessary because this attribute is for more insight on how extensively a core may have been used. The maximum dimension of the largest flake removal was also measured for this purpose.

**Projectile Points**

The projectile points were classified according to Dockall’s (1991) typology with the addition of the Diablo point type identified by Turnbow (2009) (Table 4.1). If one of these types could not be identified then the fragment was either identified as a general Arrow Frag, Dart Frag, or Unknown. The distinction between arrow and dart points was

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diablo</td>
<td>Broad, triangular blade; long, sharp barbs; deep, broad, corner notches; small expanded stem; and straight to slightly concave base.</td>
</tr>
<tr>
<td>Mimbres</td>
<td>Small points with deep corner notches; bases straight to concave and expanding. Three Circle Phase.</td>
</tr>
<tr>
<td>A1</td>
<td>Small triangular point; no stems or notches. Late Pithouse and Classic periods.</td>
</tr>
<tr>
<td>A2</td>
<td>Small corner notched points with triangular blades and contracting stems. Late Pithouse period.</td>
</tr>
<tr>
<td>A3</td>
<td>Small expeditently made arrow points; made on flakes with a small amount of modification.</td>
</tr>
<tr>
<td>A4</td>
<td>Side-notched arrow points; expanding stems. Late Pithouse and Classic periods.</td>
</tr>
<tr>
<td>A5</td>
<td>Unifacial retouch of small flakes; usually corner-notched. Late Pithouse and Classic periods.</td>
</tr>
<tr>
<td>D1</td>
<td>Medium-sized triangular corner-notched dart with expanding stem; convex or straight edge.</td>
</tr>
<tr>
<td>D2</td>
<td>Medium-sized side-notched dart point; Late Pithouse period.</td>
</tr>
<tr>
<td>D3</td>
<td>Large corner-notched dart points; percussion flaking.</td>
</tr>
<tr>
<td>D4</td>
<td>Triangular blades with straight to convex lateral edges, corner-notched, shoulders well-barbed.</td>
</tr>
<tr>
<td>D5</td>
<td>Medium to large dart points with deep corner notches and barbed shoulders; expanding stems. Late Pithouse period.</td>
</tr>
</tbody>
</table>

Table 4.1. Projectile point types and descriptions. Table adapted from Roth et. al (2011), defined by Dockall (1991) and Turnbow (2009).
recorded according to Roth et. al’s (2011) specifications used in investigating bow and arrow technology in the Mimbres Valley. Condition is a category used as descriptor for the state the point was recovered in (e.g., broken tip, reworked tip, medial frag, broken base, etc.). If broken, data on the location of the break was also recorded as a descriptive category (e.g., tip above base, far tip, 1 tang, base at MSD). For comparative purposes, the metric measurements follow that of Roth et. al (2011) and include length, maximum width, width at midpoint, thickness, stem width, minimum stem diameter (MSD), thickness at MSD, width of corner notches, and weight.

Summary

The methods outlined in this section aim to perpetuate the standardization and replication of the data collection performed during this analysis. The sample contexts of RF/WF, FF, floor, and feature fill provide a solid link between the artifacts and a particular household. The attributes described in this section were used to obtain information to address the technology, raw material use, and activities in these households. The idea that household clusters had different learning frameworks can be addressed using these attributes. The following chapter describes the results of this data collection in a format that organizes these attributes according to the research questions.
CHAPTER FIVE

RESULTS

The results presented in this chapter have been organized into sections that correspond to the research questions. The technological attribute results pertain to the first research question of distinguishing different technological styles between clusters. This section uses core and debitage data to examine the technological processes used to manufacture and repair stone implements. The next section contains raw material data. This section addresses the second research question which examines differences in raw material use between clusters. The last section corresponds to the third research question regarding activities being performed in each household. The results in this section examine the different tool types found in each cluster as a proxy for these household activities.

In each section, the attribute data are displayed according to each of the pithouse clusters outlined in Chapter 2 (see Table 2.2). To compare the results from the pithouse clusters to the rest of the site, a control group was added. This control group consists of the data collected from the lithics recovered from the pithouses not associated with the clusters being tested (Pithouses 41/47, 42, 44, 46). If the clusters differed significantly from the control group, it suggested that these patterns are unique to the cluster and supports the hypothesis that different learning frameworks are present. However, if they matched the control group, then it indicates that the patterns in the cluster are representative of a shared learning framework among all of the households at the site. Sample size was a recurring issue in regards to some aspects of the assemblage and this is
discussed in each section. Because of low sample sizes, statistical tests were not performed on the results. However, the comparison of percentages across the categories still allows for useful interpretations to address each question.

*Technological Attribute Results*

The core data were essential in addressing technological style across the site because of their role in the manufacturing process. Decisions made about core reduction methods can show material preference through conservation or careful planning, or a focus on expediency by random or opportunistic flake removal. Core type and core platform type were the attributes compared between clusters and they turned out to be remarkably proportionate for each category. Table 5.1 shows the counts for the core type results. Figure 5.1 displays the percentages of each category within the clusters and this graph shows some uniformity in the proportions across the site. The multi-facial category exceeded the other types in every cluster, followed by the tested cores. The least common across the site were the unifacial and conical types, with Cluster 2 lacking these types altogether. Cluster 2 nearly doubles the percentage of bifacial cores from other categories, possibly showing a slight preference for this type in this cluster.

The core platform types were very similar in regards to uniformity (Table 5.2; Figure 5.2). The dominant platform type was Random across all clusters. Single and bifacial platforms were nearly equally proportionate, leaving the 180 degree opposed and 90 degree opposed as the least common platform types. Bifacial core types were coded as having bifacial platforms, which explains the similar results for this category. Overall, the most common cores were multi-facial cores with random platform patterning, suggesting that the reduction of cores was a less formal process typical of expedient behavior (Parry
and Kelly 1987). The formal cores that were present came primarily from the control group and Cluster 3, which is most likely due to the larger sample sizes from these contexts. The fact that there are both informal and formal cores present in these household assemblages shows that even though there is a tendency towards expediency in

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Bifacial/Exhausted</th>
<th>Bifacial</th>
<th>Conical</th>
<th>Exhausted</th>
<th>Multi-facial</th>
<th>Unknown</th>
<th>Tested</th>
<th>Unifacial</th>
<th>Total</th>
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<td>115</td>
</tr>
<tr>
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<td>13</td>
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<td>8</td>
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<td>4</td>
<td>30</td>
<td>13</td>
<td>164</td>
</tr>
<tr>
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<td>3</td>
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<td>193</td>
<td>7</td>
<td>56</td>
<td>20</td>
<td>339</td>
</tr>
</tbody>
</table>

Table 5.1. Counts of core types across each cluster.

Figure 5.1. Percentages of core types across each cluster.
<table>
<thead>
<tr>
<th>Cluster</th>
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<th>180° Opposed</th>
<th>90° Opposed</th>
<th>Bifacial</th>
<th>Total</th>
</tr>
</thead>
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<td>7</td>
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<td>164</td>
</tr>
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<td>39</td>
<td>16</td>
<td>12</td>
<td>47</td>
<td>339</td>
</tr>
</tbody>
</table>

Table 5.2. Counts of core platform types across each cluster.

Figure 5.2. Percentages of core platform types across each cluster.

their toolkit, they may have been using a more planned strategy for utilizing certain materials more efficiently. The patterns across the clusters and control group do not suggest any significant deviance from the core reduction strategies, suggesting that the learning frameworks for core technology are not at the level of the cluster, but rather across the entire site. In addition to the core data, a sample ofdebitage from the floor contexts of the same households was analyzed (Menocal, n.d.). Unfortunately, sample
sizes were still an issue with the debitage data primarily due to the fact that the analysis was still ongoing at the time of this project (See Table 5.3 for sample sizes). The platform type (Table 5.3; Figure 5.3) was recorded on the debitage resulting in the most common being crushed and plain, making up 31.5% and 18.6% of the total sample, respectively. Crushed platforms occur from the use of hard hammer percussion, most likely in the earlier stages of flake production before the more fine work of soft hammer or pressure

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Absent</th>
<th>Complex</th>
<th>Cortical</th>
<th>Crushed</th>
<th>N/A</th>
<th>Plain</th>
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<td>3</td>
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<td>50</td>
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<td>1</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>3</td>
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<td>20</td>
<td>26</td>
<td>114</td>
<td>99</td>
<td>60</td>
<td>338</td>
</tr>
<tr>
<td>Total</td>
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<td>25</td>
<td>32</td>
<td>156</td>
<td>163</td>
<td>92</td>
<td>494</td>
</tr>
</tbody>
</table>

Table 5.3. Counts of debitage platform types across each cluster.

Figure 5.3. Percentages of debitage platform types across the clusters.
flaking are used. Plain platforms also occur in the earlier stages before other flakes are removed on the core or tool and can also represent the manufacture of non-bifacial tools (Andrefsky 2005). The presence of cortical platforms also supports the removal in the early to middle stages of reduction while cortex is still present on the parent material. Complex (or faceted) platforms were the least common platform type in the total sample, as well as in almost every individual cluster. This shows little evidence of late stage production because complex platforms occur after multiple facets have been removed from the core or tool. These patterns of platform types among the clusters still remain relatively proportionate, suggesting shared behavioral tendencies across the site. Overall, thedebitage platform types indicate a focus on hard hammer percussion in the early to middle stages of core reduction or non-bifacial tool manufacture.

Gilreath (1984) examined the correlation between both debitage platform type and preparation with the stage of production. Her study showed that platform preparation was more often associated with later stages of bifacial production rather than core reduction. Andrefsky (2005) also adds that abrasion or grinding on platforms shows more care being taken by the flintknapper, usually in the later stages of production. In the final stages, it would be beneficial to add this control to not risk wasting the time invested on the item. The debitage results show that flakes with evidence of preparation are far less common than those with no preparation (Table 5.4; Figure 5.4). The lack of platform preparation supports the other platform data by showing that the majority of the sample was from earlier stages of reduction. The data also show that this behavior was relatively proportionate in the assemblages from all clusters.
Table 5.4. Counts of flake platform preparation across each cluster.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Grind</th>
<th>Grind/Trim</th>
<th>N/A</th>
<th>None</th>
<th>Trim</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
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<tr>
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<td>4</td>
<td>99</td>
<td>206</td>
<td>5</td>
<td>337</td>
</tr>
<tr>
<td>Total</td>
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<td>6</td>
<td>165</td>
<td>282</td>
<td>12</td>
<td>493</td>
</tr>
</tbody>
</table>

Figure 5.4. Percentages of flake platform preparation across each cluster.

The presence/absence of lipped and split platforms was recorded as an indicator of the kind of percussion being performed and can also help determine the approximate stage of removal (Menocal, n.d). Lipping is usually indicative of soft hammer percussion in the later stages of production (Crabtree 1972). This attribute was very uncommon on
the debitage across the site (Figure 5.5). This pattern shows little differentiation between clusters, continuing the trend of uniformity across the site.

Split platforms were also uncommon in the sampled debitage (Figure 5.6). This characteristic is indicative of hard hammer percussion (Crabtree 1972), usually performed in the earlier stages of flake production. Although split platforms are rare in the assemblage, the crushed platforms seen in the flake platform types indicate that a large quantity of debitage was removed by hard hammer percussion. More importantly, this pattern was also distributed proportionately across the clusters, suggesting shared technological tendencies across the site instead of between the clusters.

Figure 5.5. Percentages of lipped platforms across each cluster.
Altogether the debitage attributes show evidence of early stage reduction with a significant use of hard hammer percussion. Together with the core data, they suggest that the focus was on expedient flake production with little evidence for any large scale biface production or emphasis on finer detailed work. This analysis demonstrates that this technological organization was shared across the whole village because no major differences were found in the proportions of each attribute in each cluster. Therefore, the hypothesis of the learning framework at the cluster-level cannot be supported. Instead, it appears that the learning framework operated between individuals on a village-wide basis.
**Raw Material Use**

This section discusses the two main raw material attributes used in this study: raw material type and the percentage of cortex. These attributes play important roles in the *chaînes opératoire* of lithic manufacture and can therefore be used to detect differences in learning frameworks or access to these materials. The overall raw material breakdown of the analyzed sample is listed in Table 5.5 and the proportions can be compared visually in Figure 5.7. Rhyolite (29%) and basalt (22%) dominate the assemblage, making up over 50% of the recovered materials. Chert (15%) and chalcedony (13%) are the next highest. The distribution among these materials shows that more coarse grained materials were used in overall tool production. Although there is fine grained rhyolite and basalt at the site, these materials still fall on the coarse end of the spectrum when compared to the cherts, chalcedony, and obsidian being used. Coarse grained is not to be mistaken for poor quality, however. These material types would have performed very differently in certain situations, and would have most likely been chosen for different kinds of tasks. This can be seen when the material is examined across the different tool categories (Figures 5.8-5.13).

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Andesite</th>
<th>Basalt</th>
<th>Chalcedony</th>
<th>Chert</th>
<th>Latite</th>
<th>Limestone</th>
<th>Obsidian</th>
<th>Quartz</th>
<th>Quartzite</th>
<th>Rhyolite</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>8</td>
<td>0</td>
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<td>115</td>
<td>12</td>
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<td>1</td>
<td>20</td>
<td>217</td>
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</tr>
</tbody>
</table>

Table 5.5. Total raw material breakdown of the tools and cores across each cluster.
Figure 5.7. Comparison of the tool and core raw material percentages across clusters.

Unifacial tools used for tasks such as hide scraping or woodworking require a more durable edge and are therefore usually made from rhyolite, basalt, or limestone (Table 5.6; Figure 5.8). The choppers, scrapers, and denticulates that make up the majority of the tools in this category would have required the sturdy edge that these materials provided. The unifacial tool category has the largest sample size of all the categories except cores; however, most of the sample comes from the control group and Cluster 3. This makes comparing Clusters 1 and 2 more difficult because the proportions are more likely to be skewed by outliers. Rhyolite is the most recurring material type in every cluster, with Cluster 1 showing the most use. The proportion in Cluster 1 is substantially different; however, it is difficult to say whether this is a result of a
significant difference in raw material choices or if it is a product of the small sample size. It is unlikely that this is due to differential access because of the prevalence of rhyolite in the surrounding region.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Andesite</th>
<th>Basalt</th>
<th>Chalcedony</th>
<th>Chert</th>
<th>Latite</th>
<th>Limestone</th>
<th>Quartzite</th>
<th>Rhyolite</th>
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<td>18</td>
<td>4</td>
<td>69</td>
<td>151</td>
</tr>
</tbody>
</table>

Table 5.6. Raw material distribution of unifacial tools across each cluster.

Figure 5.8. Percentages of raw materials used for unifacial tools across each cluster.
<table>
<thead>
<tr>
<th>Cluster</th>
<th>Cluster</th>
<th>Basalt</th>
<th>Chalcedony</th>
<th>Chert</th>
<th>Limestone</th>
<th>Obsidian</th>
<th>Quartzite</th>
<th>Rhyolite</th>
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<td>3</td>
<td>2</td>
<td>28</td>
</tr>
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<td>34</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>9</td>
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<td>79</td>
</tr>
</tbody>
</table>

Table 5.7. Raw material distribution of bifacial tools across each cluster.

Figure 5.9. Percentages of raw materials used for bifacial tools across each cluster.

There is a clear focus in the assemblage on high quality cryptocrystalline materials that were used for biface manufacture (Table 5.7; Figure 5.9). Bifacial tools and projectile points are made from the cryptocrystalline materials more often than the other
materials because a sharp cutting edge is usually required for the tasks these tools are used for. There is also a substantial amount of rhyolite present, most likely favored due to its tendency to come in fine grained varieties nearly comparable to some cherts found at the site. Although a focus on the higher quality materials exists, there is variation between which materials were chosen in each cluster. Compared to the control group, Cluster 3 lacks obsidian but makes up for it with chert. Clusters 1 and 2 also show substantial variability in their material choices, however with the available sample sizes ($n=9$, $n=8$), it is difficult to assume that this variation exists.

Composite tools have the lowest sample size of any tool category and are therefore most susceptible to having proportions that do not represent raw material choices. Even though this is the case, the material preference for these tools resembles that of the unifacial tools (Table 5.8; Figure 5.10). This fits with the nature of most of the composite tools which consisted primarily of denticulate and scraper edges. Only one tool in the composite tool sample is made from a fine-grained cryptocrystalline material, supporting the idea that edge durability was a primary factor for material choice.

The retouched flakes in the control group show an even mix of different material types throughout (Table 5.9; Figure 5.11). This pattern is different than any of the other tool categories and suggests that there was no preference placed on the kinds of materials needed for these tasks. Retouched flakes are the most expedient and informal tool type examined in this analysis, so this patterning may be a result of using whatever material is readily available to create a quick cutting edge. There is only one obsidian retouched flake in the sample and this is probably due to the size restriction of useable flakes that
can be created from the nodules. Because of the extremely low sample sizes throughout this category, it is difficult to discern any significance from these different proportions.

<table>
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<th>Cluster</th>
<th>Basalt</th>
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<th>Latite</th>
<th>Limestone</th>
<th>Quartzite</th>
<th>Rhyolite</th>
<th>Total</th>
</tr>
</thead>
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<td>7</td>
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<td>10</td>
<td>28</td>
</tr>
</tbody>
</table>

Table 5.8. Raw material distribution of composite tools across each cluster.

Figure 5.10. Percentages of raw materials used for composite tools across each cluster.
<table>
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<th>Chert</th>
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<th>Obsidian</th>
<th>Quartzite</th>
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<td>6</td>
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<td>2</td>
<td>8</td>
<td>59</td>
</tr>
</tbody>
</table>

Table 5.9. Raw material distribution of retouched flakes across each cluster.

Figure 5.11. Percentages of raw materials used for retouched flakes across each cluster.
The core patterns show similar characteristics to the total raw material proportions, with an emphasis on basalt and rhyolite; however, the amounts of these two types seem to shift slightly across some clusters (Table 5.10; Figure 5.12). Basalt is most prominent in Clusters 1 and 2 and less represented in Cluster 3 and the control group. The opposite is true for rhyolite; very little is present in Clusters 1 and 2 whereas it is more abundant in the Cluster 3 and the control group. When compared to the control group, these differences suggest that there may be a slight difference in preference for basalt and rhyolite in Clusters 1 and 3.

The cores of the cryptocrystalline materials show a general uniformity between clusters, with obsidian cores missing altogether. The lack of obsidian cores can be explained by a number of factors including the parent nodule size, reduction methods, and scarcity of the material. The majority of the obsidian comes from the Mule Creek source, as described previously, which produces nodules that would require bipolar reduction. This method can be quite destructive to the core, leaving behind plenty of shatter and other waste debitage. Any sizeable pieces that remained would have been the target material to work with, but these same pieces would have been the remaining evidence from which this analysis would have been able to distinguish any diagnostic core traits. Also, since the obsidian source is not local and the material is high quality, there most likely would have been an effort to utilize any remaining material.

The selection of material based on tool type is easily seen with the projectile points (Table 5.11; Figure 5.13). Chalcedony, obsidian, and chert dominate the sample because these high quality materials would have not only supplied the best cutting edge on impact, but would have also given the most control to the flintknapper for the
<table>
<thead>
<tr>
<th>Cluster</th>
<th>Andesite</th>
<th>Basalt</th>
<th>Chaledony</th>
<th>Chert</th>
<th>Latite</th>
<th>Limestone</th>
<th>Quartz</th>
<th>Quartzite</th>
<th>Rhyolite</th>
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<td>10</td>
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<td>16</td>
<td>1</td>
<td>10</td>
<td>5</td>
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</tr>
</tbody>
</table>

Table 5.10. Raw material distribution of cores across each cluster.

![Core Raw Materials](chart.png)

Figure 5.12. Percentages of raw materials used for cores across each cluster.
<table>
<thead>
<tr>
<th>Cluster</th>
<th>Andesite</th>
<th>Chalcedony</th>
<th>Chert</th>
<th>Latite</th>
<th>Obsidian</th>
<th>Quartzite</th>
<th>Rhyolite</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td>1</td>
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<td>37</td>
</tr>
<tr>
<td>Control</td>
<td>1</td>
<td>11</td>
<td>3</td>
<td>0</td>
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<td>2</td>
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</tr>
<tr>
<td>Total</td>
<td>1</td>
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<td>1</td>
<td>29</td>
<td>1</td>
<td>7</td>
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</tr>
</tbody>
</table>

Table 5.11. Raw material distribution of projectile points across each cluster.

![Bar chart showing percentages of raw materials used for projectile points across each cluster.](image)

Figure 5.13. Percentages of raw materials used for projectile points across each cluster.
Table 5.12. Distribution of raw materials of arrow and dart points between clusters.

<table>
<thead>
<tr>
<th>Description</th>
<th>Cluster</th>
<th>Andesite</th>
<th>Chalcedony</th>
<th>Chert</th>
<th>Latite</th>
<th>Obsidian</th>
<th>Quartzite</th>
<th>Rhyolite</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrow</td>
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<td>0</td>
<td>1</td>
<td>0</td>
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<tr>
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<td>1</td>
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<td>24</td>
</tr>
<tr>
<td>Arrow Total</td>
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<td>0</td>
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<td>0</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Dart Total</td>
<td></td>
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<td>9</td>
<td>8</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>26</td>
</tr>
<tr>
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<td>29</td>
<td>14</td>
<td>1</td>
<td>29</td>
<td>1</td>
<td>7</td>
<td>82</td>
</tr>
</tbody>
</table>

Figure 5.14. Percentages of arrow and dart point raw materials between clusters.

detailed process of point manufacture. Unfortunately there were only three projectile points recovered in the sample contexts of Cluster 1, leaving it difficult to distinguish any
significant patterns in this cluster other than the fact that it followed the trend of using cryptocrystalline materials. The use of chert and obsidian appears to shift between Clusters 2, 3, and the control group. Clusters 2 and 3 had roughly equal proportions of chert and obsidian, whereas the control group had very little chert compared to obsidian. Figure 5.14 shows the material distribution between the arrow and dart point types that make up the projectile point category. The obsidian is favored for arrow points and the chert for dart points. Since the proportions of arrow to dart points in each cluster is nearly equal (approximately 60-70% arrow points), this suggests that the data are reflecting a difference in raw material choice and not just a difference in the type of point being used.

Another aspect of raw material that was examined was the percentage of cortex remaining. Cortex is a characteristic of the raw material that can be targeted for removal during the manufacture process. It can also be left on the material to serve as a possible natural backing or grip for handheld tools. This analysis aims to show how the cortex was treated in each tool category across the clusters. Figure 5.15 shows the trend for cortex removal for the total sample of tools and cores in each cluster. This general trend is parabolic in nature, suggesting that most of the items are still covered with almost 50% cortex. This trend is mirrored on the cores, showing that the majority of cores fall into the middle ranges of percentages (Figure 5.16). This suggests that core reduction was not oriented towards the total removal of cortex. This behavior fits with the expedient technological approach seen in the tool manufacture. The main goal was to achieve a
Figure 5.15. Approximate amount of cortex remaining on the total sample of tools and cores.

Figure 5.16. Approximate amount of cortex remaining on the cores.
Figure 5.17. Approximate amount of cortex remaining on the unifacial tools.

Figure 5.18. Approximate amount of cortex remaining on the composite tools.
useable implement for the task; whether or not the cortex happened to come off in the flaking process was merely a secondary outcome of tool manufacture. Figures 5.17 and 5.18 support this by showing the same trend on the unifacial and composite tools however, the small sample size of composite tools makes the trend more difficult to distinguish. All of these figures show that this level of cortex removal was shared across the clusters.

Data class also plays a role in the amount of remaining cortex for these tool categories. The unifacial and composite tools were created from different parent nodules (flakes, cobbles, cores) with varying degrees of cortex to begin with. Figure 5.19 provides an example of how the data class affects the amount of cortex observed. This example demonstrates how cortex, dataclass, and tool type are interrelated: all have to do with the selection of certain materials for the desired tool. It also supports cortex removal

![Cortex on Data Class](image)

Figure 5.19. Cortex remaining according to data class on unifacial tools.
Figure 5.20. Approximate amount of cortex remaining on the retouched flakes.

Figure 5.21. Approximate amount of cortex remaining on bifaces.
as a secondary outcome because there is little evidence suggesting that the cortex on the
different nodules was reduced further than was necessary to create the desired tool.

Cortex on the bifacial tools and retouched flakes showed different patterns than
the other tool categories. Because of the nature of these tool categories, it would be
expected that there would be less cortex than others, such as unifaces or composite tools.
In fact, there are no instances of items with over 75% cortex still remaining in either
sample. This is because these tools were reduced from flakes and not larger data classes
like cores or cobbles. The retouched flakes were more likely to retain cortex because the
amount of retouch was usually minimal, leaving whatever was left on the original flake
blank (Figure 5.20). Biface manufacture requires the largest amount of reduction, which
would have left little to no cortex on these items, as Figure 5.21 shows. Also, bifaces
usually were required to have a sharp cutting edge, and cortex would have been a
hindrance to obtaining this goal. These patterns have similar outcomes across clusters,
suggesting that this approach was shared among those in different clusters.

The raw material analysis provides key insights as to how raw materials were
being utilized across the site. There is no evidence suggesting that the goal of core
reduction was complete cortex removal. Instead, the percentage of cortex remaining was
most likely a result of the data class of the parent nodule as well as the type of tool being
produced. The preference for different materials across the tool types demonstrates that
raw materials were being selected for their functional purposes. The higher quality
materials were being used for the tools that would require sharp cutting edges while the
coarse grained materials were selected for tools that would require a durable edge. The
total raw material proportions seen in Figure 5.7 pattern out similarly for each cluster,
suggesting that these choices were commonly shared throughout the village. Because the distributions are relatively equal in the samples from each pithouse cluster, it can be assumed that access to any of the raw materials was not restricted to these households. Since these total proportions are relatively uniform across the clusters, it would be expected that the raw material distributions between each tool category might be relatively equal as well. However, there were different raw material choices noted in almost all of the tool categories, supporting the idea of different learning frameworks in the clusters. On the other hand, the cortex data lend no support to this hypothesis because the lack of cluster differentiation.

**Functional Attribute Results**

Since microscopic methods were not employed in this analysis, understanding the activities being performed in the clusters depends on interpretations made from tool types. The number of different tool types are compared between clusters and used as a proxy for activities occurring within the households.

The total overall counts for each category are displayed in Table 5.1. The sample sizes from each cluster were not proportionate, with Cluster 3 nearly quadrupling the total number from either of the other clusters. Unifacially retouched tools were the most

<table>
<thead>
<tr>
<th>Category</th>
<th>Control</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unifaces</td>
<td>77</td>
<td>12</td>
<td>14</td>
<td>48</td>
<td>151</td>
</tr>
<tr>
<td>Non-Hafted Bifaces</td>
<td>28</td>
<td>9</td>
<td>8</td>
<td>34</td>
<td>79</td>
</tr>
<tr>
<td>Composite</td>
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<td>3</td>
<td>4</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>Retouched Flakes</td>
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<td>17</td>
<td>59</td>
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<td>33</td>
<td>3</td>
<td>13</td>
<td>33</td>
<td>82</td>
</tr>
<tr>
<td>Cores</td>
<td>164</td>
<td>34</td>
<td>26</td>
<td>115</td>
<td>339</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>347</strong></td>
<td><strong>67</strong></td>
<td><strong>70</strong></td>
<td><strong>254</strong></td>
<td><strong>738</strong></td>
</tr>
</tbody>
</table>

Table 5.1. Total tool counts from each cluster.
numerous tool category while composite tools produced the smallest sample size. Flakes with intentional retouch make up a significant portion of the sample. The largest sample came from the cores, which provided results for addressing the questions of technological style and raw material use. The control group consisted of almost half of the sample and had more tools in any category than any of the clusters with the exception of the projectile points from Cluster 3.

The unifacial tool category consists of the most varied selection of tools (scrapers, denticulates, choppers, and notches) that would have all functioned slightly differently. Some scrapers are associated animal processing tasks such as hide working.

<table>
<thead>
<tr>
<th>Clusters</th>
<th>Scraper</th>
<th>Denticulate</th>
<th>Chopper</th>
<th>Notch</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>0</td>
<td>12</td>
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<td>2</td>
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<td>48</td>
</tr>
<tr>
<td>Control</td>
<td>40</td>
<td>22</td>
<td>15</td>
<td>0</td>
<td>77</td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>45</td>
<td>26</td>
<td>2</td>
<td>151</td>
</tr>
</tbody>
</table>

Table 5.14. Amount of unifacial tool types across each cluster.

![Figure 5.22. Percentages of unifacial tool types recovered from each cluster.](image)
Denticulates are similar to scrapers, but they are considered to have been used more for the processing of wood or plants. Notches could have also played a part in these tasks however they would have had a more specialized function because of the single, concave groove on the tool. Choppers are usually larger, handheld tools made for the purpose of pounding or crushing materials. The scrapers and denticulates make up the majority of the sample; however, the proportions vary in Cluster 1 (Table 5.14; Figure 5.22). Unfortunately, Clusters 1 and 2 have low sample sizes that may be skewing the percentages of these tool types, making it difficult to discern the significance of this variation.

The edge shape of the unifacial tools was also recorded as this may have been a factor in the different kinds of processing activities that these tools were used for. The results show that convex edge shapes were the most common (Figure 5.23). Although still outnumbered by the convex edged tools, the proportion of straight edges in Cluster 3 is slightly higher than the other clusters and the control group.
The bifacial tool category consists of preforms, drills, and perforators. Bifaces include tools that would have had an edge used for cutting or slicing. Preforms include bifaces that are in different stages of reduction, including finished bifaces without evidence of hafting (Stage 5) (Andrefsky 2005:188-190). The other two types get their namesake from the tasks they would have performed: drilling and perforating. The drills could be used for working other materials such as ceramics, bone, or jewelry items like turquoise or chrysacolla. The perforators are usually quite sharp and small in overall size and could have been useful in clothing or textile manufacture.

Preforms were the most common bifaces in all of the clusters except Cluster 2 (Table 5.15; Figure 5.24). This cluster had an unusual proportion of drills and although the sample size may be skewing this percentage, it is still a noteworthy difference. Drills were absent in Cluster 1, which is also a suspicious difference when compared to the other clusters. Even though perforators were the least common tool type, the proportions were nearly equal in every cluster.

Cluster 2 also had different preform stage proportions, suggesting that there is potentially a real difference in biface use in this cluster. There is a focus on later stage bifaces in this cluster compared to that of the rest of the site (Figure 5.25). Finished bifaces, or Stage 5, are only seen in small amounts in Cluster 3 and the control group. The early stages seem most consistent, except in Cluster 2.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Preform</th>
<th>Drill</th>
<th>Perforator</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>9</td>
</tr>
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<td>8</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>5</td>
<td>4</td>
<td>34</td>
</tr>
<tr>
<td>Control</td>
<td>21</td>
<td>5</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>14</td>
<td>8</td>
<td>79</td>
</tr>
</tbody>
</table>

Table 5.15. Amount of bifacial tool types across each cluster.
Figure 5.24. Percentages of bifacial tool types recovered from each cluster.

Figure 5.25. Percentages of different preform stages across each cluster.
The projectile points consisted of two main categories: dart and arrow points. The dart points are associated with atlatl hunting technology whereas the arrow points were used with bow and arrow technology. Although they would have had the same function of piercing and both are indicative of hunting behavior, they represent different styles of doing so. Also, learning these two different ways of hunting would have been a key component in the learning frameworks present at the site.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Arrow</th>
<th>Dart</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
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<td>3</td>
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</tr>
<tr>
<td>Control</td>
<td>24</td>
<td>9</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>26</td>
<td>82</td>
</tr>
</tbody>
</table>

Table 5.17. Amount of dart and arrow points in each cluster.

![Diagram](image.png)

Figure 5.27. Percentages of darts and arrow points in each cluster.
The proportions of these points are remarkably similar across each of the clusters (Table 5.17; Figure 5.27). The results show that the arrow points were favored slightly over the dart points, supporting that this newer technology was used more once it was introduced into the region, although not fully replacing it. If these points are indicative of the hunting practices performed by the household members, it shows that these two technologies were learned and practiced equally among those in the different clusters. This lack of variation between clusters does not support the hypothesis of different learning frameworks present in each cluster.

Lastly, the retouched flakes were examined for unifacial or bifacial retouch. Although it is difficult to assign specific functions to retouched flakes, one possibility of examining this would be comparing unifacial or bifacial retouch on the edge. Retouched flake edges may have been used as expedient versions of the more formal tool types and therefore unifacial retouch on flakes could have been used for different tasks than edges with bifacial retouch. Following the same trend as the formal tool categories, flakes with unifacial retouch are more common than those with bifacial retouch in each cluster (Table 5.16; Figure 5.26). The slight variance in the proportions across the clusters is most likely a result of the small sample sizes from the clusters.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Bifacial</th>
<th>Unifacial</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
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<td>3</td>
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<tr>
<td>Control</td>
<td>9</td>
<td>22</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>39</td>
<td>59</td>
</tr>
</tbody>
</table>

Table 5.16. Amount of unifacial and bifacial retouched flakes in each cluster.
Figure 5.26. Percentages of unifacial and bifacial retouched flakes across each cluster.

The proportion of tool types from each category show that the range of functions they represent were performed relatively equally across the clusters. This is also the case for most of the attributes, such as the unifacial edge shapes and biface preform stages. There may be some differences in the activities being performed with the bifaces in Cluster 2, since this seems to be the only significant difference among the comparisons. However, the small sample size of bifaces in this cluster makes this difficult to verify. Even though there are some slight differences in these proportions, the evidence is not strong enough to suggest completely different learning frameworks in each cluster. Not only do the clusters show similar patterns to each other, but they are similar to the control group as well, suggesting that these functions are representative of the total site pattern.

**Summary**

Overall, the data reveal interesting dynamics about the Harris Site assemblage that have implications for each research question. The technological attributes show an
assemblage characterized by expedient manufacturing techniques. There are instances of more formal techniques in core reduction and tool manufacture, but they are outweighed by the types that lack significant planning and preparation. The low number of preparation on the debitage coupled with high number of crushed platforms suggests that the majority of flakes were removed in the early stages of reduction with hard hammer percussion. This behavior is mirrored across the clusters, seen by very little variation in the proportions of these attributes. The lack of variation does not support the hypothesis of different learning frameworks for tool manufacture in each cluster.

The raw material attributes show clear preferences for materials that suit the task. Cryptocrystalline materials are used for tools that require a cutting or slicing edge whereas tools such as choppers and denticulates were usually made from more durable materials such as basalt or rhyolite. Although these general choices pan out across the clusters, there is some variation between clusters when it comes to the exact materials that were selected. For example, most bifaces were made with cryptocrystalline materials, but whether this was chert or chalcedony (both cryptocrystalline) varied between clusters. These differences may be reflecting unconscious preferences for one material over another. Variation is not seen in the cortex remaining on the tools and cores. The cortex does not show any clear evidence of being targeted for 100% removal, as most implements still had some cortex remaining. Overall, the raw material types show the most support for different learning frameworks in each cluster, while the cortex data do not.

The tool types and different morphological attributes (edge shape, unifacial/bifacial retouch) suggest that similar activities were taking place in each of the
clusters. The unifacial tools were the most prevalent, suggesting a relatively significant amount of scraping and chopping activities. Bifaces were common as well, showing a wide range of domestic activities were taking place within the pithouse contexts. There was overlap of atlatl and bow-and-arrow technology during this time, as indicated by the use of both dart and arrow projectile points. The proportions of the tasks being performed in each cluster were relatively similar, therefore not supporting the hypothesis of different activities between clusters.
CHAPTER SIX

DISCUSSION AND CONCLUSIONS

The results obtained through this analysis have significant implications for understanding the lithic learning frameworks at the Harris Site. The theoretical framework suggests that technological styles exist within domestic, utilitarian artifact assemblages and that these styles are transmitted between those within a community of practice, often times family members. If the pithouse clusters at the Harris Site consisted of corporate groups, then the extended family members of these groups would have established learning frameworks for new generations of flintknappers to learn the techniques of this craft. The attributes analyzed in this thesis examined traits within the lithic assemblage to search for distinct patterns in the household technological styles and activities, and to determine if differences existed between household clusters. The conclusions are organized by each research question, followed by a discussion of the variation of data patterns across the clusters.

Research Questions

1. **Does the chipped stone assemblage suggest patterning in technological style between household clusters?**

   The technological attributes of the Harris Site lithics show an assemblage that is best described as expedient and informal, which is typical of assemblages from sites within the Mimbres Valley (Shafer 2003; Nelson 1984). This is best seen in the core attributes, with 47% of the cores being multifacial with random platforms and the second most common type being tested cores (17%). The cores exhibiting a more planned approach (conical cores, 180° and 90° opposed platforms) were the least common.
Furthermore, the majority of flake platforms are plain, crushed, or absent (88%) while only 22% of the debitage showed any evidence of platform preparation. This is consistent with models of expedient core technology described by Parry and Kelly (1987:287), who note that “…flaking techniques are not intended to control the form of the resulting flakes. Cores are not preformed or prepared in any ways. Instead, they are struck almost randomly.” They link this behavior to a high degree of sedentism, which could also be argued for the Mimbres at the Harris Site during the Late Pithouse period. The debitage platform characteristics also support this interpretation because of the lack of evidence for more fine-detailed work.

These attributes were used to examine the technological style of lithic manufacture in the pithouse clusters. Since technological style is useful for determining learning frameworks, comparing the frequencies of these attributes between clusters allows for identifying distinct learning frameworks per corporate group, or a shared framework between groups. These results show that very similar proportions are present across each of the pithouse clusters, suggesting that the chaînes opératoire during manufacture was shared between the individuals producing and repairing chipped stone implements in each of the clusters. There were differences in sample sizes of the cores and debitage from each of the clusters, but the sample is sufficient to suggest that these similarities are not a product of skewed proportions and that there are no significant differences in the embedded technological styles represented within these clusters. Although learning frameworks may have existed in each corporate group, even in each household, the shared technological styles across the site supports the idea that these frameworks were not so stringent as to dictate specific styles per family. Flintknappers
probably learned from family members as well as peers from different groups in the village. The degree of sedentism, raw material availability, and tool function would have played a significant role in the knowledge being transmitted through these frameworks across the entire village. These factors would have led to similar pressures on each household, explaining why the flintknappers shared technological knowledge.

2. **How was lithic raw material used within each cluster?**

The raw material results show that tool type has a clear influence on material selection. More durable materials were chosen for unifacial and composite tools whereas the fine-grained cryptocrystalline materials were selected for the bifaces and projectile points. This is also seen within the projectile points as obsidian was used almost exclusively for arrow points, although this could also be a result of the small size of the obsidian nodules. The retouched flakes resemble opportunistic selection because there is no apparent preference or pattern in material selection, suggesting that they just used what was readily available.

There was no evidence suggesting cortex removal was a primary goal during general core reduction, with the exception of bifaces which, by definition, intentionally have most of the cortex removed during manufacture. The relationship of dataclass and tool type affected the amount of cortex remaining. For example, large cobbles used to make choppers would generally begin with more cortex on them compared to flakes used to make scrapers, resulting in more cortex remaining.

The treatment of raw materials at the Harris Site is somewhat different than that seen at La Gila Encantada, an upland Mimbres Late Pithouse period site (Roth 2010). At La Gila Encantada, cores were heavily reduced, as evidenced by the number of exhausted
cores (40%) and those with less than 50% cortex remaining (85%). This supports the theory of differential sedentism over time between upland sites and those within the river valley (Roth 2007, 2010; Stokes and Roth 1999). The availability of raw material in each region could also play a role in explaining this behavior. The Harris Site lies next to the Mimbres River, which is where many of the raw materials, such as basalt and rhyolite, were procured. The increased use of basalt at the Harris Site compared to La Gila Encantada indicates that proximity to the river is a likely cause of different material conservation, therefore requiring different degrees of core reduction.

At both Harris and La Gila Encantada, obsidian cores are absent from the assemblages. This is very different than Wind Mountain, a Mimbres site to the west of the Mimbres Valley, where 72% of all cores were obsidian (Woosley and McIntyre 1996). There is no sourcing data on the assemblage from Wind Mountain, but if it consists primarily of obsidian from the Mule Creek area, such as that of the Harris Site and La Gila Encantada (Ferguson 2010; Ferguson n.d.), then this suggests that the occupants of Wind Mountain did their obsidian core reduction on-site instead of at the quarry or trading for blanks or preforms. Since Wind Mountain is closer to the Mule Creek source, it suggests that proximity to the raw material source is a determining factor in procurement and reduction strategies.

The raw material analysis shows some variation between clusters. The most variation appears to have come from the choice of cryptocrystalline materials in the biface and projectile point categories. The proportions of these materials differ for each cluster when compared to the control, however, the results from clusters 1 (n= 9) and 2 (n=8) may be skewed because of their small sample sizes. Nonetheless, cluster 3 has 17%
less obsidian used for biface manufacture than the control group, but an increased percentage in chert. Chert, chalcedony, and obsidian were less common in the region than the non-cryptocrystalline materials and therefore may have required different strategies of utilization and conservation. The knowledge of which materials to use and conserve is an example of the kinds of decisions that would have been transmitted through mentorship. The difference in biface materials between clusters could be representing different learning frameworks. This difference is not likely to be the result of differential access to either chert or obsidian because the total raw material proportions suggest a relatively even distribution of these materials across all of the clusters. These raw material differences in the clusters provide some support in the existence of learning frameworks within each corporate group.

3. Were there differences in the activities being performed with the chipped stone implements between clusters?

Without the use of microwear analysis to determine the exact activities that tools were used for, a detailed understanding of subsistence processing activities is difficult to obtain. However, it can be determined that the need for wild game was still an important factor in the subsistence economy during the Late Pithouse period. Tools typically involved with animal processing such as bifaces and scrapers are the most numerous at the site, but this does not necessarily suggest that meat was a main staple of the diet. In fact, the preliminary analysis of the significant amount of groundstone at this site suggests that the occupants were invested more so in agricultural production during this period (Falvey 2012). Projectile point data show that the atlatl was still used for hunting practices after the bow and arrow was introduced. If the proportion of dart points is assumed as a proxy for the frequency of atlatl use, the results show that even though it

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was still used, it was not preferred over the bow and arrow. This is consistent with Roth et al.’s (2011) theory of the bow and arrow introduction into the Mimbres Valley, as well as Van Pool’s (2006) model of the spread of this technology throughout the greater Southwest.

The tool types show less variation than the raw materials across clusters, but some variation is still present. The number of scrapers varied the most within the uniface category, with cluster 1 showing about 25% less than the control. The drills in cluster 2 were disproportionate to the control with approximately 30% more than the control. Unfortunately the small sample sizes may have played a role in these results, making it difficult to discern if there are significant differences between them. The edge shapes of the unifacial tools are very consistent between clusters, but the stages of the bifaces show more variation. This variation, in addition to the raw material differences in the bifaces, suggests that choices involved in this tool category were occurring independently between clusters. The fact that such similar proportions of tools and tool morphologies are seen suggests shared knowledge between clusters. The knowledge of tool use and activities was shared, but it appears that each cluster was autonomous in carrying out their own activities. Corporate groups usually work as a unit for economic purposes (Hayden and Cannon 1984), so this would support corporate group identity within each cluster; however, the control group also shows this pattern. Comparing households within each corporate group would be necessary to test whether or not this is just reflecting the behavior of individual households.
Conclusion

The analysis of each cluster’s lithic assemblage shows weak evidence supporting the hypothesis of different learning frameworks within each cluster. The technological attributes examined by the first research question show that tool manufacture and repair was very similar throughout all of the clusters. The cores and debitage suggest that the flintknappers in each pithouse cluster shared technological styles. The raw materials examined also suggest that similar choices were being made in regards to which materials were utilized and for what tools. Some material choices may have varied according to the biface materials in clusters 3, but this evidence by itself does not make a strong enough case for each cluster having a different learning framework. The proportions of tool types examined in the third research question suggest that similar activities were taking place in each household cluster; no cluster appeared to have had an emphasis on any particular activity.

From these results, it appears that the chipped stone learning framework occurs at the scale of the entire community. Flintknapping knowledge and mentoring was not restricted to one’s own corporate group lineage, but shared by most all individuals across the site. To use Cavalli-Sforza and Feldman’s (1981) definitions, the vertical and oblique transmission modes were not the only ways knowledge was being shared. These were the transmission pathways between immediate descendants (e.g.: parent-child) and also extended family members (e.g.: uncle-nephew). Horizontal transmission, or transmission within peer groups, most likely played a significant role in the learning process at the Harris Site. The results from this analysis can most likely be interpreted as a combination of all of these pathways.
When placed into the larger social context of the Harris Site, this supports the idea of a more fluid and shared identity of the individuals and family groups within the community. Evidence of identity markers such as possible clan symbols on pendants, as well as the spatial clustering of pithouses sharing distinct traits, shows that a certain level of identity was intentionally signaled by members within the community. However, this research shows that these separations of identity were not so rigid as to restrict the flow of learning amongst lineages or corporate groups. Even though some individuals may have identified as different family groups at the Harris Site, there was still some degree of sharing knowledge and assisting with daily tasks.

Future research on technological style and lithics could prove useful for identifying attributes that might hold more potential for insight into micro-styles and knapping behaviors to link identity and technology. It may also be helpful to explore the connection of rigidity in the social structure with the learning process. It is possible that groups with less formal social hierarchy, like the Mimbres, have looser learning frameworks amongst their communities of practice. On the contrary, groups with more strict social identities between corporate groups or lineages may show more formal learning frameworks to contain certain craft knowledge within the group. Whether or not this loose learning structure varies by craft or even temporally within the Mimbres region is another avenue of potential pursuit. Dockall (1991) is the only other lithic study in the region that might address the temporal aspect, but the data are not categorized by household or roomblock, so styles cannot be compared within the site. Finally, it would be beneficial to examine each individual pithouse’s assemblage within the clusters to see how they compare to other houses within the same cluster, as well as those outside.
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EDUCATION:
2013 M.A.- University of Nevada, Las Vegas, Anthropology Department, emphasis Archaeology. Thesis title: *Examining Household Identity Through Lithic Technology at the Harris Site*

EMPLOYMENT HISTORY:
2013-present Nevada State Historic Preservation Office. Archaeologist for the Nevada Site Stewardship Program  
- Worked with multiple federal agencies to assess information gaps in existing site records  
- Coordinated volunteers and interns during the collection of field data  
- Assisted with public outreach and education events
2009-present Desert Research Institute, 755 E. Flamingo Rd., Las Vegas, NV 89119  
- Graduate Assistant: Manages the GIS database of archaeological sites and surveys and is also a member of the field crew.
2012 Southwest Archaeology and Lithics Lab, UNLV Anthropology Department  
- Lab Technician: Includes analysis of lithic material from the Harris Site, New Mexico and computer mapping of the Harris Site.
2006-2009 Indiana University of Pennsylvania, Archaeological Services, Indiana, Pennsylvania  
- Lab Technician, PennDOT Curation Project: Wash, sort, re-bag, and catalog artifacts from sites associated with the PennDOT Curation project according to the 2003 PHMC Curation Guidelines.  
- Lithic Analyst: Analyzing the lithic collection from the Olliver III site.  
- GIS and GPS Technician: Collecting field data from sites with survey grade GPS technology and representing it through an ArcGIS format.

ARCHAEOLOGICAL PROJECTS:
2013 Co-director of the Gold Butte field project for the Nevada Site Stewardship Program. Directed by Dr. Samantha Rubinson and Justin DeMaio.
2012 Volunteer on the Shivwits Research Project in the Grand Canyon-Parashant National Monument, AZ. Directed by Dr. Karen Harry, Dept. of Anthropology, UNLV.
Crew member on multiple archaeological surveys on the Nevada National Security Site. Directed by Harold Drollinger, Barbara Holz, and Robert Jones, Desert Research Institute.

2011

Crew Chief for the 2011 UNLV field school at the Harris Site in the Mimbres Valley, New Mexico. Directed by Dr. Barbara Roth, Dept. of Anthropology, UNLV.

Crew member for the Gila Archaeological Project, Hermosa, New Mexico. Directed by Dr. Eleanor King, Dept. of Sociology and Anthropology, Howard University and Chris Adams, Archaeologist, Black Range Ranger District, Gila National Forest.

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Student at the 2010 UNLV field school at the Harris Site in the Mimbres Valley, New Mexico. Directed by Dr. Barbara Roth, Dept. of Anthropology, UNLV.

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2008

Crew Chief for the 2008 IUP field school at the Johnston Site in Blairsville, Pennsylvania. Directed by Dr. Sarah Neusius and Dr. Beverly Chiarulli, Dept. of Anthropology, Indiana University of Pennsylvania.

GPS Crew Supervisor at the Gila Archaeological Project, Hermosa, New Mexico. Directed by Dr. Eleanor King, Dept. of Sociology and Anthropology, Howard University and Chris Adams, Archaeologist, Black Range Ranger District, Gila National Forest.

2006

Student at the 2006 IUP field school at the Johnston Site in Blairsville, Pennsylvania. Directed by Dr. Sarah Neusius and Dr. Beverly Chiarulli, Department of Anthropology, Indiana University of Pennsylvania.

REPORTS AND PUBLICATIONS

2012

DeMaio, Justin. A Class III Cultural Resources Inventory of the BREN Powerline Repair, Area 25, Nevada National Security Site, Nye County, Nevada. Cultural Resources Reconnaissance Short Report No. 072512-1, Desert Research Institute, Las Vegas.

DeMaio, Justin and Barbara A. Holz. A Class III Cultural Resources Inventory of the Proposed Vegetation Stress Experiment Locations, Area 8, Nevada National Security Site, Nye County, Nevada. Cultural Resources Reconnaissance Short Report No. 091311-1, Desert Research Institute, Las Vegas.


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PRESENTATIONS AND POSTERS:


2011  Site Type Variation and Prehistoric Landscape Use Across the Nevada Test Site. Poster presented at the 76th Annual Meeting of the Society for American Archaeology, Sacramento, CA.


Investigating Loyalhanna Chert Procurement in the Late Prehistoric. Session: Reconsidering the Monongahela: New Viewpoints on the Archaeology of Western Pennsylvania. Poster on Undergraduate Thesis original research presented at the 74th Annual Meeting of the Society for American Archaeology, Atlanta, GA. Also presented at the IUP Undergraduate Scholars Conference in 4/09.

Applications of Advanced Technology to an Archaeological Survey of Hermosa, New Mexico. Session: Investigations of a Ghost Town: The Archaeology of Hermosa, New Mexico. Poster co-authored with Germaine McArdle and Tiara M. Bey at the 74th Annual Meeting of the Society for American Archaeology, Atlanta, GA.

2007  New Perspectives from New Investigations at some Old Sites. Session: What Happened After AD 1000? Recent Research in the Upper Ohio Watershed. Poster co-authored with Celeste Mazza and Kellen Hinrichsen at the 72nd Annual Meeting of the Society for American Archaeology, Austin, TX. This poster was also presented at the IUP Undergraduate Scholars Conference in 4/07.

GRANTS AND AWARDS:

2013  $500 UNLV GPSA Grant awarded for travel reimbursement to the 2013 SAA Conference in Honolulu, HI

2012  $150 UNLV GPSA Grant awarded for travel reimbursement to the 2012 Mogollon Conference in Silver City, New Mexico
$500 UNLV GPSA Grant awarded for travel reimbursement to the 2012 SAA Conference in Memphis, TN

2010
$300 UNLV GPSA Grant awarded for travel reimbursement to the 2010 Mogollon Conference in Las Cruces, New Mexico.
$300 UNLV GPSA Grant awarded to attend the 2010 UNLV summer archaeological field school at the Harris Site in the Mimbres Valley, New Mexico.

COMMUNITY AND PUBLIC OUTREACH

2013  Secretary for the Nevadans for Cultural Preservation (NVFCP) non-profit organization.

Guest classroom speaker and demonstrator on flintknapping and stone tools for the Dawson College Bound summer program. Class instructed by Laura Gryder.

2012  Guest classroom speaker on archaeological methods and stone tools for the Summer Advanced Gifted Education program at UNLV. Class instructed by Sharon Young.

Guest speaker and chaperone to the Las Vegas Springs Preserve for the Summer Advanced Gifted Education program at UNLV. Class instructed by Laura Gryder.


PROFESSIONAL ORGANIZATIONS:
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PROFESSIONAL SKILLS:
Archaeological Methods
Field Methods: GPS technologies including Trimble R-8 with base station and rover, Trimble GeoXH handheld with Zephyr antenna attachment, and multiple Garmin handheld devices. Also, Metal Detection
Analytical Methods: Lithic Analysis

Computer Skills
GPS Post-processing with Pathfinder Office.
ESRI ArcGIS (versions including and up to 10.1)

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