Chapter Two: Literature Review

Cory Coakley

Introduction

To accomplish this research, a solid theoretical and analytical understanding of activity spaces is essential, which requires stable geographical and archaeological foundations. I will review several concepts that have been used to interpret the pattern of people’s activities in space.

**Activity area studies** in archaeology position the humans who lived and interacted in ancient cities to the forefront, theoretically repopulating empty sites into the living systems that they once were, to better understand their construction of place (Flannery and Winter 1976). Feminist political geographers have focused on the locus of traditional female activity, the household, and investigated the interplay between domestic and production forces within that space.

**Household archaeology**, reviewed at length by Cynthia Robin in 2003, seeks to humanize archaeological sites by changing the scale at which we observe and experience monumental structures and ancient cities. **Spatial pattern analysis** of site formation processes and artifact distribution patterns can then lend statistical validity to any interpretation of the material culture record (Kvamme 1985,1990; Schiffer 1985). Observing Xuenkal through these multiple lenses will allow for a more comprehensive analysis of its place and its past.

**Social Construction of Place and Scale: Structuration**

To Pred (1984), social structures exhibit the power relations and rules of behavior formed by people in a particular context. Those social structures in turn form and influence the behavior of individuals. These reflexive actions occur over varying degrees of spatial and temporal scales; in a process he terms *structuration* : any consideration of place requires observing the path of any person or object through both time and space, tracing the interlinkages between individuals and events. Kellerman (1983) saw structuration as a means for geography to describe the process through which people, their society, place, and time become integrated. This emphasizes the transformative effects that time, space and society have on each other (Kellerman 1983). Giddens (1983) maintained that structuration was the process by which a place becomes more than just a container for human actions and becomes a contextual representation of both place and society. Expanding on Giddens, Gregson (1986) concentrated on the agency-structure relations within Giddens’ theory, suggesting that structuration implicitly narrows the focus of geographic scale to the person to person, the smallest scale at which those actions can be observed. According to Wilk and Rathje (1982), the fundamental level at which human behavior directly relates to social processes is that of the household. Staeheli and Lawson (1994) go further, claiming that larger societal processes are *recreated* at the scale of the household (emphasis mine). In terms of function, a household serves as the physical space in which social processes such as consumption or gender relations take place.

Brenner (2001) insists that a more nuanced view of the construction of scale is necessary and credits Marston with presenting the concept of the household as a geographical scale (see Marston 2000). Breaking Marston’s household scale into three elements, he describes three methods of approaching the household geographically: *functional importance*, *internal* *sociospatial organization* , and *scalar positionality* (Brenner 2001:596). These concepts provide a convenient framework through which archaeological and geographical thought can be compared based on constitutive space, scale, and function.

**Functionally,** time geography’s activity spaces and archaeology’s activity areas share a common focus on identifying and tracking the physical actions within and between individuals and their living spaces (Miller 1991,2004; Kent 1984; Flannery and Winter 1976). Activity area studies in archaeology position the humans who lived and interacted in ancient cities to the forefront, theoretically repopulating empty sites into the living systems that they once were, to better understand their construction of place (Flannery and Winter 1976). Feminist political geographers have focused on the locus of traditional female activity, the household, and investigated the interplay between domestic and production forces within that space.

**Internal** **sociospatial organization**is the process in which areas of a household reflect their role within domestic or production economies. Cognitive archaeology and feminist geography both aim to discover and represent the ways in which human actions create, reflect, and symbolize the power structures of a living community (Hodder 1982; Renfrew 1994; Patterson 1989).

**Scalar positionality** refers to the relationship of the household as a unit to other geographical entities, such as the body, the community, or the nation (Brenner 2001:596). Time geography, feminist geography, and Maya studies have developed a new regard for the household within the larger community, especially that of the everyday, domestic, or non-elite (Kwan 1999; Marston 2000; Hendon 1996, 2001). Household archaeology, reviewed at length by Cynthia Robin in 2003, seeks to humanize archaeological sites by changing the scale at which we observe and experience monumental structures and ancient cities.

Finally, spatial pattern analysis of site formation processes and artifact distribution patterns can lend statistical validity to any interpretation of the material culture record (Kvamme 1985,1990; Schiffer 1985). The goal of this study is to demonstrate that modern geostatistical tools and GIS methods can be applied at the household scale, supporting observed patterns of past behaviors and revealing gendered activity spaces.

*Feminist Geography*

To Doreen Massey (1992) the spatial organization of a location reflects the activities performed within that space. The distribution of responsibilities within a space reflects, and is constructed by, the power dynamics of the individuals who use the space. This internal behavior is confirmed and reinforced by both internal actions and external ideology . Mona Domosh (1998) highlights studies that examine the ways that women produce income in their home spaces. Rather than remaining a refuge separate from the economy, women’s actions shape the home into a space that is both public and private. The production function of the home enlarges the concept of the home from solely a place of reproduction and places it simultaneously in both the private and the economic spheres.

*Structurational and Cognitive Archaeology*

Barrett (1988), following Giddens, argues that the material culture of the ancient past is not a fixed document, but rather a physical reminder of the interactions of a society that calls for archaeology to move “away from the patterning of things to the structuring of relationships” (p.10). He suggests that archaeology visualizes past human relationships through the “field of discourse”, a unit defined by the interactions of people participating in repetitive tasks, the spatial extent over which activities take place, and the cultural resources that authorize individuals’ actions, such as architecture or personal belongings worn as symbols of elite status. Finally, Barrett includes the actions themselves and any responses engendered.

Hodder advanced the idea of a cognitive archeology, one that recognizes that the meaning of an object does not reside within the object itself, but is created through the context of its use within a society of human interactions (Hodder 1982:9). Physical artifacts, as representative symbols of an active culture, point towards the behavior and belief systems of their owners in the past (Renfrew 1994). Focusing on this sense of agency, cognitive archaeology attempts to discern the dynamic actions of the individuals who lived in the past. One method proposed to accomplish this is activity area studies (Flannery and Winter 1976; Webster and Gonlin 1988).

In addition to studying the actions of the humans within a social structure, it is crucial to study a society’s physical structures. For example, the nature of wattle and daub house structures’ permeability by sound and light may have influenced how family members communicated and interacted inside, outside, and through the walls of buildings. This fluidity and interconnectivity between inside and outside contributed to a sense of cohesion among the city’s residents and a shared experience of community (Robin 2002). Understanding past spaces as living spaces is crucial to understanding that, in Renfrew’s words, “the past really happened” (Renfrew 1994:10).

*Time Geography: Space-Time Paths and Activity Spaces*

Central to time geography is the concept of travel along the space time path from point A to point B. Finite areas in space exist at any stopping point along an individual’s travel through time. Harvey Miller named these points stations, and previous focus in time geographic studies has been on the movement through space of the individuals being studied (Miller 2005; Builing 2006, McNally 2008). Hagerstrand’s Time-Geography presented a way to visualize a person’s movements through time and 3-D space, depicted motion along a path through time as a line, bisected at intervals by polygons of “activity systems” (Pred 1977). These activity spaces indicated the cessation of that individual’s motion, and a fixed period of time spent within a finite spatial limit. These activities were characterized by a particular task or activity such as the spatial extant of an individual’s home or worksite (Pred 1977). These paths were a means of uniting spatial and temporal travel within a single conceptual unit. Harvey Miller’s graphical representation of the space-time path and prism remain the defining visualization of this concept, as seen in Figure 2.1.



Couldn’t find a caption, edit here to supply one.

Figure 2.1, from *Modelling accessibility using space-time prism concepts within geographical information systems, Harvey J. Miller, 1991*

Massey (1992) argues that, as space and time are created and defined through their relationship to each other, it is imperative to step away from this view of space as a static slice through time. To Builing (2006), while time geography theory focused on the individual, practical applications of time geography were limited to studies of activities over large zones, such as changes in transportation patterns in urban environments (Kwan 2004). Miller maintains that geographic information is especially sensitive to local interactions, and careful examination should be made of the relationships between objects (Miller 2004).

An activity-based approach (sometimes referred to as ABA) has developed focusing on the stable points of reference where activities are carried out, and not solely on travel behavior. As most travel is between home and non-home, ABA names the primary activity space unit of analysis the household activity pattern (Builing 2007, McNally 2008).

*Archaeology: Activity Area Studies*

Activity areas are “spatially restricted areas where a specific task or related set of tasks has been carried out” (Flannery and Winter 1976). This study insists that documentation of artifacts alone is not enough to reconstruct the purposes of the tools recovered in an archaeological site. Rather, the context of the artifact within the space where it was determined to have been used is essential to identifying its purpose (Flannery 1976). Coming out of a response to processional archaeology, Flannery’s microscale study of an Early Formative household floor was groundbreaking in its premise that household patterns and types could inform upon division of labor, subsistence patterns, or craft activities (Flannery 1976; Robin 2003). Careful recording of tool locations, cross referenced with function and gender use were combined in a multi-scalar analysis of houses from 5 archaeological sites. The authors concluded that detection of several categories of household activity was possible (Flannery and Winter 1976). Categories included universal activities such as food procurement and preparation, and certain kinds of tool preparation. Ethnographically, studies such as those by Susan Kent (1984,1993), that meticulously record and define the use of residential space at the individual level, lend precedent for the inferences drawn by archaeologists when they seek to describe the roles of ancient individuals, their artifact use, and reconstruct the actions of their lives within a space.

*Behavioral Archaeology and Depositional Patterns*

The first step of determining what spatial patterns mean in archaeology in order to begin analysis of artifacts at the household level is to account for whether or not the patterns visible to us are valid indicators of human behavior or merely byproducts of physical depositional processes. Early household archaeology viewed the remains of the material culture of a society as similar to a fossil record, able to be read directly from the ground (Binford 1962). Schiffer protested this study of artifact patterning as a static snapshot, moving instead towards a focus on cultural context (Schiffer 1972). Any analysis of artifact patterning, then, must involve discussions of site formation processes in order to distinguish between patterns that may have been formed by cultural behavior and those that may have occurred due to the actions of the environment upon the archaeological site (Lamotta and Schiffer 1999)

Once patterns have been recognized and established as cultural, this has the potential to recreate the history of an object throughout time, which is superimposed locationally and temporally with the individuals who used that artifact (Lamotta and Schiffer 1999). In this way artifacts, through their use and discard patterns, can unlock the lives of the people who created them. Archaeology thus functions at multiple scales. The material cultural records nests within the spaces of an artifact’s past, both community and domestic.

Scalar Positionality

*Archaeology and the Household*

The household is held by anthropologists and ethnologists to be the fundamental unit of society (Hendon 2001; Robin 2003; Freter 2004), but it was not always a clearly defined unit of archaeological study (Wilk and Rathje 1982). Hendon (2001) credits Wilk and Rathje’s definition of the household as key to archaeology progressing from studies “of physical remains to social formations”. This household concept provides a way of reducing the area of study to one small enough to include non-elite members of society (Hendon 2001; Robin 1999).  Fundamental though the household may be, individual household sites were disregarded for much of the twentieth century in favor of monumental centers and elite residences (Webster and Gonlin 1988; Wauchope 1934).

The Maya household concept is intricately related to social structure, enveloping within it terms of scale, lineage, residence, community organization, and structural variation (Freter 2004; Manahan 2004; Watanabe 2004). Marcus (1983) describes basic Maya social organization and some of the various types of household units, formal and informal. She stresses that the household, as the most basic unit of society, is also likely to be the most common and therefore the most abundant in the archaeological record.

While the tendency is to consider a house as one structure for one family, households can and do include multiple smaller buildings that were not used primarily for shelter or sleep, but served various specialized purposes in domestic life and as such are to be included in the ‘household’ category (Ashmore:1981; Webster and Gonlin:1988). A household may consist of a family living under one roof, a series of small buildings used for separate purposes, and even the outside spaces linking the structures (Freter 2004; Robin 1999; Lohse and Findlay 2000; Marcus 1983; Hutson 2004).

*Feminist Geography and Gendered use of Space*

Geographers like Kwan (1998, 2004) have used time geography and the study of activity travel patterns to highlight the differences between male and female experiences of space. Gendered experiences of place feed into gendered constructions of space and scale. Archaeological studies have established that female and male roles in Maya society were strictly gendered, with pottery associated with food preparation and female activity (Robin 2003; Hendon 1996).

Mills (1999) holds that cooking vessel size directly reflects the size of the group consuming the prepared food, and the presence or absence of storage vessels could indicate whether the inhabitants had control over their surplus (Alonso-Olvera 2012). Hendon proposes that food production demonstrates a household’s political position, in that it demonstrates to what degree a household could fulfill its larger societal obligations such as feasting or tribute (Hendon 1996).

In her dissertation, Alejandra Alonso Olvera (2012) explores Xuenkal’s link to the larger city of Chichen Itza during the Terminal Classic. In particular, Alonso Olvera examines how Xuenkal persisted during a time of population decline, in the wake of Chichen Itza’s growing influence. Concentrating on one Terminal Classic household at Xuenkal (8M-001 on Fig. 3), Alonso Olvera studies the use of domestic and production spaces to determine the ways individuals met their increased needs within that living space (Alonso Olvera 2012). Ardren et al. (2010) maintain that the high number of spindle whorls found in the Sotuta-era buildings 9L-31 and 8M-1 at Xuenkal indicate that a large quantity of higher quality cotton fabric was being manufactured during the Terminal Classic period. Economically, Ardren et al. propose that this indicates an intensification of craft production, perhaps necessary for tribute payments (Ardren et al. 2010). Ideologically, weaving was highly specialized and gender specific, performed only by women and fulfilling both practical and religious purposes (Ardren et al 2010).

By examining the distribution of artifacts across Xuenkal’s platform 8M-001 through a political economic framework, Alonso Olvera concludes that residents of Xuenkal during the Terminal Classic were participating in a production economy that was managed regionally by Chichen Itza, and that production increased due to a need to meet trade obligations. At the same time, the rising influence of Chichen Itza gave room for a new, mid-elite social class, one that did not share ruling power but, through production and trade networks, had access to higher status imported goods. Xuenkal residents’ conspicuous display of goods associated with the dominant economic class was a means of recognizing that group’s status and claiming some of that status for themselves (Alonso Olvera 2012). If economic strategies were shifting and the focus of Xuenkal residents’ economy in the Terminal Classic moved towards Chichen Itza (Ardren and Lowry 2011), patterns observed in previous studies should be visible in contemporaneous structures at the site, including 9L-31.

Spatial Pattern Analysis and Activity Spaces

*Early Spatial Pattern Analysis in Archaeology*

Cowgill (1968) discusses the advantages and disadvantages to the use of statistical analysis techniques, cluster, factor and proximity analysis, in archaeological site analysis. He emphasized that the use of statistical techniques increased the need for an understanding of the quality of the dataset being analyzed and the use of multiple techniques to cross-check any one set of results. Cowgill suggested the usefulness of these analyses for grouping assemblages and establishing seriation sequences (Cowgill 1968). Continuing this attention to statistics as a means of understanding the inherent qualities of datasets, Hodson (1970) discussed the use of nearest neighbor and k-means analyses as ways of establishing statistically significant taxonomic sequences. Wandsnider (1996) summarized the early history of the adoption of statistical techniques to spatial data in archaeology neatly. Highlighting a representative sampling of studies and their methods, goals, techniques used, she addresses the various strengths and drawbacks to applying specific techniques to archaeological sites and assemblages.

By focusing on studies that concentrate on single methods, however, publications are overlooked that took a more general approach to explaining the multiple applications of statistical methods to spatial pattern analysis. Among these is Hodder and Orton’s (1975) *Spatial Analysis in Archaeology* , which covers applications of point pattern analysis, regression analysis, clustering, trend surface analysis, and the importance of identifying spatial autocorrelation. Spatial analysis of artifact distribution patterns is addressed by Cowgill, Hodder, and Kvamme in the 1976 *Intrasite Spatial Analysis of Archaeology*(Hietala 1976). Early use of regression analysis to display trend surfaces of Maya stone monuments was performed by Bove (1981). Bove predicted that mapping the residuals from a regression analysis of sites with multiple stelae would show clustering of Maya settlement sites in the Late Terminal classic into five regional zones (see Figure 2.2 and 2.3) . This analysis supported Marcus’s (1976) conclusion that the Late Terminal Classic Maya region was characterized by regionalism that would have had bearing on its later collapse (Bove 1981; Marcus 1976).

The advancement of computing power and Geographical Information Systems (GIS) led to a greater emphasis on better fit of statistical techniques to the data at hand, including progression from global to local measures of spatial autocorrelation, including the use of Moran’s I and local measures of spatial autocorellation (Cliff and Ord 1973, 1981; Whitley and Clark 1985; Kvamme 1989, Williams 1993). Recently, Lisa Premo (2004) revisited Bove’s Maya monument data with updated counts, focusing on the use of the newer technique of Gi\* to identify local spatial autocorrelation (Fig. 2.4)



Couldn’t find a caption, edit here to supply one.

Figure 2.2 Bove’s early trend surfaces (Trend surface Analysis, Bove, 1981)



Couldn’t find a caption, edit here to supply one.

Fig. 2.3 Map of residuals identifying clustering of Maya settlements in the Late Terminal Classis (Bove 1981)



Couldn’t find a caption, edit here to supply one.

Fig. 2.4 Lisa Premo’s trend surface map of Bove’s updated data (Premo 2004)

*Activity Space: Ellipses, Density Surfaces, Space-Time Aquariums*



Couldn’t find a caption, edit here to supply one.

Early time-geography studies relied on ellipses to identify the boundaries of activity spaces along a space-time path (Newsome 1998, Miller 2005). This led to an increased focus on travel behavior and transportation planning (Pred 77). Recent advances in GPS tracking and GIScience have enabled the development of density surface analysis and the space-time aquarium, two time-geographic methods that allow better visual representation of three dimensional spatial patterning (Builing 2006; Kwan and Lee 2004a, 2004b). By projecting a trend surfaces into 3-D space, Kwan and Lee (2004) provide an intuitive method of observing multiple characteristics of spatial data at once, a process they term geovisualization (Fig.2.5).

Figure 2.5 Activity density patterns superimposed over a 3D representation of home locations, Kwan and Lee, 2004

Approaches based on movement through time are inapplicable to Structure 9L-31, as the mainly Sotuta artifact assemblage restricts our analysis to that particular time period. Density surface analysis, however, allows for the superimposition of multiple variables in an environment and the direct comparison of multiple activity spaces. While GIS has been used in archaeology successfully for landscape prediction modeling (Conolly and Lake 2006; Merher and Wescott 2006), and trend surfaces have been used to visualize artifact density (Bove 1981; Premo 2004), combining the two techniques to form visual, three dimensional representations of artifact density is a rather recent development. A dramatic example of this technique is Bevan and Conolly’s depiction of surface pottery density draped over a DEM of the island of Antikythera, Greece (2009) (figure 2.6)



Couldn’t find a caption, edit here to supply one.

Figure 2.6 Sherd density surface draped over DEM of Antikythera, Greece, Bevan and Conolly, 2009 While the image in Figure 2.6 dramatically visualizes the density of sherds on the island, the activity area surfaces in Figure 2.5 utilize the density values themselves to generate the three dimensional surface. It is a combination of these two methods which I will use to interpret artifact patterning and, by extension, 9L-31 inhabitants’ activity patterns.

**Concluding Remarks**

Understanding the reflexive nature of structuration is key to understanding a community’s construction of place and space. Examining the ways that the residents of Structure 9L-31 constructed their surroundings can only be done through a study of the artifacts they left behind. While we cannot observe resident’s actions through time tracking, through spatial pattern analysis we can begin to identify how they used particular spaces. Through the use of density surfaces and cluster analysis we are provided a statistical representation of past activities. Time geography provides us the tools to visualize these activities in three dimensional space. Cognitive archaeology allows us to project from artifact patterning and activity spaces the potential behavior and belief systems of 9L-31 residents within their community.