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No place like home for metalworkers: Household-based metal production at Early Bronze Age Çukuriçi Höyük and beyond

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ABSTRACT

This article questions the cross-cultural ethnographic insight of metalworking as a male craft, commonly performed in male spaces (workshops) away from female members of society, through the analysis of archaeological evidence for the household-based metal production within multi-gendered and multi-generational households and corresponding but rare ethnographic examples.

KEYWORDS

Metalworking; gendered labour; household archaeology; ethnographic exceptions; Early Bronze Age

Introduction

In her seminal article *Households with Faces: The Challenge of Gender in Prehistoric Architectural Remains*, Ruth Tringham (1991) posed the question of how to find gender relations from architectural remains on archaeological sites. Her answer was not to ‘add women and stir’, but to conduct microscale archaeology: the so-called household archaeology (Tringham 1991, 95–99). As she argues, the primary research goal of household archaeology is not to search for the material correlates of gender roles in the architecture of deep prehistory. The aim must be to ‘produce a *visibility of gender*’ when visualizing households within the prehistoric archaeological record (Tringham 1991, 117). With Tringham’s call in mind, this contribution addresses the question of who produced metals at Çukuriçi Höyük, an Early Bronze Age (EBA) settlement site in western Anatolia, and what the relationship between producers was. What can we learn about kinship and gender in their unified analysis (e.g. Collier and Yanagisako 1987) through the lens of metalworking? Considering that the reasons for androcentric interoperations of metalworking in prehistory may be due to a general disciplinary divide between archaeometallurgy as “science-based archaeology” and “everybody else” (Budd and Taylor 1995),¹ this article aims to consider what anthropological archaeology or archaeological anthropology may offer to the discussion of metalworking in prehistory.

Metalworking as a male craft

A cross-cultural study, based on a Standard Cross-Cultural Sample of 186 cultures documented ethnographically, confirmed metalworking being exclusively male expertise (Murdock and Provost 1973). Within archaeology, the image of male metalworkers has

been used to interpret prehistoric archaeological data since the work of Vere Gordon Childe (Budd and Taylor 1995).

The first smiths were perhaps the first independent craftsmen. Any hunter or farmer could make a flint knife or arrow-head and grind out a stone axe-head in his spare time. His wife could stitch together robes of skins, even spin and weave, and mould and fire clay pots. The art of the smith was so complicated that prolonged apprenticeship was required. His labour was so long and exacting that ... it was essentially a fulltime job ... In a Bronze Age village we often find one hut, but never more, that was obviously the smithy. (Childe 1930, 4–5)

With these words, Childe set the deterministic tone for future archaeological interpretations of metalworking in Old World prehistory and Bronze Age societies more generally. Metalworking, alongside the extraction of salt and long-distance exchange, continues to be commonly interpreted as a male activity, albeit without supporting evidence (Chapman and Palincas 2013, 417). Recent literature, however, questions such claims for the Aegean Chalcolithic and EBA (Mina 2018), Middle and Late Bronze Age Cycladic Islands (Abell 2020), Cyprus (Swantek 2016), and late third/early second millennium Wales and Ireland (Wager 2009).

Childe's attempt to visualize prehistoric gender roles through the lens of crafts and specialization stands in exact opposition to what Ruth Tringham (1991; 1994) called for in the 1990s. Therefore, this contribution follows the household archaeology approach (see Tringham 1991; 2015; Wilk and Rathje 1982) to understand metalworking at the Early Bronze Age (EBA) site of Çukuriçi Höyük in western Anatolia. The article considers both local and regional contexts of metalworking, from a multi-scalar perspective (see Gyucha, Duffy, and Parkinson 2014; Parkinson 2006; Yerkes, Gyucha, and Parkinson 2009). At the local scale, household archaeology is a suitable approach for discussing metalworking since the site of Çukuriçi was excavated with modern methods and archaeological contexts were carefully studied by an interdisciplinary team of specialists. At the regional scale, western Anatolia provides a unique opportunity to investigate the spatial organization of EBA settlements. From the early, well-known excavation of Troy by Heinrich Schliemann at the end of the nineteenth century, regional prehistory in western Anatolia have been studied through excavations of multi-period settlement mounds, or tells. Therefore, the EBA evidence from Çukuriçi can be compared to the evidence from other excavated regional sites.

From a *longue durée* perspective, the EBA is a period of important socio-economic transformations that swept across societies in the Near East and West: these changes have been summarized as an 'urban revolution' (Childe 1950). This 'revolution' included the emergence of stratified urban societies supported by the invention of the plough, the wheel, and writing, among other features, and led to increasing social stratification in the Near East and elsewhere. In EBA western Anatolia, the main driver of social change and increasing social complexity was ascribed to metalworking and associated trade (Şahoğlu 2005). In the Aegean more broadly, which includes western coastal Anatolia, the EBA 1 societies (beginning of the 3rd millennium BC) remained small, but no less novel than those in the Near East. Among these small-scale Aegean societies was the EBA 1 settlement of Çukuriçi Höyük in western Anatolia, Turkey, where transformation at the dawn of the Bronze Age can be studied 'bottom-up, largely or wholly without eastern input' (Broodbank 2013, 304).

Metal object from the EBA 1 in western Anatolia have long been interpreted as markers of rank, craft specialization, socio-political change, and key commodities of long-distance exchange (Renfrew [1972] 2011; Şahoğlu 2005; Efe 2007; Massa and Palmisano 2018; Cveček 2020). The question of *who* produced these objects, however, is crucial for understanding the organization of metal production (see Costin 1991) and the socio-political changes metalworking might have triggered in local communities. Initially, Childe (1930) claimed that smiths were the first to abandon kinship ties. According to him, male itinerant smiths worked in exchange for shelter and food and were the first independent, full-time craftsmen. New excavations of settlements in the Aegean are providing new data on craft specialization and early metalworking. One of those newly excavated and studied settlement sites is Çukuriçi.

The spatial organization of metalworking, following the model of Costin (1991), has already been examined for Çukuriçi (Cveček 2022, 150–163). Based on the context, concentration, scale and intensity, metalworking at Çukuriçi was described as production associated with domestic architecture, dispersed, within family production units, and part-time expertise (Cveček 2022, 163). This article makes a step further in exploring whether metalworking took place within workshops or households. It questions whether in relation to gender more rigid and exclusive or whether more inclusive gender practices were linked with metalworking at Çukuriçi, inspired by Bourdieu's study of gendered spaces in Kabyle houses ([1969] 1979). Based on a qualitative comparison of ethnographic examples, the article explores what kind of gender relations, acts, and ideologies may have operated in contexts of metalworking. How rigid or flexible were these arrangements at the dawn of the Bronze Age and beyond? How inclusive or exclusive were these ideologies in respect to gendered categories and classifications? Finally, the article tests the hypothesis of whether gendered participation in labour related to metalworking is contingent upon the social spaces where metalworking takes place.

To test this hypothesis against the archaeological record at Çukuriçi and comparative ethnographic evidence, the article is structured in four parts. It begins with the question of why it is important to study houses on a local scale. Second, it outlines the archaeological context of metalworking at Çukuriçi and compares it with the evidence of metalworking in the wider region. Third, material patterns of metalworking illustrating diminished gender differentiation in terms of the division of labour that could be tested against the archaeological data are identified from the 'ethnographic exceptions'. Fourth, the archaeological context of metalworking at Çukuriçi is tested against these patterns to address gender and kinship linked with metalworking at the site. The article concludes with a call for more attention to metalworking practices within households rather than assuming the existence of male metalworking workshops within archaeology.

Anthropological archaeology as historical anthropology

The article combines multiple lines of archaeological evidence and builds upon the household archaeology approach (Tringham 1991; 2015; Wilk and Rathje 1982). It is important to note that the spatial distribution of artefacts does not always necessarily reflect their original place of deposition, or their original place of use (Schiffer 1987). Moreover, archaeological contexts, never preserved completely, cannot provide the same level

of detail as ethnographic contexts. Therefore, the study of formation processes (Schiffer 1987) to establish correlations between finds and their use through context and depositional processes was conducted by other specialists and goes beyond the scope of this paper.² Instead, ethnographic insights on similar practices to those documented in archaeological contexts will be examined to help pose new questions and critically assess the conclusions.

Apart from the study of activity areas, pottery, and animal bones, the article draws upon archaeometallurgical analyses, textile production, and architecture. This approach allows tracing the connections between households at Çukuriçi ‘in a rounded (anthropological) view’, as Jack Goody put it in *Metals, Culture, and Capitalism* (Goody 2012, xii). Based on a regional comparison approach (Gingrich 2020), corresponding with multi-scalar analysis, the paper highlights differences and similarities in metalworking at the dawn of the Bronze Age in western Anatolia. Following the insight that at Çukuriçi, metalworking was a part-time, household activity (see Cveček 2022, 150–163), the archaeological material is here further contextualized using ethnographic evidence.

This approach involves creating links between ethnography and archaeology, inspired by established models of anthropological archaeology, ethnoarchaeology, and archaeological anthropology (see Binford 1980, Hodder 1982a, 1982b, Fewster 2006; Skibo, Graves, and Stark 2007). Such approaches, however, are largely missing in research in western Anatolia, with few exceptions (see Cveček 2022; Yakar 2000; Yalman 2013). Ethnoarchaeology has been abandoned in many archaeological traditions due to criticisms against positivistic science (Zvelebil & Fewster 2001). It is important to acknowledge the foundations New Archaeology or processual archaeology (Binford 1980) laid for bridging anthropological theory and methods without subscribing to testing hypotheses and developing law-like generalizations about human behaviour based on ethnographic observation. Rather than subscribing to Binford’s ‘old-fashioned’ way of using ethnographic analogies for quantitative proof, this article uses multiple lines of evidence at multiple scales to generate a more comprehensive understanding of metalworking in prehistory. As Fewster (2006, 64) wonderfully paraphrases Wylie (1985),

Post-positivist archaeology should combine the methodological excellence of processualist archaeology with the ampliative ambition of post-processual archaeology to explore not the material culture of the past *per se* but rather the means by which people in the past engaged with their material culture.

Therefore, ‘conditions of relevance’ (Wylie 1985, 101) or ‘relational analogies’ (Hodder 1982a, 1982b) remain valid for using ethnography in post-processual archaeology.

Resembling the indigenous critique (Graeber and Wengrow 2021), this approach relies on published ethnographic studies to contextualize the archaeological data. Ethnographically grounded insights enabled me to question the equivocal nature of interpreting metalworking as a necessarily male craft, performed in workshops rather than households, through both prehistoric archaeological data and several ethnographic examples. Despite a primary focus on the past, the article is not a typical one for *History and Anthropology*. In contrast to the norm, it focuses on the deep past, without the written sources that socio-cultural anthropologists could consult. However, if historical anthropology is considered in the broadest sense (see Cveček 2022; Gingrich and Knoll 2018), then socio-cultural anthropologists should also consider archaeological contexts as a valuable

source of evidence for their inquiries. Viewed as such, the historical anthropology approach could then complement a well-established field of anthropological archaeology practiced by archaeologists who employ a wider socio-cultural anthropological framework and specific archaeological expertise to understand the past.

Why study houses and homes?

The study of houses and homes allows researchers to understand social relationships and gendered spaces within households (Mauss [1915] 2006; Bourdieu [1969] 1979; Tringham 1991; 2015; Carsten and Hugh-Jones 1995; Carsten 2018). Pierre Bourdieu argued that a house is an *opus operatum*, a result of everyday practices that collide with the social and symbolic (Bourdieu [1969] 1979, 90). He studied Kabyle houses, finding that they followed a common pattern, with a spatial opposition between males and females (Bourdieu [1969] 1979). The upper part of the house was for humans, and the lower part was for animals, refuse, and domestic activities, such as sleep, sex, birth, and death. Bourdieu ([1969] 1979) showed that this separation corresponded to the opposition between males and females. This homologous opposition between men and women among Kabyle was not only reflected in house organization but also in language and even objects. Bourdieu's study of the Kabyle house, despite being criticized for its structuralist perspective, which Bourdieu himself later criticized (Bourdieu 1990, 214), has remained important, highlighting the significance and complexity of studying everyday practices, domestic spaces, and their correspondence to symbolic associations, cultural meanings, social configuration, and spatial hermeneutics.

More recent ethnographic studies have shown that houses and homes should not only be addressed through their final constellation but also as objects in the making (Carsten 2018; Ingold 2013; Pink et al. 2017), through a *modus operandi*. As they are continually changing, the *modus operandi* deserves equal attention compared to the *opus operatum* initially proposed by Bourdieu. Changes in the making rather than constants of dwelling places were noted in anthropological writing even before Bourdieu's inquiry into the Kabyle house. Change of dwelling place is not simply a material change, but it reflects structural considerations and personal choices, such as principles of descent and inheritance, changes in size or constitution of residential kin groups, and repercussions on relations with neighbours. In short, physical movement may relate to the concept of what makes up a proper social unit (Firth 1959; Fortes 1958; Goody 1971).

The study of houses and homes is therefore important to understand social relationships, gendered spaces, and everyday practices. By studying the internal structure of houses, we can gain insight into local social organization and symbolic associations, cultural meanings, and spatial hermeneutics of domestic spaces. Although Bourdieu's methodological approach remains useful for studying snapshots of human symbolic, social, and cultural settings, recent ethnographic studies have shown that houses and homes are continually changing. Evidence of houses and metalworking at Çukuriçi provides the archaeological data that will be contrasted with ethnographic studies of houses and material culture in metalworking settings.

EBA 1 settlement at Çukuriçi Höyük

The EBA 1 period at Çukuriçi Höyük dates from the first quarter of the third millennium BC (3,050–2,750 calBC).³ The site is located on an anthropogenic mound, formed by centuries

Table 1. A chronological table for Çukuriçi Höyük based on periodization and absolute dating with radiocarbon data (calBC dates are finally modelled; the other radioacarbon data are preliminary assumption) (after Horejs 2017, Fig. 1.5).

Settlement phase	Archaeological period	Preliminary dating
ÇuHö I	Present times	Twentieth century AD
ÇuHö II	Early Bronze Age 1 with mixed deposits	2900–2750 BC/twentieth century AD
ÇuHö III	Early Bronze Age 1	2850–2800/2750 calBC
ÇuHö IV	Early Bronze Age 1	2950/2900–2850 calBC
ÇuHö Va	Early Bronze Age 1	3050–2950 calBC
ÇuHö Vb	Late Chalcolithic	3110–3050 calBC
ÇuHö VI	Late Chalcolithic	3270–3110 calBC
ÇuHö VII	Late Chalcolithic	3350–3270 calBC
Hiatus		
ÇuHö VIII	Late Neolithic	c. 6200–5970 calBC
ÇuHö IX	Late Neolithic	c. 6300–6200
ÇuHö X	Late Neolithic	c. 6400–6300
ÇuHö XI	Late Neolithic	c. 6500–6400
ÇuHö XII	Early Neolithic	c. 6600–6500 calBC
ÇuHö XIII	Early Neolithic	c. 6680–6600 calBC

of human activities. First inhabited by Early Neolithic farmers around 6,680 calBC, the settlement was abandoned and resettled in the Late Chalcolithic period, around 3,350 calBC. The site was permanently abandoned at the end of the EBA 1 period, around 2,750 calBC (see Table 1). Today, Çukuriçi is located close to the modern town of Selçuk and the ancient city of Ephesus, 6 km from the Aegean coast. In prehistoric times, Çukuriçi was a coastal site, located on a rich alluvial plain covering 10 km², approximately 1.5 km from the shore (Stock et al. 2015).

The EBA 1 settlement at Çukuriçi was developed by erecting freestanding, rectangular houses upon the burnt and levelled remains of the preceding Late Chalcolithic settlement. Within approximately 100 years, or approx. four human generations, these initially freestanding rectangular houses, surrounded by open space, began to agglutinate. In each building phase, new houses were erected next to the pre-existing ones, sharing walls. Over time, houses grew closely together, so far that only tiny alleys separated groups of houses within aggregated village settlements (Cveček 2022; Grasböck et al. 2023) (see Figure 1 for the reconstruction of the EBA 1 settlement at Çukuriçi, see Figure 4 for the location of Çukuriçi).

The EBA 1 inhabitants at Çukuriçi relied on a regional mixed economy that included rain-fed horticulture, animal herding, large game hunting, craft production, and regional exchange (Cveček 2022). Animal herding and the strategies of animal consumption changed a little over 300 years and there is no significant statistical difference in the proportion of animal species from different rooms at the site (Emra, Galik, and Forstenpointner 2020; Cveček and Emra 2021). Based on this zooarchaeological analysis, households at Çukuriçi did not differ from each other in terms of beef, pork, mutton, or seafood consumption.

The archaeological context of arsenical copper production at Çukuriçi and in western Anatolia

Çukuriçi Höyük provides valuable insights into the production of arsenical copper during the Early Bronze Age (EBA) 1 period. As fire installations are integral parts of the



Figure 1. A reconstruction of the EBA 1 village at Çukuriçi Höyük (ERC Prehistoric Anatolia/OeAI, 7Reasons).

metalworking toolkit, the distribution of fireplaces within the settlement may reflect the spatial organization of metalworking. Excavation of the two EBA 1 phases revealed 49 fire installations, of which 26 were classified as bowl-shaped and 23 as shoe-shaped furnaces. Most of the fireplaces were found inside houses rather than in open areas (see Figure 2). Despite their difference in shape (bowl- and horseshoe-shaped), none of the ovens could be exclusively linked to copper production, as the same ovens were also used for cooking (Horejs and Mehofer 2015).

Items linked to metal production (including clay *tuyères*, moulds, slag, and unfinished and finished metal items), as well as grinding stones, tripod cooking pots, and bone stirring spoons linked to food preparation, were commonly found close to the ovens (Horejs, Brtisch, and Röcklinger 2017). Apart from cooking and metalworking, the ovens were also used for the disposal of food waste, namely fish bones and molluscs (Emra, Galik, and Forstenpointner 2020). Within the rooms, hearths were mostly located in the centre and were occasionally rebuilt in the same spot after the floor had been re-plastered. Hearths were also found in the corners of the rooms, but their position moved during the house's use-life and thus they do not indicate a strict continuity in either location or number of the fireplaces transmitted through generations.

Room 43 exemplifies an internal organization of domestic space at Çukuriçi. Among the 249 sherds found in Room 43, shallow bowls and *Knickrandschallen* (bowls with inwardly buckling edges) predominate. A central, superimposed hearth was found in two different use horizons (soil profiles with different soil horizons). Metal objects, including a needle, awl, metal fragments and a wire, were clustered close to the central hearth, pointing towards metal production in the centre of the room. In the southwest corner, another hearth was found with a spindle whorl nearby, indicating textile production. In the northeast corner of Room 43, loom weights and a spindle whorl were found, again pointing towards textile production (Brtsch 2018). Broken sherds of handmade tripod

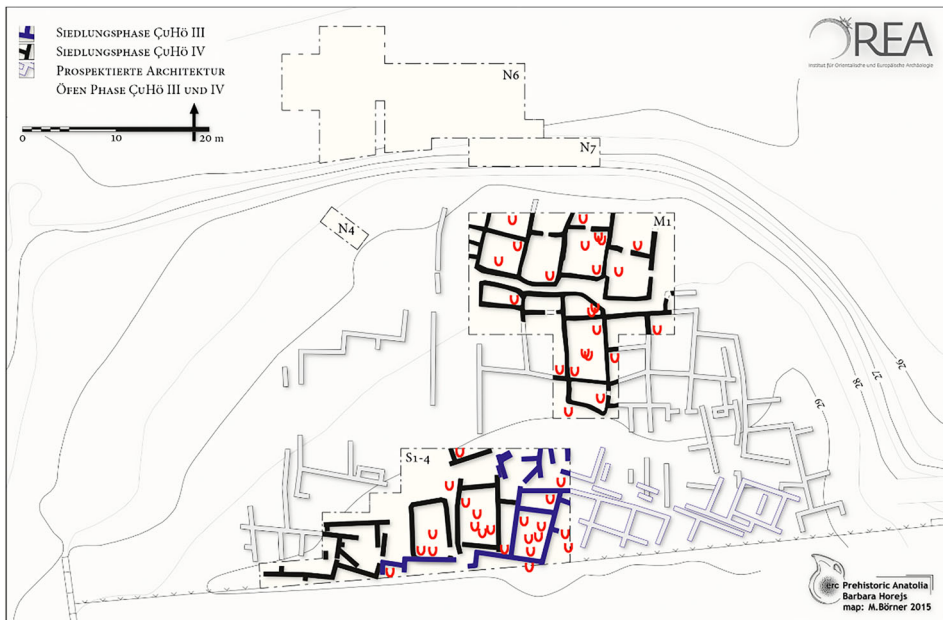


Figure 2. The EBA 1 settlement pattern at Çukuriçi Höyük with the location of the ovens marked with u-shaped symbols (ERC Prehistoric Anatolia/OeAW-OeAI, M. Börner, B. Horejs).

cooking pots and shallow bowls, used for the preparation and consumption of food, were found near the hearths (see Figure 3). Room 43 was interpreted as a multifunctional room based on multiple lines of evidence detected, including textile production, metalworking, cooking, storage, and other household activities, without a permanent continuation between the activity and the location in different use horizons. Therefore, at Çukuriçi, metalworking was performed within houses or homes, alongside the preparation, consumption, and storage of food.

Based on these observations, household activities at Çukuriçi were dynamic, occurring in different areas of house floors in different use horizons, unlike the more static case of Kabyle houses documented by Bourdieu (Bourdieu 1979). For example, whereas hearths were commonly located at the centre of the house, they were also commonly found in the northern or southern corners (Horejs, Brtisch, and Röcklinger 2017). Metalworking and textile production was attested in multiple spaces within houses (Brtisch 2018; Horejs and Mehofer 2015; Horejs, Brtisch, and Röcklinger 2017; Mehofer 2015; Mehofer 2022), without following a fixed pattern.

The knowledge of arsenical copper production and access to finished goods was shared between households at Çukuriçi. The shared knowledge of metalworking bears close similarity with the equal sharing of meat between households (see Emra, Galik, and Forstenpointner 2020). All households at Çukuriçi participated in metal and other types of craft production. Thus, the household was a key locus for and social unit of production of metals at Çukuriçi. However, what does household-based production of metals tell us about gender and kinship in prehistory? What can we infer about the gendered or non-gendered practice of metalworking from the archaeological evidence, and how can ethnographic evidence contribute?



Figure 3. Evidence of metal production at regional EBA 1 settlement sites in coastal western Anatolia and its spatial distribution (OeaW-OeAI/M. Börner, Ch. Schwall).

The dispersed nature of metalworking at Çukuriçi was not a norm at the dawn of the EBA in western Anatolia. In settlements other than Çukuriçi, such as at Emporio on Chios, Heraion on Samos, Bakla Tepe, Liman Tepe close to the modern town of Izmir, and Troy, metalworking was identified in single or a few metalworking workshops per settlement. Evidence for metalworking was recovered in two rooms at Poliochni on Lemnos, and within a village quarter at Thermi on Lesbos (see Figure 4). Except for Troy, imported objects of prestige or *exotica*, such as Cycladic frying pans and Melian obsidian, were clustered in other regional metalworking workshops (Kouka 2016). This has led to the interpretation that these metalworking shops were the workshops of metalworkers-traders and, possibly, the seats of chiefs (Kouka 2002; 2016). Given that metalworking is cross-culturally considered an exclusively male craft (Murdock and Provost 1973), and workshops were identified at many regional sites, how can we use ethnographic evidence to contextualize the dispersed nature of metalworking at Çukuriçi?

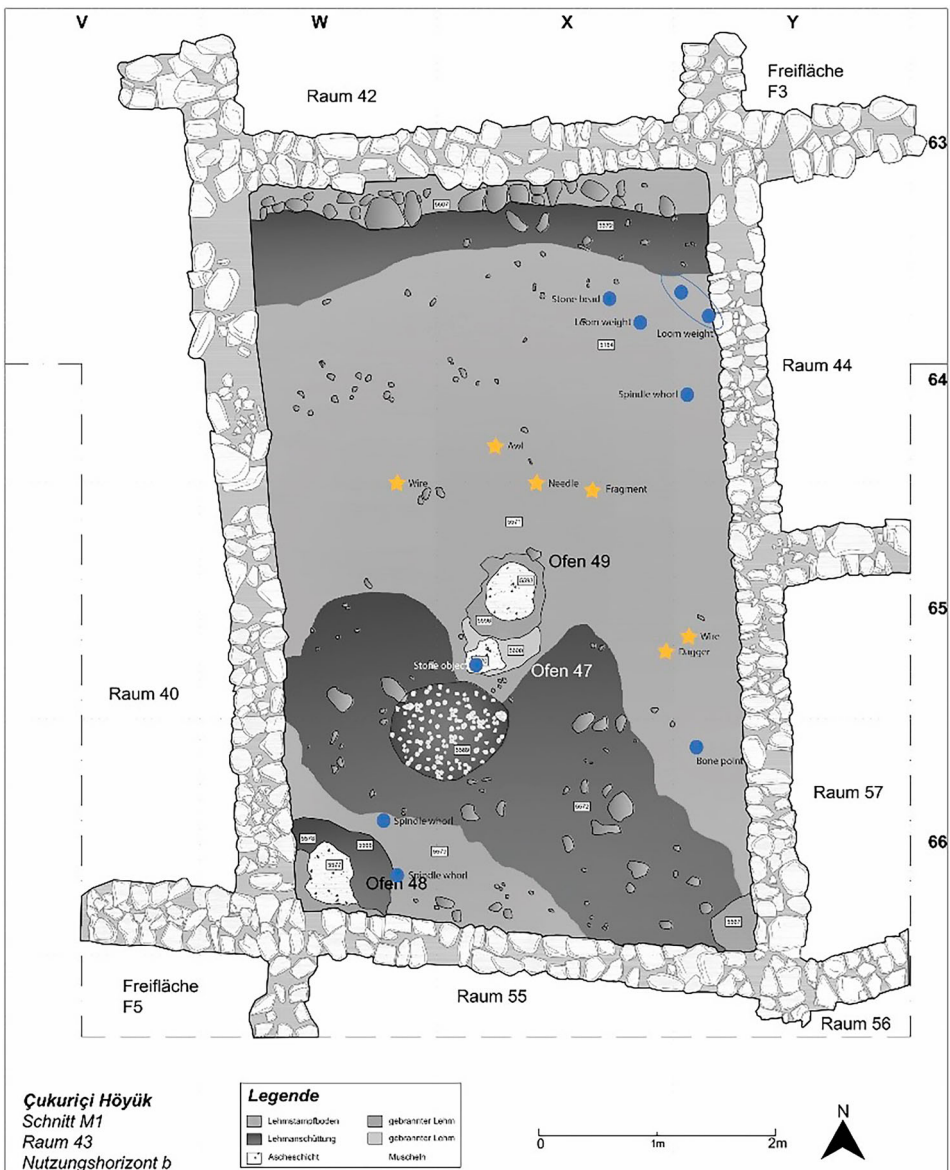


Figure 4. The intra-building distribution of finds in Room 53 in phase b (OeAW-OeAI/M. Röcklinger).

‘Ethnographic exceptions’: metalworking as gender inclusive expertise

To contextualize the dispersal of metalworking at Çukuriçi through the lens of gender and kinship, ethnographical examples are here used to identify material and social patterns of metalworking that could be explored and tested in the archaeological record. The results of a cross-cultural study of 185 societies documented in a Standard Cross-Cultural Sample suggested that metalworking and smelting of ores were exclusively male activities, with almost 100% certainty (Murdock and Provost 1973). The eHRAF World Cultures database, however, provides ethnographic evidence that does not fit these earlier results. The

search was focused on four Outlines of Cultural Material (OCM), namely the OCM 325 – Metallurgy, OCM 326 – Smiths and Their Crafts, OCM 327 – Iron and Steel Industry, and OCM 328 – Nonferrous Metal Industries. This search was complemented by a literature review of ethnographies describing metalworking societies in Asia, Africa, and Northern America. Based on ethnographic data and multiple lines of evidence, concrete patterns associated with metalworking showing a lessened emphasis on gender distinctions within the division of labour were specified. These can be tested against archaeological contexts and can be summarized in the following six categories.

Ovens located in various parts of a village

In ethnographic contexts where metalworking is a gendered expertise, a smithy is usually located on the outskirts or even outside the village and not in the centre. The reason for this could be due to the danger of fire, as observed among the Tiv in today's Nigeria (Akiga and East 1939). Within Tiv villages, the smithy, located under a thatched roof, was located either in the centre of the compound yard, away from houses, or a short distance outside the compound (Bohannon and Bohannon 1958). Likewise, a smithy was set up away from dwellings among the Azande in Central Africa (Schlippe 1956).

In contrast, among the Navajo and Zuni in Arizona, where both men and women produced silver jewellery, there was no rule about where the oven for melting silver should be located. Ovens used for melting silver (but also for cooking and heating) were found both in the centre as well as at the edge of the Navajo and Zuni settlements (Kluckhohn, Hill, and Wales Kluckhohn 1971; Matthews 1883; Mills 1995). A similar pattern exists among the Trà Đông brass smiths in Vietnam (Robequain, Botsford, and Messner 1929). Therefore, ovens used for metalworking scattered around the settlement, simultaneously located at the centre and periphery of the site, may point towards a more inclusive gender practices and ideologies, at least for metalworking.

Ovens located in various parts of houses

Among the Tiv, where metalworking was male expertise, the forge is commonly set a little off-centre of the smithy (Bohannon and Bohannon 1958) or in the centre. Among the Wolof, the blacksmith's forge, located in the centre of an open-walled building with a thatched roof, was also the most popular male gathering point in town to exchange gossip (Lancy 1996). A centrally located forge within a smithy marked a place for male craftsmanship but also male sociability, including between the specialists and their customers and male passers-by.

Among the Navajo, however, women also crafted jewellery. There, silversmiths could install a crude forge, built on rocks with a mixture of sand and clay mortar, in a corner of the room (Evans, Woods, and McPherson 2005, 197). Therefore, ovens located in various parts of the buildings, including corners and central places, without a set pattern, may indicate production of metals with more flexible arrangements concerning gendered division of labour.

Multiple charred materials present inside ovens

The search did not provide ethnographic evidence of food preparation intended for daily consumption in a smithy. Nevertheless, animal sacrifices of chicken and goats in the name

of *Aôndo* (a local deity) were common within the Tiv smithy (Bohannan and Bohannan 1958, 423). The blood from killed animals would be spilled over tools, anvils, and bellows, but not on the forge, because blood or animal bones would spoil it. Among the Zulu, when smiths worked in the forest for weeks, they did not cook but received food from their villages. Only non-menstruating girls were allowed to bring food to the smithy, as no adult woman was allowed close by. Zulu namely considered the fireplace in the smithy as the 'fire-place of the lords' (Raum 1973, 216), a semi-sacred place that can exclusively accommodate charcoal and no other objects.

Therefore, when ovens are treated as places of discard for animal bones and shells, this may indicate that a belief in the fireplace as a sacred place, used exclusively for metalworking associated with male identity, was lacking. This could be observed among the Trà Đông in Vietnam (Robequain, Botsford, and Messner 1929, 158) and the Navajo, where silver was melted in the same ovens as the food was cooked and some food remains discarded. Hence, multiple charred materials present in the ovens could indicate a pattern of practices showing a less pronounced gender divide linked with metalworking.

Artefacts considered already feminine (e.g. handmade clay objects, clay oven) but carrying clues of metalworking

In their survey of African societies, Murdock and Provost (1973, 208–209) show that iron-working and weaving are typically male crafts whereas women are typically potters. This was the case among Kpelle (Lancy 1984), an ethnic group in today's Liberia, Suku in south-western Congo (Kopytoff 1964), Talensi in northern Ghana (Fortes 1945), and the Fur in the Darfur region (Beaton 1948). If women were potters, however, then female labour and knowledge were also required for choosing clays for the construction of sturdy and durable clay ovens necessary for metalworking as well as clay moulds and clay tuyères.

Among the Trà Đông, bellows were worked by women or boys while the men supervised the forge. When brass is melted, the metal was poured into handmade clay moulds, made by women (Robequain, Botsford, and Messner 1929, 469). Therefore, artefacts considered already feminine (e.g. handmade clay objects and clay ovens) but carrying clues of metalworking, might represent another pattern pointing towards metalworking as a gender inclusive craft.

Metallurgical tools and installations associated with other household activities

In the predominant model of the gendered division of labour concerning metalworking, male metalworkers usually belong to the same clan. As observed among the Zulu, such smiths 'set smithery apart from begetting' (Raum 1973, 214); away from the shared maintenance practices (cf. Steidl 2020) such as preparation of food, childcare, crafts, and agricultural work. They also store their set of metalworking tools, which among the Tiv comprised bellows, tongs, hammers, rake, anvils, clay nozzle, water-trough, and the magic pot in the smithy (East 1936, 62). Apart from a charcoal fire and the oven in the smithy, the basic tools of blacksmiths in the Wolof ethnic group in West Africa, comprised a pair of goatskin bellows, anvil, hammers, files, pinners, and tongs (Gamble 1967).

Among the Zuni, American Pueblo peoples residing in the Zuni River valley, where more flexible and gender inclusive practices of metalworking were documented, metalworking tools were also found within houses. Zuni silversmithing was initially a male craft, but married women frequently helped their husbands in silver working, as 'hidden producers' in their homes (Mills 1995, 152). A similar practice of female 'hidden producers' was also documented among the Konso, in today's southwest Ethiopia, where craft activities were gendered and transmitted from father to son or mother to daughter. However, there were no local prohibitions against a male or female taking part in the predominant craft of the opposite gender (Hallpike 1968, 260). Konso female smiths worked metals alongside their husbands and carried out other household activities such as cooking and weaving close by.

In the latter two cases, metalworking was not removed from household activities, in specialized workshops, but integrated into the lives of houses and families. Hence, one of the material markers for gender inclusive metalworking can be the identification of multifunctional spaces, in which metalworking tools can be identified alongside the remains of household activities (e.g. cooking, weaving, leather working).

Isotopic signatures of arsenic in the bones of males, females, children

Apart from the indirect patterns of more gender inclusive metalworking practices, for archaeologists, it is particularly important to examine also direct evidence. The isotope signatures of arsenic in the bones of males, females, and children may attest to their involvement in the production of arsenical copper and metalworking. Isotopic signatures, however, should be carefully evaluated. For example, at İkiztepe, an EBA 3 (late 3rd millennium BC) burial located in the central Black Sea region of Anatolia, high levels of arsenic in human and animal bones were found. These were interpreted as diagenetic in origin, and not due to the community's involvement in metalworking because evidence of arsenical copper alloy production on-site was missing (Özdemir, Yılmaz, and Demirci 2010).

Therefore, direct evidence of isotopic signatures confirming arsenic or lead found in human bones cannot guarantee the involvement of men, women, or children in metalworking. The interpretation of results stemming from isotope studies should be carefully complemented with the archaeological contexts. Nevertheless, if isotope signatures of arsenic and lead can be combined with evidence for metalworking in settlements, then they could imply loosening of gendered boundaries in metalworking.

Six patterns that could indicate more inclusive practices and ideologies of gender in metalworking that can be explored and tested in the archaeological record are summarized below:

- (1) Ovens located in various parts of a village
- (2) Ovens located in various parts of houses
- (3) Multiple charred materials present inside ovens
- (4) Artefacts considered already feminine (e.g. handmade clay objects, clay oven) but carrying clues of metalworking (e.g. clay moulds, clay tuyères)
- (5) Metallurgical tools and installations associated with other household activities
- (6) Isotopic signatures of arsenic in the bones of males, females, children

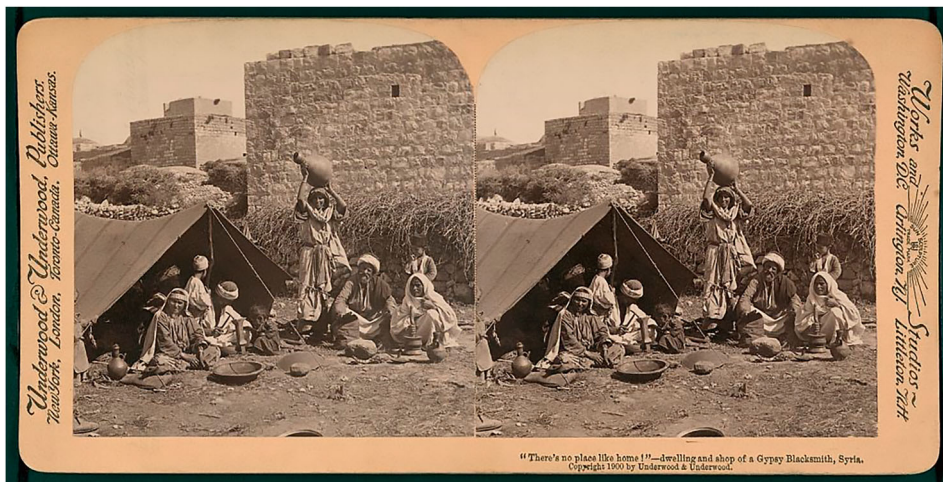


Figure 5. 'There's no place like home!' Dwelling and shop of a Roma Blacksmith, Syria, c. 1900 (Underwood & Underwood).

Except for the sixth pattern, the above-listed patterns were identified from the 'ethnographic exceptions' of practices showing a less pronounced gender divide in metalworking, characterized with inclusion rather than exclusion of participants from diverse age and gender backgrounds. These 'ethnographic exceptions', however, provide an important piece of evidence for the enormous diversity of metalworking that has been documented ethnographically. They may have an impact on inferring and discussing gender roles linked to metalworking in archaeology. The above cases also highlight the importance of homes and household members in metalworking practice. Therefore, theories and interpretations that could be summarized under 'No place like home for metalworkers' may more often than not be an androcentric interpretation. Detailed ethnographic accounts of the everyday lives of metalworkers indicate households, as well as workshops, as important units of metal production (see [Figure 5](#)).

Gender and kinship in metalworking societies reconsidered

Models that see women as producers when production is for the household, and men as the producers when items are made for exchange or in a more specialized context, such as in pottery contexts (see [Arnold 1985](#); [Rice 1991](#)), should be contested. Metalworking provides an excellent topic to contrast gendered labour and gender inclusive practices. For example, the Gikuyu, a Bantu-speaking group in today's central Kenya, neighbouring the Masai, was famous for blacksmithing and the production of spears considered the best in the region ([Kenyatta 1953](#), 67). Experienced men collected the iron ores by washing the sand from nearby rivers and bringing them home. Within homes, women and children cleaned the ores and dried them in the sun. After the ores crossed the women's and children's hands, the iron ores were later smelted by the men who knew the smithing rituals needed to produce metal objects ([Kenyatta 1953](#), 69–71). Among the Gikuyu, the whole family of a smith took part in the work. While a man was in the river washing the sand, his wife or wives, and children were busy spreading the iron

ore in the sun to dry (Kenya 1953, 72). A similar observation was made among the Fur in western Sudan. The Fur women, who were predominantly potters, collected iron dust (*daurang suru*) from the sandy riverbeds in the hills and bartered it to the male smiths for grain (Beaton 1948, 27).

Even though Gikuyu women and children, as well as Fur women, had no access to the smithies, they were important 'hidden producers' of metals. Therefore, also in contexts where metals are produced for exchange, such as among Gikuyu and Fur, women can play an important role in metalworking. Hence, it appears that the cross-cultural interpretation of metalworking as a typically male craft (Murdock and Provost 1973) overlooks important steps in the *chaîne opératoire* – before the melting of copper or iron ores – in which women and children could be important actors.

Regarding kinship, a practice of smiths breaking off kinship ties, as initially proposed by Childe (1930), is not the only possibility. Smiths could reside in villages, alongside their kin. For example, among the Gikuyu, the communion between the male smiths and the ancestor spirits is of great importance (Kenya 1953, 74). Among the Talensi in northern Ghana, the blacksmiths belong to the Sakpee lineage and only they can be taught the craft of the smith (Fortes 1938, 9). Among the Zulu, smiths formed a distinct kin group. Men belonged to that clan in which they could trace back their ancestry at least three generations (Raum 1973, 214). Not only ties of descent but also affinity, through marriage, were important in acquiring metalworking skills. For example, wives learned silversmithing from their husbands among the Zuni (Adair 1944) and wives participated in brass production by working the bellows while their husbands supervised the fire in Trà Đông (Robequain, Botsford, and Messner 1929, 469).

The above examples show the complex gender and kinship relations metalworkers might maintain to practice their craft. Although we cannot establish that early metalworking was in relation to gender more rigid and exclusive than later developments or vice versa, not all metalworkers abandoned kinship ties at the dawn of the metal ages. In most cases, kinship ties of descent, affinity and other locally recognized social relations, were mobilized for practicing a complex craft such as metalworking. Therefore, archaeological records should be carefully evaluated against the six patterns outlined above to better understand the interplay of gender and kinship within the archaeological metalworking contexts.

Women, men, and children as visible producers of metals at EBA 1 Çukuriçi

Returning to Çukuriçi, we can now examine the six patterns identified above against the evidence of metalworking at the site. First, concerning the location of ovens, they were found in various parts of a village, including the mound's centre and periphery (see Figure 2). Second, ovens were also located in various parts of houses, including the centre and corners of rooms. Third, multiple charred remains, including charred animal bones and shells, were present inside the ovens. Fourth, artefacts considered to be feminine (e.g. handmade clay objects) but carrying clues of metalworking (e.g. clay moulds, clay tuyères) were found near the ovens. Fifth, metallurgical tools and installations were associated with other household activities, such as cooking, food consumption,

and textile- and leather production. As for the sixth, isotopic signatures of arsenic in the bones of males and females cannot be attested, since only one infant burial (see Cveček and Schwall 2022) was found within the EBA 1 settlement. Out of the six possible identified patterns that could point towards more inclusive arrangements and ideologies concerning gendered division of labour in metalworking, five of them have been identified at Çukuriçi.

Hence, we may conclude that at Çukuriçi metalworking took place within households, without a fixed location within rooms. Metalworking crosscut gendered or spatial divisions between members of a household group. Women, men, and children within households may have been active producers or hidden assistants of arsenical copper at Çukuriçi if we consider the spatial organization of metalworking at the site. All members of Çukuriçi households could have shared hearths used for cooking, metalworking, and heating. Hearths as multifunctional installations within Çukuriçi houses, without their fixed diachronic position, therefore, may point towards more fluid gender roles in crafts such as metalworking.

Women and children at Çukuriçi may have been ‘hidden producers’, as documented among Zuni (Mills 1995, 152). This conclusion could be made if we subscribe to the view that sees metalworking as an exclusively male craft. However, if we aim for the visibility of gender (Tringham 1991) and age when visualizing prehistoric households, then women and children at Çukuriçi could be considered as ‘visible producers’ who actively participated in the production of metal objects. In this case, metalworking does not take place in workshops, separated from other reproductive activities such as cooking, food consumption, and other crafts, but alongside those activities, within the domestic mode of production households (cf. Sahlins 1972). In the case of Çukuriçi, as well as for early metalworkers more generally, it remains likely that ethnographic data, if not considered in all their nuances, may obscure the identification of multiple producers (Kovacevich 2016, 323). It is women and children who should be made visible in the production of metals within Çukuriçi households at the dawn of the Bronze Age, a practice less often documented but nevertheless existent within the ethnographic literature.

If Caroline Humphrey claimed more than three decades ago that there is ‘no place like home in anthropology’ (Humphrey 1988, 16), then concerning the common archaeological interpretations of metalworking, there is ‘no place like home for metalworkers’ in archaeology. This could be due to prioritising one type of material evidence rather than looking at complex systems such as households through multiple lines of evidence. Another reason for that could be that economic activities within workshops are commonly perceived as more economically important than household production (Kovacevich 2016, 323). The household-based production of metals and other crafts was not unique to the EBA 1 period in the Aegean. Households rather than workshops were also key spaces for metalworking and other specialized crafts in later periods, for example, during the Middle and Late Bronze Age periods at Ayia Irini on the Cycladic Island of Kea (Abell 2020). In addition, in the case of coastal western Anatolia, some households were turned into metalworking workshops and, consequently, the seats of chiefs (Kouka 2002; 2016). In comparison, the spatial arrangement of household assemblage at Çukuriçi points towards a decentralized network of reciprocal sharing of metals and crafting knowledge and even meat between households, possibly based on the principle



Figure 6. Artistic reconstruction of metalworking as less gendered craft during the EBA at Çukuriçi Höyük (B. Egger).

of symmetry of debt (see Schnegg 2021).⁴ For an artistic reconstruction of metalworking as a gender inclusive craft at the EBA 1 at Çukuriçi, see Figure 6.

Lastly, although the social status of metalworkers was not the focus of this paper, the difference in an aggregated, predominantly male workshop production and the Çukuriçi model of distributed multi-gender household crafting might also have related implications for status. In non-state sedentary societies, craftspeople such as metalworkers may be feared, seen as dirty, or as outcasts in comparison to other non-metalworking populations (Budd and Taylor 1995; Childs and Killick 1993; Rowlands 1971). In some cases, a smith's offspring could only marry into other smithing families, and metalworking knowledge was transmitted from fathers to sons, and continued to the next generation. At the same time, smiths were thought to have healing powers and were highly respected for their 'supernatural' powers and abilities to transform materials using fire. Among the Kpelle, blacksmiths were powerful healers and important ritual leaders. Similarly, among the Igbo, an ethnic group in Nigeria, blacksmiths were doctors, circumcisers, and agents of the oracle (Forde and Jones 1950, 32). Mande Blacksmiths in West Africa were important mediators, rainmakers, healers, diviners, protectors, and circumcisers (McNaughton 1993). It is possible that on a regional scale, Çukuriçi metalworkers represented a low-status group, despite their crafting expertise, like carpenters in another ethnographic context (see Dostal 1983). At the same time, as dirt may also be a source of danger or even power, smiths at Çukuriçi may have played an important role as healers and or ritual leaders. The social status of smiths is another topic to which socio-cultural anthropology could contribute by revisiting the ethnographic accounts.

Conclusion

This article has aimed at extending the debate on craft models (see Costin 1991; Cveček 2022) by using a socio-cultural anthropological perspective to question metalworking as necessarily gendered labour at the dawn of the Bronze Age in western Anatolia. To address the question of who produced metals at Çukuriçi, the article summarized the archaeological context of metalworking at the site, on a local scale, which was then contrasted to contexts at other contemporaneous sites. Çukuriçi was unique in having a dispersed production of metals, whereas metals at other sites were produced in single rooms, so-called 'workshops'. To understand the dispersed mode of metalworking at Çukuriçi, a search for ethnographic examples in the eHRAF database and an additional literature review was carried out. Based on 'ethnographic exceptions' of metalworking as a gender inclusive, part-time, household-based craft, six patterns were identified that can be used to contextualize archaeological data. These patterns complement Costin's (1991) study on craft specialization in prehistoric archaeological contexts by adding kinship and gender as important units of analysis. The article shows that at Çukuriçi, metalworking was not performed in workshops of unrelated individuals or male-only spaces, away from women and children. Instead, arsenical copper, tin-bronze, and silver production took place within multi-gendered, multi-generational, and multi-crafting households.

Ethnographic documentation for gender inclusive practices of metalworking is marginal, but existent, and supports the archaeological evidence that there is enormous variety and diversity in metalworking, gender, and kinship practices. If we consider kinship as a mutuality of being or as 'participation in one another's existence' (Sahlins 2013, 18) then, at Çukuriçi, metalworking and shared substances like meat underpinned important kinship ties and relatedness between and within metalworkers' homes. On a theoretical scale, metalworking becomes a test case for the necessity of the gendered division of labour with the domestic mode of production households (cf. Sahlins 1972).

The initial hypothesis, whether gendered participation in labour related to metalworking is contingent upon the social spaces where metalworking takes place can be supported. The research presented here demonstrates that when metalworking was performed at the household scale of production, it usually involved more than one gender. Furthermore, if we consider the spatial organization of metalworking beyond male-only practices, women and children often participated in the drying of metal ores, the preparation of ores, the blowing of bellows, and other necessary steps to produce metal objects also in cases where metalworking took place within workshops and/or in contexts where metals were produced for exchange.

A nuanced reading of 'ethnographic exceptions' documented by other researchers can further highlight a vast diversity in which gender *may* or *may not* have been an important category for underpinning craft such as metalworking. Therefore, anthropological archaeology or for that matter historical anthropology (see Cveček 2022; Gingrich and Knoll 2018), in which socio-cultural anthropologists highlight complexities and ambiguities in the archaeological interpretations, may furthermore contribute to the growing body of literature that problematizes gendered division of labour. As this article shows, gendered labour based on cross-cultural comparison cannot be taken for granted and imposed on the archaeological data. There are few, if any, 'cross-cultural truths' to mobilize when

interpreting prehistoric contexts. Rather, cross-cultural studies are useful in bringing out possible explanations that we can test with archaeological data. Bringing ethnographic insights into dialogue with archaeological evidence is therefore key to understanding technologies and various degrees of gendered labour in a particular craft.

As this contribution shows, at the EBA 1 settlement of Çukuriçi, metalworking crosscut gender and age differences within homes, in which cooking, the sharing of food, crafts such as weaving, and metalworking co-existed as household-based, part-time activities. Women and children at Çukuriçi may have been ‘hidden producers’ of metals. However, if we aim for the visibility of gender, age, and kinship when visualizing prehistoric households, then women and children can be considered ‘visible producers’ who actively participated in the production of metal objects. Only then can a craft, such as metalworking, which is commonly associated with male spaces in both the ethnographic and archaeological records, become recognized as an important socio-economic practice performed within households rather than workshops. Further, if kinship is considered as the mutuality of being, then early metalworkers did not break off kinship ties, as claimed by Gordon Childe. As can be seen from the material record at Çukuriçi, metalworking underpinned important kinship relations and the sharing of substances such as food between and within metalworkers’ homes.

Notes

1. In archaeometallurgy – the study of prehistoric mining and metallurgy – the topic of gender may be addressed in passing, as taken for granted, or not addressed at all. For example, in David Killick and Thomas Fenn’s (2012) contribution on archaeometallurgy in the *Annual Review of Anthropology*, the authors avoid the question of gender, except for providing what they call an African example, where sometimes furnaces were ‘modelled as women’s bodies or bellows as male genitalia’, being ‘a classic example of the symbolic appropriation by men of women’s generative powers’ (Killick and Fenn 2012, 567).
2. This study resulted from an interdisciplinary project ‘The Role of Households at the Dawn of the Bronze Age’, funded by the Austrian Academy of Sciences DOC-team (70291) fellowship. The project was based on cooperation between two prehistoric archaeologists (Maria Röcklinger, Constanze Moser), a zooarchaeologist (Stephanie Emra) and myself, a socio-cultural anthropologist. Our research focused on studying households, household activities, and settlement organisation as a primary source for discussing social organisation in the EBA, at the beginning of the third millennium BC in the Aegean. Maria Röcklinger studied formation processes and ceramics for the EBA layers at Çukuriçi (see Röcklinger 2015).
3. Çukuriçi Höyük was excavated between 2009 and 2014 by Prof. Barbara Horejs and her team from the Austrian Archaeological Institute in Vienna.
4. Symmetry of debt, however, cannot guarantee egalitarian relations within Çukuriçi households (see Collier and Yanagisako 1987, Yanagisako and Delaney 1995).

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