

Peopling the Landscape of Çatalhöyük: Reports from the 2009–2017 Seasons

Edited by
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Supplementary material to Chapter 8. Macromammals of Çatalhöyük

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Online appendix S8.1. General appendix

Changing methodologies

Faunal recording strategies at Çatalhöyük changed in 2012 and again in 2014. Curtailing some elements of our analyses and adding new ones enabled us a) to analyse a higher proportion of the site's fauna; b) to quantify assemblages in new ways; and c) to provide basic quantitative characterisations of units that would not be fully studied. Data recorded using our new systems are identified as such in the online Çatalhöyük database (please see 'Recording Type' in the Faunal Unit Description).

Data recorded using our new methodologies are comparable to data gathered prior to 2012 in most but not all ways. We highlight throughout this appendix and the associated chapter (Twiss et al. 2021) which of the data we present cannot be compared directly to those published in Russell and Martin (2005) and Russell et al. (2013). Key differences between the faunal methodologies used to produce those two chapters and those used to produce the current appendix and chapter are as follows. For additional details, see Best et al. (2012) and Mulville et al. (2014).

Tier 1 recording (instituted 2012)

1. On the Faunal Unit Description we entered quantitative estimates of unit contents in addition to text descriptions of each unit. These quantitative estimates consisted of:

a. the proportion (by NISP and by weight) of specimens derived from cattle-sized animals (including large equids and red deer); sheep-sized animals (including medium canids and small cervids); and other-sized animals (including hares, foxes, birds, boar and small equids)

b. the proportion of the unit that was burned
c. the proportion that was rodent- or carnivore-gnawed
d. the modal surface condition (Good; Normal; Heavy; Variable).

2. We added a zone system of quantification (see below, 'Cardiff Zones'). This replaced verbal descriptions of element portion(s) present, as used in Russell and Martin (2005) and Russell et al. (2013).

3. We did not weigh individual specimens; we rely on the size-class weights on the Faunal Unit Description to summarise the weight of bone in each unit.

4. We now use 2, 3, 4 to number deciduous premolars (pre-2012 analyses recorded dp1, 2, and 3).

A5 (revised) recording (instituted 2012)

For low-priority units (for example, mixed or tertiary deposits), we recorded only diagnostic specimens and specimens with traces of pathology, working or butchery. We weighed all other specimens together. Size-class weight totals on A5 Faunal Unit Descriptions exclude the unanalysed material.

'2014' recording (instituted 2014)

Russell and Martin (2005) and Russell et al. (2013) provide a wealth of information about sheep and goat management at Çatalhöyük: caprines dominate the assemblages numerically, and these chapters and other publications provide rich data about their production and consumption (for example, Henton 2012; 2013). We therefore decided in 2014 to try to acquire as much information as possible about taxa other than caprines.

We developed this recording system in order to facilitate that goal. We emphasise that this system was used only with units marked in the database as ‘2014 Recording’ (or, pre-2014, ‘P’ for ‘partially recorded’). It was *not* used with all units recorded in 2014–2017.

The ‘2014’ system entails the following:

1. Normal completion of the Faunal Unit Description, with a note at its beginning stating ‘2014 RECORDING’.

a. We include the total weight of non-size-classed bones, so that we can calculate the total weight of the unit.

b. We took no weights on individual elements except for antler and horn cores.

2. Individual recording of the following specimens only:

a. Taxa that are relatively rare in the Çatalhöyük assemblage (for example, bear, boar, deer, hares, foxes, badgers, etc.)

b. Cattle: only measureable elements and teeth suitable for stable isotopic analysis

c. Caprines: unusually informative specimens (for example, worked, pathological, directly sexable).

Figure S8.1 illustrates the effects on the faunal database of the different recording methods in use at Çatalhöyük over the course of the project’s duration. Long Form (L) recording and Tier 1 (T1) recording produced similar if not identical taxonomic proportions as measured using diagnostic zones; the ‘2014’ protocol resulted in our recording significantly higher proportions of animals other than caprines. Analysts must compare and contrast taxonomic proportions from comparably analysed units only (as we are cautious to do here). Future research using the Çatalhöyük Project faunal database must begin with a check of the recording status of each unit as noted in its Faunal Unit Description entry.

Cardiff zones

To facilitate body part representation analyses and minimum numbers of individuals (MNI) comparisons we also began recording what we call Cardiff Zones. These are a modified version of the diagnostic zone system described by Serjeantson (1996), in which for each recordable fragment a zone is recorded only where over 50% is present. To facilitate comparison between the most frequent taxa, we calculate the minimum number of

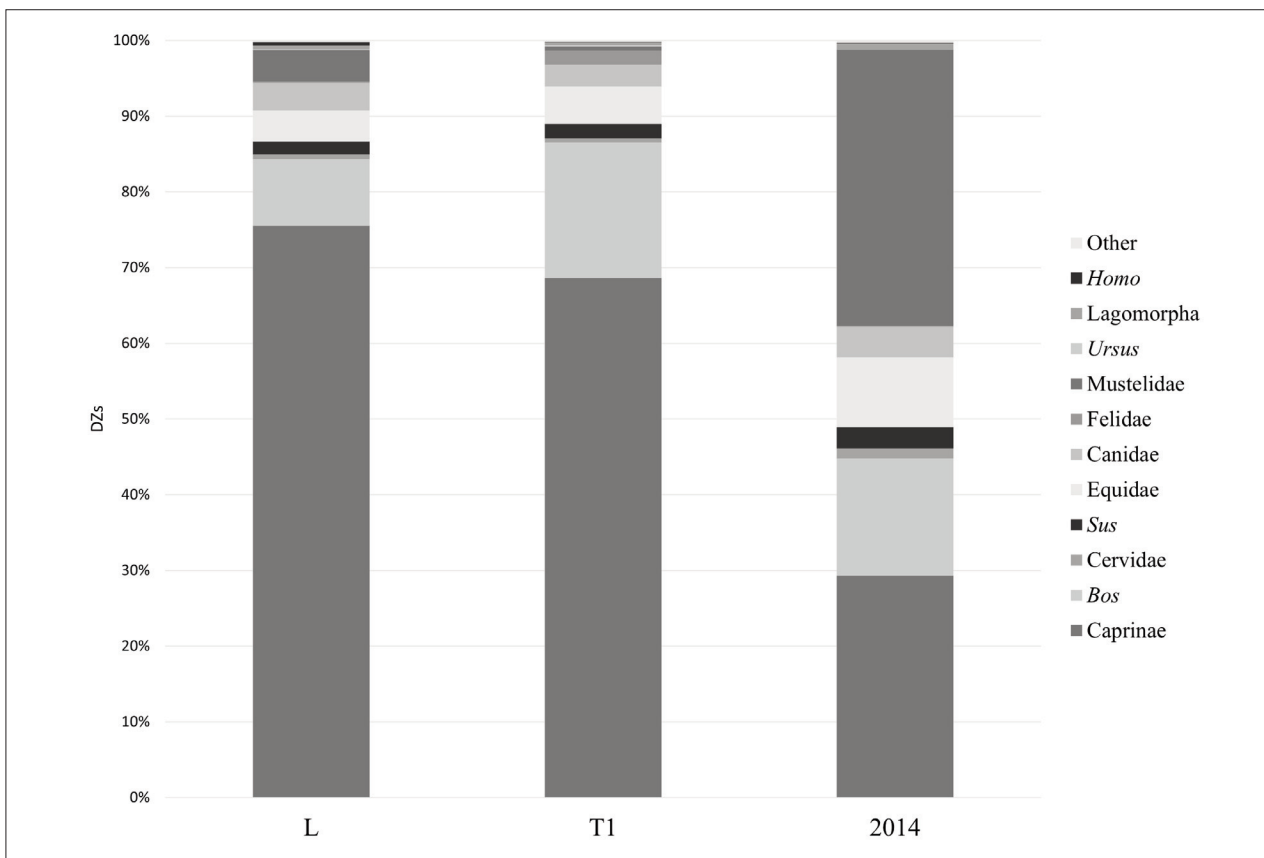


Figure S8.1. Effects of different methods used to analyse the Çatalhöyük macrofauna on taxonomic proportions. Size-classed specimens excluded. Data from all three major tranches of research, North, South, IST and KOPAL Areas, reported using Diagnostic Zones (DZs).

elements (MNE), based on the sum of the most frequent zone for each element (taking symmetry into account). We then derive minimum numbers of individuals (MNI) from the most common element in the MNE counts for these species.

Body part representation can provide an indication of the type and location of activities carried out at a settlement, since butchery, food preparation and industrial processing can result in the differential disposal of certain elements. For instance, heads and feet are often removed and discarded during primary butchery whereas meaty limb bones are more likely to have been transported to areas where food was prepared and consumed. In reality the situation is often more complex, since some elements might be valued as raw material with which to fashion artefacts and tools, such as horn and antler. Human activities are not the only factors affecting body part representation, since the actions of scavengers, particularly dogs, can also result in the movement and destruction of bones and this has clearly affected the material at Çatalhöyük.

Another major factor influencing body part representation is the variation in bone density that occurs throughout the skeleton, which to a large extent is dependent on the on the morphology of the bones, with

those composed of dense cortical bone such as limb-bone shafts more likely to survive than elements, and parts of elements, composed of softer cancellous bone, such as vertebra and ribs. Small bones are also more likely to be destroyed than larger elements, so the bones of large animals survive better than their smaller counterparts. Immature bones are more porous than those belonging to adults so will also be preferentially destroyed by density-mediated process, including dog gnawing. As a result, it is necessary to consider the role that bone density has played in modifying an assemblage when making interpretations concerning body part representation and the nature of activities taking place at a settlement.

Differences in the number of bones present in the skeleton of the major food mammals also need to be considered, as do the effects of fragmentation. This is achieved by the calculation of the percentage survival of the individual elements, as this takes into account the number of times a bone occurs in the body. Each Cardiff Zones analysis in this report estimates the survival of each element as a percentage of the quantity expected to have been produced by the minimum number of individuals represented.

	<i>Hodder Level</i>	<i>Russell et al. NISP</i>	<i>Russell et al DZs</i>	<i>2018 NISP</i>	<i>2018 DZs</i>	<i>Mellaart Level</i>	<i>Russell and Martin NISP</i>	<i>Russell and Martin DZs</i>
Late Çatalhöyük	North.J	0	0		0	<i>Summit</i>	<i>1264</i>	<i>212.2</i>
	North.I	11865	2085.9	33	23.2	<i>IV/later</i>	<i>71</i>	
	North.H	1286	473	284	65.2	<i>North V-IV</i>	<i>312</i>	<i>9.5</i>
	South.T	858	140.9	286	63.5	<i>North VI-V</i>	<i>2230</i>	<i>213.4</i>
	South.S	11037	1924.7	24	4.5			
	South.R	4237	547	141	36.2			
	South.Q	5281	911.7	193	51.8			
	South.P	2882	642.1	2146	504.7			
Middle Çatalhöyük	North.G	13094	533.2	4283	853.7	<i>VII</i>	<i>2658</i>	<i>488.9</i>
	North.F	0	0	226	88.7	<i>VIII</i>	<i>4564</i>	<i>717.4</i>
	South.O	0	0	3638	467.4			
	South.N	0	0	248	76.7	<i>IX</i>	<i>1673</i>	<i>361.2</i>
	South.M	2997	572.9	450	74	<i>X</i>	<i>140</i>	<i>22.7</i>
Early Çatalhöyük	South.L	4521	774.4	668	147.4	<i>XI</i>	<i>988</i>	<i>80.7</i>
	South.K	1832	400.2	705	188.4	<i>XII</i>	<i>202</i>	<i>20.4</i>
	South.J	1832	26.7	0	0	<i>Pre-XIIA</i>	<i>1571</i>	<i>232</i>
	South.I	987	80.7	2	0.5	<i>Pre-XIIB</i>	<i>3135</i>	<i>383.9</i>
	South.H	281	36.9	89	44	<i>Pre-XIIC</i>	<i>580</i>	<i>62.9</i>
	South.G	5851	749.8	402	25.2	<i>Pre-XIID</i>	<i>480</i>	<i>51.6</i>

Table S8.1. NISP and DZs by level in each of the previous publications. Dark Grey=Late Çatalhöyük; White=Middle Çatalhöyük; Light Grey=Early Çatalhöyük. Mellaart and Hodder Levels do not correlate directly. The table includes only specimens assigned to (a) family, genus and/or species, and (b) a specific level. Here and throughout this appendix and the associated chapter (Twiss et al. 2021), we include specimens cautiously attributed to specific levels (that is, deriving from spaces with no direct stratigraphic link to the site chronological ‘backbone’) with the securely attributed specimens. Previous publications did likewise.

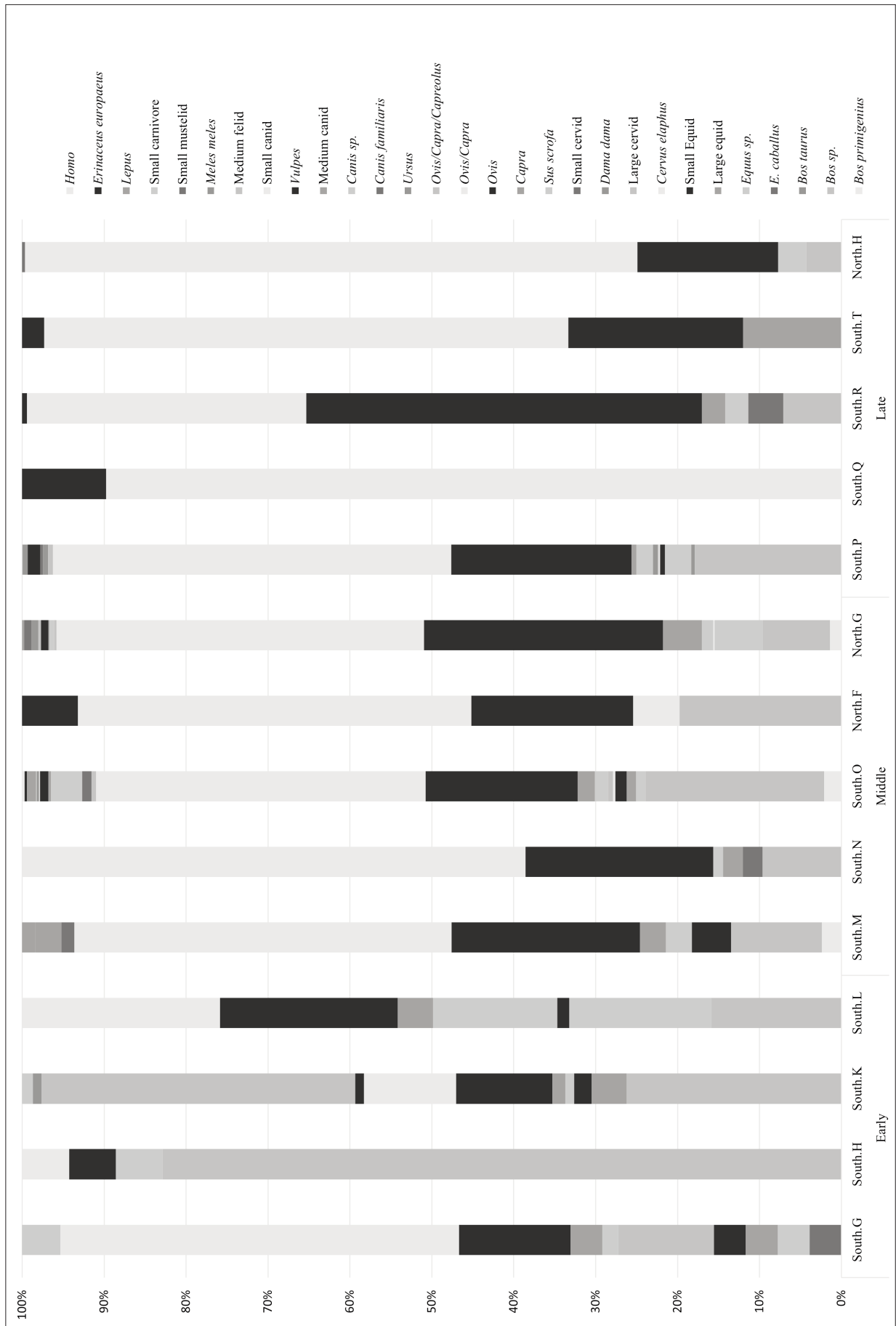


Figure S8.2. Faunal taxonomic proportions, Çatalhöyük 2009–2017. By Diagnostic Zones (DZs); no size-classed specimens. L and T1 unit data only.

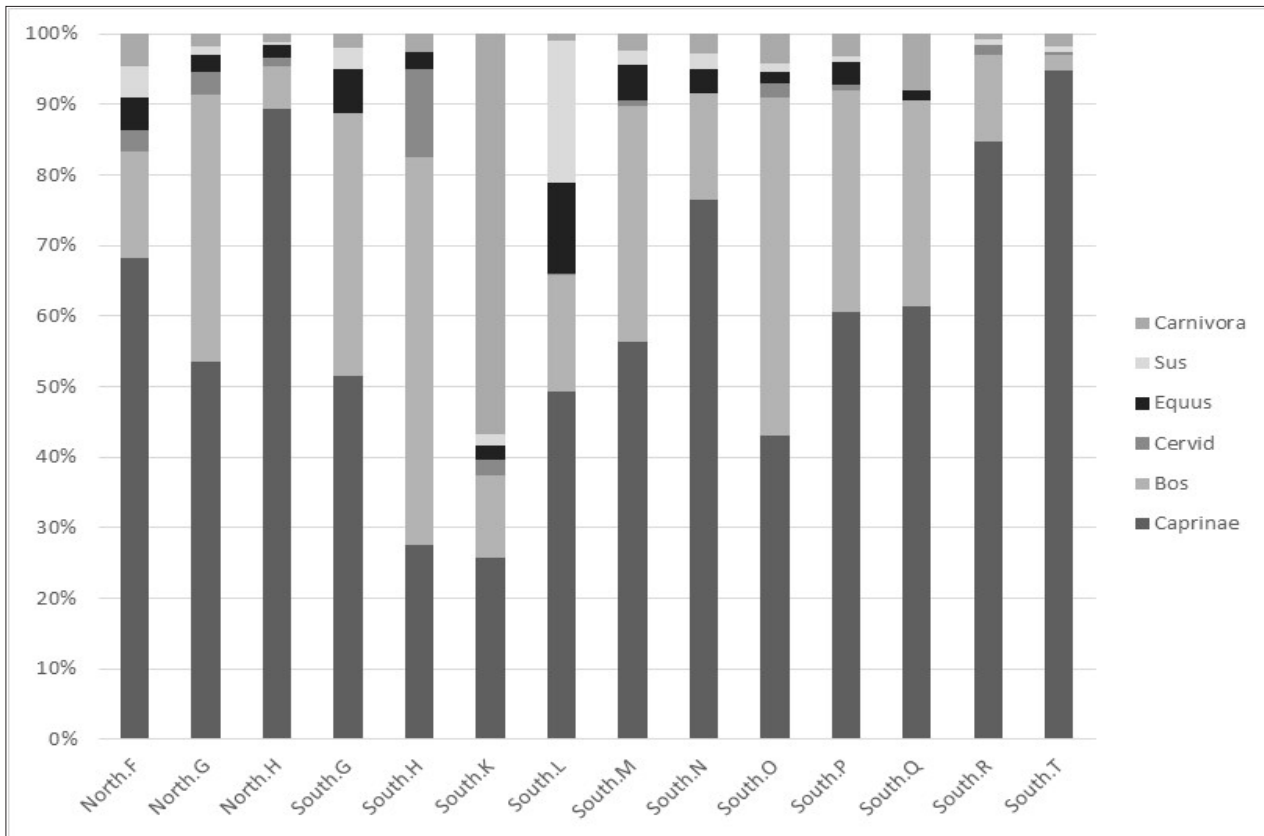


Figure S8.3. Çatalhöyük North and South Area specimens recorded in 2009–2017 (NISP, major genera only, all recording types). This figure does not testify to taxonomic proportions at the site.

Data by deposit type, 2009–2017

A preponderance of our efforts went to recording middens; we also dedicated significant time to recording fills. (Table S8.2: Deposit Types relies on data categories assigned by excavators to particular units, which is why we seem to have recorded a cut unit; units identified as skeletons are theoretically entirely comprised of human bone, but it is easy for untrained eyes to mistake faunal remains for human.) Figure S8.4 highlights the extent to which most of our recording was done using the 2014 and the T1 protocols, as well as our focus on middens and fills. The ‘Assessment’ recording system is no longer in normal use; the specimens recorded using this protocol typically came into the lab years after the rest of a unit was recorded, having been repatriated from other labs as ‘not stone’ or ‘not ceramic,’ etc. ‘Partial’ recording occurred when individual specimens were selected for recording out of otherwise unstudied units: these specimens were either artefacts (for example, tools or personal adornments) or samples for radiocarbon dating.

Figure S8.5 demonstrates that taxonomic proportions were broadly consistent across deposit types (where samples are large enough for evaluation). What

differences appear probably relate to both Neolithic activities and modern excavation and analysis norms. Consider, for example, the various proportions of cattle remains found in different types of deposits. We recorded higher proportions of cattle remains in clusters and fills than in middens. Over-representation of cattle remains in clusters – which are commonly interpreted as the remains of feasts and ritual deposits – accords extremely well with what we know about symbolism and feasting norms not just at Çatalhöyük but throughout southwest Asia. However, cattle remains are also highly noticeable in the ground, and we suspect that excavators were likelier to identify clusters when they encountered multiple cattle rather than multiple caprine bones. Floors, meanwhile, appear richer in cattle than even clusters: these remains must be either intentionally placed abandonment deposits or bones found atop floors but actually associated with the fills directly above them. (The same applies to the boar remains that are more common in floor deposits than in any other contexts.) The taxonomic variation across deposit types is not purely a product of modern archaeological practice – but one must keep that practice in mind when interpreting said variation.

<i>Data category</i>	<i>Recording type</i>	<i>Number of units recorded</i>	<i>Number of specimens recorded</i>	<i>Number of DZs recorded</i>
Activity	All	156	833	19.5
	2014	8	7	2
	Partial	5	4	1
	T1	143	822	16.5
Arbitrary	All	89	239	17.2
	2014	25	17	7.2
	Assessment 5	5	5	0
	Partial	10	10	6
	T1	49	207	4
Cluster	All	357	1219	123.7
	2014	8	10	2
	Assessment 2	33	146	16.5
	L	14	15	0
	Partial	21	72	10
	T1	281	976	95.2
Construction/ make-up/packing	All	812	4759	137.1
	0	1	1	
	2014	77	234	19.6
	Assessment 3	4	5	2
	Assessment 4	10	10	5.5
	Assessment 5	43	43	10
	L	1	1	
	Partial	46	44	13.5
	T1	630	4421	86.5
Cut	All	1	1	
	L	1	1	
Fill	All	4708	26235	1012.9
	0	7	5	2
	2014	511	989	175.1
	Assessment 1	1	1	
	Assessment 3	9	9	2
	Assessment 4	13	13	5.5
	Assessment 5	177	229	40.9
	L	12	17	
	Partial	212	350	62
	T1	3766	24622	725.4

Table S8.2. Deposit types: Number of units in each data category with faunal data recorded during this tranche of research. Data categories are assigned by excavators; they are not faunal team inferences. Assessment numbers represent the team's evaluation of the faunal significance of the unit, and thus the importance of trying to revisit the unit for fuller recording in future. Units ranked Assessment 1 are strong candidates for additional attention; Assessment 5 units are extremely low priority. Units that were revisited in more detail had their recording status changed in the database; none of the Assessment units tallied here have received more in-depth study.

<i>Data category</i>	<i>Recording type</i>	<i>Number of units recorded</i>	<i>Number of specimens recorded</i>	<i>Number of DZs recorded</i>
Floors (use)	All	646	2665	131.9
	2014	80	194	43.5
	Assessment 3	1	1	1
	Assessment 4	1	1	
	Assessment 5	4	4	2.5
	L	6	6	
	Partial	35	35	4
	T1	519	2424	80.9
Midden	All	7944	45835	1717.9
	2014	2080	3963	596.4
	Assessment 1	91	96	25.9
	Assessment 3	54	52	24
	Assessment 4	4	4	
	Assessment 5	2	2	1
	Partial	739	4855	225.5
	T1	4974	36863	845.1
Skeleton	All	12	17	2
	Partial	9	14	1
	T1	3	3	1
(No data category recorded)	All	501	1630	89.2
	Assessment 5	2	2	2
	Partial	42	42	21.2
	T1	413	1550	55.5
Grand total		15226	83433	3251.4

Table S8.2 (continued). Deposit types: Number of units in each data category with faunal data recorded during this tranche of research. Data categories are assigned by excavators; they are not faunal team inferences. Assessment numbers represent the team's evaluation of the faunal significance of the unit, and thus the importance of trying to revisit the unit for fuller recording in future. Units ranked Assessment 1 are strong candidates for additional attention; Assessment 5 units are extremely low priority. Units that were revisited in more detail had their recording status changed in the database; none of the Assessment units tallied here have received more in-depth study.

We are comfortable saying that caprines dominate all deposit types, and that animals other than caprines and cattle appear most frequently in clusters. Floors and fills have higher proportions of these rarer taxa than do middens: we believe that this is because there were pockets of special material in the larger units. Special (large or otherwise noteworthy) faunal remains have been found in building fills and as abandonment deposits

on house floors across the site (Twiss et al. 2008; Russell et al. 2013; 2014). All of the deposit types represented in Figure S8.5 must be recognised as umbrella terms subsuming considerable variation. Clusters in particular testify to diverse individual events with a wide range of social meanings: a heap of aurochs bones deposited in a midden is very different from an articulated kitten skeleton placed carefully by a wall.

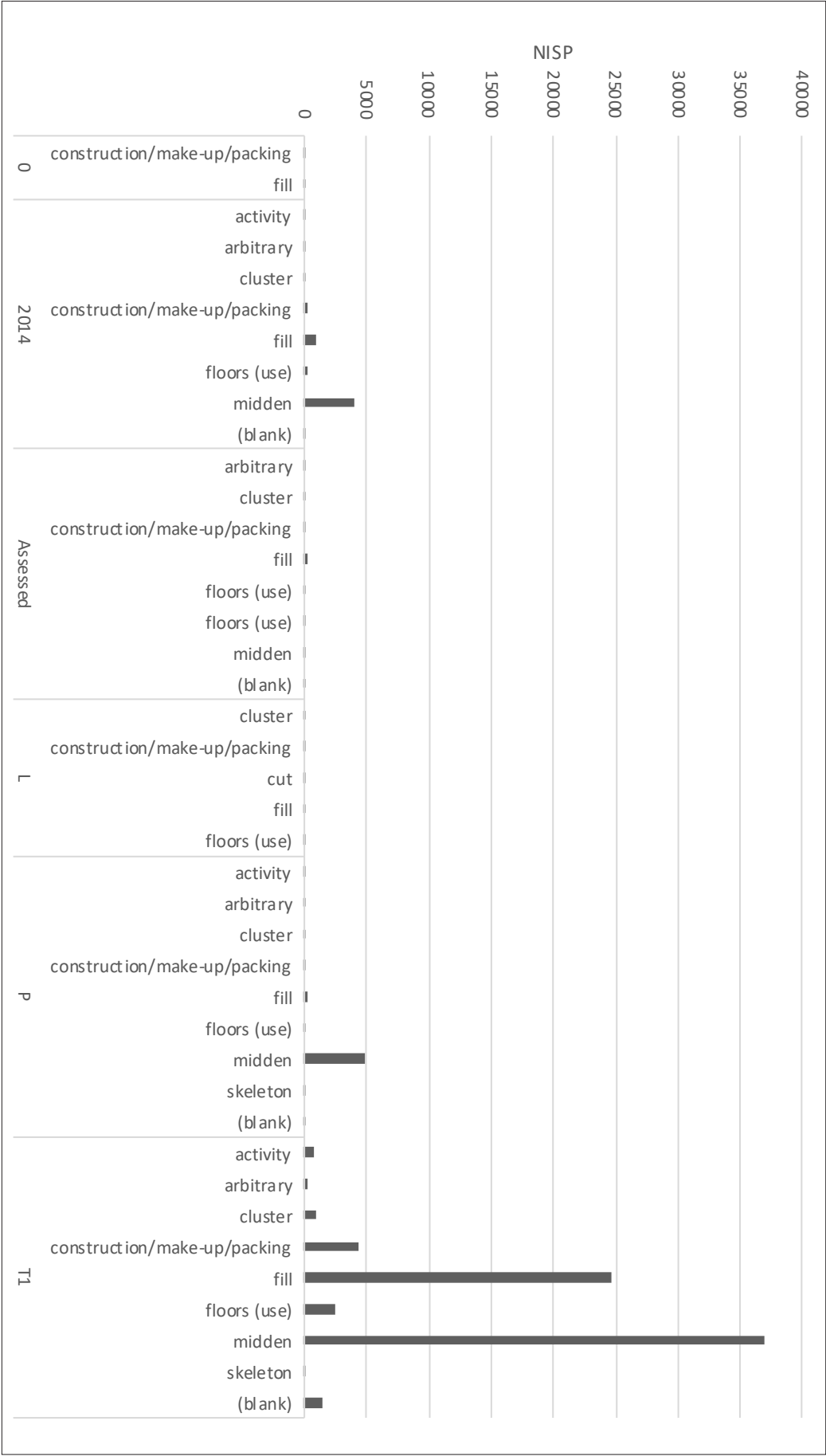


Figure S8.4. Number of faunal specimens recorded using different protocols. By deposit type and NISP, Çatalhöyük 2009–2017.

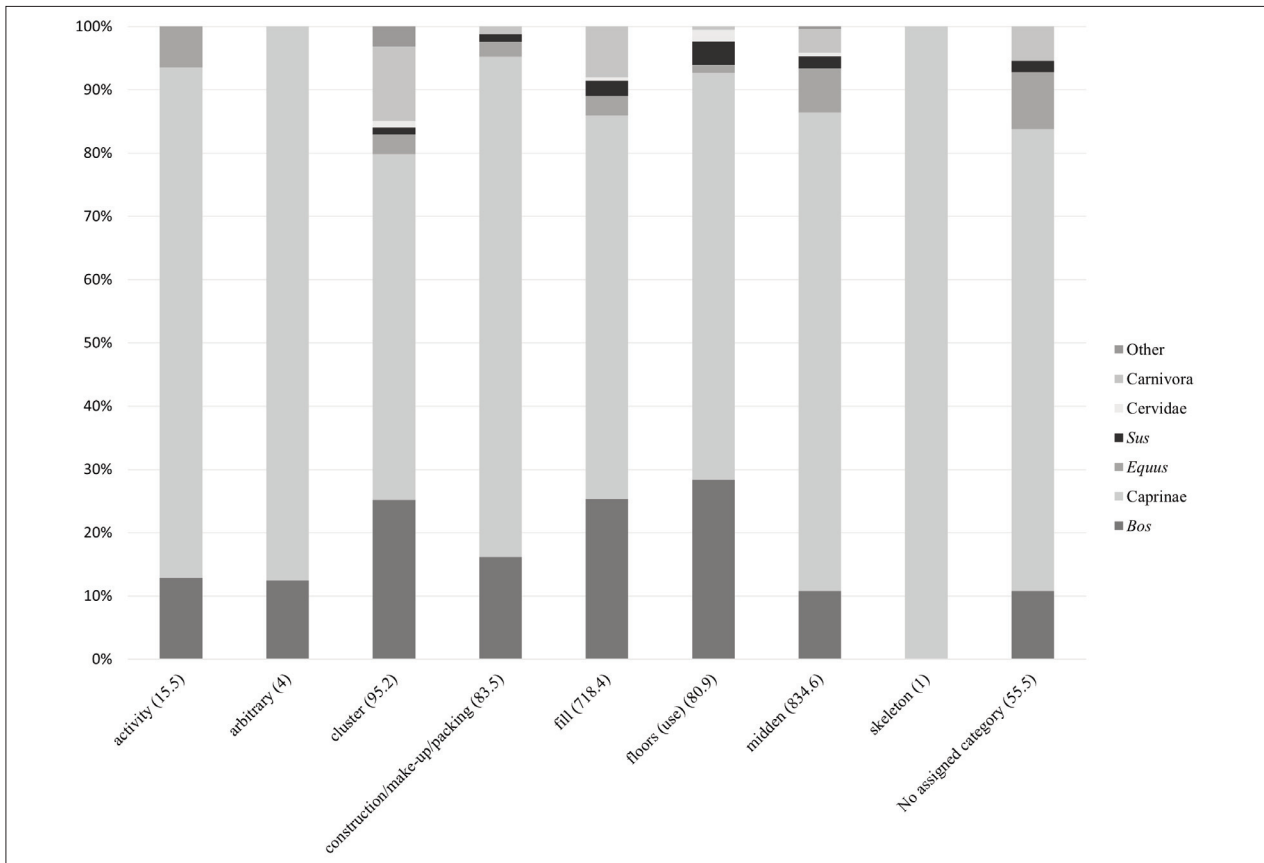


Figure S8.5. Faunal taxonomic proportions in different types of deposits. By Diagnostic Zones (DZs); no size-classed specimens. On the x-axis, each deposit type is followed by a number in parentheses: this is the number of DZs used to calculate the percentages in the figure. L and T1 unit data only.

Building-by-building comparisons

The main text of Twiss et al. 2021 summarises variability across building contents recorded during this research tranche. This section provides additional information about the buildings' faunal contents.

Building 77

The zooarchaeology of B.77's burned phase (Spaces 336 and 337) is reported in Volume 8 (Russell et al. 2013). Excavation of Building 77's pre-burning phase produced few faunal remains relating to the house's construction, use or abandonment. (Faunal remains unrelated to the house's use are small fragments of material caught up in various soils – tertiary deposits, or what we commonly call background noise.) However, bone artefacts in selected burials testify to Neolithic personal adornment practices. Of particular note are worked boar tusks – perhaps collars – in two burial fills and two red deer canine teeth and five bone beads (one mimicking a red deer tooth) in a third (burial F.3697). We cannot tell whether F.7133 contained one worked tusk (perhaps a collar?) or multiple artefacts: the fill yielded contained a perforated boar tusk fragment and another piece of worked boar tusk. The worked tusk in

F.7309 is nearly complete (30154.x1) and was recovered along with a bone bead and yet another worked boar tusk fragment. Excavators reported that a long bone point (20625.x1) that was found in mixed burial fills lay in the centre of B.77's northeast platform together with a small fragment of a pinkish stone. Points are common finds around Neolithic Çatalhöyük, and we do not assume that this one was a symbolically weighty inclusion in a mortuary deposit.

Building 131

This building, which contained three dismantled zoomorphic plaster heads (Busacca, Lingle 2017), contained few actual faunal deposits that relate to its construction or occupation. Assorted fragments were inadvertently caught up in the soils used to build the house's walls and features, but during the construction of the building's main room (Space 500) people also intentionally embedded two left cattle scapula blades (23074.x1 and x2) into the eastern and western sides of a niche (F.7986) on the northern wall of the building. One of the scapulae comes from an aurochs; the other is smaller and might come from either a female aurochs or

a domesticated animal. Both specimens were broken in antiquity. The aurochs scapula's glenoid is missing and its spine broken down, while the smaller specimen's spine is intact but its glenoid also missing. Scapulae are a common element in special deposits at Çatalhöyük, and the pairing here – perhaps wild/domesticated, perhaps male/female – may have been a meaningful one. Other paired bones in other special deposits likewise derive from different animals (Russell et al. 2013); we note in particular an inferred male/female scapula pairing in Building 50.

The only macrofaunal remains that relate to the occupation phase of Sp.500 are personal adornments in subfloor interments (30092, 22676, 22675) and a few burned rodent bones (32334) recovered from the inside of a basin (F.7988) – see Feider and Jenkins (2021) – which we interpret as the remains of a Neolithic rodent that died in its pursuit of the house's grain stores. An interesting find among the personal adornments is a boar tusk bead in (30092). This unit contained multiple beads deriving from two bracelets: one which adorned the person's lower-mid right arm (the beads are 30092.x7 and F.1–3) and one on the right wrist (beads 30092.x9, F4–16). According to Russell and Griffiths (2013: 298), beads made out of teeth usually come from either carnivores (dog, badger) or wild boars, and they are quite individualised: 'the associations of the animals from which they derive likely play[ed] a part in... individual[...] identities.' Floor and hearth units contained small, largely unidentifiable fragments of bone; floor unit (32533)'s burnt bone point and possibly burnt needle fragment are inferred to be tertiary deposits.

The fills of Sp.500 as well as its side room Sp.556 yielded highly fragmented and incinerated remains from a variety of animal taxa: caprines and cattle, dogs and deer. At least two horn cores burned here (there are numerous fragments in the fill), as did multiple antler tines, some of which may have been worked.

A pendant fragment (23000.F1) found on the side room floor may or may not be related to the earliest use of Building 131's side room (Sp.504); Unit (23000) was an arbitrary layer that included, but was not fully comprised of, floor deposits.

Building 132

Almost none of the fauna recovered from inside this house testify to its occupation. There are virtually no recorded faunal remains from the earliest phase of B.132's main room occupation (Sp.633). A large majority of our data comes from fills associated with the room's subsequent phase (Sp.531). These fills (both those above floor level and those inside pits) contain bones with variable surface conditions and fragmentation

patterns, and we infer that each fill reflects multiple activities largely unrelated to the use of the building. An exception is an artefact cluster (31585) in pit F.7724 that included a complete worked bone point and a worked bone spatulate item.

We also examined two contexts from Building 132's partially excavated side room (Sp.511). As in the main room, there was no cohesion to the units, and with one possible exception we don't link our finds to the occupation of the structure. The exception is a possibly worked cattle scapula fragment (30591.F2) found at floor level; it might or might not have been on the floor of the house at or immediately after abandonment. A complete aurochs scapula (20988.x11) in the infill directly over the floor may derive from activities taking place in this location around the time of abandonment or after the building was abandoned.

Building 80

In sharp contrast to the buildings described thus far, burnt Building 80 yielded faunal data richly informative about life at Neolithic Çatalhöyük. This house contained multiple faunal installations as well as a cache of material that may be related to the house's occupation. All of these finds come from the main room (Sp.135) of the house. The team also recorded multiple bone personal adornments from subfloor burials. (The following data are described in Twiss et al. 2021; we reiterate them here so that readers have descriptions of all of this research tranche's buildings' fauna in a single place.)

A handful of grave goods and caches testify to practices predating the burning and abandonment of B.80. Two finely made bone points (19151.x1 and x2) found near the pelves of a young woman and another possible female adult may once have pinned their shrouds closed. The two points, crafted from a single caprine metatarsal, were lightly used if at all, and may well have been created specifically for these simultaneous interments. (Another, fragmentary, bone pin rested with a partial infant skeleton in one of the building's backfills (18519).)

More quotidian practices might be reflected by two other deposits. As also described in the chapter to which this is an appendix (Twiss et al. 2021), a stone and bone cluster (18955) found atop the building's oven included a fragment of burnt red deer antler. Unworked, it may have been collected as raw material for toolmaking. (That it was not a fresh specimen is indicated by the presence of gnawing marks.) A cluster of worked and possibly worked burnt bones (19194) lay inside a post retrieval pit: their location is inconsistent with regular storage across the lifespan of the house, but their presence at its termination suggests that they were household tools in

some fashion or another. One specimen was a needle, and the others – rib fragments, possibly unfinished or rejected equipment – may have been needles, burnishers or pottery polishers (after Russell, Griffiths 2013: 279–80).

Building 80 burned with a collection of bones (18964) lying beneath its entrance. The bones, found underneath the scar that marks where the building's ladder once was, were heavily fire damaged (calcined). Their otherwise fine surface conditions and lack of rodent or carnivore gnaw suggest that they were relatively fresh when they burned. Sheep-sized specimens represent meaty body parts such as the torso and haunches (vertebrae and ribs, upper limb bones), whereas larger animals are represented by less-meaty distal limb specimens (two cattle metacarpal fragments, an equid distal radius with its carpals). Perhaps these latter bones were intended for boiling? The excavator of this cluster suggested that the bones might have been waste, piled near the entrance for future disposal; it seems equally likely that some or all of the deposit was symbolically intended. Its location echoes that of the fish bone/pea cluster found beneath the entry to Building 77 (House 2014: 496).

Building 80 also contained at least two and perhaps several more installations at the time of its destruction. Set into the south side of a bench sat a horned bucranium (22430.x1), unburnt apart from its left horn core and somewhat crushed. A horned goat head probably protruded from the western wall of the building; excavators recovered a burnt *Capra* frontlet (anterior cranium, 18576.x4), set in clay, from a collapse deposit. It retained two fragmentary horn cores (we believe the sheaths to have been present in the original installation), and two pole-shaped impressions at its base suggest how the installation was supported. We think that a horned cattle skull found upside down in a dump deposit (18543.x1) was a dismantled installation, but we cannot link it to Building 80's occupation. Nor do we know the relationship between Building 80's occupation and an unburned aurochs anterior skull fragment and atlas (plausibly once articulating) found in a wall collapse unit (18531). Several other fill and collapse units in the building also contained horn cores, often with cranial fragments; their presence in such numbers is reminiscent of similar high proportions of skull remains in burned Buildings 52 and 77 in the North Area (Russell et al. 2013: Table 11.10).

Building 80's fills and dumped deposit units in this building also contained numerous scapulae – and all of those for which symmetry could be determined came from the left sides of animals' bodies. This attention to symmetry is reminiscent of special faunal deposits from

burned B.52 and elsewhere on site (Twiss et al. 2008; Russell et al. 2013: 222). In contrast to Buildings 77 and 52, however, many of B.80's scapulae came from equids rather than cattle.

Room fill (17342) contained five left-hand-side scapulae, of which only two came from cattle. Two others came from large equids (*E. ferus*), and the last came from a small/medium equid. Only one cattle scapula was burnt. We believe these scapulae to have been deliberate placements in the fill. The use of bones from five different animals echoes practices in Buildings 3, 131 and 65, and the choice of scapulae in particular accords with the selection of these elements for a variety of symbolic deposits across the site (Russell et al. 2013: 214). This fill unit probably lay above and related to a fill (18508) in neighbouring B.79 (Space 134). Building 79's fill also held a complete, left-hand-side equid (*E. ferus*) scapula, and taphonomically similar human cranial fragments (plausibly derived from one person) were found in both fills.

Finally, back in B.80, one dump deposit held a cattle or large equid scapula, showing signs of use wear along its cranial edge (18947.F3), and another held one bovine and one large equine scapula (18543.x2 and x4), whose symmetry could not be determined. This unit also contained a partial dog skeleton (1854). The dog bones (vertebrae, pelvis and femur) were burned a uniform chocolate colour on all surfaces, suggesting that they were defleshed at the time they burned. We infer that this was a secondary, or redeposited, dog burial.

Building 80's fills were unusual in ways that extend beyond their richness in scapulae and equid remains. Unlike most fills and wall/roof collapse deposits at Neolithic Çatalhöyük, those in Building 80 were often rich cattle-sized specimens (for example, 18519, 18531, 18544). Some units contain bones consistent with feasting, perhaps in situ. The collapse deposit that contained the *Capra* frontlet (18576) also held a variety of cattle and caprine remains, roughly 90% of which were burnt. A series of cattle vertebrae may derive from a single animal; we think it plausible that they and the rest of the unit derive from a single event. (Alternatively, perhaps they were stored goods.)

Building 89

Two finds – one architectural installation and one plausible tool – probably reflect life inside B.89. This house was only partially excavated, and virtually all of the other faunal remains found inside it derive from post-abandonment room fills. Indeed, from the annexe (Space 565) that abuts the main room (Space 379) we have only fills: these are midden-like, containing remains from diverse activities that occurred in multiple locations.

Perhaps some of these activities occurred inside Space 365, possibly at or around the time of abandonment, but we cannot be sure.

The main room's fills come from both above its floors and from inside pits: redeposited material unrelated to the room's use characterises all of them. Most specimens were fragmented to the point of being unidentifiable. The two faunal exceptions mentioned previously are a large worked antler base (21952.x1) and a plastered bucranium (21968.x1). We think that the heavy (roughly 500g) antler base, which was perhaps abandoned near a working surface and quern stone cluster (30945), may have been used as a pounder or a soft hammer.

The bucranium was found in floor deposits, and it is unclear whether it had been dismantled (it was somewhat damaged) or remained installed. Surviving were the back of the skull and both horn cores from a wild adult female. The plastered face of the bucranium is missing but fragments of black paint survive: Busacca and Lingle (2017: 339) suggest that a semi-circular line might indicate a nostril or derive from a geometric pattern adorning the object.

Building 97

Building 97 contained a variety of secondary and tertiary middens and fills, virtually no material reflecting the daily life of its occupants but some evidence of special activities in and around its main room (Space 365). Side room Sp.469 contained a variety of mixed fills (containing bones with variable taphonomic signatures and little if any mutual coherence), with virtually no evidence of either occupation deposits or special events in this space. A worked *Bos* skull fragment (maxilla and premaxilla, (919625)), was presumably special at some point in time, but its final deposition in a makeup layer in the abandoned side room suggests that its importance had passed by the time it entered the remains of B.97.

The faunal story of Building 97 thus rests firmly in and around Sp.365. We cannot characterise the fills in this space quantitatively as many of them were hand-picked; we can, however, report on select deposits that seem to derive from activities/events in or near the structure (albeit not, on the whole, during Space 365's occupation). Of particular note is a collection of bones (18647) associated with the room's floors. Here, several large pieces of cattle bone – coming from more than one animal – lay together with equid, sheep, fox and dog remains. Not all of the bones would have been meaty ones, but those that were would have provided enough meat for at least ten people to have eaten a half-kilo of meat each. A feast seems to have taken place in or near the house, close enough to the time of its abandonment that the leftover bones lay directly atop its floor, to burn when the structure did.

Also burning inside Space 365, but not in direct contact with fire, were a cattle horn core and sacrum. These bones were recovered together with a cluster of seeds (19238) and might either have been stored with them or lain near them on the floor of the house. It is also entirely possible, however, that one or both derive from the surrounding fill.

Well after the house was abandoned and burned, people placed another collection (19245) of bones – human as well as animal – in the midden that had built up inside Space 365. Human remains lay alongside those of cattle, equids, boar and caprines. The animal bones were lightly processed and a few articulate, which is again consistent with feasting. Admittedly, not all of the bones would have been meaty ones (for example, cattle feet), but many were prime cuts (for example, ribs, vertebrae, upper limb bones), and some sheep-sized ribs had cut marks on them. Two scapulae – one cattle, one equid – show traces of possible use. We believe that this deposit testifies to ritualised activity in or near abandoned B.97.

Another possible, but far less clear, example of post-abandonment feasting comes from a fill unit (18695) associated with both Spaces 365 and 469. This unit contained multiple large bone fragments, including what was probably once a string of articulated cattle vertebrae. These remains clearly represent significant amounts of meat. We are not sure, however, whether this deposit was simply a rich midden, amalgamating the traces of prosaic and special activities conducted in multiple locations near this spot, or whether people held a feast atop the midden that filled what was once B.97.

Only one bone is perhaps associated with activities that took place during B.97's occupation. A worn *Bos* shoulder blade lay buried in the edge of a bin (19665.x1). We don't know when or why it was deposited in the bin's siding, but at one point somebody – *perhaps* somebody living in B. 97 – used it.

Building 160

While B.160 was fully excavated, no faunal remains were clearly related to the occupational history of the house. Instead, several special faunal deposits were related to the house's construction and abandonment. In the side room Sp.552, a young wild cat (*Felis silvestris*) was found in a 'foundational deposit' under the north wall (F.7847), along with a large fragment of antler and clay ball clusters (Barański 2016: 62). The young wild cat skeleton appears to have been a complete animal when it was deposited, though the skull was poorly preserved and not fully recovered (see 'Cats' section in Twiss et al. 2021: 168–69). Four shallow pits were dug into the main room Sp.551's

central floor during the abandonment phase; these pits were filled with placed aurochs remains (Barański 2016: 64). Pits F.7831, F.7832, F.7833 and F.7840 all included the remains of aurochsen; probable articulations linked remains from three of the pits (F.7831, F.7832 and F.7833) to one another. The remains from these pits are limb bones and vertebrae; all the limb bones (excluding scapulae) had spiral fractures opening the marrow cavities. The blades of the scapulae and spinous processes of some of the thoracic vertebrae had dry breaks that could be refit together within single pits, possibly suggesting that bones were broken to fit into the pits. Body part representation and metrics suggest that the pits contain remains from two–three aurochsen, likely one male and at least one female. The fill of one post retrieval pit (22334) included a plaster fragment of a plastered bucranium, though no associated faunal remains were found with the object (Busacca, Lingle 2017: 339).

Most of B.160's faunal material derives from infills and midden material. Occupation deposits in the building's main (Sp.551) and side (Sp.552) rooms reveal little about how the house's occupants consumed or discarded animals. Small, highly fragmented and minimally identifiable remains in floor deposits are accidentally included background noise, and bones technically inside hearths and ovens are part of the spaces' infills, not household leftovers or deliberate placements.

We do, however, have evidence for ritual activities immediately prior to and after the house's occupation. Prior to its construction, a foundation deposit was laid under what would become the north wall of Space 552 with three clusters, (32495), (32496) and (32600): a young cat (see *Felis silvestris* above), a large piece of antler, clay balls, a wood plank and limestone pebbles. After its last residents left Building 160, two or perhaps three aurochsen's remains were deposited in three pits (F.7831, F.7832, and F.7833) in the main room of the house. Each pit contained multiple, deliberately placed aurochs bones, with articulations linking all three fills. It is possible that other aurochs bones (the pairs 32453.x3 and 32453.F1, 32467.F1 and 32467.F2) also derive from the same event, as they are other articulating sets of aurochs remains in contexts that have been interpreted as abandonment deposits. The butchered aurochsen probably included at least one male and at least one female based on the sizes and fusion states of the specimens, and the bones found in B.160's pits are meaty ones: vertebrae, scapulae, and limb bones, the latter broken up to retrieve the fatty, delectable marrow inside. Aurochs bones aside, the fill of the three pits resembles the rest of the building's infills.

Changing use of an outdoor space?

Comparison of deposits from three superimposed Spaces – Sp. 631 (North.G), Sp. 610 (North.G) and Sp.85 (North.?H) in order from earliest to latest – allows us to explore potential changes in an outdoor area's use during the early years of Çatalhöyük's occupation. Preliminary analyses by macrobotanical and chipped stone specialists suggested that this area may have shifted from being a discard zone to a more yard-like space (Stroud et al. 2017: 176). Densities of faunal remains in the spaces' middens and fire spots, however, (table S8.3, fig. S8.6) are consistent with Early Neolithic use of this location remaining stable.

North Area middens and fire spots

Recent excavations of the North Area yielded rich midden deposits from three superimposed Spaces: Sp.631 (North.G), Sp.610 (North.G) and Sp.85 (North.?H) in order from earliest to latest. The middens may derive primarily from the buildings surrounding them. Buildings 112 (North.?G)/119 (North.F) lay to their north, Building 114 (North.G) to their south, Buildings 129 (North.H)/131 (North.G)/139 (North.F) to their east, and Building 3 (North.G) to their west. However, not all of these buildings were in use throughout the formation of the midden deposits. Space 631 predates the construction of Buildings 131 and 114; they plausibly relate to Space 610. Building 129 postdates the use of Space 610 and may relate to Space 85.

We compare and contrast the fauna from these middens in order to explore potential diachronic changes in animal exploitation. Preliminary analyses by macrobotanical and chipped stone specialists suggested that there was a change in the use of this area over time (Stroud et al. 2017: 176). In particular, macrobotanical analyses indicated a decrease in the density and abundance of plant remains, suggesting that the area grew cleaner through time, possibly becoming a yard-like space more than a location of rubbish disposal.

Is such a change indicated by the area's faunal remains? To explore this question, we compare the density of faunal bones in the spaces' various deposits. We also examine potential meal sharing in this area, assessing deposits that plausibly represent coherent events/primary dumps to get at the scale of potential meals in this area (as in Demirergi et al. 2014).

We focus our analysis on two types of deposits: middens and fire spots/pits. Table S8.3 shows the faunal units studied from Spaces 631, 610 and 85, their Level designations, and the interpretive categories into which they were placed: we have more fire-related deposits in North.G and more midden deposits in North.H.

<i>Level</i>	<i>Space</i>	<i>Unit</i>	<i>Inferred deposit type</i>
North.G	631	32132	midden / pit fill
		32133*	midden / pit fill
		32137*	fire pit fill
		32144	midden
	610	32112*	fire spot
		32114	charcoal-rich dump
		32115*	fire spot
		32123	clay surface (floor)
		32127*	fire spot
North.?H	85	6350	midden
		6650	midden
		6672	midden
		8143	midden
		8159	midden
		8178	midden
		8253	midden
		8312	midden
		8354	midden
		32106	mixed midden deposit
		32111*	fire spot
		32113	clay floor
		32107*	ash deposit

Table S8.3. Faunal units studied from Spaces 631, 610 and 85. *Fire spot/pit or ash deposit.

Figure S8.6 shows the faunal densities of the fire spots/pits and the middens in each space. The bone density of the fire spots/pits largely decreases over time: the bone density in fire spots in Space 631 is much higher than in Spaces 610 and 85. These findings parallel those of the archaeobotanists. However, middens show a different trend. Bone densities in spaces stay at similar levels throughout the midden sequence.

If we combine the midden and the fire spot data (as per Stroud et al. 2017), we again see general stability through time since (a) middens are immensely richer in faunal remains than fire spots, and (b) we have data from more midden units than fire spots/pits. Overall, therefore, the fauna do not indicate that these spaces significantly changed function through time.

We do see some shifts if we focus in more tightly, seeking out changes in the proportions of different kinds of animals consumed rather than in animal consumption as a monolithic whole. We use animal size classes, rather than exclusively specimens assigned to specific taxa, to maximise our sample sizes and to ensure that we don't disregard economically important but hard-to-identify remains. In middens, the density of bones from sheep-sized animals (fig. S8.7a) diminishes modestly through

time. (A simultaneous increase in NISP/L suggests an increase in bone fragmentation: the proportion of unidentifiable bones in these middens also rises through time (fig. S8.7b).) Space 631's fire spots/pits also contained a higher density of sheep-sized bones than the other spaces' fire spots (fig. S8.8). Analysts noted at the time of recording that the fire spot units from Space 631 might represent events at which one or two sheep were eaten; alternatively, they might reflect the burning of household trash (which tends to be dominated by sheep remains).

Space 610 contained a higher density of bones from cow-sized animals than either the earlier or the later Spaces (fig. S8.9) (figure S8.10 shows a higher density of cow-sized bones in Sp.610 fire spots than in the other spaces' fire spots, but the high values derive from a single unit (32115)). One might, therefore, argue that these spaces saw little change in terms of the overall amount of meat people were depositing in them, but that mutton consumption declined and beef consumption rose and fell. Admittedly, only a few cattle specimens – especially if they are minimally processed – can raise densities, but Sp.610's cattle remains included no articulations or bone clusters and we infer similar levels of processing across the Spaces.

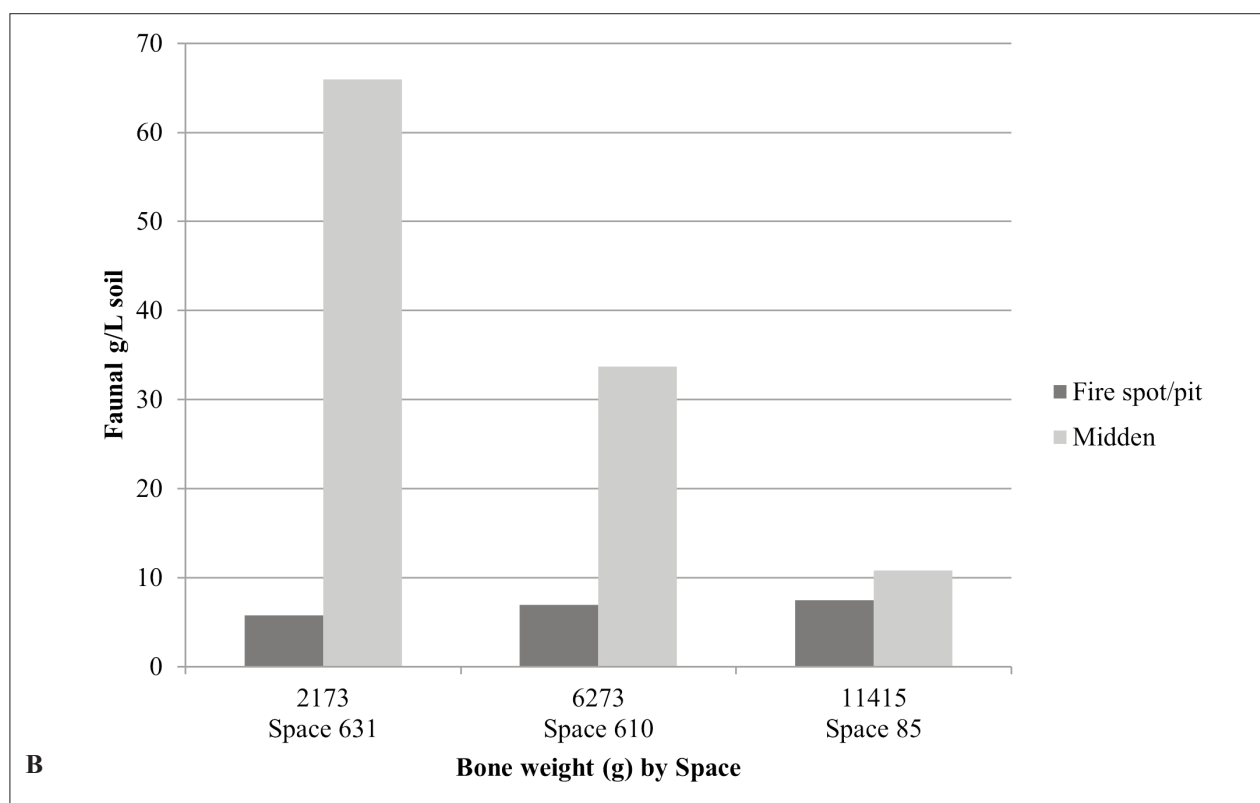
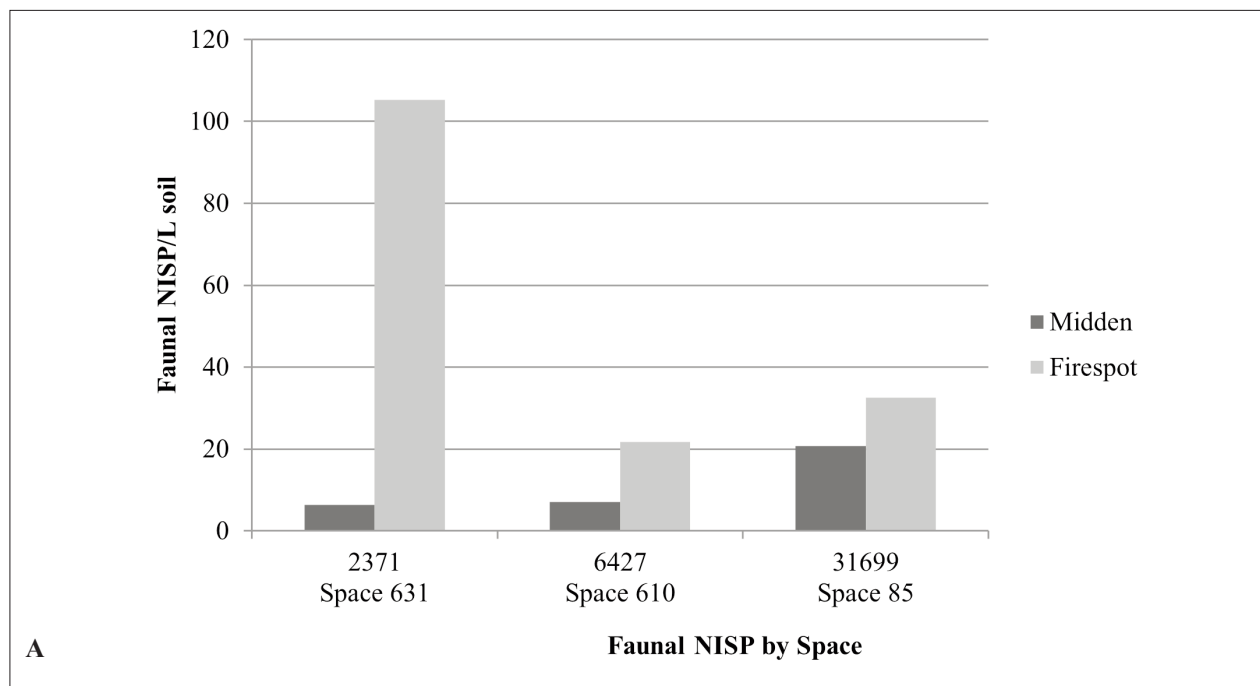


Figure S8.6. Faunal densities of fire spots/pits and middens in Spaces 631, 610 and 85.

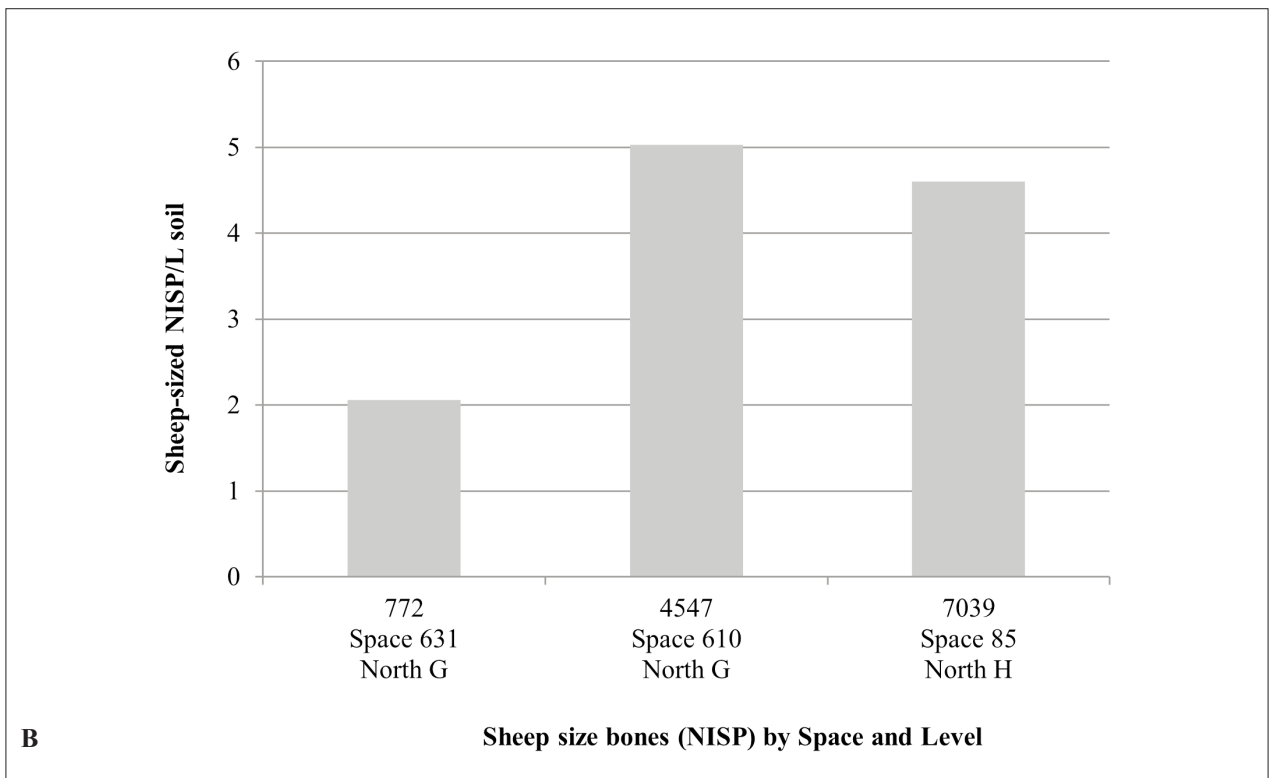
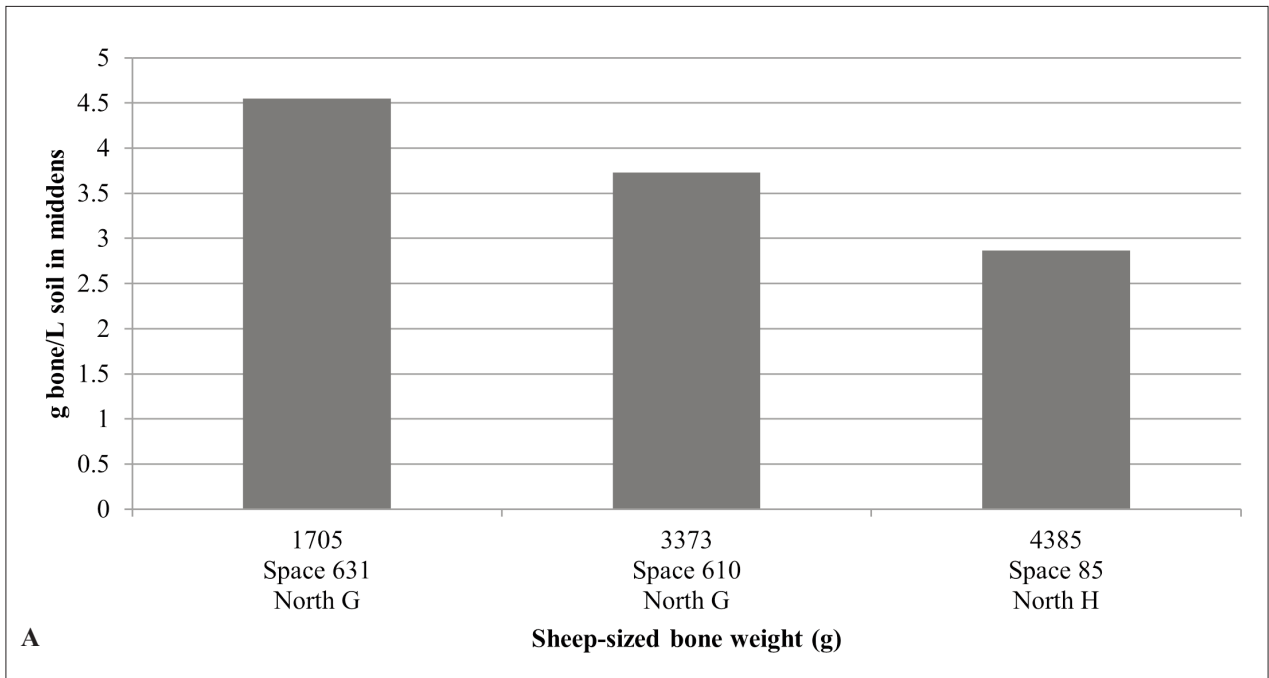


Figure S8.7. Sheep-sized remains in fire spots and middens in Spaces 631, 610, and 85.

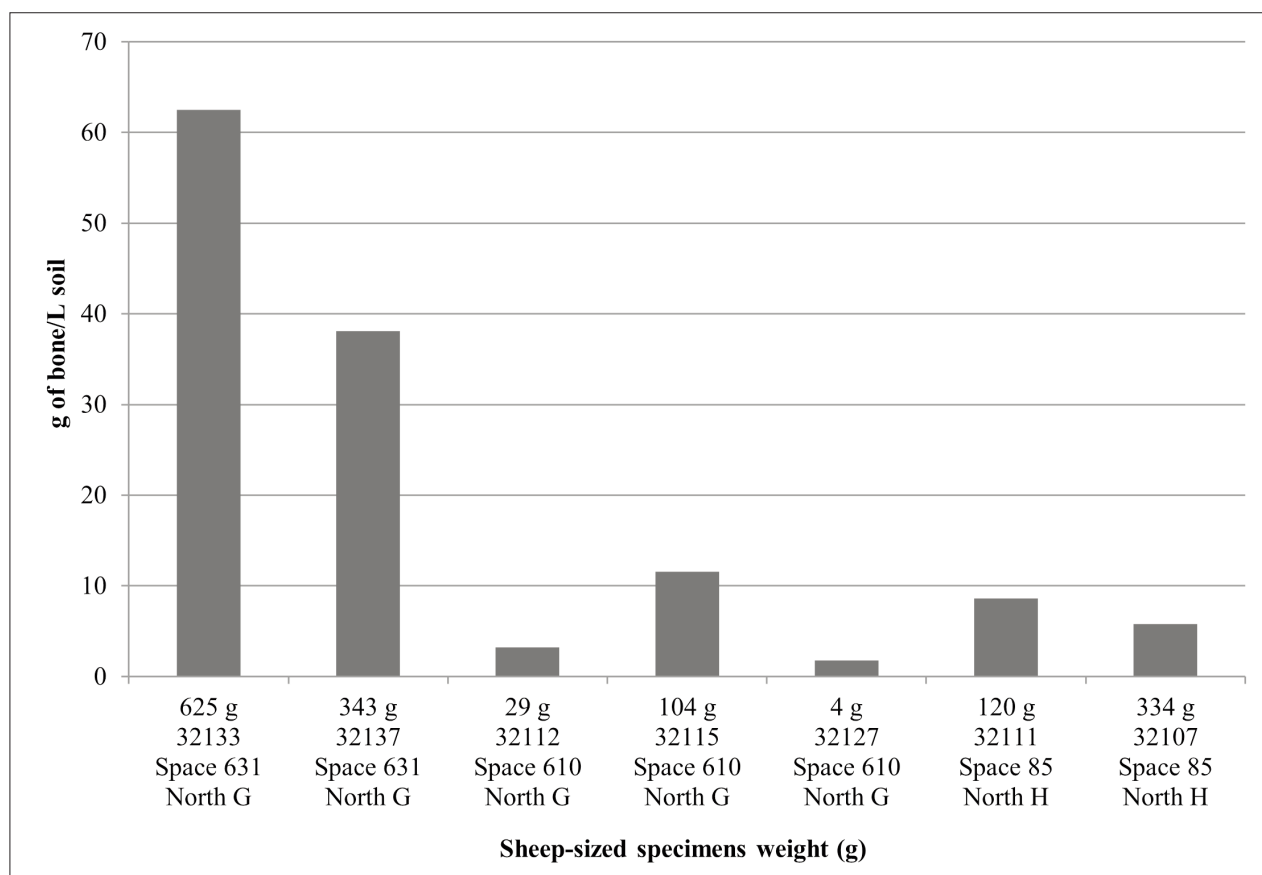


Figure S8.8. Sheep-sized remains in fire spot units in Spaces 631, 610 and 85.

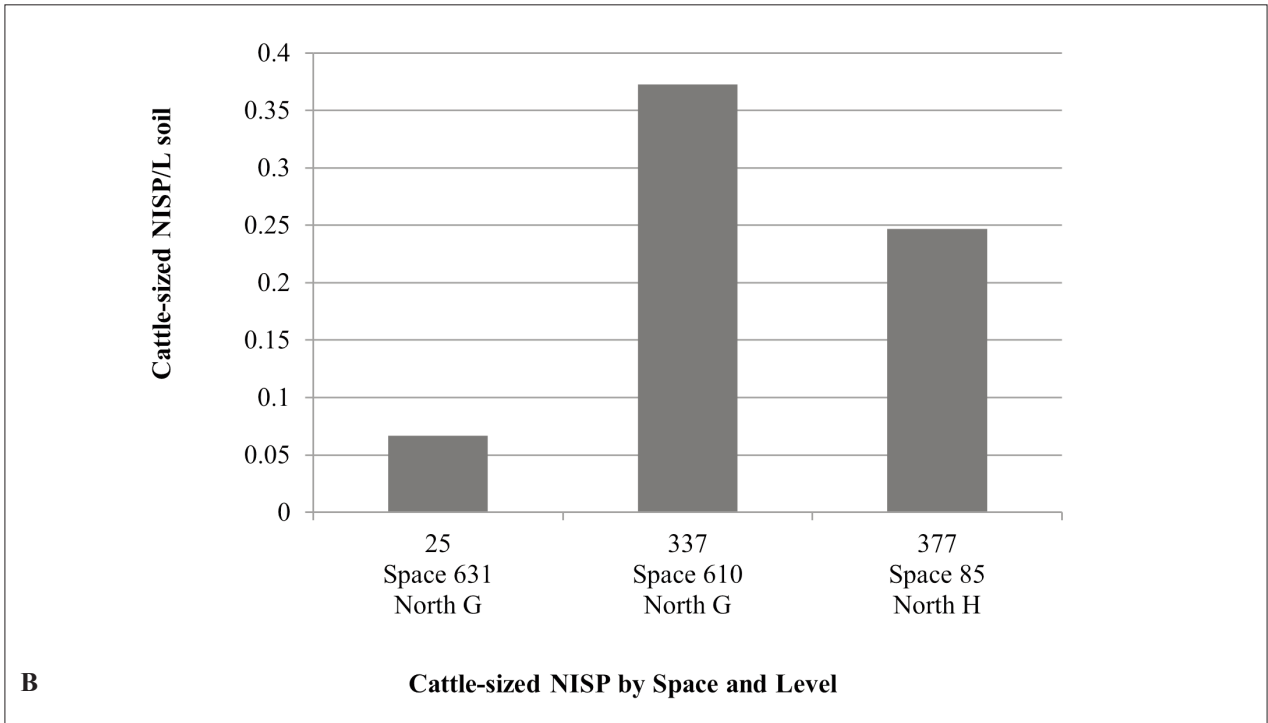
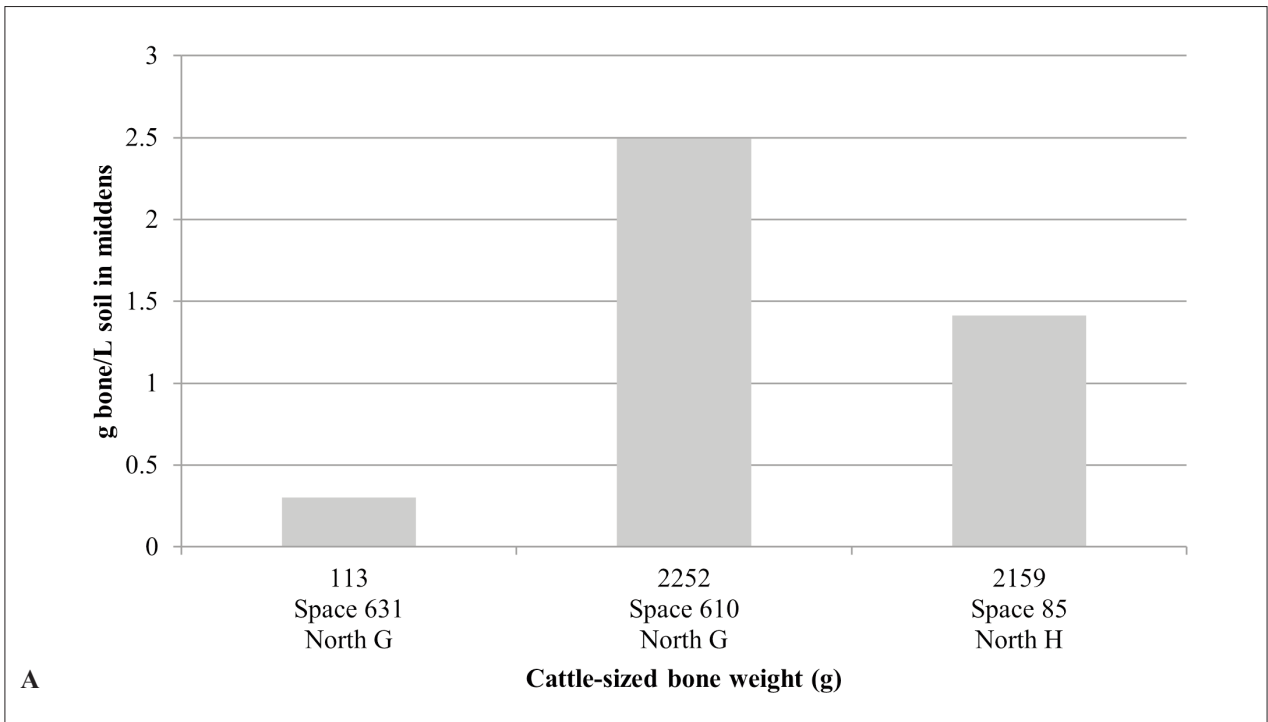


Figure S8.9. Cattle-sized remains in fire spots and middens in Spaces 631, 610 and 85: A) by bone weight; B) by NISP.

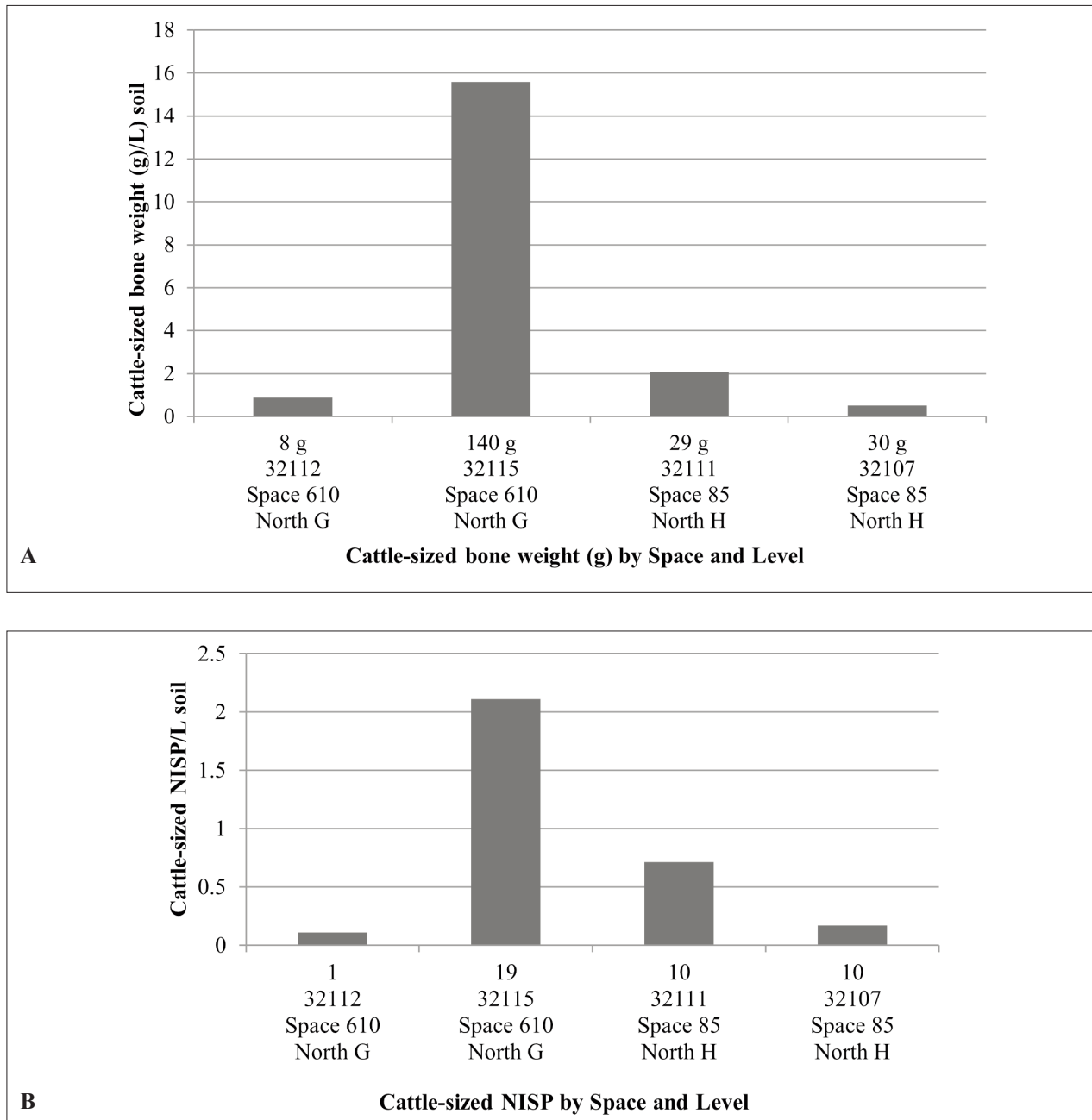


Figure S8.10. Cattle-sized remains in fire spot units in Spaces 631, 610 and 85: A) by bone weight; B) by NISP.

Meal sharing

We believe all but one of the fire spot deposits in Spaces 631, 610 and 85 to represent coherent individual events (the excluded unit is (32127)). We use the weight of bone in these units to estimate the amount of meat consumed at each event (calculations following Demirergi 2015: 156–57). We infer meat quantities ranging from 250g to 3,965g at each event (table S8.4). As a serving of meat may range from a meatball (~30 g) to a large steak (~500g), as few as six or as many as 103 people might have shared each meal. If we assume a relatively generous 250–500g of meat per person, we derive between 2 and 16 people (perhaps one to three families)

dining together. Unit (32112) could not have been a shared meal if servings were that generous, though, and we assume that serving sizes varied.

Demirergi (2015) suggests that while the numbers of attendees at Çatalhöyük feasts ranged from perhaps 3 to 170 people, most probably seated between 7 and 34 people (perhaps one to seven families). If the deposits in these Spaces reflect feasts, they were smaller than average, perhaps involving only people affiliated with a neighbouring house or houses (B.114 and/or B.131). Although small, these shared meals would not have been completely private events since they were held outdoors, visible to passers-by.

Butchery marks of the North and South Areas

This section summarises North and South Area Neolithic butchery marks recorded between 1993 and 2017. A total of 1,953 marked specimens are included in this discussion. The frequency of butchery marks is low: only 0.21% of the Neolithic bones in these areas bear visible traces of butchery. As explained in previous publications, the low incidence of butchery marks is plausibly due to Neolithic Çatalhöyük's primary reliance on chipped stone tools made of sharp-edged obsidian (Russell, Martin 2005: 85; Dewbury, Russell 2007).

Butchery by area and deposit type

We do not see significant differences between the North and South Areas in terms of the frequency of butchery marks: we identified 0.12 marked specimens per 100g of

recorded bone in the North Area, and 0.14 specimens per 100g in the South Area (fig. S8.11).

We found similar frequencies of cut-marked bones in analogous context types in the two Areas as well (fig. S8.12). In both the North and the South Areas, cut-marked remains appear most commonly in middens and fills; they are relatively rare in construction, cluster, floor and activity deposits. We attribute the differences primarily to the average size and condition of the specimens included in different deposit types. Floor and construction deposits generally contain relatively small fragments, many of which have been rolled and trampled; fill and midden deposits commonly yield fresher-looking specimens of various sizes. Small, crushed and rolled fragments are less likely to reveal identifiable cut marks than larger ones with better surface conditions.

<i>Unit</i>	<i>Bone weight (g)</i>	<i>Approx. meat equivalent (g)</i>	<i>Possible number of diners</i>
32133	793	3965	8–16
32137	461	2305	5–9
32112	50	250	1
32115	620	3100	6–12
32111	214	1070	2–4
32107	566	2830	6–11

Table S8.4. Bone to meat conversion in Spaces 631, 610 and 85 fire spots. Unit (32127) appears to be post-burning sweepings: we exclude it from consideration. Number of diners is based on a meat serving size of 250–500g.

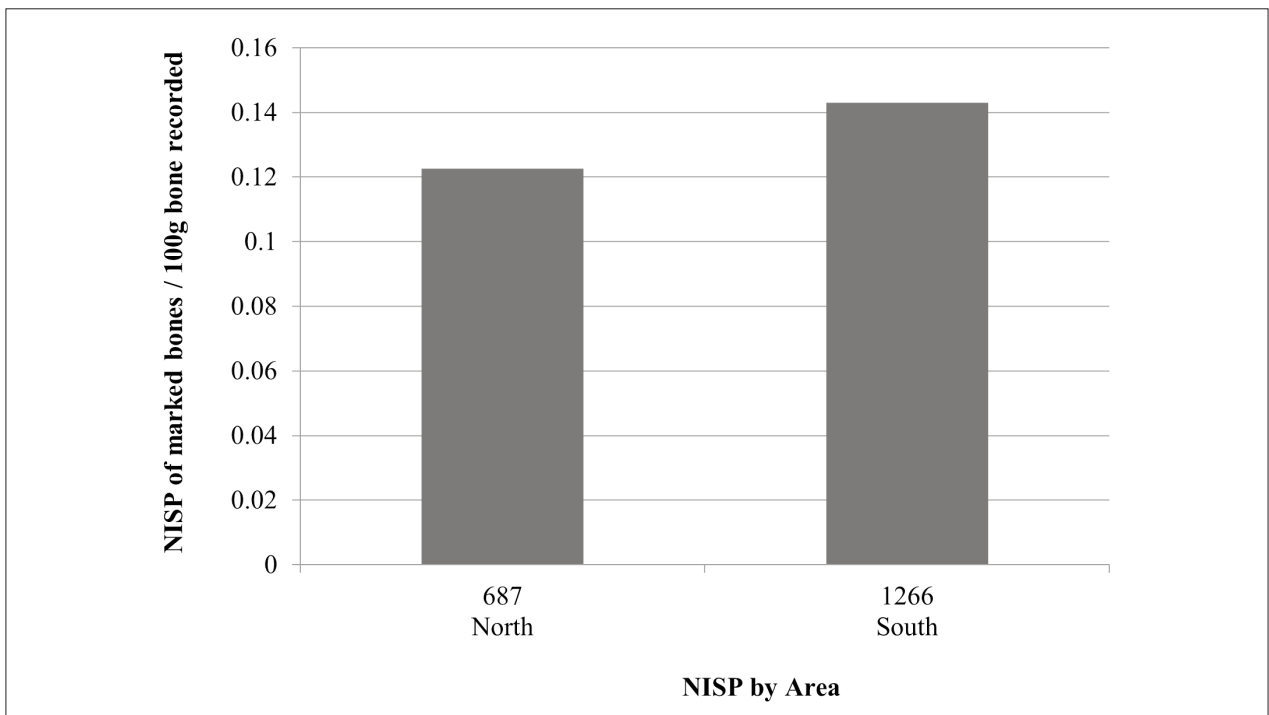


Figure S8.11. Number of specimens with butchery marks (NISP) per 100g of recorded bone in the North and South Areas.

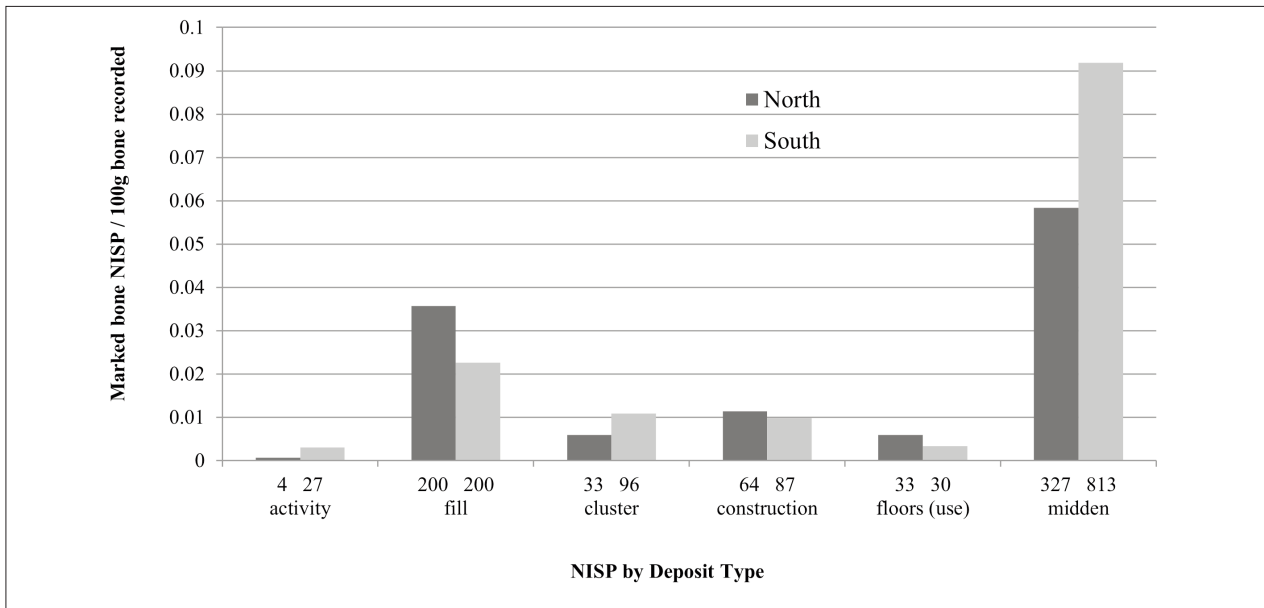


Figure S8.12. Numbers of butchery-marked bones in different types of deposits, North and South Areas.

Butchery by animal size class

High proportions of butchery marks occur on specimens not assigned to a specific taxon (for example, ribs and long bone shaft fragments). We therefore find it useful to examine patterns of butchery within animal size classes; as one or two species dominate our most common size classes (that is, cattle are overwhelmingly the most common taxon in ‘cattle-sized animals’ and caprines dominate ‘sheep-sized animals’), we take our findings as broadly informative about cattle and caprine butchery.

Figure S8.13 reveals that distribution of cut marks by animal size category is similar in both areas. Surprisingly, the proportion of bones with cut marks rises as the size classes get larger. Hare-sized specimens have the highest proportion of marked bones, followed by sheep-sized, pig-sized and cow-sized remains. (We have fewer hare-sized specimens than specimens in any other size class, but if one excludes these smallest remains from consideration due to sample size concerns, the pattern of fewer marks on larger animals holds.) Perhaps this pattern is related to the relative size and rugosity of the bones: cow and boar bones have extensive and sometimes rugged surface areas, while hare bones tend to be small and relatively smooth. The faunal team might simply not have noticed or identified short, light marks on large bones as effectively we did on smaller ones. Or perhaps certain butchery practices were less likely to leave obvious marks on cattle bones than on the bones of smaller taxa. Let us now explore this issue.

Inferred types of butchery

We categorised butchery marks according to inferred purpose following Russell and Martin (2005: 85). Figure S8.14 shows similar patterns of butchery in the North and

South Areas. Consumption is the most common inferred purpose, and dismemberment cuts, filleting cuts and marks with indeterminate aims are all well represented.

Butchers leave dismemberment cuts on bones as they separate carcasses’ joints during primary butchery. People leave filleting marks on bones when they are removing raw meat from the bone for stewing boneless meat, cleaning a bone for marrow fracture, or preparing meat for drying (Russell 1993: 359). In other words, filleting cuts are consistent with people cooking boneless meat or drying meat for storage. Diners leave consumption cuts while consuming meat that is on the bone, such as bone-in roasts, bakes, and grills. The intent behind indeterminate marks is, obviously, unclear; filleting, consumption and tendon removal marks are particularly difficult to differentiate from each other.

That consumption cuts and filleting cuts are among the most common categories of butchery marks at Çatalhöyük suggests that cooking meat on the bone (for baking, grilling or roasting) and filleting meat off the bone (for drying or for stewing) were both common preparation methods in the Neolithic settlement.

Let us return now to our finding that the proportion of bones with butchery marks decreases as animal size increases. We raised the possibility that certain types of butchery may not have left readily visible marks on large bones. Notably, filleting marks tend to be subtler than dismemberment marks: those, which need to sever tough ligaments and tendons, tend to leave deeper marks than filleting’s slices through softer meat. Perhaps at Çatalhöyük in particular, where butchers commonly used razor-sharp obsidian tools, hair-like filleting scratches have been easy to overlook on large and rough-surfaced bones.

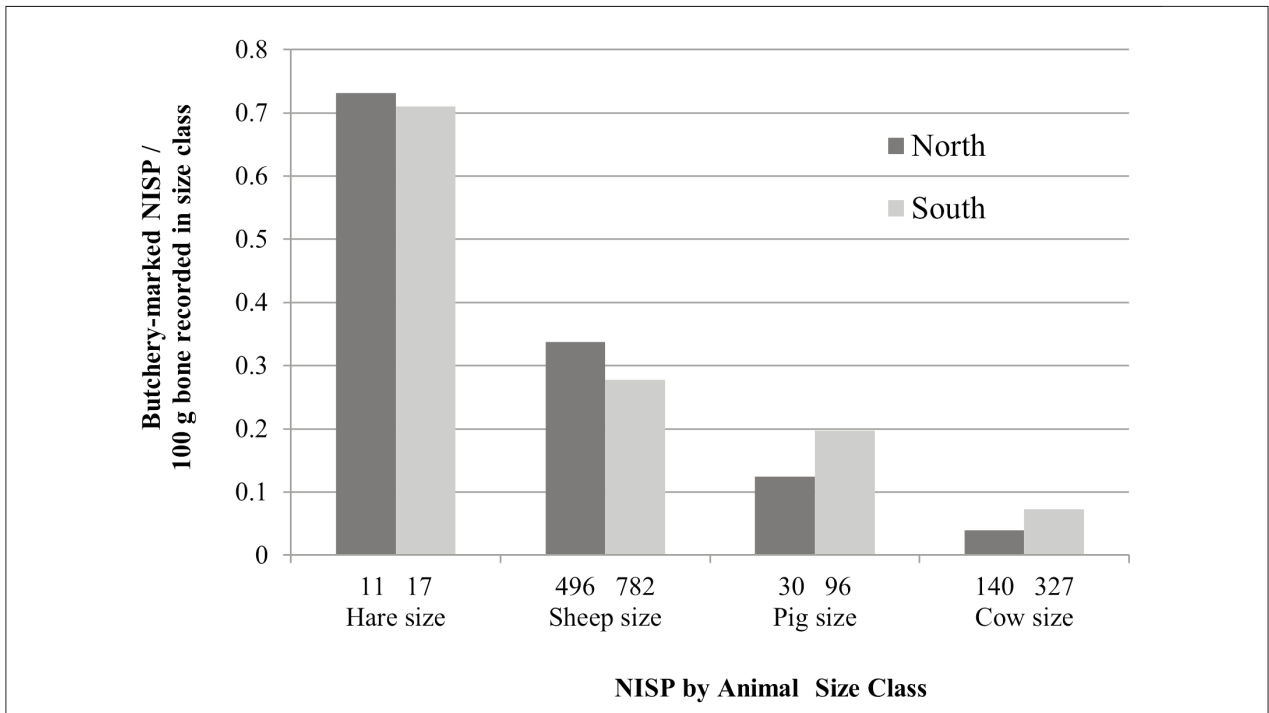


Figure S8.13. Proportions of butchery-marked bone by animal size class: North and South Areas. The Y axis is size-class-specific; that is, it tallies the number of cut-marked specimens of a particular size class per 100g of bones of that size class.

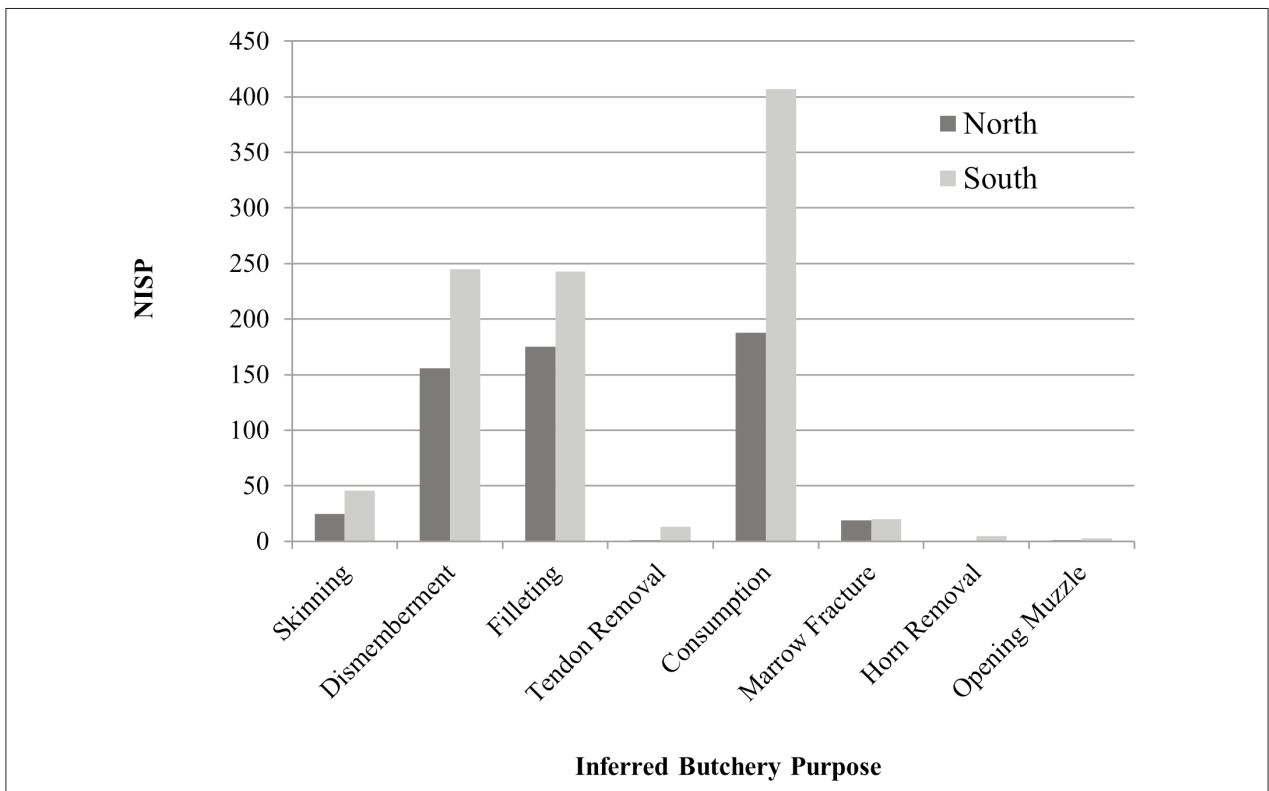


Figure S8.14. Number of specimens with marks inferred to derive from different butchery processes: North and South Areas.

This idea gains support from the fact that the most common cut-mark type on North Area cow-sized bones is dismemberment; in the South Area we see consumption marks followed by dismemberment marks. In both Areas, the most common cut type on hare bones is filleting (fig. S8.15). We think it extraordinarily unlikely that large animals were filleted less frequently than smaller animals. Some aurochsen and boars may have been roasted or baked as joints or perhaps near-entire carcasses, but doing so would entail not only massive feasts but also immense food wastage.

Furthermore, we find no clear associations between cattle and specific butchery or cooking methods: cattle were undoubtedly symbolically important but no evidence suggests that their butchery and consumption required special tools, specialised butchers, or cooking methods exclusive to cattle meat. Nor is there direct evidence of cattle bones being reserved exclusively for special consumption: *Bos* remains appear throughout the site in a wide variety of deposit types. Every cattle kill probably meant a feast, but not every episode of beef consumption required special methods or preparations.

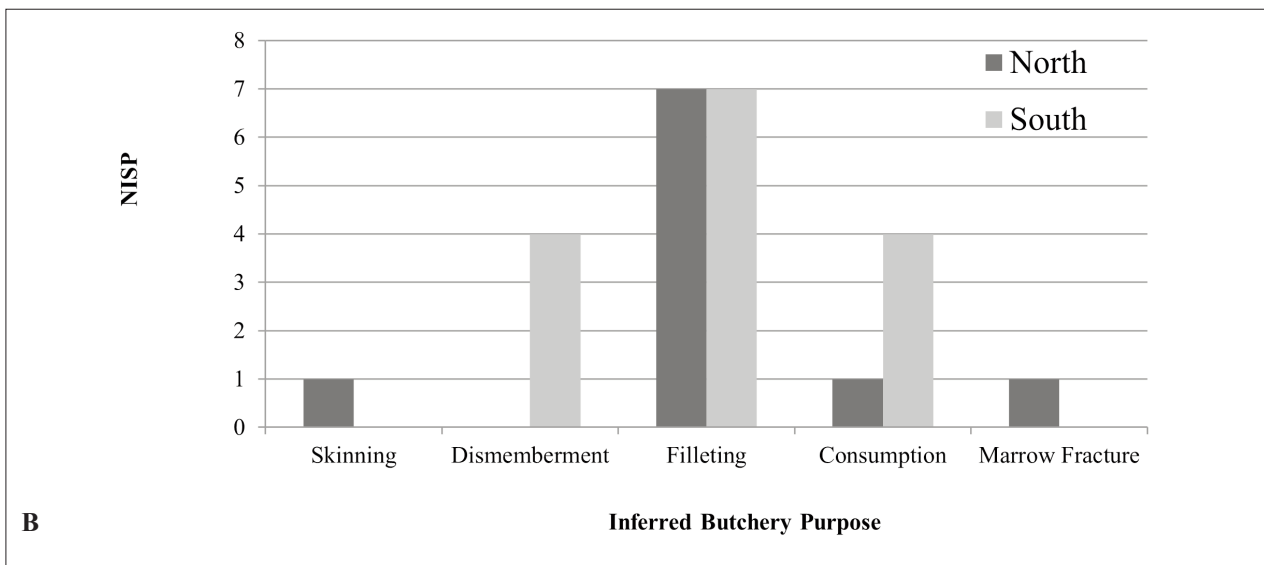
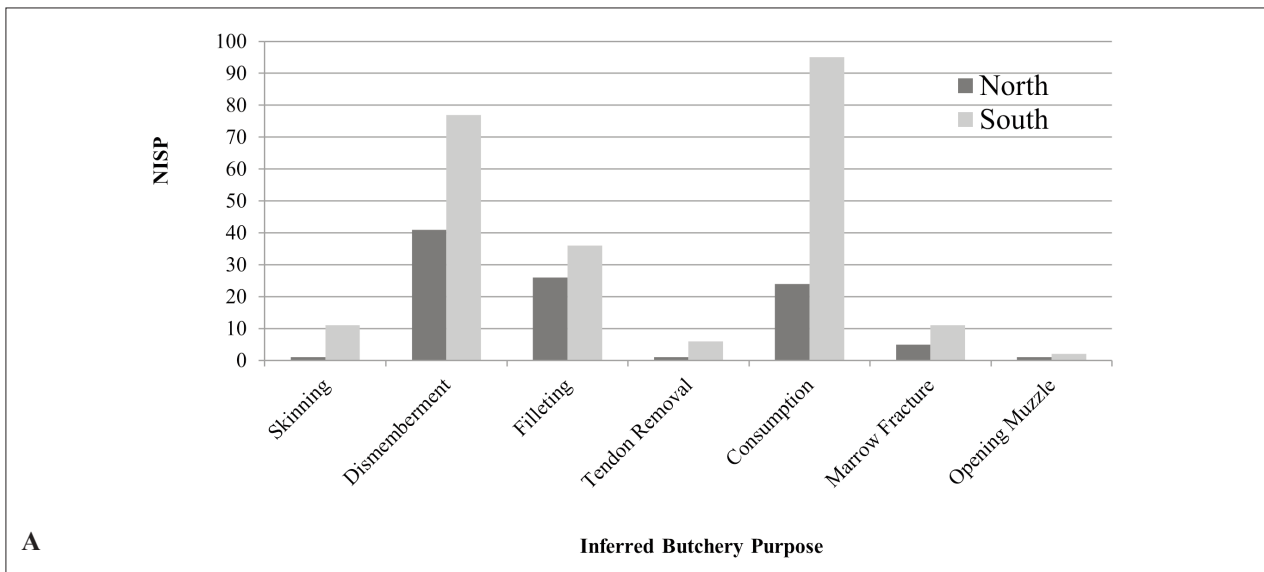


Figure S8.15. Comparing butchery evidence on remains of large and small animals: A) butchery marks on cow-sized specimens by inferred butchery purpose; B) butchery marks on hare-sized specimens by inferred butchery purpose. North and South Areas.

Butchery through time

The number of cut marks per 100g of recorded bone increases through time in the North Area, while in the South Area it increases from Early into Middle Çatalhöyük phases and then decreases again during the Late Çatalhöyük occupation (fig. S8.16). To explore these trends, we analyse the distribution of butchery marks according to animal size and butchery purpose.

Figure S8.17 reveals different trends in the North and South Areas. In the North, the only dramatic change in the proportions of bones with cut marks is an increase among hare-sized remains. This might be caused by intensified consumption of small animals, but as sample sizes are extremely small, we draw no such conclusions at this time. In the South Area, we see a gradual and slight decline in the frequency of cattle-sized bones with cut marks. In sheep- and boar-sized remains, cut-mark frequencies rise from the Early to the Middle phase and then decrease dramatically. Again, we have few hare-sized specimens, so we draw no conclusions from the apparent Middle-to-Late Çatalhöyük precipitous drop. All together, the South Area specimens suggest that the intensity of processing food increased from the Early to the Middle phase and then declined during the Late Çatalhöyük occupation. The intensity of processing stayed comparatively consistent in the North Area, where we see at most a slight decline from Middle to Late Çatalhöyük.

Butchery patterns changed differently in the North and South Areas as time passed (fig. S8.18). In the North Area, consumption, dismemberment and filleting marks all increased through time. The rise in filleting marks is particularly noticeable and suggests an increase in drying meat or cooking meat off the bone (for example, stewing). In the South Area we again see a diachronic increase in dismemberment and filleting marks, but consumption cuts decline significantly from the Early to the Middle phase. (This drop was also identified in Demirergi 2015: 143–46). We thus see an increase in dismemberment and filleting marks in both Areas, but divergence between them in the proportion of consumption cuts identified. If, as we believe, the decline in consumption cuts reflects a decrease in meat-baking, and if clay balls were indeed used in part to bake meat (Atalay, Hastorf 2006), then the South Area's decline in meat consumption cuts relates to Çatalhöyük's mid-occupation decline in the frequency of onsite clay balls (Bennison-Chapman, Volume 14, Chapter 8) and increase in pottery (Atalay, Hastorf 2006; Last 2005).

Summary

This section provides a brief summary of North and South Areas cut-mark data recorded from the beginning of the Çatalhöyük Research Project through 2017. The total number of Neolithic faunal specimens with butchery marks is 1,953; only 0.2% of Neolithic specimens deriving from the two areas show evidence of butchery.

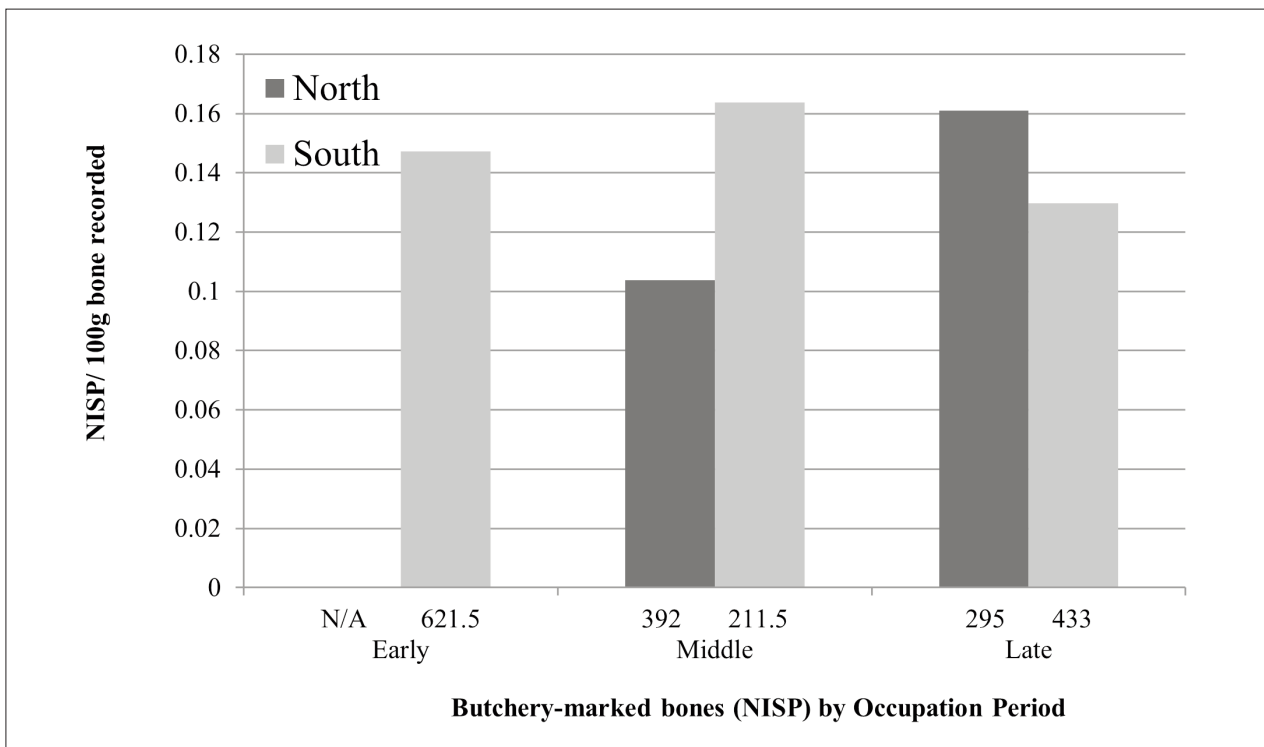


Figure S8.16. Frequency of butchery-marked specimens in Early, Middle and Late Çatalhöyük deposits: North and South Areas.

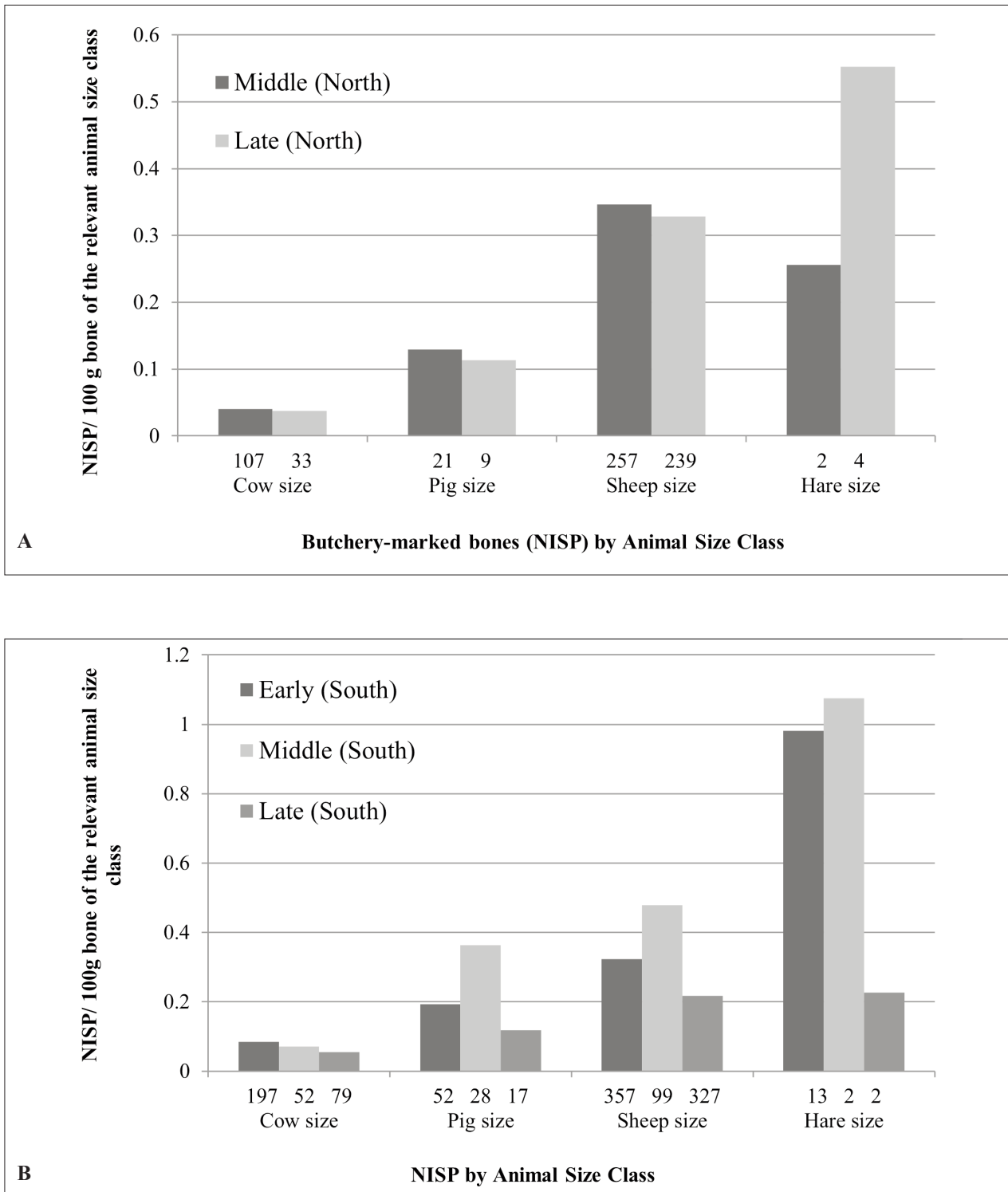


Figure S8.17. Numbers of bones with cut marks per 100g of recorded bone, by animal size class and occupation phase A) North Area; B) South Area. The Y axis tallies the number of cut-marked specimens of a particular size class per 100g of bones of that size class.

The frequency of cut-marked bones in various types of deposits accords with the frequency of all bones in such deposits: bones with visible butchery marks were not deposited differently from unmarked bones. This is not surprising, as we assume that most remains on site

derive from butchered animals, and that the scarcity of marks on the bones reflects a combination of ancient skill and reliance on very sharp cutting tools (Russell, Martin 2005: 85; Dewbury, Russell 2007). These two circumstances might also contribute to the fact that the North

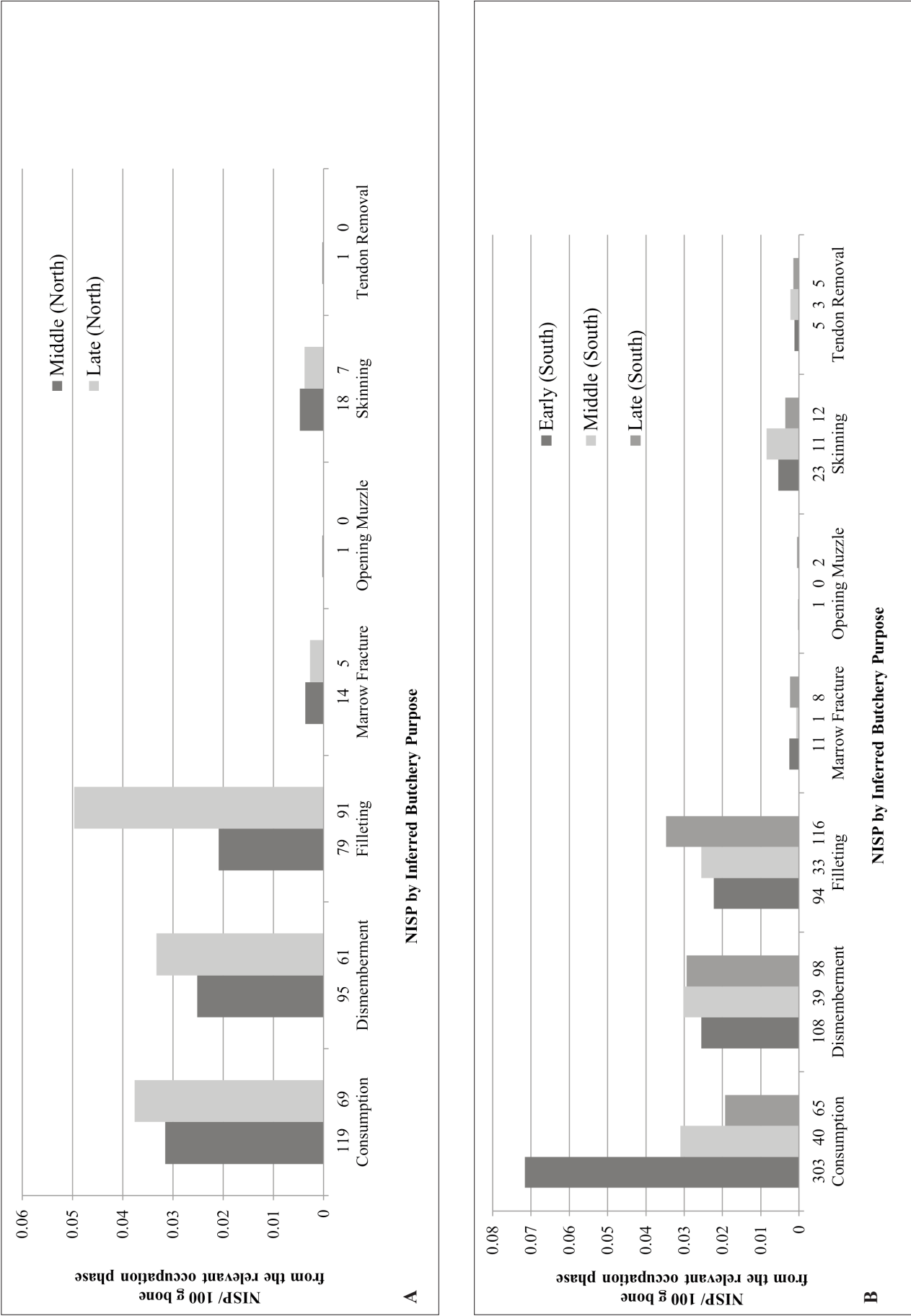


Figure S8.18. Changes in butchery patterns through time. A) North Area. B) South Area.

and the South Areas have broadly similar proportions of cut-marked bones within each animal size category. In both Areas small (hare-sized) remains are more frequently marked than large (cow-sized) ones, and they most frequently bear evidence of filleting, while large animals' bones bear traces of dismemberment and consumption. Perhaps skilled butchers found it easier to fillet beef than hare without nicking underlying bones. Or perhaps hares were caught, butchered and eaten ad hoc – by relatively unskilled or careless butchers – whereas cattle, symbolically as well as socially and economically important, were filleted with care? In any case, dismembering something as large as an aurochs was hard enough work that sharp obsidian cutting edges could have dulled or bigger chert tools (Carter, Milic 2014: 447) been deployed to wrest apart immense joints.

In general, the inhabitants of the North and the South Areas probably used similar stone tool types and butchery methods. The overall intensity of their meat processing remained fairly consistent through time in the North Area (where we have data from Middle–Late Çatalhöyük only); it rose and then declined again in the South Area. The two Areas had similar proportions of various cut-mark types, with dismemberment, consumption and filleting cuts dominant. We infer that meat-drying, boneless meat stewing, and bone-in meat-

baking were all practised with some regularity at Neolithic Çatalhöyük. Relative proportions of these kinds of cooking may have changed differently through time in the different areas, however. A Middle-to-Late Çatalhöyük modest increase in dismemberment and filleting marks is apparent in both the North and the South Areas; in the North Area consumption cuts also rise, but in the South Area they decrease in frequency, particularly when one considers their very high numbers in Early Çatalhöyük deposits. Perhaps the Late Çatalhöyük denizens of the North Area preferred to keep baking their meat as their great-grandparents had done, while their neighbours to the south liked more stews.

More and more sheep

Figure S8.19 is based on remains from fully (that is, long-form) recorded units with soil volumes greater than zero (707 units, 119 Early, 303 Middle and 189 Late Çatalhöyük). Using long-form data allows us to examine caprines specifically as well as sheep-sized animals more broadly.

Cattle (*Bos sp. cf. primigenius*)

See table S8.5 (*Bos* tooth eruption and wear states, 2009–2017).

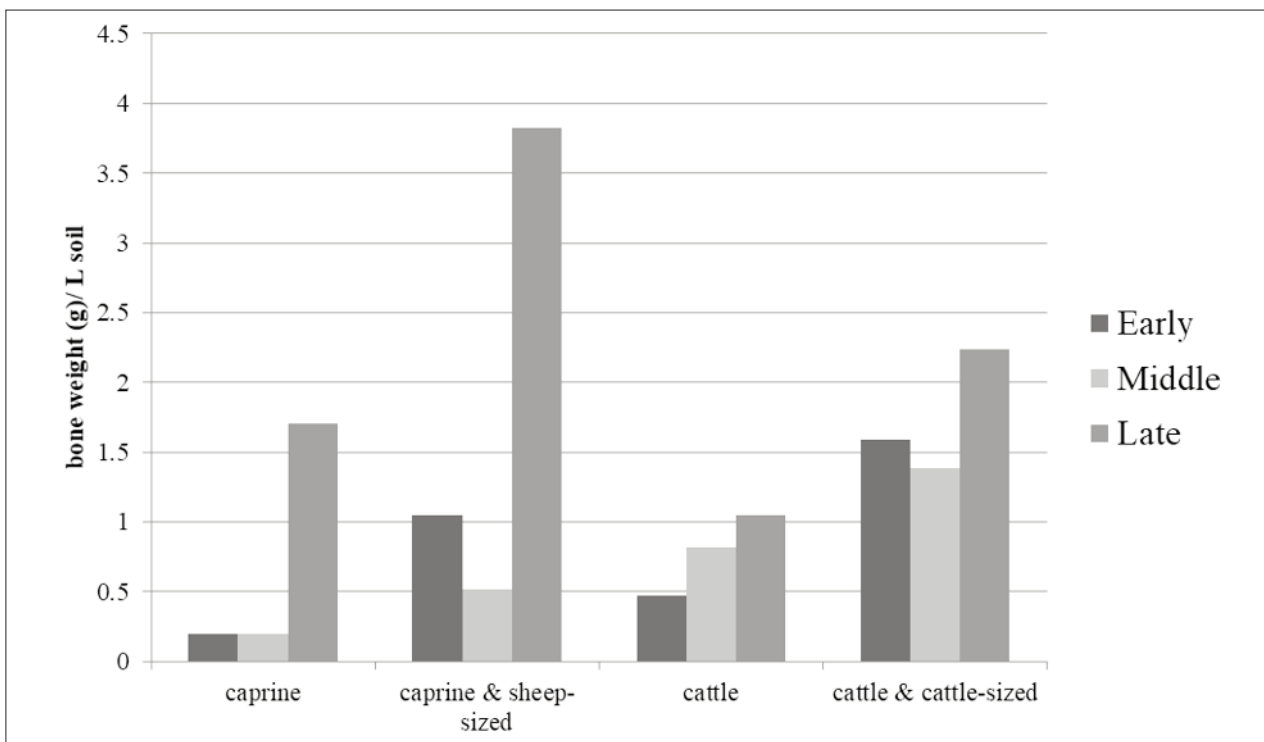


Figure S8.19. Faunal bone densities through time: grams of faunal bone per litre soil, by occupation phase and animal size class. Long-form units only.

<i>Area</i>	<i>Phase</i>	<i>GID</i>	<i>dP2</i>	<i>dP3</i>	<i>dP4</i>	<i>P2</i>	<i>P3</i>	<i>P4</i>	<i>M1</i>	<i>M2</i>	<i>M3</i>	<i>Stage (Halstead 1985)</i>
North	Middle	16453.F14							Indeterminate wear			C–I
		16489.X11			k		Unworn/erupting		j	f	b	E
		17501.X4					Indeterminate wear	Indeterminate wear	Indeterminate wear	Indeterminate wear	Indeterminate wear	E–I
		17525.X3				Indeterminate wear		Indeterminate wear	Indeterminate wear	Indeterminate wear	Indeterminate wear	E–I
		20404.X3				Indeterminate wear	Moderate wear		l	j	j	H
		20487.F360	Unworn/erupting	Unworn/erupting								A
		30567.X3				Moderate wear	Moderate wear	f	l	k	j	H
		31553.F26							Indeterminate wear	Indeterminate wear	Indeterminate wear	E–I
	Late	10238.F6				Unworn/erupting		Unworn/erupting				A–E
		13153.F9									Indeterminate wear	E–I
		13153.F105					Heavy wear	Very heavy wear	Very heavy wear			E–I
		17733.X10*							h	f		D–E
		17733.X12*	Indeterminate wear	Indeterminate wear	l				g	e		D–E
South	Early	22320.F27	Unworn/erupting									A
	Middle	18645.F3						f	k	j		E–I
		19818.F1**					Moderate wear	f	Indeterminate wear	h	g	G
		19818.F3**						f	j			E–I
	Late	16590.F1569							Moderate wear			C–I
		17047.F397		Medium wear	h							B
		18536.F39				Slight wear	Slight wear	Half-way erupted	j	g	b	E

Table S8.5. Bos tooth eruption and wear states, 2009–2017.

Equids (*E. ferus*, *E. hemionus/hydruntinus*)

Body part representation

All body parts are present for both large and small equids (Table 8.6). Fig. S8.20 groups all equids together and looks at element representation by occupation phase.

Dental ageing

A small sample of equid tooth rows testifies to equids being taken at ages ranging from very young to elderly. One mandible (table S8.6) contains three extremely heavily worn cheek teeth; another contains only deciduous teeth, one of which is not yet in wear, suggesting an age at death of between six months and a year. Seven of the nine available tooth rows contain deciduous rather than permanent teeth, but many of the loose teeth (that is, those not in jaws) are heavily worn. It thus appears that Çatalhöyük's hunters were far from selective when it came to the ages of the equids they would take. The dental data are limited, however: do epiphyseal fusion patterns tell a similar story?

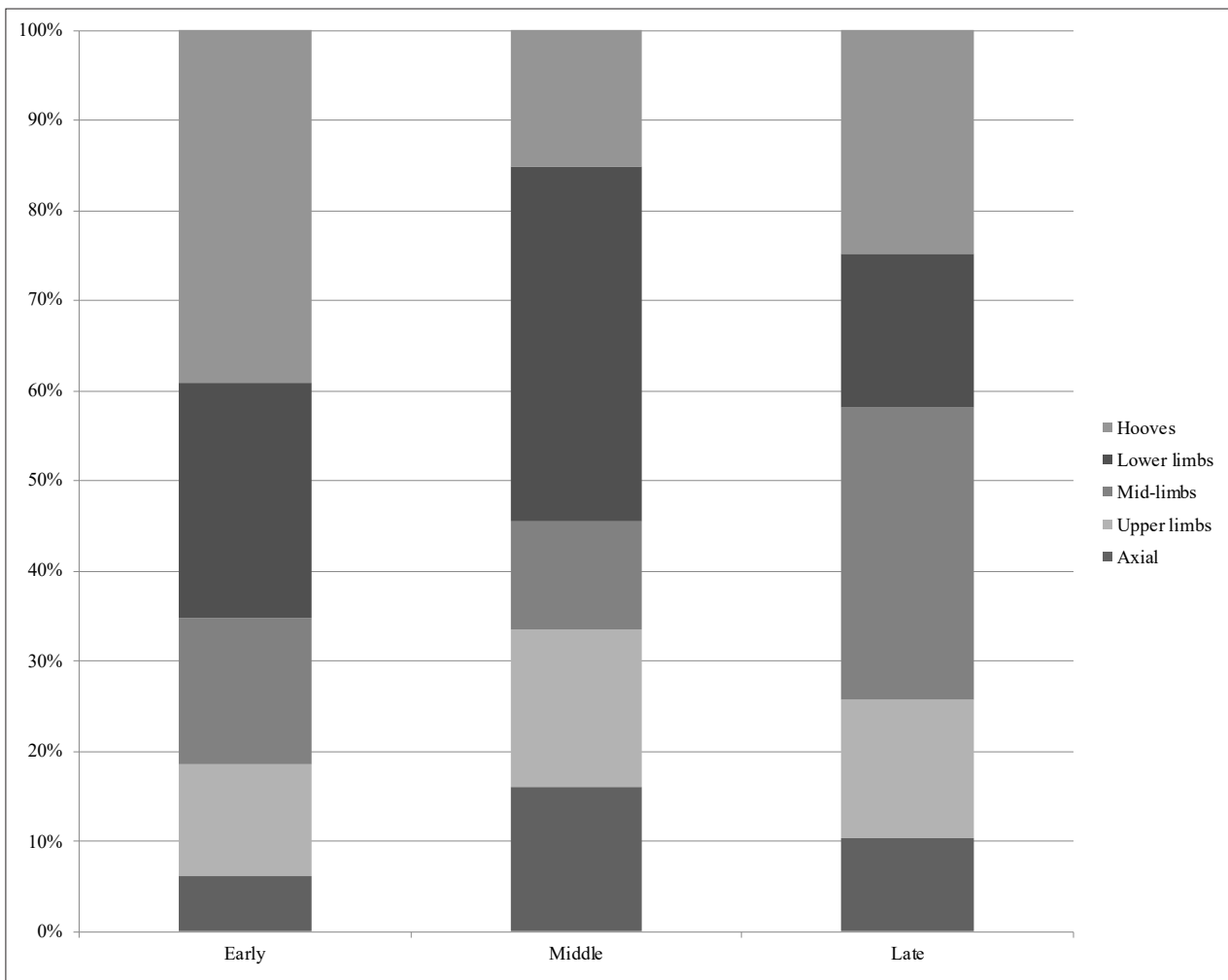


Figure S8.20. Equid skeletal element representation by occupation phase. By DZs. All equid species grouped together. Axial=vertebrae, pelvis; upper limbs=scapula, humerus, femur; mid-limbs=radius, ulna, patella, tibia; lower limbs=carpals, tarsals, metapodia; hooves=phalanges.

<i>GID</i>	<i>Occupation phase</i>	<i>Element</i>	<i>Taxon</i>	<i>Teeth</i>
1832.F22	South.L	maxilla	<i>Equus</i> sp.	dp2 very worn, roots almost wholly resorbed.
18536.F1-2	South.P	mandible	Small equid	I1s and I2s in wear, left I3 in root, right I3 erupting. Fused left and right sides of mandible.
20965.F20-21	North.G	mandible	<i>Equus</i> sp.	di1 and di2 present on both sides; di3, dp2 and dp3 only remain on one side.
21545.F7-8	North.G	mandible	<i>Equus</i> sp.	di1 and di2 are in wear, but di3 is not. 0.5–1 year in age
2739.F130	South.L	mandible	<i>Equus</i> sp.	dp2–dp4.
2739.F134	South.L	maxilla	<i>Equus</i> sp.	dp3 and dp4.
2739.F135	South.L	mandible	<i>Equus</i> sp.	Three extremely heavily worn cheek teeth.
31578.F5	North.F	mandible	<i>Equus</i> sp.	dp2, dp3 (dp4 missing but would have been erupted).
32653.F102	South.Unknown	mandible	<i>Equus</i> sp.	dp2–dp4.

Table S8.6. Equid tooth rows, 2009–2017.

<i>Equid epiphyseal fusion</i>	<i>Fusion group</i>	<i>Fused</i>	<i>Fusing</i>	<i>Unfused</i>	<i>Total</i>
Early (n=78)	A	9		1	10
	B	3			3
	C	35	4	2	41
	D	7		2	9
	E	7		6	13
	FG			2	2
Middle (n=96)	A	20	1	3	24
	B	15			15
	C	24		3	27
	D	11		1	12
	E	12		6	18
	FG				0
Late (n=43)	A	12			12
	B	1			1
	C	10		1	11
	D	3		1	4
	E	12		2	14
	FG	1			1

Table S8.7. Equid epiphyseal fusion. Each stage represents a group of epiphyses that fuse at a similar age. The percentages of fused specimens can thus be seen as estimates of the proportion of animals that survived at least into the age group represented by each stage. Fusion groups are: A=pelvis, proximal radius; B=scapula, distal humerus, pelvis; C=phalanges; D=distal tibia, distal metapodia; E=distal radius, proximal ulna, proximal and distal femur, proximal tibia, calcaneus; FG=proximal humerus.

Boar (*Sus scrofa*)

Table S8.8 summarises *Sus scrofa* remains recorded during this tranche of research.

Body parts

All suid body parts are present on site (table S8.9), although relative proportions of different body segments may change through time (Twiss et al. 2021: fig. 8.9).

Cull patterns

Although samples are small, epiphyseal fusion data (table S.8.10) suggest that hunters took few adult boars.

<i>Phase</i>	<i>Hodder Level</i>	<i>NISP</i>
<i>Early</i>		195
	South.G	32
	South.H	1
	South.H, South.I	9
	South.I	1
	South.K	20
	South.L	125
<i>Late</i>		85
	North.H	2
	North.I	2
	South.P	65
	South.Q	11
	South.R	1
	South.S	2
	South.T	2
<i>Middle</i>		219
	North.F	13
	North.G	132
	South.M	15
	South.M, South.N	1
	South.N	7
	South.O	51

Table S8.8. Boar (*Sus scrofa*) remains by level, 2009–2017.

Body segment	Element	Total NISP	Total DZs	NISPs associable with occupation phases			DZs associable with occupation phases		
				Early	Middle	Late	Early	Middle	Late
	Cranium	39	6	7	20	11	2	1	3
	Upper tooth	32	0	11	7	12		0	
	Mandible	31	12	4	19	3	3	6	1
	Lower tooth	83	0	25	39	11		0	0
Skull		185	18	47	85	37	5	7	4
	Thoracic vertebra	1		1					
	Atlas	1	1	1			1		
	Rib	48		48					
	Pelvis	11	1	2	5	4	0	0	1
	Sacrum	1							
Axial		62	2	52	5	5	1	0	1
	Scapula	17	14	5	6	4	3	8	
	Femur	7	4	1	4	2		1	3
	Humerus	12	5	4	6	2	2	3	
		36	23	10	16	8	5	12	3
Upper limb									
	Radius	20	6	3	16	1	2	3	1
	Ulna	8	7	2	2	3	1	3	3
	Tibia	5	3		1	3			2
	Fibula	12	14	5	3	4			14
		45	30	10	22	11	3	6	20
Mid-limb									
	Carpal	1	1		1			1	
	Tarsal IV	1				1			
	Central tarsal	1			1				
	Calcaneus	7	9	2		4			4
	Astragalus	10	14	3	4	3	3	2	9
Carpal/tarsal		19	23	5	5	8	3	2	13
	Metapodia	24	11	5	14	4	1	6	4
	Phalanges	52	35.2	19	21	8	16.5	8.2	9
		76	46.2	24	35	12	17.5	14.2	13
Feet									

Table S8.9. Suid skeletal element representation. Tooth fragments are excluded.

Occupation phase	Fusion group	Fused	Fusing	Unfused	Neonate	Comment
Early (n=47)	Neonate				15	
	A	1				
	B	4		2		
	C	2	2	8		
	D	1		1		
	E	3		1	1	
	FG			2		
Middle (n=69)	Neonate				13	
	A			1		
	B	3		6		
	C	4		6		1
	D	3		4		
	E	2		14	1	
Late (n=33)	A	16				
	B	1		2		
	C	2		2		
	D	4		2		
	E	1		2		

Table S8.10. Suid fusion statuses by occupation phase. Fusion Group A=proximal radius; B=scapula, distal humerus, pelvis; C=first and second phalanges; D=distal tibia, distal metapodia; E=distal radius, proximal ulna, proximal and distal femur, proximal tibia, calcaneus; FG=proximal humerus. NOTE: Many specimens were recorded as ‘neonatal’. For most elements, this designation provides more precise information than would ‘unfused’, so such designations are included in this table’s tallies.

Bears (*Ursus*)

Table S8.11 summarises *Ursus* remains recorded during this tranche of research.

GID	Hodder Level	Element	Symm.	Pathology	Burning	Surface Condition	Diagnostic zones	Comments	
17333.F21	South.P	MT 1	R			Moderate	1		Plausibly all from a single bear skin.
17333.F34	South.P	Phal 2	L			Good	1		
17333.F4	South.P	Calcaneus				Moderate	1		
17333.F400	South.P	Scaphoid	L			Moderate		Articulating	
17333.F401	South.P	Hamate	L			Moderate			
17333.F402	South.P	MC5	L			Moderate			
17333.F403	South.P	MC4	L			Moderate		Articulating	
17333.F404	South.P	MC3	L			Moderate			
18530.F21	South.P	MT 1	L			Moderate			
18928.F45	South.O	MP				Moderate		Cut marks	
19304.F1	South.P, South.N	Phal 1		exostosis		Moderate	0.2		
22635.F43	North.G	Phal 1			calcined	Moderate			

Table S8.11. Bear (*Ursus*) remains from the 2013–2017 tranche of research at Çatalhöyük East.

Dogs and Wolves (*Canis familiaris*, *Canis sp.*, *Canis lupus*)

In table S8.12, elements are listed in order of fusion: those at the top of the list fuse extremely early in life, while those at the end are generally fused in mature animals. The South.O puppy (19814) is excluded from this table so that its multiple bones don't overwhelm broader potential patterning in dog ages at the site. For those who wish to add in the (19814) data, add to the 'Late Çatalhöyük' column one unfused distal humerus specimen, one unfused first phalanx, seven unfused distal metapodial shafts (an eighth is an articulating unfused epiphysis), and one unfused proximal humerus (a second is an unfused but articulating epiphysis). Note: whether one includes or excludes *Canis sp.* (unsized canid) specimens from this table it is clear that we recorded more mature dogs than puppies.

Element	Fused			Unfused	
	Early	Middle	Late	Middle	Late*
Scapula			2	1	
Humerus (distal)	1	3	1		1
1st phalanx		4	8		1
2nd phalanx		1	2		
Tibia (distal)		2	1		
Metapodia (distal)	1	12	5		7
Radius (distal)	2	1			
Ulna (proximal)		1	2		
Femur (distal)					
Humerus (proximal)	1				1

Table S8.12. Dog and medium canid epiphyseal fusion statuses. *All Late Neolithic unfused specimens are from a single animal, the puppy in the fill between the walls of Buildings 76 and 80.

Foxes (*Vulpes sp.*)

We don't have enough fox DZs to trust that signal will overwhelm noise when considering skeletal element distributions across occupation phases, but table S8.13 reveals that mandibles total 17.5% of fox DZs in Early levels and 19.6% of DZs in Late levels. Again, we see no decline in fox cranial proportions through time.

Element	NISP			DZs		
	Early	Middle	Late	Early	Middle	Late
Skull	3	2	7	2	1	2
Mandible	5	5	11	2	3	4
Axial elements	2	8		2	4	
Upper limb	2	5	4		1	3
Mid-limb	5	6	7	2	6	2
Carpals & tarsals	1	2		1	1	
Metapodia	9	10	14	2	2	4.2
Phalanges	2	12	14	0.4	4.2	5.2
Total	29	50	57	11.4	22.2	20.4

Table S8.13. Representation of fox elements across occupation phases at Çatalhöyük East, 2009–2017. Loose teeth are excluded from skull and mandible specimen counts. For those who wish to add them in, there are three upper and three lower loose teeth in Early deposits, one upper and five lowers in Middle deposits, and eight uppers and ten lowers in Late deposits.

	Early (n= 29)	Middle (n= 50)	Late (n= 57)	Element	Fused	Unfused/Fusing
				Pelvis	3	
Cranial	10.3	4.0	12.3	Radius (proximal)	2	
Mandible	17.2	10.0	19.3	Scapula	5	
Axial elements	6.9	16.0	0.0	Humerus (distal)	6	
Upper limb	6.9	10.0	7.0	1st phalanx	19	
Mid-limb	17.2	12.0	12.3	2nd phalanx	1	1
Carpals & tarsals	3.4	4.0	0.0	Metapodia (distal)	21	1
Metapodia	31.0	20.0	24.6	Femur (proximal)	2	
Phalanges	6.9	24.0	24.6	Ulna	3	
				Tibia (distal)	4	1
				Tibia (proximal)	2	1
				Femur (distal)		1
				Radius (distal)	1	
				Calcaneus	2	

Table S8.14. %NISP of fox elements across occupation phases at Çatalhöyük East, 2009–2017. Loose teeth are excluded from skull and mandible specimen counts. For those who wish to add them in, there are three upper and three lower loose teeth in Early deposits, one upper and five lowers in Middle deposits, and eight uppers and ten lowers in Late deposits.

Table S8.15. Fox epiphyseal fusion statuses. Elements are listed in order of fusion: those at the top of the list fuse extremely early in a kit's life, while those at the end are generally fused in mature animals.

Badgers (*Meles meles*) and other mustelids

We note re table S8.17 that Çatalhöyük's later occupants used badger teeth for beads (Russell et al. 2013). This might encourage curation or collection of badger cranial remains.

Phase	Level	Taxon	NISP	DZs
Early	South.H, South.I	Small mustelid	1	1
	South.K	<i>Meles meles</i>	3	4
	South.L	<i>Meles meles</i>	1	1
Late	North.H	Small mustelid	1	0.2
	South.P	<i>Meles meles</i>	3	2
	South.Q	Small mustelid*	1	
	South.S	<i>Meles meles</i>	1	
Middle	North.G	<i>Meles meles</i>	11	6.6
	North.G	<i>Mustela</i>	1	1
	North.G	Small mustelid	4	4
	South.N	<i>Meles meles</i>	4	2
	South.N,South.O	<i>Meles meles</i>	1	1
	South.O	<i>Meles meles</i>	2	1
Unknown	North.Unknown	<i>Meles meles</i>	1	
	South.Unknown	Small mustelid	1	
Total			36	23.8

Table S8.16. Mustelid specimens by occupation phase, 2009–2017. The South.Q small mustelid was recorded as 'probably polecat'.

<i>Taxon</i>	<i>Body part</i>	<i>Element</i>	<i>NISP</i>	<i>DZs</i>
<i>Meles meles</i>	Cranial	Skull	3	1
	Cranial	Mandible	6	5
	Cranial	Loose teeth	1	
	Axial	Ischium	1	
	Limb	Humerus	2	1
	Limb	Radius	2	3
	Limb	Ulna	3	3
	Feet	Calcaneus	1	1
	Feet	Metacarpals	4	3
	Feet	Metatarsals	1	
	Feet	Phalanx	3	0.6
<i>Mustela</i> sp.	Limb	Ulna	1	1
Small mustelid	Cranial	Mandible*	1	
	Cranial	Loose teeth	1	
	Limb	Femur	2	3
	Limb	Radius	1	
	Limb	Ulna	1	1
	Limb	Tibia	1	1
	Feet	Phalanx	1	0.2

Table S8.17. Mustelid body part representation, 2009–2017. The asterisked small mustelid mandible was recorded as ‘probable polecat’.

Hedgehogs (*Erinaceus europaeus*)

<i>GID</i>	<i>Hodder Level</i>	<i>Element</i>	<i>Building</i>	<i>Space</i>	<i>Feature</i>	<i>Symmetry</i>	<i>DZs</i>
21367.F1	North.F	Maxilla	119	512		L	
30625.F1	South.H, South.K	Mandible	118	510		L	1
30625.F2	South.H, South.K	Mandible	118	510		L	
19390.F87	South.M	Mandible		470		R	
19140.F1	South.O	Mandible	80	135	7417	R	
18558.F19	South.O	Mandible	80	135		R	1
12553.F5	South.P	Mandible		132		R	1
5507.F1	South.Unknown	Maxilla	North Beam Slot	390		L	

Table S8.18. Hedgehog remains from Çatalhöyük East, 2009–2017.

Pathologies

Cattle pathologies

We recorded 29 new pathological *Bos* specimens in this tranche of research (table S8.19), bringing the total number of pathological *Bos* specimens in the North and South occupations to 69. By far the most notable *Bos* pathology from this tranche of research is a healed wound on a scapular fragment (17383.F143; see Twiss et al. 2021: fig. 8.7). Multiple pieces of obsidian remain embedded in the healed bone, testifying to an aurochs' escape from hunters – at least its first escape, as the animal's remains ended up inside the settlement, in a South.O fill deposit. Another noteworthy find is a scapula from the North Area (20988.x11), with healed glenoid damage (resembling osteochondrosis dissecans). In later periods, such damage is commonly interpreted as traction-induced, but in the absence of other evidence suggesting that Çatalhöyük's villagers were using cattle for labour we do not assume a similar origin here. The scapula comes from an occupation phase wherein we do find the remains of smaller cattle, but the bone itself is likely an adult male aurochs, based on its size. Apart from these two scapulae, most of the bovine pathologies recorded in this tranche of research are related to age (osteoarthritis is the dominant pathology) or minor trauma.

Equid pathologies

There are six new equid pathologies to report (table S8.20). Three first phalanges have exostoses, one carpal shows signs of osteoarthritis, a loose tooth displays pitting that we attribute to enamel formation problems (for example, hypoplasia), and one rib has a possible pathology on its head (this last specimen is not guaranteed to be from an equid). Most of these pathologies seem primarily related to age; we have no evidence of infection or of stress or traction-induced damage.

Suid Pathologies

Three new suid pathologies reveal little about the health of the wild boar population around Çatalhöyük. One animal had some exostosis on the lateral epicondyle of its humerus (11377.F20); another suffered a fractured ilium with dislocation (19349.F18); and third lived with a mandible (5488.F4) with two spurs extending from the medial edge of its left condyle, a possible non-metric trait of unknown aetiology. The former two specimens come from levels South.Q and South.N respectively; the mandible is of unknown date.

Caprine Pathologies

A remarkable cluster of pathological caprine metapodia (shaded grey in table S8.21) lay in the South Area's

Building 104. It is possible that the damage derives from traction or hobbling of the animals.

Also worthy of note are multiple pathological sheep-sized vertebrae in (21208) (shaded pale grey in table S8.21). A lumbar vertebra and its articulating sacrum show no signs of trauma or infection; they are simply misshapen, perhaps congenitally so. In the same unit, a thoracic vertebra has constriction on the spinous process. It is possible that this constriction was related to an abscess or some other growth. If so, and if the lumbar and thoracic vertebrae derive from a single animal, perhaps the issue was not localised mid-spine, but affected the animal's lower spine as well?

Three horn cores bear so-called 'thumbprint depressions', which may be caused by malnutrition. (The condition is associated with malnutrition and milking stress, but its aetiology is still unclear (Albarella 1995)). These specimens come from North.G and South.P, eras in which sheep populations may have increased in and around Çatalhöyük (see below).

Two specimens appear to come from animals that would have been incapacitated. A radius (32106.F184) has such dramatic exostotic growth that it almost surely disabled the sheep's limb, and a pelvis (19108.F11) carries a lesion so severe that the sheep would not have had a functioning hip. That these two animals survived as long as they did suggests that people were taking care of them. The radius comes from a midden in North.H and the pelvis from another midden in South.P. A third animal – owner of a heavily pathological first phalanx (19348.F28, from South.N) might have limped, as might another animal from North.G (20487.F170–171) whose radius and ulna's pathologies probably precluded free motion at the elbow.

Dog pathologies

Most of the dog pathologies are mild mouth anomalies (table S8.22). We recorded a resorbed canine tooth root on a mandible recovered from a deposit of mixed debris in South.O (18545.F2), and a South.?T mandible with no M3 alveolus (perhaps the dog was congenitally missing its third molar). The dog skeleton in South.P (18625) lacked its left upper first molar. Two of its premolars broke during the animal's life. A cusp broke off the lower left P4, and the upper right P4's break exposed its pulp cavity but did not create an abscess. Elements from this skeleton are shaded grey in table S8.22. The only postcranial pathology is a variably fused and swollen metacarpal from the juvenile dog in between the walls of Buildings 76 and 80 in South.O (19814).

Fox and small canid pathologies

See table S8.23.

<i>GID</i>	<i>Element</i>	<i>Pathology</i>	<i>Comments</i>	<i>Hodder Level</i>
20988.X11	Scapula	Glenoid shows cleft – probable healed osteochondrosis dissecans. Also lateral expansion of articular surface at two points but no eburnation or grooving. Likely early trauma with the articular expansion a later secondary reaction.	Ridge of the spine and edges of the blade have almost pristine ‘bubbly’ surfaces, suggesting cartilage still present when deposited. Metrics indicate an adult male aurochs.	North.F
2739.F32	1st phalanx	Possible osteoarthritis (mild).	Possible mild arthritis on the axial end of the anterior half of the distal articulation.	South. ?L
30625.F132	1st phalanx	Osteoarthritis (mild).		South.H, South.K
18192.F39	2nd phalanx	Osteoarthritis (growth on the abaxial proximal articulation).	Possibly articulated with third phalanx (18192.F40), but it’s uncertain.	South.P
18645.F17	2nd phalanx	Osteoarthritis (early stage: slight dorso-abaxial extension of the proximal articular surface).		South.O
21102.F3	2nd phalanx	Fissure in the distal articular surface.	Articulates with first phalanx (21102.F2).	North.G
1832.F37	2nd phalanx	Extra bone growth on the abaxial border of the distal articulation.	Articulates with distal sesamoid (1832.F38) and third phalanx (1832.F39).	South. ?L
22346.F4	2nd phalanx	Potential lipping/osteoarthritis on the axial half of the proximal articulation; also a little bit on the distal articulation.		South.K
22369.F3	3rd phalanx	Osteoarthritis (some exostotic growth on the edge of the proximal articulation, as well as some grooving on the articular surface itself).		South.L
1832.F39	3rd phalanx	Roughened surface on the abaxial end of the hoof, possibly related to infection?		South. ?L
18645.F19	3rd phalanx	Small transverse cleft on axial articular surface (Baker & Brothwell type 3). Also a group of small pits axial facet near midline, in patch of newer bone 5mm in diameter: osteochondrosis?		South.O
32444.F2	Metatarsal	Apparent pathological bone growth on distal end.	Unclear if attributable to bone infection or perhaps osteoarthritis.	South.K

Table S8.19. Bos pathologies, 2009–2017.

<i>GID</i>	<i>Element</i>	<i>Pathology</i>	<i>Comments</i>	<i>Hodder Level</i>
19215.F16	Radius	Fracture with dislocation. Small area of light periostitis on plantar part of facet for ulnar carpal; deep cleft extending medio-laterally along facet for intermediate carpal; similar cleft with four radiating branches on facet for radial carpal.	Clefts on carpal facets perhaps osteochondrosis, perhaps congenital.	South.M
19213.F155	Rib	Osteomyelitis/Abscess/Infection.		South.O
18192.F43	Scapula	Pathology on the superior surface of the coracoid, apparent infection.		South.P
17383.F143	Scapula	Healed trauma. Small fragment of bone from the scapula blade; 4–5 pieces of obsidian still embedded in the bone.	See photo, Twiss et al. 2021, p. 156.	South.O
21351.F2	Ulnar carpal	Possible osteoarthritis.		North.F
2845.F51	Upper tooth	Pathological root, also possible eburnation on root.		South. ?L
19370.F7	2nd phalanx	Large oval area (8.7mm long) of bone dissolution on proximal surface's plantar edge: a few mm deep with irregular base.	Looks more like an osteochondrosis lesion than an infection or abscess. Possibly a periarticular cyst, related to minor trauma (probably non-clinical).	South.N, South. ?M

Table S8.19 (continued). Bos pathologies, 2009–2017.

<i>Hodder Level</i>	<i>GID</i>	<i>Element</i>	<i>Taxon</i>	<i>Age</i>	<i>Pathology</i>	<i>Comments</i>
North.G	32114.F87	Carpal III (os magnum / capitatum)	<i>Equus</i> sp.		Osteoarthritis	Heavy carnivore gnaw
North.G	20472.F25	1st phalanx	<i>Equus</i> sp.		Exostosis	
South.?L	1542.F1	1st phalanx	Small equid	Fully fused	Exostosis: prominent and dense on proximal anterior and posterior portion on the bone.	
South.N, South.?M	19370.F5	1st phalanx	Small equid	Subadult/adult (prox. end fused)	Exostosis: split lengthways down midline, slight exostosis at site of distal insertion.	
South.M	19390.F8	Upper tooth	Small equid	Adult	M1 or M2 showing two pathologies: 1) series of small pits in the dentine of the occlusal surface. These seem not to be post-depositional; possibly decay? 2) on mesial surface near lingual corner, a hole (3.5mm at surface) through cement into enamel and possibly dentine, increasing depth towards root. The hole's edges appear rounded and undercut, and the exposed surface is pitted. Probably a defect in formation (for example, hypoplasia), not decay or post-depositional damage	
South.O	18933.f27	Rib	Large equid (possibly)		Possible pathology on rib head.	

Table S8.20. *Equid pathologies, 2009–2017.*

<i>Taxon</i>	<i>GLD</i>	<i>Element</i>	<i>Pathology</i>	<i>Comments</i>	<i>Hodder Level</i>
Ovis	19830.F2	1st phalanx	- Exostosis (distal end, abaxial ligament insertion) - Some bone growth around plantar part of proximal articulation.		South.N, South.O
Ovis	17369.F10	1st phalanx	Exostosis (distal axial ligament insertion).		South.T
Ovis	19348.F28	1st phalanx	Extra bone growth on distal end of phalanx.	Extreme disfigurement.	South.N
Ovis	32114.F333	1st phalanx	Bone appears to have grown at an angle, possibly reflecting a dislocated epiphysis.		North.G
Ovis	21102.F7	1st phalanx	Ample extra bone growth on the abaxial proximal surface and near the distal end.	Related to arthritis? Does not resemble classic arthritic lipping.	North.G
Ovis	20487.F277	2nd phalanx	Osteoarthritis: growth on the axial distal epiphysis.		North.G
Ovis	19390.F74	Axis	Congenital anomaly (cleft in the ventral part of the cranial end).	Possibly incomplete union of fetal/neonatal parts.	South.M
Ovis	13183.F11	Calcaneus	Pathology/non-metric trait (pronounced channel running dorso-ventrally, caudal from and parallel to sustentaculum).		North.I
Ovis	19818.F41	Mandible	Bulging on the buccal side of the bone at the M2.	Probably a gap created from an infection or gum disease.	South.O
Ovis	32114.F227	Horn core	‘Thumbprint’ depression on the medial size of the horn.	Possibly indicative of malnutrition.	North.G
Ovis	18136.F4	Horn core	‘Thumbprint’ depression.	Possibly indicative of malnutrition.	South.P
Ovis	18156.F2	Horn core	Three medial ‘thumbprint’ depressions: near base, partway up, at tip.	Possibly indicative of malnutrition.	South.P
Ovis	17333.F41	Humerus	Osteoarthritis on the posterior lateral distal condyle.		South.P
Ovis	19370.F37	Humerus	Small projection from medial surface of distal end: Osteomyelitis/Abscess/Infection.	Initially interpreted as exostosis, but wavy surface of bone proximal to projection suggests possible infection.	South.N, South.?M
Ovis	20472.F45	Humerus	Periostitis.		North.G
Ovis	19390.F90	Intermediate carpal	Reactive bone on posterior and anterior surfaces: Osteomyelitis/Abscess/Infection.	May articulate with 19390.F89.	South.M

Table S8.21. *Caprine pathologies.*

<i>Taxon</i>	<i>GLD</i>	<i>Element</i>	<i>Pathology</i>	<i>Comments</i>	<i>Hodder Level</i>
Ovis	14028.F28	Mandible	Malocclusion (massive: affected the occlusal surface of M1 (buccal half) and M2 (anterior portion)).	Reconstructed tooth row with a small amount of bone also reconstructed on Teeth M1–M3.	South.T
Ovis	20988.F2	Mandible	Swelling of horizontal ramus at the M1, possible abscess.	P2–P4 present, molar alveoli present but teeth missing.	North.F
Ovis	19215.F45	Mandible	Extra foramen buccal to the dp3.		South.M
Ovis	17333.F47	Mandible	Bone growth (abscess) on both the lingual and buccal side of the mandible around M1, more severe on the lingual side. May have affected the roots of M1 as well, but not visible as still in bone.		South.P
Ovis	17333.F56	Mandible	Possible large abscess on the lingual side of what would have been the M1 alveolus (tooth is missing and bone is broken at relevant location, but bone looks swollen).		South.P
Ovis	17333.F52	Mandible	Possible malocclusion between the P4 and M1 (apparent space in between in the alveolar row, tilting P4 towards M1).		South.P
Ovis	17377.F125	Mandible	Possible mild ‘lumpy jaw’ (actinomycosis).		South.P, South.?M
Ovis	21660.F12	Metacarpal	Distorted lateral epiphysis, cause unclear.		North.G
Ovis	19387.F3	Metacarpal	<ul style="list-style-type: none"> - Marked development of bony ridge down posterior of shaft, to a lesser extent along the lateral and medial edges of the shaft. - Expansion of shaft at fusion line laterally and medially. - 2/3 down shaft, a slight swelling in the shaft to the posterior, medial and lateral. 	<ul style="list-style-type: none"> - Part of cluster of pathological metapodia. Probable pair with 19387.F2. - No obvious remodeling of bone as consistent with healed break, infection, or a response to tethering. 	South.M, South.N, South.M, North.G
Ovis	19387.F2	Metacarpal	<ul style="list-style-type: none"> - Marked development of bony ridge down posterior of shaft, to a lesser extent along the lateral & medial edges of the shaft. - Expansion of shaft at fusion line laterally & medially. - 2/3 down shaft, a slight swelling in the shaft to the posterior, medial & lateral. 	- Part of cluster of pathological metapodia. Probable pair with non-pathological metacarpal 19387.F5.	South.M, South.N, South.M, North.G

Table S8.21 (continued). Caprine pathologies.

<i>Taxon</i>	<i>GLD</i>	<i>Element</i>	<i>Pathology</i>	<i>Comments</i>	<i>Hodder Level</i>
Ovis	19387.F4	Metacarpal	<ul style="list-style-type: none"> - Lateral, medial and posterior swelling 2/3 down shaft as for 19387.F2-3. - Examination under x20 lens -> evidence of periosteal reaction. X-ray shows localised thickening of the bone; no associated infection. 	- Part of cluster of pathological metapodia. Probable pair with non-pathological metacarpal 19387.F5.	South.M, South.N, South.M, North.G
Ovis	19387.F1	Metacarpal	<ul style="list-style-type: none"> - Slight lateral and medial swelling 2/3 down shaft. - Little macroscopic evidence of bone remodeling other than small area of periostitis on medial edge. - X-ray shows localised thickening of the bone; no associated infection. 	- Part of cluster of pathological metapodia.	South.M, South.N, South.M, North.G
Ovis	19387.F6	Metatarsal	<ul style="list-style-type: none"> - Slight swelling to medial and lateral ~ 2/3 down shaft. - No visible change to bone surface under x10 or x20 magnification. 	- Part of cluster of pathological metapodia. Similar to 19387.F2 and 19387.F3. - Healed tethering/hobbling damage?	South.M, South.N, South.M, North.G
Ovis	19387.F8	Metatarsal	<ul style="list-style-type: none"> - Slight swelling ~2/3 down shaft, most apparent on lateral shaft 	- Part of cluster of pathological metapodia	South.M, South.N, South.M, North.G
Ovis	19387.F11	Metatarsal	<ul style="list-style-type: none"> - Slight medial and lateral swelling 2/3 down shaft. - No macroscopic evidence of active remodeling. - Extracted for C14 4/8/12. 	- Part of cluster of pathological metapodia	South.M, South.N, South.M, North.G
Ovis	19387.F15	Metatarsal	<ul style="list-style-type: none"> - Slight medial & lateral swelling ~ 2/3 down shaft. - Little macroscopic evidence of bone remodeling other than two small patches of old well-healed bone: one forms a small prominence in swelling on medial side, the other a short elongated patch along the medio-posterior edge midshaft. - X-ray shows localised thickening of the bone; no associated infection. 	- Part of cluster of pathological metapodia.	South.M, South.N, South.M, North.G
Ovis	19387.F17	Metatarsal	<ul style="list-style-type: none"> - Slight medial and lateral swelling ~ 2/3 down shaft. - X20 magnification shows slight periostitis medially, laterally and posteriorly at site of swelling, and extending up shaft posteriorly. 	- Part of cluster of pathological metapodia.	South.M, South.N, South.M, North.G

Table S8.21 (continued). Caprine pathologies.

<i>Taxon</i>	<i>GID</i>	<i>Element</i>	<i>Pathology</i>	<i>Comments</i>	<i>Hodder Level</i>
Ovis	19390.F89	Radial carpal	Reactive bone on posterior and medial surfaces, latter more active than former. Thickening of bone cortex in this area.	Osteomyelitis/Abscess/Infection.	South.M
Ovis/Capra	20465.F90	2nd phalanx	Significant exostotic growth on the distal end of the bone.	Possibly an infection?	North.G
Ovis/Capra	11360.F39	3rd phalanx	Osteoarthritis on the proximal articulation.		South.R
Ovis/Capra	20487.F15	3rd phalanx	Exostosis on the abaxial edge of the hoof.		North.G
Ovis/Capra	16507.F75	Calcaneus	Osteoarthritis: extra bone growth (enthesophyte) medially, immediately above the horizontal 'platform' of the articulation, with a 1-cm-diameter semicircular and internally smooth tube for tendon running across it anterior-posteriorly	Possible septic arthritis.	South.S
Ovis/Capra	18153.F259	Calcaneus	Groove behind the proximal articulation's medial projection		South.P
Ovis/Capra	11370.F21	Central tarsal + IV	Congenital anomaly: incomplete fusion between navicular and cuboid.		South.Q
Ovis/Capra	18153.F183	Humerus	Exostosis on the lateral end of the condyle.		South.P
Ovis/Capra	32132.F50	Lower tooth	Possible malocclusion: P2 heavily worn, lingual/posterior margins of the occlusal surface much higher than the buccal/anterior portion.		North.G
Ovis/Capra	19370.F13	Mandible	- Malocclusion: distal half of P3 overly worn compared to mesial. - Accessory foramen buccal below P3.		South.N, South.?M
Ovis/Capra	32653.F132	Mandible	Possible missing tooth: no apparent alveolus for dp2.		South.?K, South.?I, South.?J
Ovis/Capra	20938.F89	Mandible	Osteoporotic growth on the mandibular condyle	Two cut marks on the mandibular notch.	North.G
Ovis/Capra	20965.F52	Mandible	Abscess surrounding dp3.		North.G
Ovis/Capra	19215.F52	Mandible	Extra foramen buccal to the dp3.		South.M
Ovis/Capra	19390.F25	Mandible	Accessory mental foramen.		South.M

Table S8.21 (continued). Caprine pathologies.

<i>Taxon</i>	<i>GLD</i>	<i>Element</i>	<i>Pathology</i>	<i>Comments</i>	<i>Hodder Level</i>
Ovis/Capra	18927.F10	Mandible	Foramen buccal to the P3.		South.O
Ovis/Capra	14028.F25	Mandible	M1 alveolus probably resorbed.	Fragmentation precludes determining whether the tooth was lost or if there was an abscess.	South.T
Ovis/Capra	20472.F100	Mandible	Osteomyelitis/Abscess/Infection.		North.G
Ovis/Capra	20472.F99	Mandible	Osteomyelitis/Abscess/Infection.		North.G
Ovis/Capra	18927.F11	Mandible	Foramen buccal to the P3.		South.O
Ovis/Capra	19215.F46	Mandible	Extra foramen buccal <dp2(3).		South.M
Ovis/Capra	13183.F13	Mandible	Medial edge of the mandibular condyle has a bony spur extending ventrally.	May be a non-metric trait rather than pathology	North.I
Ovis/Capra	18552.F14	Mandible	Accessory foramen buccal to the P2 alveolus.		South.O
Ovis/Capra	5843.F24	Mandible	Articular surface of mandibular condyle possibly expanded/arthritis?		South.R
Ovis/Capra	19115.F38	Maxilla	Infection? Congenital anomaly? Either the (heavily worn) dp3 and dp4 are about to be shed or there is an infection: alveoli look quite strange.	Calculus present.	South.P
Ovis/Capra	18933.f31	Maxilla	Large/abnormal nasal foramen. Possible gum infection.		South.O
Ovis/Capra	12514.F5	Metacarpal	Exostosis: bone growth on posterior midshaft, lateral side.		South.P
Ovis/Capra	20487.F291	Metacarpal	Exostosis: small amount of exostotic growth on the lateral proximal metaphysis (below the articular surface).		North.G
Ovis/Capra	32106.F9	Metacarpal	- Infection on the posterior side of the bone (medial half) expanded the bone. - Exostotic ridge on the lateral half of the bone at the same level.		North.?H

Table S8.21 (continued). Caprine pathologies.

<i>Taxon</i>	<i>GLD</i>	<i>Element</i>	<i>Pathology</i>	<i>Comments</i>	<i>Hodder Level</i>
Ovis/Capra	20465.F38	Metacarpal	Possible pathology? Unusually large tuberosity at the anterior end of the proximal epiphysis.		North.G
Ovis/Capra	22300.F45	Metapodial	Bone growth on the shaft – infection?		South.K
Ovis/Capra	18508.F47	Metatarsal	Infection/injury: bone swollen in the midshaft on the lateral side, possibly also on the medial side.	Healed: bone surface normal.	South.O
Ovis/Capra	14028.F23	Metatarsal	Large bulbous area midshaft: possible previous injury or infection.		South.T
Ovis/Capra	13183.F12	Pelvis	Osteoarthritis: Probable slight eburnation but clear and pronounced osteophyte development on acetabular margin.		North.I
Ovis/Capra	19108.F11	Pelvis	Severe porotic lesion on acetabulum. No eburnation or osteophytosis.	- Possible reaction to extreme osteoarthritis but lesion is so severe the etiology is difficult to discern.. - The hip joint no longer functioned	South.P
Ovis/Capra	20487.F171	Radius	Significant exostotic growth on the articular surface with the humerus and the proximal shaft, growing from the muscle attachments and grooves on the articular surface.		North.G
Ovis/Capra	20487.F170	Ulna	Massive exostotic growth around the ulna near the articular articulation with the radius and surrounding some of the tendons.	Probably impeded free motion.	North.G
Ovis/Capra	5493.F4	Radius	Significant extra bone growth around proximal articulation with ulna.	Articulated (not fused) with 5493.F5.	South.Unknown
Ovis/Capra	5493.F5	Ulna		Articulated (not fused) with 5493.F4.	South.Unknown
Ovis/Capra	32106.F184	Radius	Dramatic exostotic growth.	Almost surely disabled the animal, may have immobilised the limb.	North.?H
Ovis/Capra	32106.F43	Ulna	- Exostotic growth on the lateral side of the olecranon process. - Groove: formed by ligament damage?	Infection?	North.?H

Table S8.21 (continued). Caprine pathologies.

<i>Taxon</i>	<i>GLD</i>	<i>Element</i>	<i>Pathology</i>	<i>Comments</i>	<i>Hodder Level</i>
Ovis/Capra	19366.F39	Radius	Nutrient foramen proximal-posterior.		South.N, South.?M
Ovis/Capra	18555.F59	Rib	Fracture (healing) without dislocation on shaft	May not have fractured all the way through: the original bone surface on the external side only thinly covered with reactive bone, the majority of the callus formation is on the internal surface, remnant of the original surface visible in the broken end.	South.O
Ovis/Capra	10537.F2	Scapula	- Pits of osteochondrosis type lesions in glenoid - Gap between coronoid process and glenoid		
Ovis/Capra	12519.F32	Skull	Severe exostosis – perhaps heavy periostitis – on the zygomatic arch of the temporal.		South.P
Ovis/Capra	32692.F300	Tarsal II + III	Ossified ligament in the posterior part of the bone.		South.?I, South.?H
Ovis/Capra	23956.F44	Tibia	Enthesopathy on distal articulation.		
Ovis/Capra	4868.F2	Ulna	Osteoarthritis: considerable excess growth (including a ~lipped valley that looks like a tendon might pass by) on the lateral side at the height of the articulation; moderate excess bone on medial side. Articular surfaces do not display eburnation.	No obvious cloaca, but perhaps growth is attributable to infection of the soft tissue?	South.G
Sheep-sized	11377.F29	Costal cartilage	Fracture without dislocation		South.Q
Sheep-sized	19216.F575	Indet.	Possible eburnation? Polishing on surface.	May be humerus caput.	South.O, South.P
Sheep-sized	20467.F135	Long bone	Abscess/infection? Groove (does not look anthropogenic in origin) around the shaft, ~oblique to bone's axis		North.Unknown
Sheep-sized	20472.F46	Long bone	Periostitis		North.G
Sheep-sized	21208.F1	Thoracic vertebra	Constriction on the spinous process: may have been related to an abscess or some other growth that affected the bone.	Part of articulated thoracic vertebral column (5 vertebrae, 20524.F1-5; 8 rib heads, 21208.F6-13; and 1 thoracic spinous process: 21208.F14).	South.L

Table S8.21 (continued). Caprine pathologies.

<i>Taxon</i>	<i>GLD</i>	<i>Element</i>	<i>Pathology</i>	<i>Comments</i>	<i>Hodder Level</i>
Sheep-sized	21208.F15	Lumbar vertebra	Asymmetrical caudal articular facets: left facet is warped and flattened. The corresponding cranial articular facet of the sacrum is also warped to form a tight articulation.	Last lumbar vertebra. Articulates with sacrum (20524.F16).	South.L
Sheep-sized	21208.F16	Sacrum	Left-hand cranial articular facet is warped and flattened relative to the right-hand one.	Articulates with last lumbar (21208.F15).	South.L
Sheep-sized	32132.F92	Rib	Exostosis around the head.	Broken and healed? Arthritis?	North.G
Sheep-sized	32106.F1	Rib	Fracture with dislocation (large bone bruise around break).		North.?H
Sheep-sized	18933.f38	Rib	Osteomyelitis/Abscess/Infection on anterior body.		South.O
Sheep-sized	13183.F14	Rib	New bone formation on dorsal surface of shaft.	Unknown etiology. Resembles periostitis but that is unlikely on the dorsal surface.	North.I
Sheep-sized	21545.F6	Rib	Bone growth on posterior surface of shaft.		North.G
Sheep-sized	4865.F173	Rib	Possible fracture, dislocation.		South.G
Sheep-sized	19115.F23	Rib	Possible fracture/warping.	Shaft possibly crooked.	South.P
Sheep-sized	21102.F13	Tibia	Extra bone growth on medial shaft end.	2–3 oblique cut marks on anterior midshaft.	North.G

Table S8.21 (continued). Caprine pathologies.

<i>Taxon</i>	<i>GID</i>	<i>Element</i>	<i>Pathology</i>	<i>Hodder Level</i>
<i>Canis familiaris</i>	18545.F2	Mandible	Canine root is resorbed (tooth lost antemortem).	South.O
<i>Canis familiaris</i>	1832.F75	Mandible	Teeth very crowded.	South.?L
<i>Canis familiaris</i>	18625.F3	Mandible	One posterior cusp on the M1 broken off antemortem. Left side	South.P
<i>Canis familiaris</i>	18625.F4	Mandible	Heavily and atypically worn on the posterior half of the M1 and M2. Right side; wear doesn't match that on the left side of the mandible.	South.P
<i>Canis familiaris</i>	18625.F7	Maxilla	Heavily worn (right side; more worn than the left maxilla). Occludes well with the mandible despite the heavy wear on the molars. P4 broke during life, exposing the tooth pulp cavity, but no sign of an abscess. The wound presumably drained without forming an abscess.	South.P
<i>Canis sp.</i>	19814.F18	Metacarpal V	Part of (19814) puppy skeleton. Possible fracture/trauma with infection?: proximal epiphysis appears partially unfused, but there is also an anterior-medial swelling where the diaphysis and epiphysis are fused.	South.O
<i>Canis sp.</i>	19702.F19	Skull	Maxillary M2 lost antemortem, lingual root resorbed.	South.O

Table S8.22. Dog and *Canis sp.* pathologies.

<i>Taxon</i>	<i>GID</i>	<i>Element</i>	<i>Pathology</i>	<i>Hodder Level</i>
<i>Vulpes</i>	17333.F227	Mandible	Congenital anomaly: an extra premolar alveolus mesial to P1.	South.P
<i>Vulpes</i>	17333.F232	Mandible	Mesial alveolus of M2 has ~4 tiny holes in it, and the bone is mildly swollen.	South.P
<i>Vulpes</i>	22343.F29	Metapodial	Bone growth on the shaft, more cancellous bone in the shaft. Possible infection.	South.K
Small canid	1646.F1	Lower tooth	Uncertain ID – pathological but looks canid-like. Heavily swollen roots.	South.?M

Table S8.23. Fox and small canid pathologies.

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