

Occupation Span and the Organization of Residential Activities

A Cross-Cultural Model and Case Study from the Mesa Verde Region

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INTRODUCTION

The anthropological study of households was revitalized during the 1980s when researchers began to examine household organization from a behavioral perspective (Netting, Wilk, and Arnould 1984a; see also Douglass and Gonlin, this volume). Archaeology was well equipped to meet the challenge posed by this emphasis on what households do. There was a long tradition of identifying and interpreting activity areas at archaeological sites, and a robust method and theory for undertaking these studies had developed as a result of this intense scrutiny (c.f. Binford 1976, 1981; Kent 1984, 1987, 1990a; Schiffer 1972, 1975, 1976, 1987). These factors combined to produce a renewed interest in the study of household organization in the past through the excavation of residential sites and the reconstruction of the activities that occurred at these residences (c.f. Lightfoot 1994).

The study presented in this chapter builds on this tradition. I examine the organization of activities at residential sites with a focus on one of the most important activities undertaken by a household: the construction of a new resi-

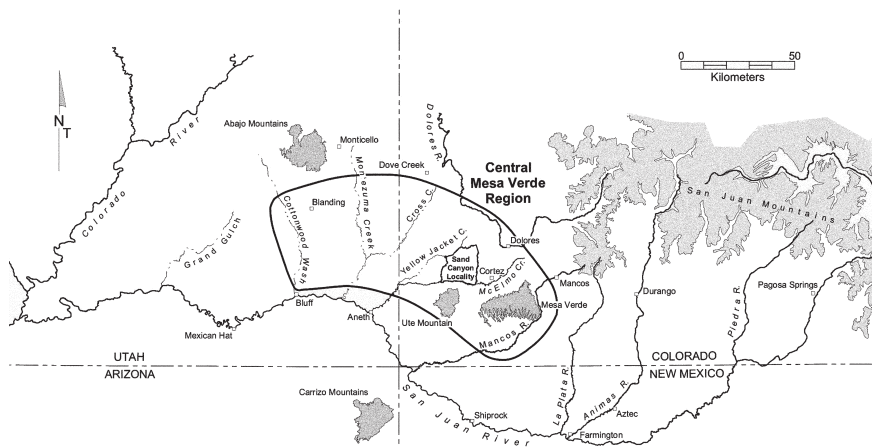


Figure 2.1. Map showing the location of the central Mesa Verde region in the northern San Juan drainage of the southwestern United States

dence. I show how the organization of activities and aspects of the construction of residences were influenced by the anticipated occupation span of residences and the length of time the residences were actually occupied. I also examine the effects of restricted space at residential sites.

This study combines two approaches. The first is a cross-cultural study of the spatial organization of residential sites (see also chapters by Beaulé, Ciolek-Torrello, Henderson, McCormack, and Snow for other types of studies of households related to architecture). I develop this study by synthesizing numerous ethnoarchaeological analyses. This cross-cultural study suggests that there are general principles that structure the organization of activities at residential sites. I test the applicability of this cross-cultural model by comparing it to a case study from the central Mesa Verde region of the northern San Juan River drainage in the US Southwest (Figure 2.1). In so doing, I achieve two goals: I demonstrate the general applicability of the cross-cultural model with the central Mesa Verde region case study, and I explain the changing organization of selected activities that occurred at ancient Pueblo residences over a period of seven centuries.

To better understand Pueblo household archaeology I examine nineteen residential sites that were constructed and occupied at different times between AD 600 and 1300. My analysis of these sites unfolds in several parts. I begin by examining the relationship among three key concepts: household social organization, coresidence, and the organization of activities at residential sites. Next, I examine the archaeological features found at residential sites in the central Mesa Verde region and discuss how households are identified in the archaeological record of this area. Then I discuss the continuity and change that occurred in the form of these features over a period of seven centuries. To complete the study

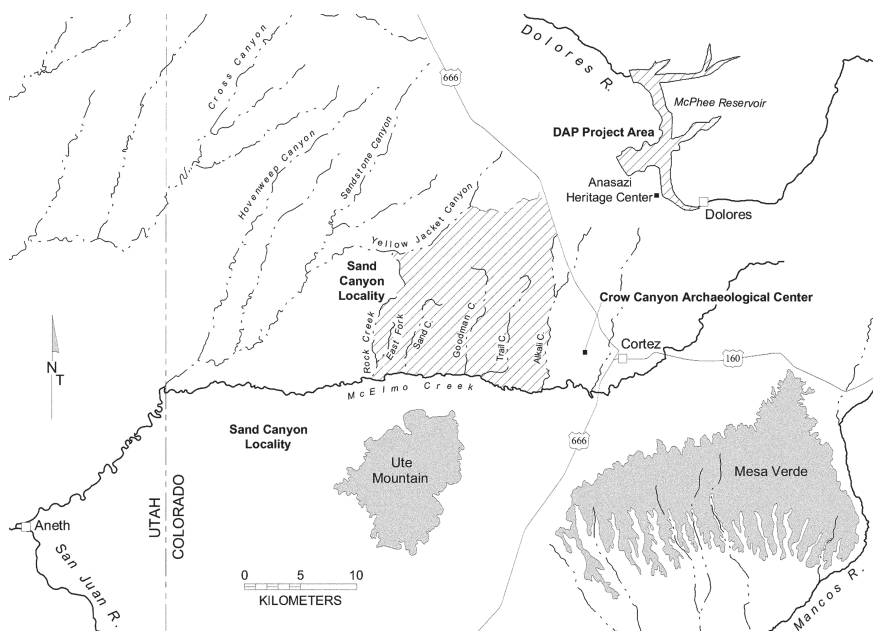


Figure 2.2. Map showing the location of the Dolores Archaeological Program (DAP) project area and the Sand Canyon locality, Colorado

of household residences in the central Mesa Verde region, I measure the length of occupation of these sites and document how their occupation span changed through time.

After presenting these archaeological data, I summarize the ethnoarchaeological studies and develop a cross-cultural model that specifies how the spatial organization of selected activities at residential sites changes as occupation span increases and as space becomes more restricted. Finally, I examine the archaeological case study in light of this cross-cultural model to evaluate the link between occupation span and the changing form of ancient residences in the central Mesa Verde region.

To examine household archaeology in the central Mesa Verde I examine nineteen excavated residential sites. These sites are located in two study areas, the Dolores River valley and the Sand Canyon locality (Figure 2.2); those in the Dolores River valley were excavated as part of the Dolores Archaeological Program (Breternitz 1993) and those in the Sand Canyon locality as a part of the Sand Canyon Archaeological Project, which was sponsored by the Crow Canyon Archaeological Center (Lipe 1992; Varien and Wilshusen 2002). The period during which each residence was occupied is established using tree-ring dates or pottery dating. The sample includes one residence that was occupied in the AD

600s, five from the AD 775–900 interval, two from the AD 900–1100 interval, and eleven from the AD 1100–1300 interval. I determine the occupation span of these nineteen sites using two approaches. General estimates are obtained by using data on the relationship between the structure use life and the type of building materials (i.e., earthen vs. stone-masonry buildings). Refined occupation span estimates are calculated by quantifying the amount of cooking pottery discarded by each household using a method that has been described in a series of publications (Varien 1997, 1999a; Varien and Mills 1997; Varien and Potter 1997).

The analyses, presented below, show three things: (1) the occupation span of residences increased through time; (2) there were concomitant changes in the spatial organization of activities at these sites; and (3) these changes are consistent with patterns identified in ethnoarchaeological and cross-cultural studies. This study documents how the changes in the organization of activities were conditioned by increasing occupation span and, to a lesser degree, by limitations in available space. The development of a cross-cultural model and the application of this model to the Mesa Verde region suggest that the relationships identified in this study have general applicability and they provide new insights into the changing household organization of a specific area. As such, this study fosters a better understanding of the organization of activities undertaken by households and provides a basis for future studies of household organization that are even more detailed.

HOUSEHOLD ORGANIZATION, CORESIDENCE, AND RESIDENTIAL SITES

Many early studies of households viewed household membership and coresidence as coeval, but critical examination of the household concept focused on the relationship between the household and coresidence and demonstrated that the two are not isomorphic (Netting, Wilk, and Arnould 1984b:xxvi–xxviii; Wilk and Netting 1984:17–19). In particular, analysts encountered problems when coresidence was used to determine household membership, when household membership was used to categorize households into structural types, and when structural types were used in comparative studies and evolutionary frameworks.

The presumed link between coresidence and household membership was undermined by a series of empirical studies that demonstrated that the group that resides together is fluid and has impermanent social boundaries (Netting, Wilk, and Arnould 1984a, 1984b; Wilk and Netting 1984). As has been discussed by many authors in this volume, the household as a coresidential group can include kin and people who are not biologically related, and it can include kin who temporarily reside elsewhere but who nonetheless make an important contribution to household affairs. The spatial dimension of the physical residence

should not be conflated with the social, demographic, or conceptual dimensions of the household. The fact that household membership and coresidence are not isomorphic was a key factor that led to the call for behavioral, as opposed to structural, analysis of the household. This critique of the household concept led to the distinction between families as kinship units as opposed to households as task-oriented residence groups. This led to the call for the empirical study of household activities.

This critique clearly uncoupled coresidence and household membership, but the focus on activities gave the residence a new salience as the spatial unit for the analysis of household organization because it provided a nexus for the activities that define households in behavioral terms. This is especially true for archaeology, in which the residential site is virtually the sole focus for household studies. The residential site comprises the buildings that served as the house and the artifacts and features that resulted from the activities conducted by householders during their occupation of the residence. The nature of house construction, the use of the residence, and the spatial organization of residential activities are therefore among the most useful data available for the analysis of household organization. Decisions involved in building a house and creating associated activity areas are rarely made or acted upon by a single individual because these decisions affect, and in turn are affected by, the entire household (Netting, Wilk, and Arnould 1984b:xxii).

Study of the spatial organization of activities at residential sites offers insights into the interaction among household members that occurred by virtue of their coresidence. There is nothing universal about household composition or the arrangement of specific activities that occur at a residence, but residential sites and households are among the most universal analytical units that can be observed. For this reason they remain important for comparative and cross-cultural research that is designed to elucidate the practices and processes that define household relations.

HOUSEHOLD RESIDENTIAL SITES IN THE NORTHERN SAN JUAN REGION

Some of the earliest archaeological research on households anywhere in the world was T. Mitchell Prudden's work in the central Mesa Verde region (Prudden 1903, 1914, 1918). Prudden focused on household residential sites that had the greatest archaeological visibility—those constructed with stone masonry—which we now know dated to the final century of Pueblo occupation in the region, the AD 1200s. Prudden (1903:11–16) presented a diagram of a typical residential site and emphasized the remarkable uniformity in their layout. This layout includes a roughly north-south orientation and the recurring association of a small block of aboveground rooms on the north, a pit structure south of

the roomblock, and a midden south of the pit structure. Given the consistent patterning in their orientation and layout, Prudden (1903:11) called these residential sites “unit type” pueblos, a label that remains in use today. Roberts (1939) subsequently demonstrated that unit pueblos developed in the AD 600s, and he documented the continuity and change in the unit pueblo over the subsequent seven centuries.

There is variation among unit pueblos (Gorman and Childs 1981), but equally striking is the widespread distribution and relentless modularity of this basic residential unit. In some cases, unit pueblos were isolated residential sites that were a part of dispersed, multisite communities. In other cases they were the basic building block for larger, nucleated villages. Studies that describe and attempt to explain the changing form of this residence unit span decades (Brew 1946; Bullard 1962; Gillespie 1976; Gilman 1987; Lipe and Breternitz 1980; McGuire and Schiffer 1983; Morris 1939; Roys 1936; Wilshusen 1988a). A detailed examination of the use of individual structures at residential sites—and how this use changed over time—is beyond the scope of this chapter, but I will briefly summarize recent research that provides the necessary background for my study.

In a particularly important work, Lightfoot (1994) examined household organization at the Duckfoot site, a remarkably well-preserved hamlet that was occupied between AD 850 and 880. Major features at Duckfoot include a roomblock with nineteen contiguous structures, four pit structures to the south of the roomblock, and a midden south of the pit structures. Duckfoot is an exceptionally strong case study because of the completeness of the excavations, the precision of a chronology based on almost 300 tree-ring dates, and the abundance and diversity of artifacts that were found on structure floors. A detailed site report (Lightfoot and Etzkorn 1993) and a series of publications present interpretations of architectural patterns, artifact assemblages, and household organization at the site (Lightfoot 1992a, 1992b, 1993, 1994; Varien and Lightfoot 1989).

Lightfoot used architectural and artifactual data to reconstruct activity areas at the site. Following the approach outlined by Wilk and Netting (1984), he analyzed these activities to examine household organization at Duckfoot. He identified the smallest spatial-architectural unit that contained a full set of activities and showed how this full set of activities was repeated in each of the households at the site. He demonstrated that a pit structure and its associated rooms and extramural areas composed the spatial-architectural unit that contained a full set of activities, and he showed that this set of activities was repeated in each of the pit structure-room-extramural units at Duckfoot. He concluded that one large household had used each of these spatial-architectural units and that the hamlet was constructed and occupied by three such households (Figure 2.3). He argued that within each unit the front rooms of the surface roomblock were living areas used by different segments of the household, and that back rooms were storage

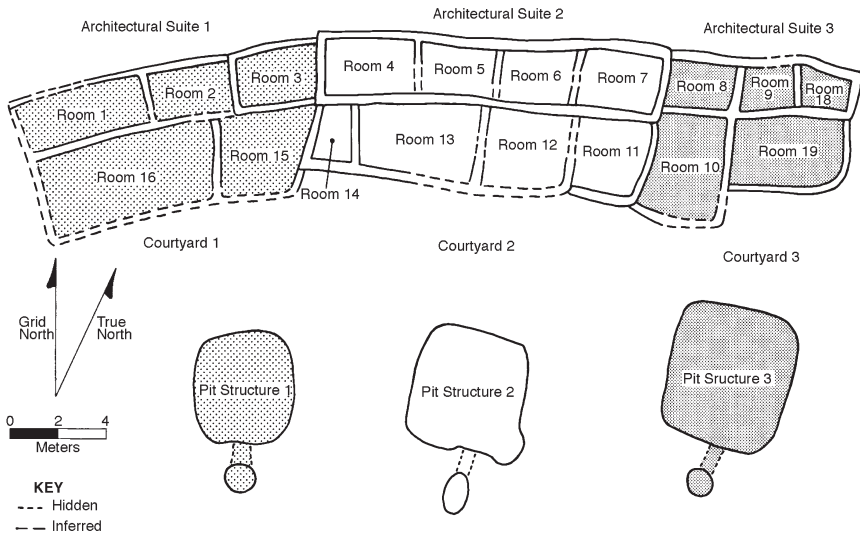


Figure 2.3. Plan map of the Duckfoot site (5MT3868) showing the architectural suites used by three households, central Mesa Verde region, Colorado

areas used by the entire household. Each household also used a pit structure for domestic and ritual activities (Lightfoot 1994; Varien and Lightfoot 1989).

Lipe (1989) examined the temporal depth of this pattern in the central Mesa Verde region and concluded that this spatial-architectural unit was the residence for an extended family or some other small coresidential group throughout the Pueblo occupation of the region. Synthesizing data from the region, he showed that the average number of rooms associated with a single pit structure varied from 7.6 to 6.5 to 9.0 in three successive periods: AD 850–900, 1050–1150, and 1150–1300, respectively (Lipe 1989:56). These data indicate that the size of the household remained relatively consistent through time and that the variation that did exist was constrained to a relatively narrow range. To provide general estimates of household size, Lightfoot (1994:147–148) examined ethnographic data on Pueblo household size and concluded that, on average, the range was five to eight individuals. A similar range is derived by using Lipe’s (1989:56) data on the average floor area for architectural suites in conjunction with Naroll’s (1962) often-cited estimate of ten square meters per person. Doing so produces a range of 5.1 to 8.7 individuals per household during the AD 850–1300 period.

At each of the residential sites examined in this chapter, a single pit structure or kiva is associated with a roomblock containing fewer than ten rooms. The size of these spatial-architectural units suggests that they were used by a single, large household. In the remainder of this chapter, I examine how the changing form of ancient Pueblo residences corresponds to their increasing occupation span.

ESTIMATING OCCUPATION SPAN

One of the things members of a household do is build and occupy residences. In terms of labor expenditure, the house was the most expensive artifact created for daily use by Pueblo people. Based on Pueblo ethnography, and consistent with vernacular architecture worldwide, the construction of a house is typically a corporate undertaking that is shaped by household membership (Cameron 1999; Mindeleff 1891). The house in turn structures the activities that occur there. Activity areas in and around the house were formed and modified during the use of the residential site and are a reflection of the daily practices of household members.

Measuring the length of occupation of residential sites is one essential step in evaluating the relationship between variation in occupation span and changes in the organization of activities through time. I examine occupation span in two ways. First, cross-cultural analyses demonstrate that the maximum use life of individual structures depends in part on the type of building materials used in construction, and these data can provide a general upper-limit estimate for the occupation span of a particular residence. Second, I obtain a more refined estimate of the occupation span of specific residential sites by quantifying the amount of broken cooking pottery that accumulated at that residence.

CONSTRUCTION MATERIALS AND OCCUPATION SPAN

Residential architecture in the central Mesa Verde region changed in important ways during the AD 600–1300 period. There were changes in the form of the pit structure, which has been labeled the pithouse-to-kiva transition (Gillespie 1976), and there was an increasing use of more substantially constructed surface rooms through time, which has been labeled the pithouse-to-pueblo transition (Gilman 1983, 1987; Lipe and Breternitz 1980; McGuire and Schiffer 1983; Whalen 1981; Wilshusen 1988a). Less attention has been given to the transition from earthen architecture to masonry architecture, although I have argued that this was a change of even greater importance (Varien 1999b, 1999c).

To examine the development of masonry architecture in the central Mesa Verde region, a distinction must be made between structures in which masonry was incorporated into the lower portions of walls, but whose upper portions were predominantly adobe and vegetal materials, and structures with full-height masonry walls. This distinction is important because the former—which I will call “composite earth-and-masonry walls”—are non-load-bearing walls that do not support the roof. Virtually every excavated example of rooms with earthen walls and composite earth-and-masonry walls has roofs that were supported by upright posts. In contrast, full-height masonry walls are almost always load-bearing walls that do support the roof. Thus, changes in architectural form that mark the pithouse-to-kiva transition and the pithouse-to-

pueblo transition are similar in an important respect: both are characterized by a shift from earthen and composite walls that were non-load-bearing to masonry load-bearing walls.

Cross-cultural studies demonstrate that earthen structures have a shorter use life than stone masonry buildings (Diehl 1992; see chapters by Ciolek-Torrello, and Douglass and Heckman, this volume). Cross-culturally, earthen buildings like those found in the central Mesa Verde region typically last from six to twelve years, although some last as many as thirty years with extensive remodeling (Ahlstrom 1985:83–84, 638; Cameron 1990, 1999; Diehl 1992; Diehl and Gilman 1996; McIntosh 1974; Schlanger 1987:586). A factor that limits the use life of these buildings is the use of upright posts that support the weight of the roof; these posts are one of the first things to wear out in earthen buildings.

Masonry buildings with load-bearing walls lasted much longer. Ahlstrom (1985:642) inferred, on the basis of tree-ring data, that sixty years is a reasonable use-life estimate for masonry buildings in the ancient Southwest. Thus, the occupation span of residences constructed of earth was less than thirty years, but residences constructed with masonry buildings could have far exceeded this thirty-year limit. In the central Mesa Verde region, the transition from earthen to masonry architecture occurred during the early AD 1100s at most residences (Varien 1999b).

ACCUMULATION RATES AND OCCUPATION SPAN

I used the total amount of cooking pottery at residential sites to measure the occupation span for individual residences. My methods have been reported in detail elsewhere (Varien 1997, 1999a, 1999d; Varien and Mills 1997; Varien and Potter 1997); here I merely provide a summary of the procedures. First, I relied on sites that were excavated using a random sample and calculated statistical point estimates and confidence intervals for the total weight of cooking pottery discarded at each site. Second, I developed an annual discard rate per household for the accumulation of cooking potsherds using data from the Duckfoot site. Third, I estimated the number of households based on the number of pit structures or kivas at each residential site. Occupation span estimates were calculated by dividing the estimates for the total weight of cooking potsherds by the annual discard rate per household. I use the point estimate and the 80 percent confidence intervals, which illustrate the precision of the statistical estimates for the total amount of cooking potsherds at each site. At sites with more than one household, the occupation span estimates were divided by the number of households to obtain the occupation span per household.

I calculated these spans at nineteen residences excavated as a part of the Dolores Archaeological Program (Breternitz 1993; Kane 1986; Robinson, Gross,

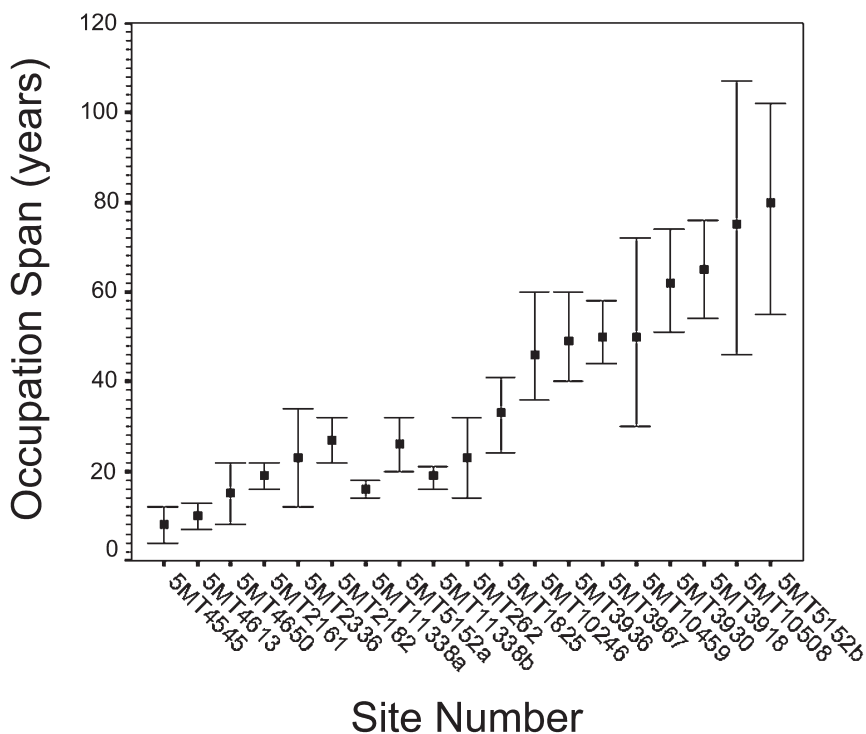


Figure 2.4. Occupation span estimates for household residential sites in the central Mesa Verde region, Colorado

and Breternitz 1986) and the Sand Canyon Project Site Testing Program (Varien 1997; Varien 1999a). Figure 2.4 illustrates the point estimate and 80 percent confidence interval for the length of time households occupied their residences at each of these sites. From left to right along the x-axis, the first site was occupied during the AD 600s. The next five residences were occupied sometime between AD 775 and 900. The next two residences were occupied sometime between AD 900 and 1100, and the final eleven sites were occupied sometime between AD 1100 and 1300.

Although the sample is limited, the trend is clear: occupation span increased through time (see Figure 2.4). Figure 2.5 presents the mean for the point estimates and 80 percent confidence intervals for the household occupation span in each of the four time periods; it shows that the largest increase in occupation span occurred at residences that were occupied after AD 1100. This corresponds to the transition from earthen to masonry residences. I now turn to ethnoarchaeological and cross-cultural research to develop a model that specifies how increasing occupation span affects the spatial organization of residential sites.

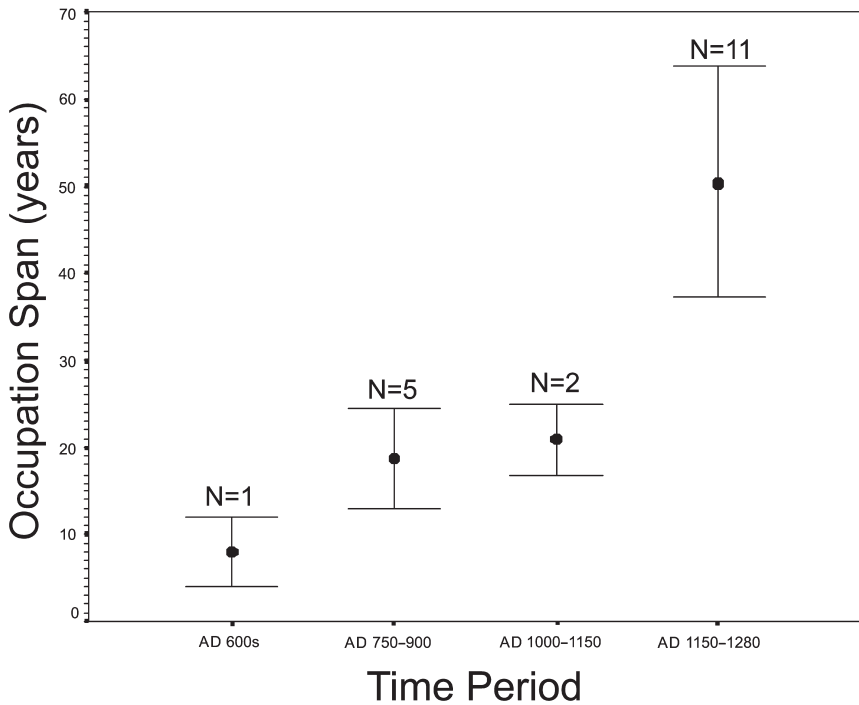


Figure 2.5. Mean occupation span estimates for each time period for household residential sites in the central Mesa Verde region, Colorado

CROSS-CULTURAL GENERALIZATIONS: OCCUPATION SPAN AND THE ORGANIZATION OF ACTIVITIES

Several ethnoarchaeological and cross-cultural studies have examined the spatial organization of household activities at residential sites. These studies examine the factors that affect architecture, site layout, and refuse disposal at these sites. This includes studies of mobile groups that rely on hunting and gathering as a mode of subsistence as well as more sedentary agricultural groups.

The cross-cultural studies include Gilman's (1983, 1987) research on the use of pithouses, pueblos, and storage facilities, which examines a sample of groups living throughout the world and a sample of groups in the US Southwest. Diehl (1992) and Diehl and Gilman (1996) use a worldwide cross-cultural sample to examine the relationship between occupation span and the types of buildings found at residential sites. Kent (1990b, 1991, 1992) uses a worldwide cross-cultural sample and ethnoarchaeological research that she conducted among EuroAmericans, Northwest Coast Native Americans, Navajo groups in the US Southwest, and Basarwa and Bakgalagadi groups of the Kalahari Desert, Botswana, Africa. Her wide-ranging studies examine a variety of issues including the segmentation and

use of residential space and the relationship between occupation span and the organization of activities at these sites. Her work builds on Yellen's (1977) classic study of spatial patterning and site structure among the !Kung in the Kalahari, which examines, among other things, the relationship between site size and occupation span.

Other ethnoarchaeological studies have focused on the disposal of refuse, including Hayden and Cannon's (1982) study of trash disposal and Deal's (1985) study of pottery disposal by Maya households in Mexico and Guatemala. Arnold (1990) built on that research by studying refuse disposal and pottery production among households in Veracruz, Mexico. Finally, Killion (1990) examined the relationship between cultivation intensity and residential site structure among households in Veracruz, Mexico.

The generalizations culled from these studies form a valuable body of middle-range research that provides a starting point for a model that identifies the general principles that structure the organization of activities at residential sites. This model can then be used to interpret household behaviors in the central Mesa Verde region. The generalizations that are the basis for this model can be summarized as follows:

1. Increasing length of occupation results in increasing amounts of material, both artifacts and architecture, resulting in increasing site size (Yellen 1977), although Kent (1990a, 1991, 1992; Kent and Vierich 1989) argues that it is *anticipated* occupation span rather than the actual length of occupation that conditions site size and the amount of material at sites.
2. Increasing length of occupation correlates with the construction of formal, as opposed to informal, storage areas and an increased investment in the labor and materials used to construct storage facilities (Gilman 1983, 1987; Kent 1990a).
3. Increasing length of occupation correlates with increasing investment in the labor and materials used in the construction of architectural facilities designed as habitations (Diehl 1992; Kent 1990a).
4. Increasing length of occupation and increasingly restricted space at residential sites results in increasing specialization and segmentation of space and activities (Arnold 1990; Kent 1990a).
5. Increasing length of occupation and increasingly restricted space at residential sites results in increasingly formal refuse disposal (Arnold 1990; Deal 1985; Hayden and Cannon 1982; Kent 1990a, 1992; Killion 1990).

THE SPATIAL ORGANIZATION OF ACTIVITIES AT RESIDENCES IN THE CENTRAL MESA VERDE REGION

These five cross-cultural generalizations can be used to interpret changes in the organization of activities at household residential sites in the central Mesa Verde

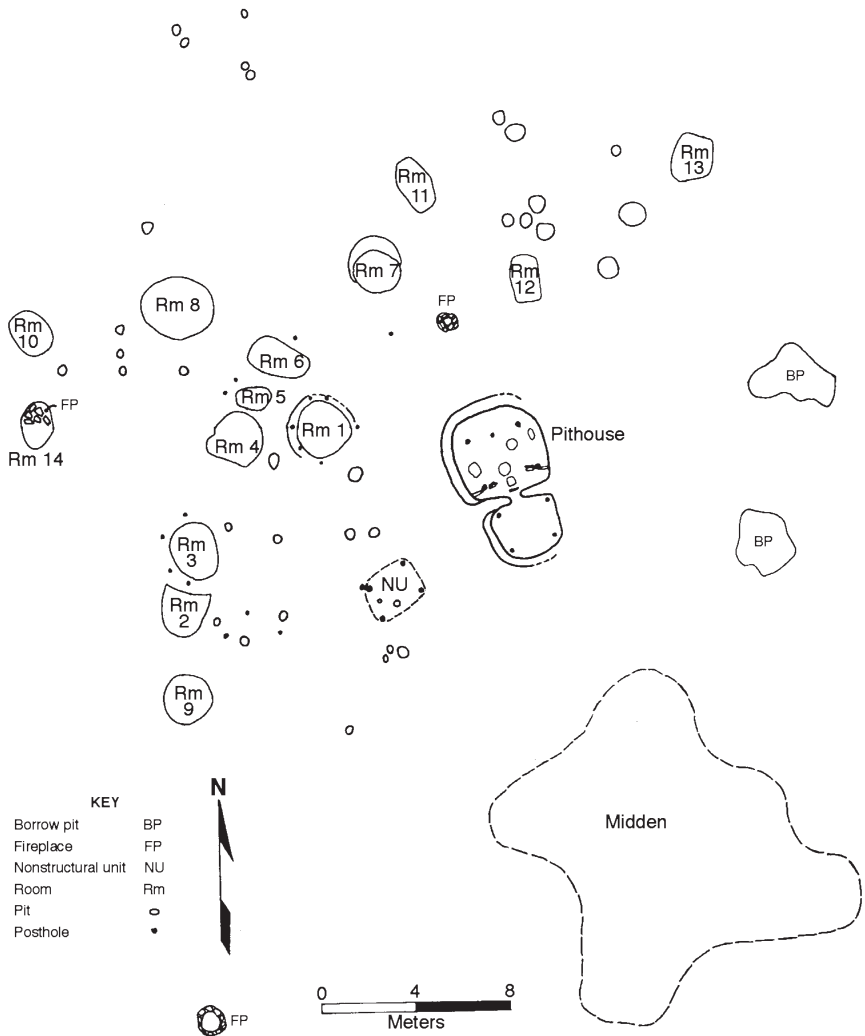


Figure 2.6. Plan map of Tres Bobos (5MT4545), a household residential site occupied around AD 650, central Mesa Verde region, Colorado

region. In this section, I review those changes by beginning with the earliest site in my sample and moving through successive periods.

The earliest site, Tres Bobos Hamlet, or 5MT4545 (Figure 2.6), was a single household residence with earthen architecture that was occupied at approximately AD 650 (Brisbin and Varien 1986). The occupation span estimate is eight years with a range of four to twelve years. Tres Bobos is the only site dating from this period from which a random sample was collected that could be used

to estimate occupation span by calculating the total accumulation of cooking pottery. There are several other residences from this period for which construction episodes of sequentially occupied structures have been tree-ring dated. These dates indicate that pithouses were occupied for a maximum of fifteen years (Errickson 1995), which suggests that the accumulation-based occupation span estimates for Tres Bobos are reasonable and representative of sites dating to this period.

Tres Bobos was a typical seventh-century residence in the central Mesa Verde region (Wilshusen 1988b). All of the structures at Tres Bobos and at other residential sites that date from this time period were built with earth and timbers. The pit structure is the only building that was large enough to have served as a domicile, and the artifacts and features on the floor indicate that the structure was used for a variety of activities, including short-term storage, corn grinding, cooking, tool manufacture, and other domestic activities. The surface rooms were noncontiguous structures that appear to have been used primarily for long-term storage. There was no formal courtyard, and the extramural area between the pit structure and rooms was cluttered with many different types of pit features, indicating it was used for a wide range of activities. The refuse area was a thin layer or scatter of artifacts termed “sheet trash.”

Five residences in my sample date from the subsequent AD 750 to 900 period. These residences were occupied nearly twice as long as those in the previous period; cooking-pot sherd accumulation demonstrates that the mean occupation span was nineteen years, with an 80 percent confidence interval range of ten to twenty-seven years (see Figures 2.4 and 2.5). The five residences in this sample were similar to each other and representative of the habitations occupied during this era. These residences had earth-walled pit structures and roomblocks constructed with earth and posts, although masonry is present at the base of the walls of some rooms. These residences do exhibit several changes in architecture and layout when compared to those of the earlier period, changes that are consistent with the general changes documented cross-culturally.

Pit structures in this period are deeper and almost fully subterranean. Artifacts and features on the floor indicate these pit structures were used for many domestic activities including short-term storage, corn grinding, cooking, and tool manufacture (Lightfoot 1994). There is also evidence that pit structures in this period were used for episodic household ritual, and some were used as the location for burials (Lightfoot 1994; Stodder 1987; Varien and Lightfoot 1989; Wilshusen 1986, 1988b, 1988c, 1989).

There were important changes in the surface rooms during this period (Wilshusen 1988b). For the first time, individual rooms were constructed in roomblocks of contiguous rooms with shared walls. These roomblocks are formed by two rows of rooms, as can be seen in Figure 2.7. There are smaller rooms on the back, north row, and these are fronted by a single larger front room to the south. The back rooms have almost no artifacts and features on

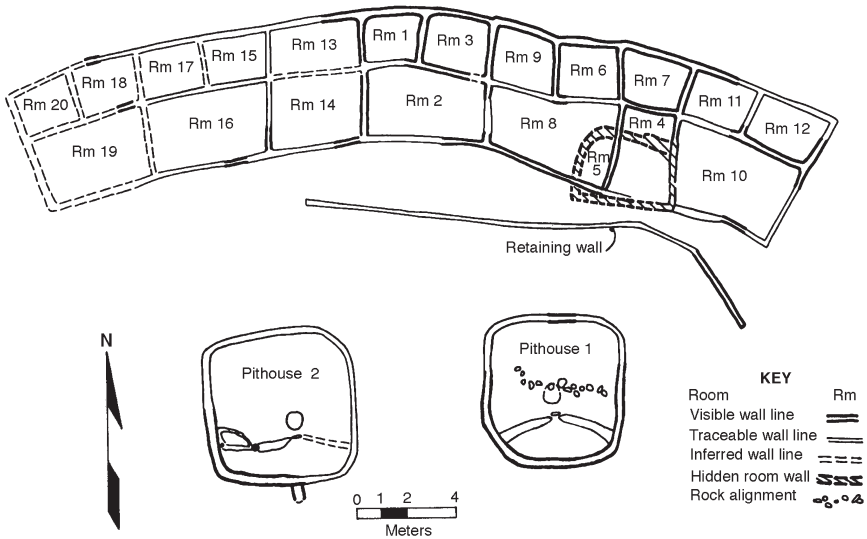


Figure 2.7. Plan map of Prince Hamlet (SMT2161), a household residential site that was occupied during the AD 750–900 interval, central Mesa Verde region, Colorado

the floor and they are interpreted as long-term storage facilities. These storage rooms incorporate the most masonry in the lower walls, and there was a far greater labor investment in these facilities when compared to the long-term storage facilities of the earlier period. The front rooms have artifacts and features on the floor that indicate they were used by intrahousehold groups as living areas (Lightfoot 1994). As in the pit structures, living activities in the surface rooms included cooking, corn grinding, short-term storage, and tool manufacture (Lightfoot 1994). Courtyards located between the roomblock and the pit structure contains numerous features.

The presence of multiple structures that were used as living areas indicates greater segmentation of space as compared to residences in the earlier period. On the other hand, the presence of activity areas for cooking, storage, and corn grinding in pit structures, rooms, and courtyards suggests a flexible and unspecialized organization for these domestic activities (Hegmon, Ortman, and Mobley-Tanaka 2000:68). As in the earlier period, refuse at these residences was deposited in broad areas of sheet trash, although this sheet trash covers a larger area and is deeper when compared to the middens of the earlier period. In the subsequent period, AD 900 to 1100, there are only two sites from which a random sample was collected that could be used to calculate the total accumulation of cooking pottery (Kuckelman 1999a, 1999b; Varien 1999a). The occupation spans at these two residential sites, an average of twenty-one years, are slightly longer than the estimated spans for the previous period. The buildings at both

sites were earthen structures, including earth-walled pit structures and surface rooms constructed of posts and earth.

The random samples from these sites do not expose large areas and therefore do not allow an assessment of activity organization. For this information, I turn to data from other sites in the central Mesa Verde region that date from this time period and that were excavated in a manner that exposed entire structures and associated features (e.g., Kuckelman and Morris 1988). Like the two sites above that were used to calculate occupation span, the buildings at these sites were earth-walled pit structures and surface rooms constructed of posts and earth. At some sites, these architectural features were enclosed by a stockade constructed with posts and earth (Kuckelman 1988a:68–71).

As in the previous time period, pit structures occupied during this era were used for both domestic and ritual activities (Kuckelman 1988b:425). Domestic activities in pit structures included cooking, tool manufacture, and short-term storage. The aboveground roomblock was used as additional living space (Morris 1988a:126) and for long-term storage (Kuckelman 1988b:425). As in the previous period, refuse was deposited in relatively broad areas as sheet trash.

The most important change in spatial organization at these sites as compared to earlier residences was further specialization and segmentation of architectural space. For example, the organization of corn-grinding activities changed by the installation of metates into fixed bins constructed with slabs and adobe mortar. The earliest mealing bins have been found in subterranean mealing rooms located adjacent to pit structures (Hegmon, Ortman, and Mobley-Tanaka 2000:72; Kuckelman 1988b:425; Morris 1988b:162–169); this suggests that the organization of domestic activities and the use of space became more formal and specialized in this period (Hegmon, Ortman, and Mobley-Tanaka 2000:72). Figure 2.8 illustrates the structures and features at a residence from this period.

The change to masonry construction occurred by about AD 1100 in the central Mesa Verde region, and masonry buildings were found at each of the eleven sites in my sample that date from the AD 1100 to 1300 interval. The adoption of masonry architecture was accompanied by a dramatic increase in the length of occupation of residential sites. The mean occupation span estimate for the eleven sites is fifty years, more than double the estimate for the previous period. The 80 percent confidence interval range is 14 to 102 years. Figure 2.9 illustrates a masonry residence unit from this time period.

Construction of masonry buildings represents an increased labor investment in all types of architectural facilities, and the shift from earthen to masonry architecture almost certainly indicates that these households anticipated living in these residences for a longer period of time. The masonry-lined pit structures are called “kivas.” Kivas have traditionally been interpreted as specialized structures used for ritual in this period; however, a variety of studies demonstrates that kivas occupied during this era were still used for domestic activities (Cater

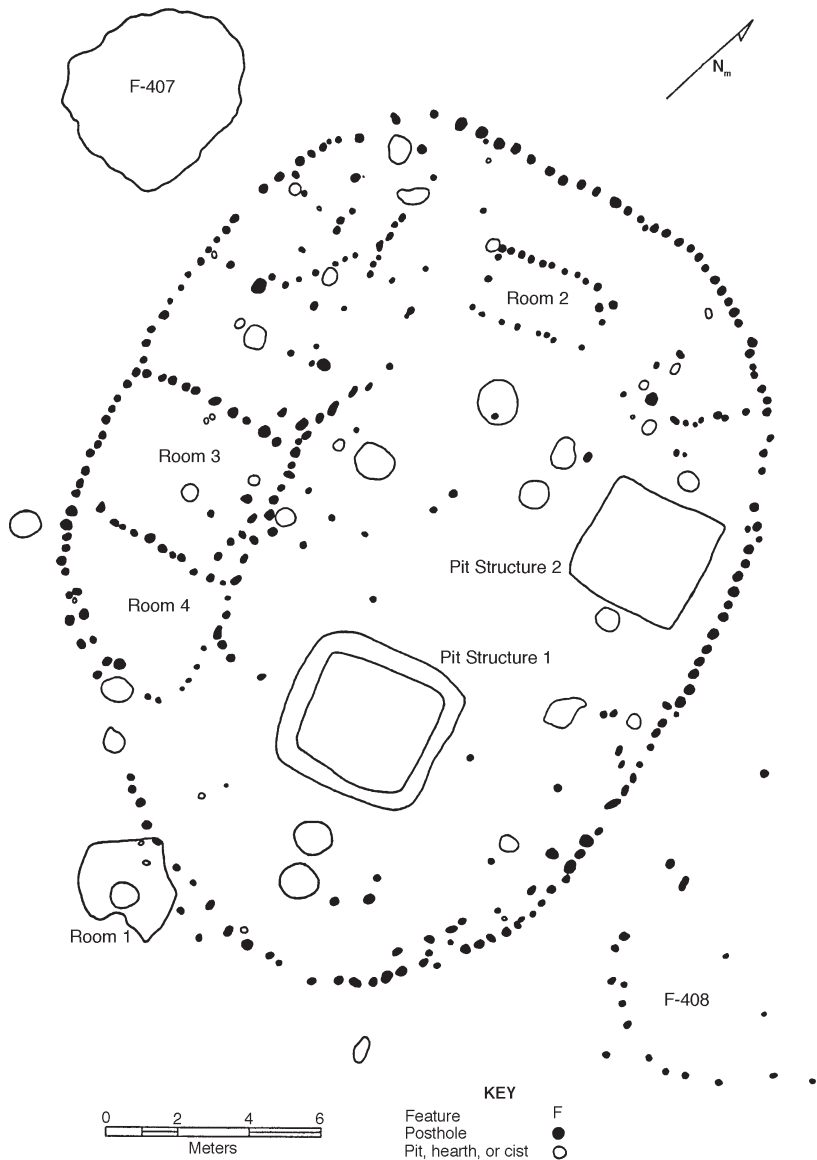


Figure 2.8. Plan map of Dobbins Stockade (SMT8827), a household residential site that was occupied during the AD 900–1100 interval, central Mesa Verde region, Colorado

and Chenault 1988; Lekson 1988; Ortman 1998), and macrobotanical remains from hearths in the kivas indicate they were used for cooking (Adams 1999). Kivas do contain fewer features than pit structures built in earlier time periods,

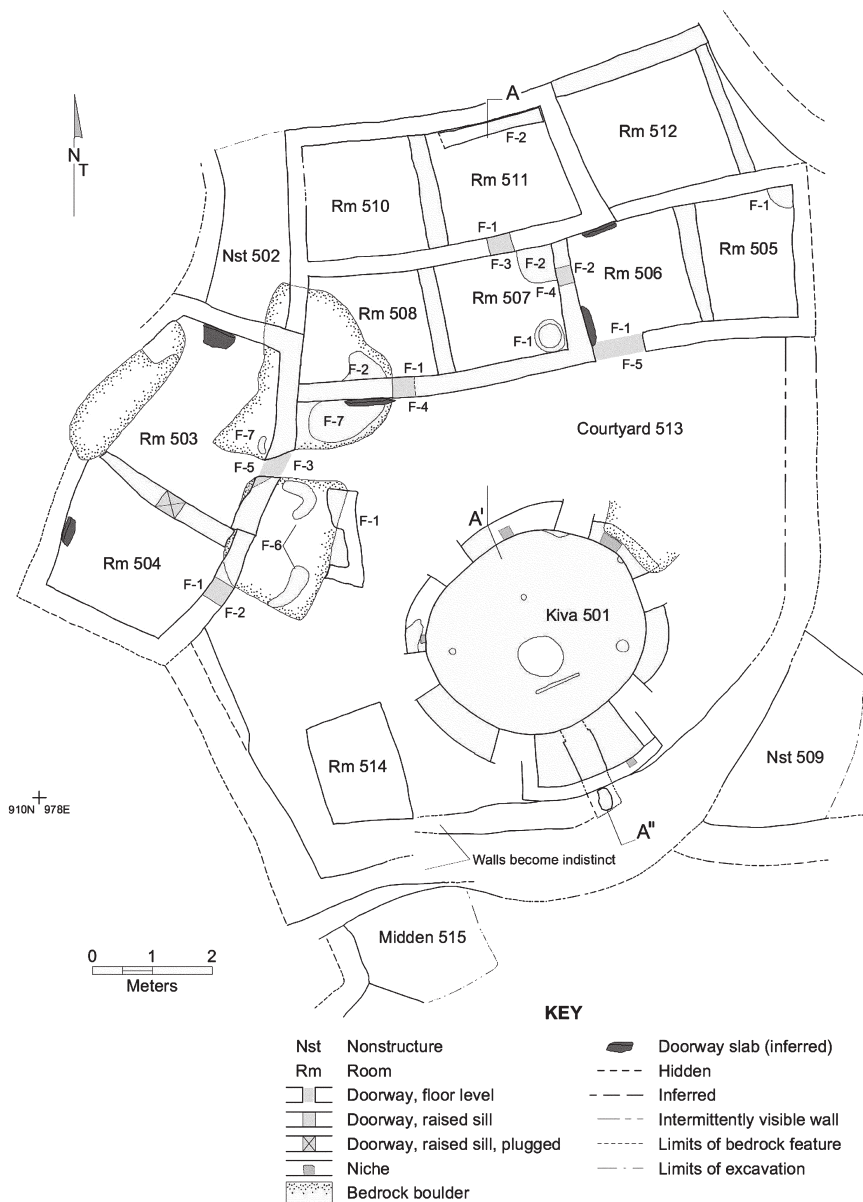


Figure 2.9. Plan map of Architectural Block 500 at Sand Canyon Pueblo (site 5MT765), a household residential unit that was occupied in the AD 1100–1300 interval, central Mesa Verde region, Colorado (© 2001 by Crow Canyon Archaeological Center. All rights reserved.)

and features for short-term storage are seldom found in kivas. Corn grinding continued to be a fixed and specialized activity, and mealing bins are found in specialized aboveground mealing rooms, subterranean mealing rooms, and occasionally kivas and courtyards (Cater and Chenault 1988; Ortman 1988). In my sample, and in most excavated residences that date to this time period, the only long-term storage facilities were in the surface roomblocks. Most roomblocks also contain structures that appear to have been living areas that were used for a variety of activities.

An important difference in these residences is that they have a more compact layout when compared to earlier residences. Kivas were constructed closer to the roomblock and were fully subterranean; the top of the kiva roof was level with the surrounding extramural surface enlarging the courtyard in front of the roomblock. The courtyards are for the most part free from refuse and contain few or no features.

Refuse disposal at these sites was different from that at earlier residences in ways that are consistent with the observations made during ethnoarchaeological studies. One difference is the presence of areas of higher artifact density around the perimeter of the courtyard. Ethnoarchaeological research has indicated that the regular maintenance of courtyard areas—usually daily sweeping—resulted in a high concentration of debris around the courtyard that has been termed the “toft zone” (Arnold 1990:918; Deal 1985:262; Hayden and Cannon 1982:126). Ethnoarchaeological research demonstrates that courtyards were cleaned periodically to keep this space clear and available for multiple activities that occurred regularly. Most studies of Southwestern unit pueblos have neither recognized nor investigated the toft zone at the margins of the courtyard. This lapse is unfortunate because analysis of the artifacts from these areas is the only evidence of the types of activities that occurred in the courtyard.

There is a second difference in refuse disposal at the later, masonry residential sites with longer occupation spans: the primary midden is not a broad area of sheet trash but rather a circumscribed, discrete trash mound. Depositing refuse in these discrete mounds contributed to the compact layout of these late unit pueblos. In Killion’s (1990) ethnoarchaeological research, he examined refuse disposal at forty household residential sites in Veracruz, Mexico. He found that some households created middens that were broadly dispersed sheet trash while others deposited trash in discrete mounds. His research showed that the formation of discrete mounds correlated with residences that were surrounded by intensively cultivated agricultural fields. As with the regular maintenance of courtyards, the creation and maintenance of discrete middens increase the amount of useable outdoor space at a residence, space that remains free from debris and available for other activities. Killion found that this was particularly important for households that were surrounded by intensively cultivated fields, because cleared open space was needed for a variety of activities that were not

spatially segregated. These included activities related to agricultural production as well as other domestic activities. As Killion points out, this observation is an important one because it is difficult to find archaeological evidence of agricultural intensification. The change from refuse disposal in dispersed sheet trash at the earlier residences to discrete mounds at the post-AD 1100 residences suggests that these Mesa Verde households had intensified agricultural production in fields that surrounded their residence.

This inference is supported by independent evidence for agricultural intensification during this period (Varien and Kuckelman 1997; Varien, Van West, and Patterson 2000). The eleven residences examined in this sample include six sites that are located in upland settings and five that are in canyon settings. The residences in the upland settings are located on deep loess soils that retain moisture; these are the most productive soils for agriculture in the region, especially direct precipitation farming (Van West 1994). The direct association between the upland residences and the best agricultural soils suggests that fields surrounded these houselots. In fact, these households were likely staking their claim to this land through the placement of their residences (Adler 1990, 1996; Varien 1999b).

The residences located in canyon settings were on shallower, less moisture-retentive soils; however, irrigation from rainfall runoff was possible in these settings. There are agricultural features at three of the five sites in my sample that are in canyon settings, including rudimentary stone terraces and water control features (Kuckelman 1999c, 1999d; Varien 1999d). The terraces were not large enough to have been the primary fields for these households, but their presence indicates that some type of cultivated area was located in proximity to the residence. But perhaps a more important restriction on space than the gardens is the canyon setting of these residences. The setting itself restricted space at these residences because there were smaller areas appropriate for construction, and this restricted space likely caused the more compact layout and changes in the organization of activities that are observed.

SUMMARY AND CONCLUSIONS

I have tried to illustrate how residential sites in the central Mesa Verde region exhibit evidence of both continuity and change in the spatial organization of household activities over a period of seven centuries. There was continuity in the layout and orientation of the residence, which was composed of surface rooms, a pit structure or kiva, and a trash area typically oriented on a northwest-southeast axis. Yanagisako (1984) pointed out that households are units of cultural meaning; they are a symbolic and conceptual unit—a cognitive model—and not merely a functional group. Addressing the issue of meaning in ancient Pueblo households, Ortman (1998) has argued that the redundant layout of twelfth- and thirteenth-century unit pueblos symbolized the cultural ideal of large, multi-

generational extended family households. The persistence of the basic form of the household residence for seven centuries suggests that this cultural ideal was a deeply rooted aspect of ancient Pueblo society. History matters, and this continuity in layout and orientation illustrates how historically derived structure shaped household organization in the central Mesa Verde region.

In spite of this continuity, there was also considerable change in the form of Mesa Verde residences. Ethnoarchaeological and cross-cultural data were used to create a model that identifies the general principles that structure the organization of activities at residential sites, and the changing form of Mesa Verde residences were examined in light of this model. My study shows how these changes in form were conditioned by an increase in occupation span and restricted space at residential sites in ways that are consistent with the general principles derived from the cross-cultural model.

An important and straightforward accomplishment of this study has been to measure the change in the length of occupation of residences between AD 600 and 1300. The increase in occupation span alone is a fundamental change in household organization. At the seventh-century sites, the occupation span was relatively short, about one half of a generation. Length of occupation increased gradually over the next few centuries to a span that approximated a human generation; between AD 750 and 1100 residences were used for about twenty years. During this interval, the construction and occupation of a new residence may have been linked to the domestic cycle, with new residences being built when new households formed at marriage. Average occupation span more than doubled during the final two centuries of occupation of the region. During this era, the occupation of residences spanned multiple generations; elsewhere I have argued that this corresponds to the development of the heritable transfer of property from one generation to the next in Mesa Verde society (Varien 1999b).

This study goes on to show how increasing length of occupation conditioned other important changes in the form of the residence. The most obvious change was the shift from earthen to masonry architecture, which was accompanied by a striking increase in occupation span. The adoption of masonry architecture is likely to have occurred as households anticipated a longer period of occupation of residences, although variation in occupation span at these sites indicates that anticipated occupation was not always realized (Kent 1992; Varien 1999b). This link between increasing occupation span and the changing form of residential sites may seem obvious, but, with the notable exception of Sue Kent's work (1992), occupation span has scarcely been mentioned during a century of research on the changing form of unit pueblos.

In addition, increasing occupation span and restricted space have rarely been identified as factors that conditioned the organization of activities at residences. This study, however, shows a patterned relationship among increasing occupation span, the restriction of available space, and site structure. It is somewhat

surprising to find that these factors appear to have affected architectural space and extramural areas differently. Within buildings, increased occupation span co-occurs with greater segmentation and specialization in the use of space; this is illustrated by the construction of mealing rooms. Extramural areas, on the other hand, were more intensively maintained so that they could accommodate multiple activities that were conducted on a regular basis but that were not spatially segregated. Changes affecting extramural areas at residential sites include the following: creating more compact site layouts with more formal courtyards; minimizing the number of features in the courtyard; cleaning courtyards on a regular basis, which resulted in the formation of toft zones around the courtyard perimeter; and changing the pattern of refuse disposal from sheet trash to discrete trash mounds, which created more usable extramural space at the residence. Wilk and Netting (1984:20) point out that the morphology of a household is often a compromise among different functional imperatives. The fact that increased occupation span and restricted space affected the organization of architectural and extramural space differently indicates that the organization of activities at residential sites was also a compromise.

Wilk and Netting (1984) argue that different activities vary in importance when households seek this compromise among functional imperatives. They further suggest that there is a general relationship between the subsistence economy and the types of activities that are emphasized by households. Hunter-gatherer households perform mostly distributive and reproductive tasks, while the emphasis among horticulturists is on productive activities. Further, as agriculture is intensified, the role of households in the transmission of goods and lands increases. The Mesa Verde case study supports these observations. Households in the central Mesa Verde region did emphasize activities related to production, and the form of the residence changed in ways consistent with the interpretation that agriculture was being intensified. Occupation span eventually increased to an interval that spanned multiple generations, which was likely associated with the transmission across generations of both the house and the agricultural lands adjacent to the house. Agricultural intensification occurred in the context of population growth and increased competition for the best agricultural land (Mahoney, Adler, and Kendrick 2000; Varien 2002; Varien, Van West, and Patterson 2000), and these factors, combined with higher levels of conflict and warfare (Kuckelman 2002, 2010; Kuckelman, Lightfoot, and Martin 2002), promoted longer occupation of residences and the transmission of property across generations.

This study has examined household organization in the central Mesa Verde region by focusing on broad patterns of site structure and how they changed through time. I believe this approach is justified because residences are a focal point for the activities that constitute households in behavioral terms. Formation processes have affected residential sites in many complicated ways, but they do

not undermine our ability to interpret the buildings, features, and artifacts at these sites as the aggregated residue of the activities, or practices, undertaken by the individuals who lived there (c.f. Shennan 1993). Ethnoarchaeological and cross-cultural research has been helpful in identifying how occupation span and restricted space conditioned site structure and the organization of activities at residential sites. Demonstrating that these factors influence site structure in similar ways in a variety of societies helps us understand the general principles that govern site structure and the organization of activities at residential sites, and archaeologists should be able to apply this general model in a wide range of cultural contexts.

Occupation span and restricted space, however, *conditioned* site structure, and this is not the same thing as producing the specific changes observed at residential sites in the central Mesa Verde region. It was the individuals occupying those sites who produced the observed changes. Just as continuity in the basic components and layout of residences was a reflection of the historically derived structure of Mesa Verde region society, changes in form and in the organization of activities were an expression of the agency of the householders who occupied these sites.

Although this study lays useful groundwork for continued research on household organization in the central Mesa Verde region, it examines issues at a general level and much remains to be done. I hope future research examines specific changes in the organization of activities at residences in greater detail, detail that would allow us to better understand how the processes of structuration played out among Mesa Verde Pueblo households. For example, occupation span and restricted space conditioned the formation of toft zones, but these factors do not inform us about the specific types of activities that occurred in courtyards. To understand this we need to conduct detailed studies of the artifact assemblages from these areas. Similarly, increasing occupation span resulted in greater segmentation and specialization of architectural space, but this does not tell us about the gendered use of this space and how the activities of men and women were organized at these sites and how the organization of these gendered activities changed over time. A full understanding of changing household organization in the Mesa Verde region therefore requires continued research that reconstructs activities in greater detail. These activities need to be interpreted in terms of the changing social context in which these householders were situated. In this way, the activities of householders at residences reflect the complex interplay of structure and agency, and a continued focus on the behavioral aspects of household organization will produce important new insights into Pueblo society in the central Mesa Verde region.

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