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Corporate kin-groups, social memory, and "history houses"? A quantitative test of recent reconstructions of social organization and building function at Çatalhöyük during the PPNB

W. Chris Carleton [a], James Conolly [b], Mark Collard [a,*]

[a] Human Evolutionary Studies Program and Department of Archaeology, Simon Fraser University, 8888 University Drive, Burnaby, British Columbia V5A 1S6, Canada
[b] Department of Anthropology, Trent University, 2140 East Bank Drive, Peterborough, Ontario K9J 7B8, Canada

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ABSTRACT

It has been argued that the corporate kin-group was the main form of socioeconomic organization at the Turkish site of Çatalhöyük during the Pre-Pottery Neolithic B (PPNB). This hypothesis is linked to a claim of long-term repetitive patterning in the use of household space. Çatalhöyük's corporate kin-groups, it is suggested, would have been maintained by social memory, and social memory would have been created by the repeated rebuilding of houses with the same floor plan and by the burial of important members of the corporate kin-groups under house floors. This hypothesis been taken up by a number of authors in recent years. However, it is not clear how much confidence should be invested in the hypothesis as the use of household space at Çatalhöyük during the PPNB has not been subject to formal evaluation. With this in mind, we carried out a study in which we examined the relationship between continuity in house floor plans and the percentage of houses that contain burials. To assess the co-variation between these variables, we developed a GIS-based method of quantifying house wall continuity, and then subjected the resulting index and a number of other variables, including the percentage of houses that contain burials, to factor analysis. The results of the analyses do not support the hypothesis. The house-wall continuity index and the percentage of houses that contains burials load on different factors, which indicates that they do not co-vary through time. This is contrary to the predictions of the corporate kin-group hypothesis. Thus, claims that during the PPNB Çatalhöyük's occupants formed corporate kin groups that were maintained by social memory and "history houses" should be curtailed and interpretations built on this hypothesis should be viewed with suspicion.

1. Introduction

In this paper we report a test of a widely discussed hypothesis concerning social organization and building function at the well-known site of Çatalhöyük during the Pre-Pottery Neolithic B (PPNB). Çatalhöyük is located in a region of south-central Turkey known as the Konya Plain. Part of the Central Anatolian Plateau, the Konya Plain is about 6000 km^2 in area and has an average altitude of approximately 1000 m (Roberts et al., 1996). The closest major cities to Çatalhöyük are Konya, which is 37 km to the northwest, and Mersin, which is 187 km to the southeast. The site consists of two tells that are separated by a branch of the Çarsamba river. These tells usually are referred to as the East Mound and the West Mound. The East Mound, which has been more thoroughly investigated than its neighbour, covers approximately 12 ha and is around 21-m deep (Roberts et al., 1996). The West Mound also extends over about 12 ha but is only about a third of the height of the East Mound (Roberts et al., 1996).

Çatalhöyük's archaeological significance was first recognized in the 1950s by James Mellaart, who at the time was assistant director of the British Institute of Archaeology in Ankara (Mellaart, 1967). Mellaart conducted four field seasons at the site between 1961 and 1965. Large-scale archaeological research was restarted at the site in the early 1990s by Ian Hodder, then of the Department of Archaeology, University of Cambridge, and now of the Department of Anthropology, Stanford University. Hodder's team has excavated at Çatalhöyük every year since 1993 (www.catalhoyuk.com). Peter Biehl of the University at Buffalo's Department of Anthropology initiated an additional, independent field project at the site in 2006. Currently, Hodder's team is excavating on the East Mound, while Biehl's team is excavating on the West Mound (ibid.).

* Corresponding author.
E-mail address: mcollard@sfu.ca (M. Collard).

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Evidence recovered at Çatalhöyük since 1961 suggests the site was inhabited from approximately 9400 calBP to about 7600 calBP (Cessford, 2005). The East Mound was the initial focus of settlement. Its occupation layers span the middle Pre-Pottery Neolithic B (PPNB) through to the early Ceramic Neolithic.[1] Around 8200 calBP the East Mound appears to have been depopulated. The West Mound was settled around the time the East Mound was depopulated, but it is unclear whether there was overlap or a hiatus between the occupations (Schoop, 2005; Biehl et al., 2012). The West Mound's occupation layers span the early Ceramic Neolithic through to the Chalcolithic (Cessford, 2005). Both mounds were used as cemeteries in the Roman and Byzantine periods, but there is no evidence of people living at the site during these periods or between 7600 calBP and the start of the Roman period. There is also no evidence of post-Byzantine occupation on either mound (Hodder, 1996; Gibson et al., 2002; Gibson and Last, 2000).

The PPNB is found throughout much of Southwest Asia in deposits dating between 10,800 and 8500 calBP (Aurenche et al., 2001). It is characterized by reliance on domesticated plants and animals, permanently occupied settlements dominated by high-density agglutinated rectilinear buildings, and wide-ranging economic networks involving the transportation of raw and processed materials, particularly obsidian (Kuijt and Goring-Morris, 2002; Asouti, 2006). Art and ritual are also important features of the PPNB. Wall paintings and anthropomorphic figurines have been found at many PPNB sites, as have decorated human skulls (Grissom, 2000; Goring-Morris et al., 1998; Lesure, 2002; Verhoeven, 2002). In addition, a number of PPNB sites have yielded evidence of what appears to be special, non-domestic, buildings and ritually embellished architecture (Schmidt, 2001, 2003; Byrd, 2005). All these characteristics of the PPNB, with the exception of non-domestic architecture, have been documented at Çatalhöyük (Hodder, 2005a, 2005b, 2006).

The hypothesis we tested holds that socioeconomic organization at Çatalhöyük during the PPNB was based on the corporate kin-group, which is a collection of consanguineal and affinal relatives who share economic, social, and ritual rights and responsibilities. First proposed by Conolly (1999), this hypothesis has been developed more fully by Hodder (e.g. Hodder and Cessford, 2004; Hodder, 2006, 2010; Hodder and Pels, 2010). The case Hodder makes for the existence of corporate kin-groups at Çatalhöyük during the PPNB focuses on four phenomena that have been documented at the site – the daily repetition of household tasks, the building of new houses in the same location and with the same floor plan as old houses, the burial of individuals beneath the floors of houses, and the exhumation and reburial of the skulls of some of the aforementioned individuals (Hodder and Cessford, 2004; Hodder, 2010). These phenomena, Hodder contends, generated the social memory necessary to maintain a corporate kin-group. The daily repetition of household tasks would have reminded the living generation that preceding generations performed the same daily tasks in the same places and created a sense of continuity (Hodder, 2006). The building of a new house atop the remains of the old house reinforced a sense of shared identity between the generations and linked the persistence of the house with that of the kin-group. Hodder asserts that the individuals buried beneath the floors of houses were particularly important ancestral members of kin-groups (Hodder, 2006). He argues that the presence of the remains of these individuals under house floors and the occasional exhumation and reburial of some of their skulls would also have reinforced the identity of the groups because those ancestors would be actively remembered by the occupants of the house and the community at large (Hodder and Cessford, 2004; Hodder, 2007). Social memory of the actions and socioeconomic negotiations of the ancestors would have provided a vehicle for transferring the rights and obligations obtained by those ancestors onto the living members of the corporate group. Such transcendence of rights and obligations and the persistence of a group identity are regarded as key components of a corporate kin-group (Gillespie, 2000).

The suggestion that the corporate kin-group was the primary form of socioeconomic organization at Çatalhöyük during the PPNB has been taken up by a number of authors in recent years and has influenced interpretations of other sites not only in southwest Asia, but in other parts of the world too (e.g. Adams, 2005; Fairbairn, 2005; Pauketat and Alt, 2005; Atalay and Hastorf, 2006; Düring, 2007; Borić, 2007; Varien and Potter, 2008; Twiss, 2008; Russell et al., 2009; Belfer-Cohen and Goring-Morris, 2011; Kuijt et al., 2011; Schortman and Urban, 2011; Hayden, 2012; Watkins, 2012). However, at the moment, it is not clear how much confidence should be invested in this hypothesis. One reason for this is that Hodder only examined evidence from a few areas of the site (i.e. the excavated portions), which means that the hypothesis may not hold for the whole of the site. In addition, Hodder has not demonstrated that the phenomena he argues would have generated the social memory necessary to maintain the corporate kin-groups co-vary in the manner required by the hypothesis. He claims that there is "a clear link between houses with many burials and houses that are replaced through many levels" (Hodder and Cessford, 2004: 36), but does not show quantitatively that such is the case. Thus, it is not even possible to be confident that the hypothesis holds for the areas of the site that Hodder examined. Lastly, a recent odontometric study found that individuals buried within houses at Çatalhöyük are no more closely related to each other than they are to individuals buried in other houses (Pilloud and Larsen, 2011), which runs counter to the notion that a kin-group would have occupied the same house for multiple generations and identified specifically with that house.

The study reported here focused on key part of the corporate kin-group hypothesis, namely the claim that houses with many burials tend to be replicated through successive rebuilding events (Hodder and Cessford, 2004; Hodder, 2006). We tested this claim by applying factor analysis to several house-related variables from the PPNB levels at Çatalhöyük, including a measure of house-wall continuity and the percentage of houses that contain burials. Factor Analysis (FA) is a statistical technique that is designed to reduce variability among observed variables into a smaller number of unobserved variables called factors (Spearman, 1904; Mulaik, 1987). It has a long history of use in archaeology to reconstruct socioeconomic processes (e.g. Binford and Binford, 1966; House et al., 1975; Healan, 1995; Kuijt and Goodale, 2009). In our study, we reasoned that if Hodder's claim is correct, the measure of house-wall continuity and the percentage of houses that contain burials should load on the same factor and do so in the same direction.

2. Materials and methods

Data for seven of the variables used in the study were taken from Cutting (2005). These variables are 1) the percentage of houses with platforms, 2) the percentage of houses that contain pillars, 3) the percentage of houses in which benches are found, 4) the percentage of houses that are decorated in some way, 5) the percentage of

[1] There is disagreement about the phase-chronology at Çatalhöyük, with some authors arguing for the use of the well-known Southwest Asian scheme developed by Kathleen Kenyon (e.g. Kenyon, 1957), and others favouring an Anatolia-specific scheme (e.g. Gerard and Thissen, 2001). We have elected to follow the main excavator of the site, Hodder, and use Kenyon's scheme (e.g. Hodder and Cessford, 2004).

houses that contain adult and sub-adult burials, 6) the percentage of houses that have ovens associated with them, and 7) the average number of rooms per building in each level (Table 1). A platform is a nearly square raised floor area located in the main room of a house adjacent to the walls. A pillar is a mudbrick column that abuts one or more of the walls of the house. Benches are raised floor areas, similar to platforms, but with a very narrow rectilinear shape that may have been used as working surfaces, for seating, as spatial dividers, or for some ritual purpose. Cutting (2005) extracted the values for these variables from Mellaart's (1962, 1963, 1964, 1966, 1967) publications and excavation plan maps.

The eighth variable used in the study was a quantitative measure of spatial continuity created specifically for this study, which we call the Spatial Continuity Index (SCI). The SCI is similar to the measure of spatial continuity developed by Düring (2001, 2005) but is a continuous-scale variable rather than an ordinal-scale variable. To calculate the SCI for a given stratigraphic level, the level's excavation plan and the excavation plan for the next lowest stratigraphic level are converted into GIS raster data matrices in which the presence of a wall is indicated by pixels with a value of 1 and the absence of a wall by pixels with a value of 0. The two matrices are then spatially aligned to match their stratigraphic superposition. Next, the matrix for the lower level is subtracted from the matrix for the upper level and the values in the resulting matrix are summed. Lastly, the latter figure is divided by the sum of all 1-valued pixels in the original two matrices to obtain the SCI. Ranging from 0 to 1, the SCI can be thought of as the ratio of the area of superimposed walls to the area of all walls in a pair of vertically adjacent levels. When subtracted from 1 so that the measure becomes more intuitive, an SCI of 1 indicates that the two levels have walls in exactly the same places, while an SCI of 0 indicates that there is no overlap between the walls of the two levels.

To compute the SCI values for Çatalhöyük we digitized Mellart's architectural plans for levels IX–III. The plans were scanned from Cutting (2005) and then cleaned with a raster image editor. The latter involved removing portions of the plans that were the product of artistic licence, such as shading to show the location of unexcavated slopes or rubble in open space areas. Subsequently, the digitized plans were imported into the GRASS GIS software package (GRASS Development Team, 2012) as raster data and aligned with one another. The SCI was then calculated for each level from VIII to III. No architectural plans are available for levels below level IX from Mellaart's excavations. This means that we could not compute the SCI for level IX. Consequently, in order to be able to include the other data from level IX in the analysis we assumed that the SCI for level IX was the same as the SCI for level VIII.

The factor analysis was carried out in R (R Development Core Team, 2011) using the "fa" function of the "psych" package (Revelle, 2012). Because the data are not normally distributed according to Shapiro–Wilk test (Shapiro and Wilk, 1965), factors were extracted with the ordinary-least-squares method rather than the maximum-likelihood method. The number of factors to retain was determined on the basis of the percentage of variance explained by the factors, Cattell's (1966) scree-plot method, and Horn's (1965) parallel analysis. We used Varimax rotation to improve the clarity of the model (Kaiser, 1958).

It is not unusual in an FA for variables to load on multiple factors to some degree. As such, a minimum acceptable variable versus factor correlation coefficient value is required to make sense of the results. A correlation coefficient cut-off value of 0.4 is commonly used in behavioural studies (Ford et al., 1986). Accordingly, we considered a variable to load significantly on a factor if the correlation coefficient for a given variable–factor combination was greater than or equal to 0.4. A variable was permitted to load on multiple factors if the relevant correlation coefficients exceeded the cut-off value.

3. Results and discussion

The selection criteria favoured two models, one with two factors and one with three. Models with more than three factors did not have substantially better explanatory power than the two- and three-factor models. This can be seen in the scree-plot presented in Fig. 1. A scree-plot allows a visual assessment of the additional variance explained by each extra factor. An "elbow" in a scree-plot indicates the last additional factor that contributes to the explanatory power of the model. In the present case, it is clear that explanatory power tails off rapidly after the third factor.

Both the two-factor and three-factor models are statistically significant (two-factor model: $p < 0.014$; three-factor model: $p < 0.018$). However, there are several reasons to prefer the three-factor model. First, the three-factor model explains more of the common variance in the dataset than the two-factor model (two-factor model: 73%; three-factor model: 90%). Second, the uniqueness scores for the variables of greatest importance for the present study – the SCI and the percentage of houses that contain burials – are significantly lower in the three-factor model than in the two-factor model (SCI two-factor model uniqueness score: 0.5; SCI three-factor model uniqueness score: 0.05; percentage of houses that contain burials two-factor model uniqueness score: 0.42; percentage of houses that contain burials three-factor model uniqueness score: 0.29). The uniqueness score indicates how much of a given variable's variance cannot be explained by a particular factor model. Thus, the two-factor model fails to account for 50% of the variance in SCI and 58% of the variance in percentage of houses that contain burials, whereas the three-factor model fails to explain only 5% of the variance in the SCI and only 29% of the variance in the percentage of houses that contain burials. Adding more factors will generally reduce the uniqueness scores of variables because the resulting model is more complex, but the statistical significance and explanatory power of the model should decrease if the additional factors are not meaningful. In the present case, adding a factor allowed the model to explain more of the variance in the dataset without losing statistical significance according to a Chi-

Table 1
Data used in study: Average number of rooms per house (#rooms); Percentage of houses containing each of platforms (%platforms), pillars (%pillars), benches (%benches), decoration (%decoration), burials (%burials), and ovens (%ovens); Spatial Continuity Index for the relevant occupation level (SCI).

Level	#rooms	%platforms	%pillars	%benches	%decoration	%burials	%ovens	SCI
XII–IX	1.8	50	25	0	50	25	50	0.5
VIII	1.3	75	88	0	88	88	88	0.5
VII	2	80	68	52	40	52	52	0.6
VIb	1.9	74	59	59	31	51	38	0.6
VIa	2.1	95	86	88	50	68	45	0.7
V	1.9	95	23	82	27	45	41	0.3
IV	1.3	83	0	83	25	75	25	0.4
III	1.9	63	0	38	25	13	88	0.4
II	2.8	100	0	100	0	75	75	0.5

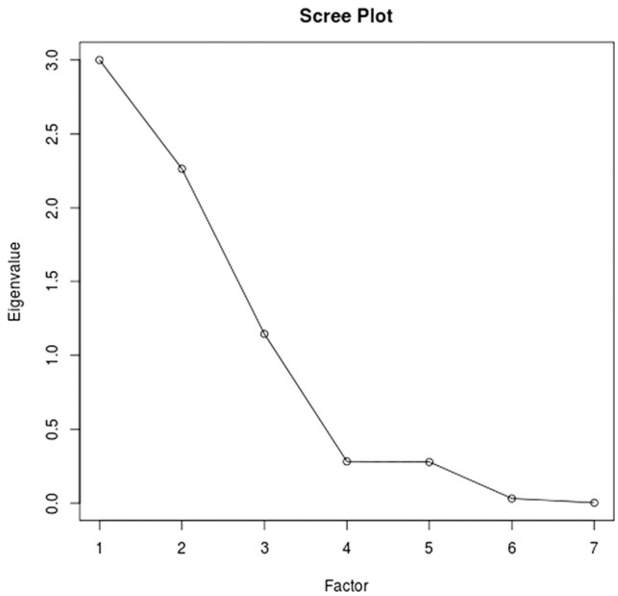

Fig. 1. Scree plot yielded by ordinary-least-squares factor analysis. Each point represents a factor and they are plotted in order of the percentage of the variance in the dataset for which they account descending from left to right. The plot shows that after three factors, additional factors account for similarly little variance compared to the first three.

square test. Third, the total variance captured by the three-factor model is greater than that of the two-factor model and the rate at which the variance explained by each additional factor decreases declines rapidly after three factors. The final reason for preferring the three-factor model to the two-factor model is that the three-factor model is more readily interpretable than the two-factor model. Ease of interpretation is often used to choose between factor models because it suggests that the structure identified by the factors retained reflects real phenomena rather than spurious relationships produced by chance (Costello and Osborne, 2005).

The three-factor model is summarized in Table 2. The communality estimates for the three-factor model are all higher than 0.7, with most being higher than 0.9. This suggests that most of the variance in the data is communal and that most of the communal variance is explained by the three extracted factors. The only variable that did not covary significantly with at least one of the other variables was the percentage of houses containing ovens. This variable was excluded from the model.

Factor 1 accounts for 35% of the common variance in the dataset. The number of rooms per house, the percentage of houses containing benches, and the percentage of houses containing platforms correlate positively with Factor 1, while the percentage of houses that contain pillars and the percentage of houses that contain decoration correlate negatively with it. Hodder (2006) has suggested that benches and platforms were a means by which internal domestic space at Çatalhöyük was divided and would have provided cues to the occupants regarding the use of space, which was different in different areas of the houses. In line with this, we interpret Factor 1 as reflecting norms concerning the division of space within houses.

Factor 2 accounts for 27% of the common variance in the dataset. Factor 2 is dominated by the percentage of houses containing pillars and the SCI. Both of these variables correlate strongly and positively with Factor 2. The percentage of houses that contain decoration correlates positively with Factor 2 as well, but does so more weakly. A certain amount of covariance between pillars and decoration is to be expected since decoration includes plastered installations of buccrania and other animal remains that were set into the pillars themselves (Hodder, 2006). It is difficult to disentangle the structural and non-structural components of the use of pillars in the houses, but the strong association between pillars and the SCI suggests that Factor 2 is largely structural.

Factor 3 accounts for 27% of the common variation in the dataset. Three variables correlate positively with it: the percentage of houses containing platforms, the percentage of houses containing benches, and the percentage of houses that contain burials. The covariant relationship between houses containing platforms and houses containing burials was to be expected since the within-house adult and sub-adult burials at Çatalhöyük occur beneath platforms. Covariation between benches and the other two variables is not as easy to explain and could involve mechanistic or social phenomena. Benches may be more common in more spatially complex houses and those houses may be more likely to contain burials. Alternatively, given that benches also load heavily on the factor relating to norms of spatial division, they may have helped separate the area of the house used for mortuary activities from other areas of the house. Overall it seems reasonable to interpret the third factor as reflecting norms related to intramural inhumation.

As noted earlier, if the hypothesis that intra-mural burials and house replacement covary is correct, the SCI and the percentage of houses that contain burials should load on the same factor and do so in the same direction. The SCI and the percentage of houses that contain burials load on different factors in the three-factor model. The SCI loads on Factor 2, while the percentage of houses that contain burials loads on Factor 3. Thus, the three-factor model does not support the hypothesis that these two behavioural practices covary, and thus cannot be used to support the hypothesis that the corporate kin-group was the main form of socioeconomic organization at Çatalhöyük during the PPNB.

Table 2
Summary of the results of the three-factor model using Varimax and Oblimin rotations.

		Varimax				Oblimin			
Loadings	Variables	F1	F2	F3	U2	F'1	F'2	F'3	U2
	%burials	−0.20	0.23	0.79	0.287	0.46	0.77	0.07	0.287
	SCI	0.16	0.96	0.01	0.050	−0.10	−0.05	1.00	0.050
	#rooms	0.83	0.19	0.05	0.266	−0.80	0.10	0.41	0.266
	%platforms	0.41	0.00	0.91	0.016	−0.12	0.96	−0.02	0.016
	%pillars	−0.44	0.82	0.26	0.073	0.57	0.17	0.66	0.073
	%benches	0.74	−0.15	0.63	0.041	−0.55	0.72	−0.04	0.041
	%decoration	−0.87	0.45	−0.01	0.034	0.90	−0.11	0.21	0.034
Variance	Proportion	0.35	0.27	0.27		0.34	0.31	0.24	
	Cumulative	0.35	0.62	0.89		0.34	0.65	0.89	
Statistical significance	Chi-square	10.09				10.09			
	DF	3				3			
	P-value	<0.018				<0.018			

There are four potential explanations for the failure of our factor analysis to support the corporate kin-group hypothesis: 1) the factors are spurious, 2) the results of the analyses are idiosyncratic, 3) the data are inadequate, and 4) the hypothesis is incorrect.

One of the issues with FA is that random data can some times yield large factor loadings and statistically significant factor models (Armstrong and Soelberg, 1968). To evaluate this possibility, we carried out two analyses. In the first, we used Bartlett's test, which determines whether the number of correlations in a matrix differs significantly from the number of correlations that can be expected in a similar-sized matrix consisting of random data (Vierra and Carlson, 1981). We found that the number of correlations in our matrix is significant ($n = 9$, $p = 0.0004$). In the second analysis, we employed bootstrapping. We began by creating 1000 matrices of the same dimensions as the original data matrix by resampling with replacement from the original data matrix. We then subjected the bootstrap matrices to FA. Thereafter, we calculated the number of times we achieved a result as significant as our least significant factor model. The results of the bootstrapping analysis indicated that the factor models yielded by the original dataset are significant. Only 4% of the bootstrap matrices produced factor models with significance levels greater than or equal to the significance level of the least significant factor model obtained from the original matrix. Together, the Bartlett's test and the bootstrapping analysis indicate that the factors we recovered are not spurious.

To assess the likelihood that the results of our analyses are idiosyncratic, we re-ran the analysis using oblimin rotation to see if relaxing the variance maximizing principle produced substantially different results. Oblimin rotation allows factors to be correlated with each another (Jennrich and Sampson, 1966). The results of the re-analysis were similar to those obtained in the original analysis (Table 2). Most importantly for present purposes, the SCI and the percentage of houses that contain burials continued to load on different factors that are very weakly correlated. Thus, there is reason to believe that our original analysis' lack of support for the corporate kin-group hypothesis is not idiosyncratic.

With regard to the third possibility, it is undoubtedly the case that the data from Mellaart's excavations are not as detailed as the data from the recent excavations at the site. Archaeological practice is considerably more detail-oriented today than it was in the early 1960s. However, it seems unlikely that the data from Mellaart's excavation are so coarse-grained that they would fail to record the relationship between spatial continuity and intramural burials posited by Hodder. Hodder's hypothesis describes a society-wide social structure and this can be expected to result in large-scale, long-term archaeological patterns. We think it is implausible that a few sub-metre errors in a plan map, or a handful of unrecorded burials would result in such patterns being missed. Thus, we contend that the quality of the data also cannot explain the failure of the analyses to support the corporate kin-group hypothesis.

This leaves the fourth potential explanation for the failure of the analyses to support the corporate kin-group hypothesis, namely that the hypothesis is incorrect.

If the corporate kin-group hypothesis is incorrect, what are the alternatives? We have identified three possibilities so far. One is that the first part of the corporate kin-group hypothesis – the suggestion that corporate kin-groups were the main form of socioeconomic organization at Çatalhöyük during the PPNB – is correct, but the second part of the hypothesis – the claim that the corporate kin-groups were maintained by social memory created through the rebuilding of houses with the same floor plan and by the burial of important members of the corporate kin-groups under house floors – is erroneous. Another possibility is that the second part of the corporate kin-group hypothesis is accurate but the first part is incorrect. It is feasible that corporate kin-groups were present at Çatalhöyük during the PPNB and were maintained by social memory created through the rebuilding of houses with the same floor plan and by the burial of important members of the corporate kin-groups under house floors but the corporate kin-group was not the main form of socioeconomic organization in that period. It could be that corporate kin-groups operated in different areas of the settlement at different times during the PPNB, but were never sufficiently numerous to leave a site-wide, long-term signal, and that is why our analysis, which was designed to identify such a signal, returned the results it did. On this hypothesis, Hodder's interpretation of the specific houses on which he based the corporate kin-group hypothesis is correct, but the extrapolation to the settlement in general is not. The third possibility is that corporate kin-groups were simply not present at Çatalhöyük during the PPNB and that some other form of socioeconomic organization operated at the site during that time period. All of these hypotheses are consistent with our results. As such, determining which, if any, of the hypotheses is correct will require further research.

4. Conclusions

The study reported here casts doubt on a widely discussed hypothesis concerning socioeconomic organization and building function at the well-known Neolithic site of Çatalhöyük. The hypothesis contends that the corporate kin-group was the main form of socioeconomic organization at Çatalhöyük during the PPNB, and that the corporate kin-groups would have been maintained by the repeated rebuilding of houses in the same place and by the burial of important members under the floors of the houses. However, we found that house-wall continuity and the occurrence of within-house burials loaded on different factors in a factor analysis and therefore cannot be treated as co-varying through time. This leaves three possibilities. One is that corporate kin-groups were the main form of socioeconomic organization but they were not maintained in the manner posited by the corporate kin-group hypothesis. Another is that corporate kin-groups existed in some places and at some times at Çatalhöyük during the PPNB, but the corporate kin-group was never the main form of socioeconomic organization. The third possibility is that the corporate kin-group hypothesis is wholly incorrect and a different model of socioeconomic organization at Çatalhöyük during the PPNB is required. Additional research will be required to determine which of these possibilities is correct. Until this research has been carried out, claims that during the PPNB Çatalhöyük's occupants formed corporate kin groups that were maintained by social memory and "history houses" should be curtailed and interpretations built on this hypothesis should be viewed with suspicion. Lastly, our study suggests that there is a pressing need to quantitatively evaluate the claims for the existence of corporate kin-groups and "history houses" at other sites that have been inspired by Hodder's claims about Çatalhöyük.

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