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Tepe in the north during Neolithic  
emergence in south-west Asia*

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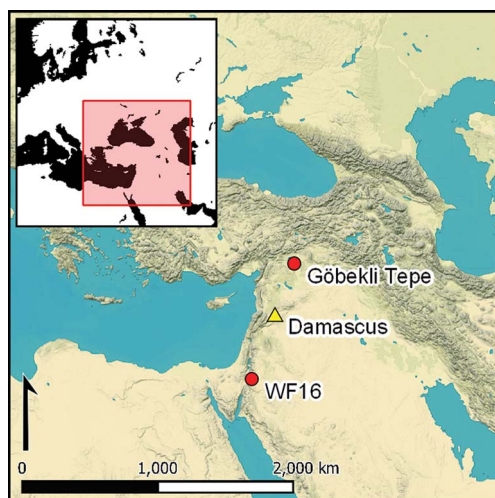
# The flow of ideas: shared symbolism during the Neolithic emergence in Southwest Asia: WF16 and Göbekli Tepe

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During the Late Epipalaeolithic and Early Neolithic, societies across the Levant transformed their social, cultural and economic organisation, with new forms of food production, architecture and material culture. But to what extent were regional developments connected and how, in particular, did ideas and objects flow between the most southern and northern reaches of Southwest Asia? Finds from the Pre-Pottery Neolithic site of WF16 in southern Jordan resonate with those from Göbekli Tepe and other sites hundreds of kilometres to the north. Emphasising shared symbolism and ideology, the authors explore how connections may have arisen and how they were maintained, revealing expansive social networks spanning Southwest Asia that underpinned the emergence of farming.

Keywords: Levant, Epipalaeolithic, Neolithic, iconography, cultural connectivity

## Introduction

The transition from hunter-gatherer to farming lifestyles involved changes in all aspects of human lifeways: how food was acquired; technology, mobility, settlement and architecture; demography and social relations; ideas of ownership, property and ideology. With such all-encompassing change, farming probably emerged gradually rather than as a Neolithic revolution within each centre of origin. Similarly, the transition is likely to have been a spatially diffuse process, with plant cultivation, animal herding and sedentism developing independently in different localities. New ideas, tools, crops and other items would have flowed through spatially extensive social networks, coalescing in favourable environmental and

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cultural circumstances to create a diversity of farming lifestyles. Here, we provide further evidence for the social networks that underpinned the emergence of farming in Southwest Asia by outlining a series of previously unrecognised material and symbolic connections between sites in the Northern and Southern Levant.

## Göbekli Tepe and WF16 as nodes within a social network

Steps towards farming in Southwest Asia involved the exploitation of wild cereals by Late Pleistocene hunter-gatherers (Weiss *et al.* 2004; Snir *et al.* 2015), their cultivation during the tenth to ninth millennium BC by Pre-Pottery Neolithic A (PPNA) communities in the Middle Euphrates and Southern Levant (e.g. Wilcox & Stordeur 2012; Colledge *et al.* 2018; Weide *et al.* 2022) and the exploitation of legumes, fruits and nuts in eastern regions—today’s Iran and Iraq (Asouti & Fuller 2013). The first steps towards the domestication of goats are known from the Zagros Mountains in the ninth millennium BC (Zeder & Hesse 2000), but, as with cereals and legumes, there were likely multiple loci and different pathways towards such domestication (Stiner *et al.* 2022). These and other constitutive elements merged to create sedentary communities that were increasingly reliant on domesticated plants and animals: the Pre-Pottery Neolithic B ‘farming villages’, first appearing in the Euphrates Valley *c.* 9200 BC, rapidly spreading throughout Southwest Asia (Edwards 2016). How plant cultivation and animal herding articulated with changes in climate, population, sedentism, social relations, ideology, notions of property, and cognition have been long debated (e.g. Childe 1928; Cohen 1977; Bender 1978; Bar-Yosef & Belfer-Cohen 1989; Cauvin 1994, 2000; Bar-Yosef & Meadow 1995; Hayden 1995; Mithen 1997; Powers & Lehmann 2014; Feynman & Ruzmaikin 2018; Bowles & Choi 2019).

The 1994 discovery and excavation of Göbekli Tepe in Upper Mesopotamia (southern Turkey) has influenced this debate in two key ways. With its impressive PPNA art and architecture, dated to between *c.* 9800 and 8300 BC (Dietrich *et al.* 2013), it places emphasis on ideological change occurring within hunter-gatherer communities (Schmidt 2012), supporting Cauvin’s (1994, 2000) view that developments in cognition and symbolism had priority over economic change during the transition to farming. Second, Göbekli Tepe shifts attention away from the Southern to the Northern Levant, the north also having the wild ancestors of wheat and barley; this has been termed ‘the cradle of agriculture’ (Lev-Yadun *et al.* 2000). Ideology and domestication may have been related: Mithen (2003: 167) has suggested that the intensive harvesting of wild cereals to feed large gatherings at Göbekli Tepe may have led to domesticated strains as “an accidental by-product of the ideology that drove hunter-gatherers to carve and erect massive pillars of stone”, a view now supported by the evidence for feasting (Dietrich *et al.* 2012) and a “massive presence of cereals” at the site (L. Dietrich *et al.* 2019: 1).

Göbekli Tepe was likely a gathering place for hunter-gatherers from dispersed residential groups. Seasonal aggregations are a core element of the hierarchal social networks that characterise hunter-gatherers: individuals, families, residential groups, seasonal and periodic gatherings, and regional populations (Hamilton *et al.* 2007; Bird *et al.* 2019). Such networks serve multiple functions: to maintain food security (Whallon 2006; Belfer-Cohen & Goring



Morris 2010); to resolve social tensions and mitigate conflict (Johnson 1982; Clare *et al.* 2019); to facilitate cooperation (Apicella *et al.* 2012); to achieve reproductive success (Page *et al.* 2017); and to maintain population viability (Wobst 1974). The flows of ideas, material culture and people enable dispersed communities to follow similar trajectories of change while maintaining local identities.

Ethnographic accounts for the spatial scale of such social networks (e.g. Bird *et al.* 2019) suggest that those of the Late Epipalaeolithic (c. 13 000–10 000 BC) and PPNA (c. 10 000–8200 BC) would have connected people throughout Southwest Asia, approximately 1200km from north to south and 800km east to west. In addition to Göbekli Tepe, gathering places—nodes within the social networks—are likely to be represented by sites with particularly large structures, such as Karahan Tepe, Hallan Çemi and Jerf el Ahmar in the north, and Wadi Hammeh 27, Mallaha and Jericho in the south (Kenyon & Holland 1981; Rosenberg & Redding 2002; Stordeur & Abbès 2002; Çelik 2011; Edwards 2013; Finlayson & Makarewicz 2018; see Figure 1).

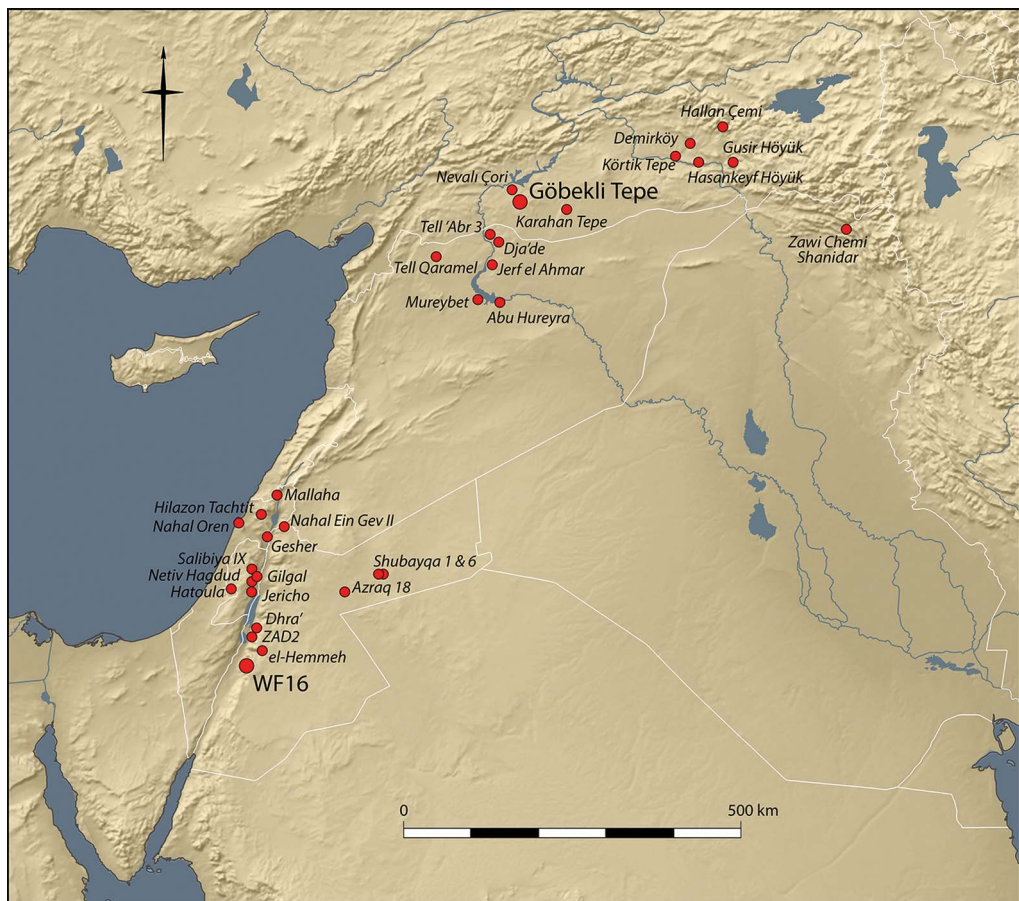


Figure 1. WF16, Göbekli Tepe, Early Neolithic and selected Epipalaeolithic sites of the eleventh to ninth millennia BC (figure © E. Jamieson & authors).

With its large amphitheatre-like building (Structure O75), the site of WF16 is yet another candidate for a seasonal or periodic gathering place in the Southern Levant (Figure 2). WF16 is located at the head of the Wadi Faynan in southern Jordan. Excavated between 2008 and

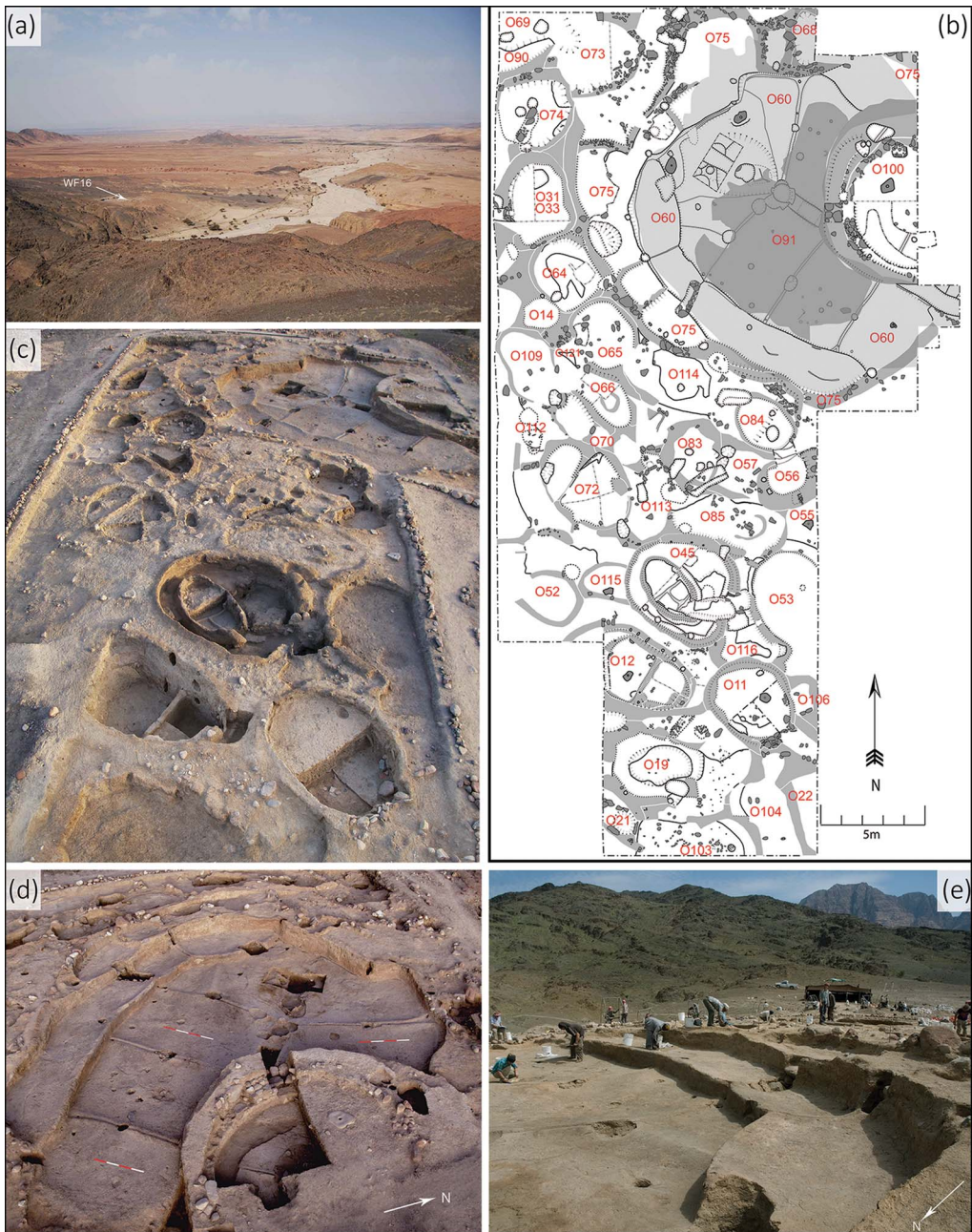


Figure 2. WF16, southern Jordan: a) view west along Wadi Faynan towards Wadi Araba; b) site plan; c) excavation, April 2010; d) Structure O75, looking north-east, underlying a later, free-standing circular structure, O100; e) Structure O75 under excavation, showing decorated face of bench (Figure 5) (figure © S. Mithen and B. Finlayson).



2010, the site dates to *c.* 9800–8200 BC, with a focus of activity between 9400 and 9100 BC (Mithen *et al.* 2018). The bird bones recovered from the site are dominated by raptors (White *et al.* 2021). Zooarchaeological analysis suggests that the capture of buzzards, predominantly *Buteo buteo*, during the spring and/or autumn provided an occasion for seasonal gatherings. Performance, ceremony and ritual likely took place within the amphitheatre-like structure, using costume and body decoration made from bird skins, feathers and talons (Mithen 2022; Mithen *et al.* 2022).

## The flow of technology and materials

El-Khiam lithic points—the type-artefact of the PPNA—provide the most striking evidence for the flow of material culture and/or cultural ideas through the Southwest Asian social network. These are found from Jebel Qattar in the far south to Göbekli Tepe in the north, and Hatoula in the west to M'lefaat in the east (Kozłowski & Aurenche 2005; Crassard *et al.* 2013). Geographical variation in the techniques used to make typologically similar points (Crassard *et al.* 2013) indicates the local expression of a generic idea. Similarly, while the production of large, regular blades becomes widespread during the final PPNA, the naviform knapping methods developed in the Middle Euphrates are distinct from simpler opposed platform techniques of the Southern Levant (Smith *et al.* 2019). New finds constantly disrupt understanding of chronology and the direction of movement; for example, the Helwan point had been identified as a marker of north to south flows (Edwards 2016), but has now been found as early in the south as the north (Fujii *et al.* 2019).

The distribution of obsidian also indicates north to south connections during the Epipalaeolithic and PPNA. With major sources in Anatolia, obsidian has been found as cores, flakes and blades at the Natufian site of Mallaha (Khalaily & Valla 2013) and several PPNA sites in the Southern Levant, including Jericho, Netiv Hagdud and Iraq-el Dubb (Ibáñez *et al.* 2016). The low number of obsidian artefacts compared with later periods, and the fact that it was knapped like flint, suggests that the formal exchange networks of the PPNB had yet to be established. Prior to these, obsidian likely passed through the existing social networks of material, technological and information exchange.

WF16 has been proposed as a hub for the exchange of obsidian, malachite, bitumen and marine shell (Goring-Morris & Belfer-Cohen 2011). Although the evidence for obsidian is scarce, worked copper ore and other greenstone at WF16 suggests that it was likely a raw material source and an exchange hub for the greenstone beads found at numerous Neolithic sites in the Southern Levant (Kuijt & Goring-Morris 2002). Near-identical double-holed greenstone pendants have been found at WF16 and late Natufian sites in the Jordan Valley (Grosman *et al.* 2016: fig. 15.6; Mithen *et al.* 2018: fig. 35.16g). Likewise, more than 400 marine shell beads have been recovered from WF16, comprising a mixture of species from both the Red Sea and Mediterranean (Cerón-Carrasco 2007; Mithen *et al.* 2018). Similar transfers of marine shells from multiple distant sources are evident from Epipalaeolithic sites in the Azraq Basin (Richter *et al.* 2011) and central Anatolia (Baysal 2019).

## The flow of symbolism and ideology

Compared with the exchange of objects and technology, the flow of symbolism and ideology has appeared more constrained. While Epipalaeolithic and PPNA north–south connections are evident from mortuary practices, notably skull removal (Baird *et al.* 2013; Bocquentin *et al.* 2016), visual symbolism has seemed quite different. Based on similarities in zoomorphic art and monumental architecture, Benz & Bauer (2015: 13) have suggested there were “common ideological concepts ... across northern Mesopotamia in the earliest Holocene”, epitomised by those expressed at Göbekli Tepe, but they were unable to identify that ideology in the Southern Levant. PPNA art works are relatively scarce in the south, with zoomorphic imagery being absent, or at best ambiguous. New finds from WF16 change this situation. Although limited in number, they provide evidence for aspects of shared symbolism between south and north, even if this does not necessarily translate into a shared ideology.

### *Benches, geometric designs and a monolith*

The amphitheatre-like structure at WF16 (Figure 2d) has internal benches, as found within the enclosures at Göbekli Tepe and in communal building EA53 at Jerf el Ahmar, the latter dated to a PPNA/PPNB transition phase of 9000–8495 BC (Stordeur & Abbès 2002). There is a striking similarity between the geometric designs on bench faces at WF16 and EA53. The wet mud plaster at WF16 features a zigzag design, comparable to that at Jerf el Ahmar (Figure 3a). The same design also appears on decorated slabs at Tell ‘Abr 3, forming the front of a bench in Building B2 (c. 9300–8800 BC; Yartah 2004, 2013: figs 9 & 10).

Shaham & Grosman (2019) have previously noted similarities in the geometric designs incised on stone from Late Epipalaeolithic Nahal Ein Gev II (c. 10 700–10 000 BC; Grosman *et al.* 2016) and WF16 in the south, and from Tell ‘Abr 3 in the north. We are cautious about drawing conclusions in the absence of a formal statistical study but note that WF16 has a greater abundance of cross-hatched, wavy, zigzag and parallel lines than found elsewhere in the Natufian and PPNA of the Southern Levant, such as at Netiv Hagdud, ZAD2 and Nahal Ein Gev (Bar-Yosef & Gopher 1997; Edwards 2007; Grosman *et al.* 2016). Such designs are ubiquitous in the north, with those from Tell Qaramel, Tell ‘Abr 3, Göbekli Tepe, Hallan Çemi (Mazurowski 2003; Yartah 2004; Rosenberg 2011a; Dietrich 2021) and others, having similarities to those found on decorated stone vessels, stone plaques and shaft straighteners from WF16 (Mithen *et al.* 2018: fig. 35.19; Figure 4).

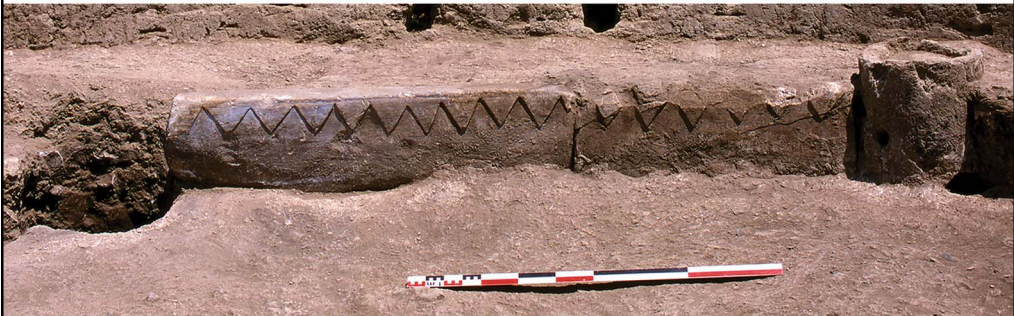
As a further architectural parallel, we note a stone monolith at WF16 (Figure 3b). Although small compared with those at Göbekli Tepe and Karahan Tepe, it sits within a niche of a stone-walled building and is the only PPNA example in the Southern Levant of which we are aware (Finlayson & Mithen 2007).

### *Snakes and raptors*

Snakes are a pervasive theme in the imagery from the Northern Levant and Upper Tigris (Peters & Schmidt 2004; Zimmermann 2019). They are depicted on stone plaques, shaft-straighteners, monoliths and stone vessels, and are incised, carved in bas-relief and occasionally sculpted in the round, with varying degrees of realism or abstraction (e.g. Figure 5a–d).

(a) Decoration on benches

Jerf el Ahmar



WF16



(b) WF16 standing stone



*Figure 3. a) Decoration on benches: Jerf el Ahmar (© D. Stordeur. Mission El Kowm-Mureybet. Ministère Affaires Etrangères, France; WF16 © S. Mithen and B. Finlayson); b) WF16 monolith set vertically within a niche formed by the intersection of stone walls within Trench 3, looking west; September 1999 (© S. Mithen and B. Finlayson).*



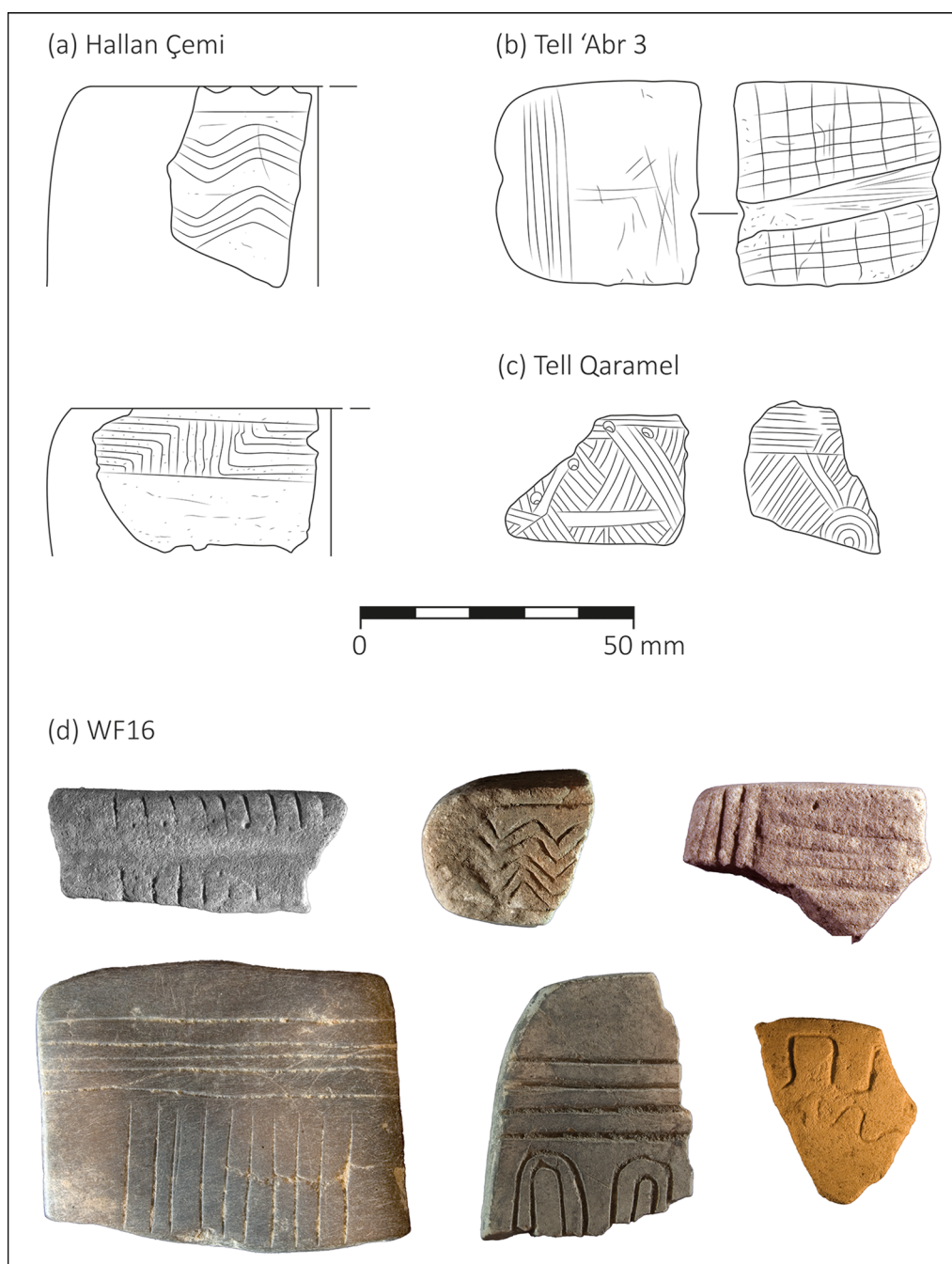


Figure 4. Examples of incised stone vessels: a) Hallan Çemi (redrawn from Rosenberg 2011a); b) Tell 'Abr 3 (redrawn from Yartah 2004); c) Tell Qaramel (redrawn from Mazurowski 2003); d) WF16 (© S. Mithen and B. Finlayson).

While open to numerous interpretations, including links to phallocentrism (Hodder & Meskell 2011: 239), shamanism (Benz & Bauer 2015) and evolved phobias (Zimmermann 2019), snakes are recognised as central to Early Neolithic ideology from north-western Syria to south-eastern Anatolia.

Figure 5f illustrates a cylindrical stone from WF16, with bas-relief carvings interpreted as snakes. Four tapering wavy lines, one with a forked ending, are spaced evenly around the stone (Mithen *et al.* 2018: fig. 35.30). It is more heavily worn than other ground stone artefacts from WF16, suggesting either greater antiquity or heavier handling. If the latter, this might indicate a history of exchange through the network and/or extensive ritual use.

The interest in raptors at WF16 is also echoed in the north, with depictions at Göbekli Tepe, Jerf el Ahmar and Tell 'Abr 3 (Stordeur & Abbès 2002; Yartah 2004; Peters *et al.* 2005). These birds have been proposed as symbols of death and as part of a shamanistic ideology (Hodder & Meskell 2011; Benz & Bauer 2015). Raptor bones at Zawi Chemi Shanidar, Jerf el Ahmar and Hallan Çemi suggest that wings, feathers and talons were used in costumes during ritual and performance (Solecki 1977; Gourichon 2002; Zeder & Spitzer 2016), as also inferred at WF16 (Mithen *et al.* 2022).

### *'Half-skeletonised' animals*

'*Halb skelettierten*' is the term used by Schmidt (2013) to describe a group of animal and human sculptures from Göbekli Tepe that have prominent ribs (Figure 6a). Precisely what types of animals these depict and whether they represent de-fleshed, excarnated or emaciated creatures is unknown. They may imply death, a theme also expressed by the imagery of wild and dangerous animals in the Northern Levant (Schmidt 1999; Hodder & Meskell 2011). Figure 6b illustrates a carved stone from WF16, also zoomorphic and with incised vertical lines suggesting exposed ribs. Although significantly smaller than the examples from Göbekli Tepe, the similarity is striking. Another zoomorphic comparison is between the finely rendered head of a probable gazelle from Abu Hureyra in the Middle Euphrates Valley and that from WF16 (Figure 6c–d).

### *Stone faces*

A small face carved in stone from WF16 has greater similarity to that from the contemporaneous site of Jerf el Ahmar in the Middle Euphrates of the Northern Levant than a face from the spatially closer but earlier Epipalaeolithic (Natufian) site of Nahal Ein Gev II (Figure 7). Does this indicate a shared cultural tradition of making small stone faces by PPNA communities living more than 800km apart in Southwest Asia? If so, would the small faces have been used in a similar manner and carried the same symbolic meaning? We note the differences: the Jerf el Ahmar face and others from the Northern Levant have concave backs (Dietrich *et al.* 2018), while that from WF16 has a face on both sides (Mithen *et al.* 2018: fig. 35.22). This may represent a further example of the local expression of a generic idea.

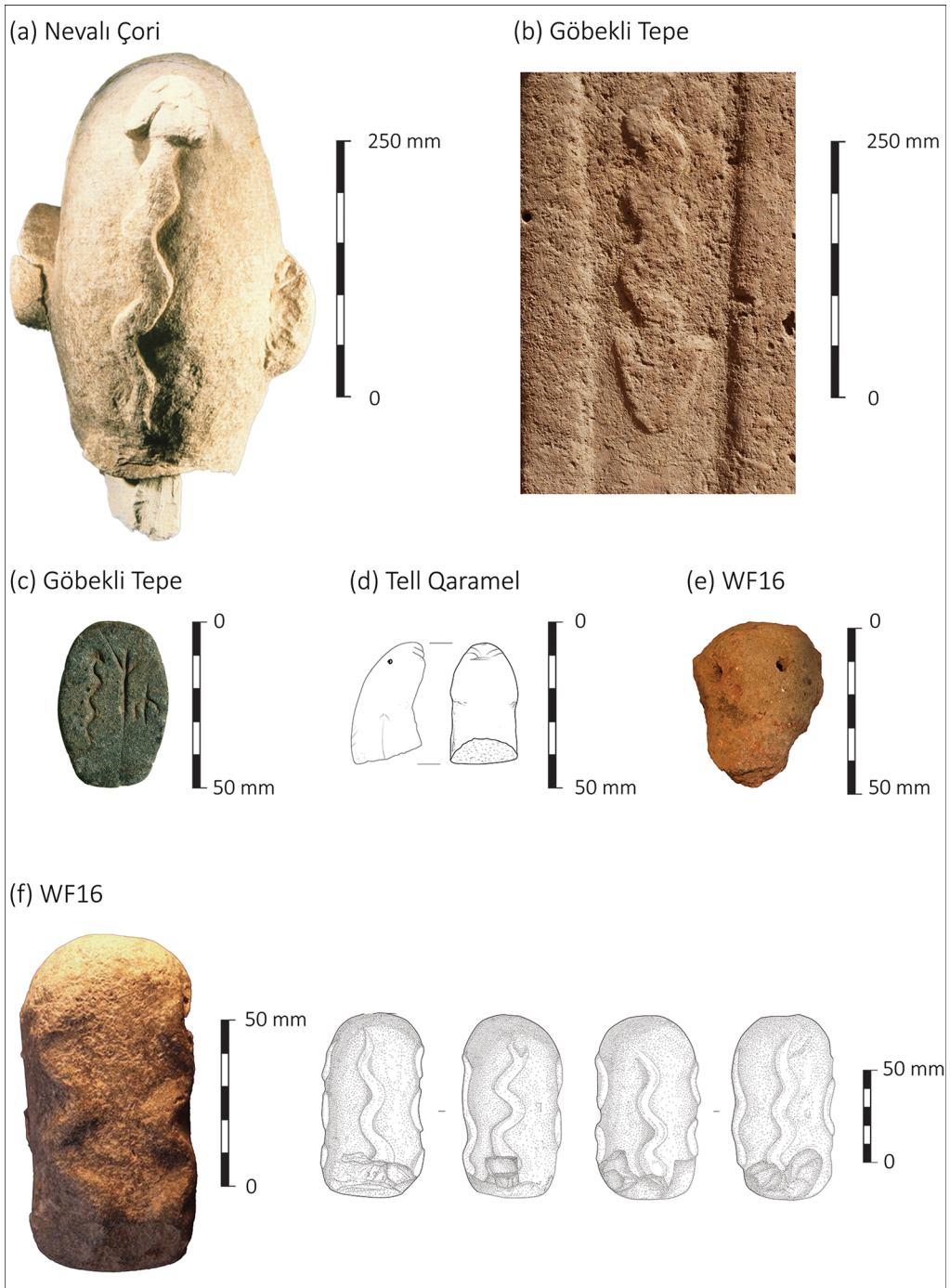
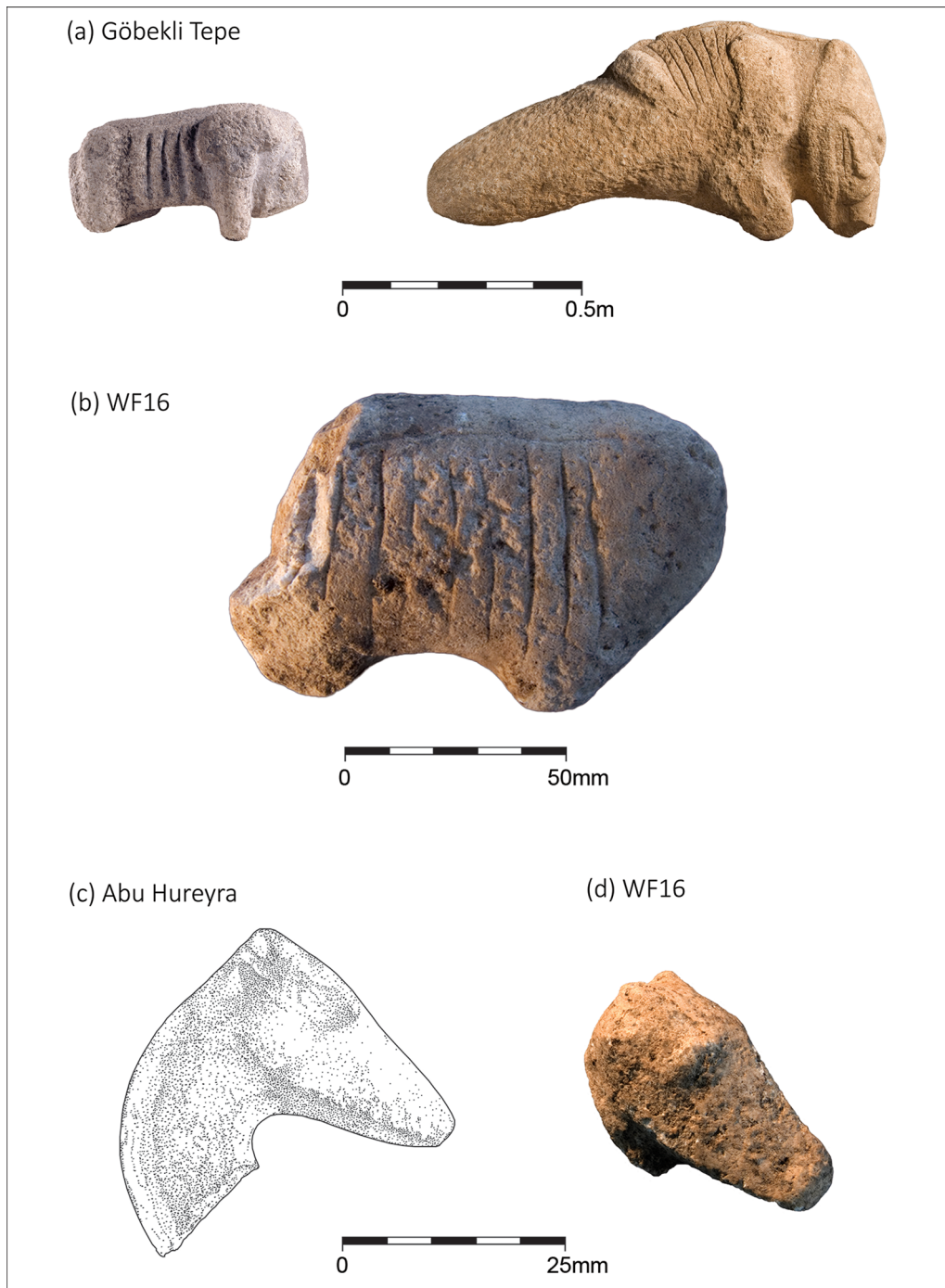


Figure 5. Snake imagery: a) Nevalı Çori (Hauptmann 1999, reproduced with permission of the Euphrates Archive, German Archaeological Institute (L. Clare)/Heidelberg University (J. Maran)); b) Göbekli Tepe D-DAI-IST-GT2002-IW-0001 (© Deutsches Archäologisches Institut, Göbekli Tepe Project); c) Göbekli Tepe D-DAI-IST-GT2002-IW-P22\_1944 (© Deutsches Archäologisches Institut, Göbekli Tepe Project); d) Tell Qaramel (redrawn from Mazurowski 2003); e) WF16, SF2078 (© S. Mithen and B. Finlayson); f) WF16, SF1298 (© S. Mithen and B. Finlayson).

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*Figure 6. Half-skeletonised animals: a) Göbekli Tepe D-DAI-IST-GT1996-DJ-A14 0051 and D-DAI-IST-GT2008-DJ-A61 0004 (© Deutsches Archäologisches Institut, Göbekli Tepe Project); b) WF16. SF1365 (© S. Mithen and B. Finlayson); c) gazelle (?) from Abu Hureyra (redrawn from Moore et al. 2000); d) WF16, SF115 (© S. Mithen and B. Finlayson).*

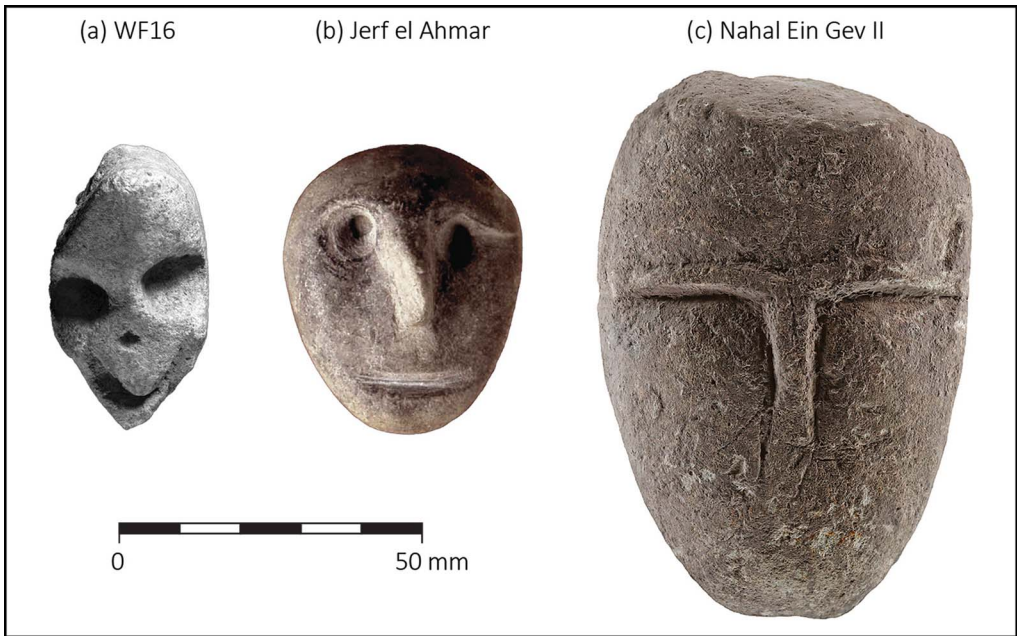


Figure 7. Small stone faces: a) WF16, SF238 (© S. Mithen and B. Finlayson); b) Jerf el Ahmar (Stordeur & Abbès 2002) (© D. Stordeur, Mission El Kowm-Mureybet. Ministère Affaires Étrangères, France); c) Nahal Ein Gev II (Grosman et al. 2017), with kind permission of L. Grosman (© G. Laron).

### Phalli

Maleness and ‘phallogocentric’ art have been proposed as key themes in the symbolism of the Northern Levant (Cauvin 2000; Hodder & Meskell 2011). Where gender is evident at Göbekli Tepe, male animal and human figures are the most frequent, some having a prominent phallus (Figure 8a). Three ‘stand-alone’ phalli are known from Göbekli Tepe, one of which is 0.8m in length (O. Dietrich *et al.* 2019; O. Dietrich *pers. comm.*). Pillars within an enclosure at Karahan Tepe have been interpreted as representing a ‘penis chamber’ (Thomas 2022)—although this has yet to be academically assessed and published. WF16 has the only conclusive depictions of phalli from the PPNA in the Southern Levant, with several realistic and schematic carvings, one of which is covered in red ochre (Figure 8b). Mithen and colleagues (2005) have proposed that the process and equipment of food preparation—mortars and pestles—were embedded in a metaphor of sexual symbolism.

### Batons

Figure 9a illustrates a highly polished, long and pointed stone artefact found on the floor of a semi-subterranean structure at WF16. It is made from a fine-grained, pale grey and white stone—the source of which is yet to be determined—and worked to form a fine point. Flake removals at its base suggest that it had been inserted into a haft. As far as we know, there are no comparable artefacts from the Southern Levant. It does, however,



Figure 8. Phalli: a) Göbekli Tepe D-DAI-IST-GT1995-MMA02 (left) and D-DAI-IST-GT1998-KS-AO7 (right) (© Deutsches Archäologisches Institut, Göbekli Tepe Project); b) WF16, from left to right: SF2389, SF339, SF1005 (© S. Mithen and B. Finlayson).



Figure 9. Batons: a) WF16, SF531 (© S. Mithen and B. Finlayson); b) Mureybet (redrawn from Cauvin 2000); c) Gusir Höyük (Karul 2011) (© N. Karul).

have similarities to an artefact from Mureybet in northern Syria, and to a so-called ‘baton’ from Gusir Höyük, located in the Upper Tigris Basin of south-east Turkey, which has two parallel incised lines (Figure 9b–c). Fragments of such batons are described from Hallan Çemi, these being made from soft stone, notched and cigar-shaped (Rosenberg 2011a).

#### *The treatment of human bodies*

Gresky and colleagues (2017: 1) describe modified skull fragments from Göbekli Tepe that “could indicate a new, previously undocumented variation of skull cult in the Early Neolithic of Anatolia and the Levant”. The fragments, from three individuals, have deep incisions along their sagittal crests (Figure 10a). In one case, there is a drilled perforation on the left parietal. A fragment of human skull with a drilled perforation has also been recovered from WF16 (Figure 10b). Scattered cranial and mandible fragments from Structure O45 at WF16 suggest that a skull had been displayed, before being smashed when the roof of this structure collapsed (Mithen et al. 2018: 168–70, fig. 14.27).

The ‘painting’ of human bones was practised at sites in the Upper Tigris Basin. This is prominent at Körtik Tepe, with 58 per cent of 407 skeletons having either red and/or black colouring forming diagonal bands, fine parallel lines, or dotted lines in a plaid pattern (Erdal 2015). Red and black bands were also found on human bones from Demirköy and Hasankeyf Höyük (Rosenberg 2011b; Miyake et al. 2012). Erdal (2015) suggests that the paint was transferred onto the bones from mats used to wrap the bodies.

Skeletal remains from both primary and secondary burials at WF16 have traces of black pigment, in one case forming parallel black bands on the rear of a skull, as also seen at



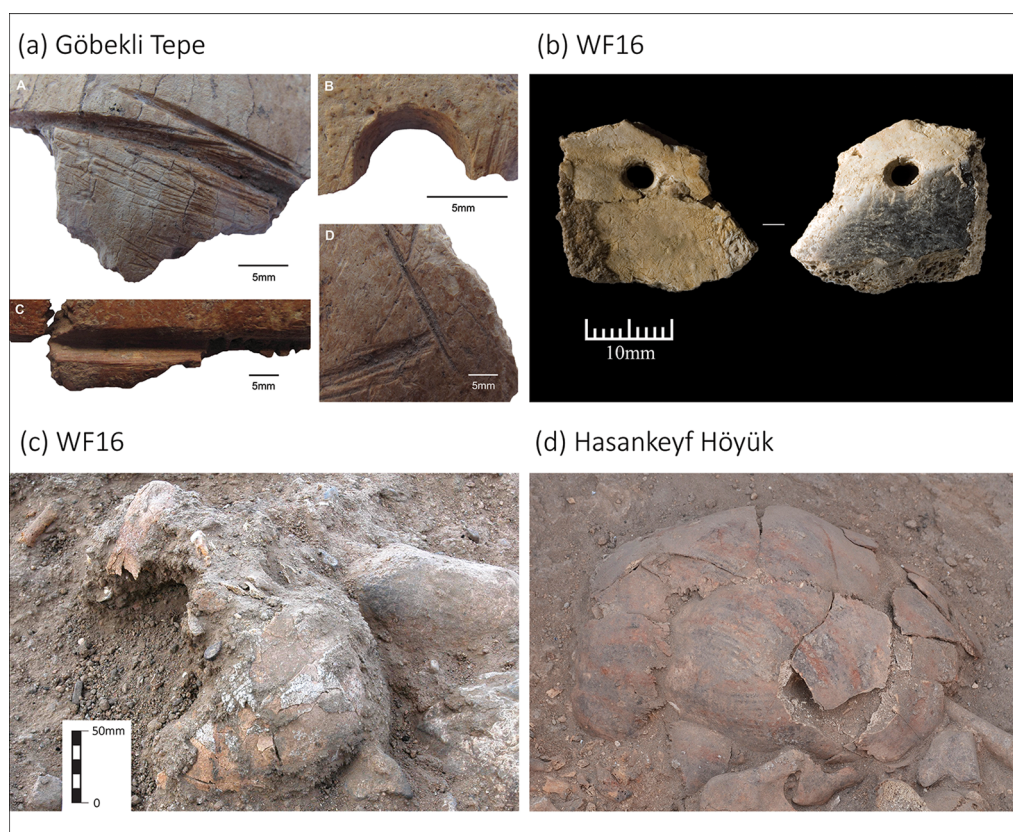


Figure 10. Drilled human crania: a) Göbekli Tepe (© J. Gresky DAI); b) WF16, SF558 (© S. Mithen and B. Finlayson). Skulls marked with lines of pigment: (c) WF16, Burial O38 (© S. Mithen and B. Finlayson); d) Hasankeyf Höyük (© Y. Miyake).

Hasankeyf Höyük on the Upper Tigris (Figure 10c–d). The WF16 bones often have residual or thick patches of gypsum plaster with impressions of textiles, suggesting that they had been wrapped (Mithen *et al.* 2018: figs 21.19–20). This use of plaster resonates with practices at Körtik Tepe, also on the Upper Tigris, where entire or partial skeletons were covered with thin layers of gypsum plaster. In some cases, plaster was applied in multiple layers interspersed with paint, suggesting that burials were repeatedly exposed for re-plastering and painting (Erdal 2015)—an interpretation that appears appropriate for WF16. At El-Hemmeh, approximately 50km north of WF16, a seated PPNA burial within a cist had most of the legs, arms and torso covered with white lime or gypsum plaster (Makarewicz & Rose 2011), directly comparable to the practice at Körtik Tepe.

Precedents for the use of both pigment and plaster on human bones come from Late Epipalaeolithic sites in the Southern Levant (c. 10 000 BC). Lime plaster was used to cover burials at Nahal Ein Gev II (Friesem *et al.* 2019), while pigment, likely from painted wrappings, has been found on skeletal remains from Azraq 18 and Shubayqa 1 (Bocquentin & Garrard 2016; Richter *et al.* 2019).

## Conclusion

The extent to which the small stone face from WF16 is comparable to that from Jerf el Ahmar remains in the eye of the beholder (Figure 7). The same applies to the snakes, half-skeletonised animal, phalli, decorated bench, batons, perforated cranium and treatment of the dead. Are the similarities between these phenomena and those known from the Northern Levant, together with an interest in raptors, coincidental? We suspect not—their range and comparability suggest that cultural convergence is unlikely. Although the same symbols do not necessarily reflect the same ideology, the combination of raptors, snakes, a half-skeletonised animal, and phalli, all represented at a location of social gathering, suggests an ideology at WF16 resonant with that in the north—potentially a specific expression of shamanism (Benz & Bauer 2015; Mithen 2022). This indicates a more substantive flow of ideas between the south and the north than previously recognised.

The direction of flow, however, remains unclear. With the absence of an Epipalaeolithic record in the vicinity of Göbekli Tepe, and no evident precedent within the known Epipalaeolithic of the Upper Tigris (Benz *et al.* 2015; Kudas *et al.* 2018), it is unclear from where its art and architecture originated. A local origin may be discovered as new fieldwork reveals the Epipalaeolithic of that region. Alternatively, a Natufian/early PPNA origin in the Southern Levant might be possible, with the ideology materially expressed at Nahal Ein Gev II and WF16 spreading to the north. The abundant wild cereals in that region would have enabled larger and more frequent social gatherings than in the south, providing a context for the ideology to flourish with a more elaborate and monumental expression. Current dating is insufficient to demonstrate that this is the case, although we note the decorated bench at WF16 is earlier than the PPNA/PPNB transition phase at Jerf El Ahmar on the Upper Euphrates, which features a bench embellished with a similar design.

Wherever and whenever the ideas originated, the finds from WF16 indicate that symbols and ideology were flowing along social networks that extended between the far south and the far north of Southwest Asia during the formative millennia, prior to the emergence of farming.

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## References

- APICELLA, C., F. MARLOWE, J. FOWLER & N. CHRISTAKIS. 2012. Social networks and cooperation in hunter-gatherers. *Nature* 481: 497–501. <https://doi.org/10.1038/nature10736>
- ASOUTI, E. & D.Q. FULLER. 2013. A contextual approach to the emergence of agriculture in Southwest Asia: reconstructing Early Neolithic plant-food production. *Current Anthropology* 54: 299–345. <https://doi.org/10.1086/670679>
- BAIRD, D. *et al.* 2013. Juniper smoke, skulls and wolves' tails: the Epipalaeolithic of the Anatolian plateau in its Southwest Asian context: insights from Pinarbaşı. *Levant* 45: 175–209. <https://doi.org/10.1179/0075891413Z.000000000024>
- BAR-YOSEF, O. & A. BELFER-COHEN. 1989. The origins of sedentism and farming communities in the Levant. *Journal of World Prehistory* 3: 447–98. <https://doi.org/10.1007/BF00975111>
- BAR-YOSEF, O. & R. MEADOW. 1995. The origins of agriculture in the Near East, in T. Price & A. Gebauer (ed.) *Last hunters-first farmers: new perspectives on the prehistoric transition to agriculture*: 39–94. Santa Fe (NM): School of American Research.
- BAR-YOSEF, O. & A. GOPHER. 1997. *An Early Neolithic village in the Jordan Valley, part 1: the archaeology of Netiv Hagdud*. Cambridge (MA): Peabody Museum of Archaeology and Ethnology.
- BAYSAL, E. 2019. *Personal adornments in prehistory*. Oxford: Oxbow. <https://doi.org/10.2307/j.ctvpmw46d>
- BELFER-COHEN, A. & N. GORING-MORRIS. 2010. The initial Neolithic in the Near East: why is it so difficult to deal with the PPNA? *Journal of the Israel Prehistoric Society (Mitekufat Haeven)* 40: 149–66.
- BENDER, B. 1978. Gatherer-hunter to farmer: a social perspective. *World Archaeology* 10: 204–37. <https://doi.org/10.1080/00438243.1978.9979731>
- BENZ, M. & J. BAUER. 2015. On scorpions, birds and snakes: evidence for shamanism in Northern Mesopotamia during the Early Holocene. *Journal of Ritual Studies* 29: 1–23.
- BENZ, M. *et al.* 2015. Prelude to village life: environmental data and building traditions of the Epipalaeolithic settlement at Körük Tepe, southeastern Turkey. *Paleorient* 41: 9–30. <https://doi.org/10.3406/paleo.2015.5673>
- BIRD, D.W., R.B. BIRD, B.F. CODDING & D.W. ZEANAH. 2019. Variability in the organization and size of hunter-gatherer groups: foragers do not live in small-scale societies. *Journal of Human Evolution* 131: 96–108. <https://doi.org/10.1016/j.jhevol.2019.03.005>
- BOCQUENTIN, F. & A. GARRARD. 2016. Natufian collective burial practice and cranial pigmentation: a reconstruction from Azraq 18 (Jordan). *Journal of Archaeological Science* 10: 693–702. <https://doi.org/10.1016/j.jasrep.2016.05.030>
- BOCQUENTIN, F., E. KODAS & A. ORTIZ. 2016. Headless but still eloquent! Acephalous skeletons as witness of Pre-Pottery north-south Levant connections and disconnections. *Paleorient* 42: 33–52. <https://doi.org/10.1016/j.jasrep.2016.05.030>
- BOWLES, S. & J.-K. CHOI. 2019. The Neolithic agricultural revolution and the origins of private property. *Journal of Political Economy* 127: 2186–228. <https://doi.org/10.1086/701789>
- CAUVIN, J. 1994. *Naissance des Divinités, Naissance de l'Agriculture: la Révolution des Symboles au Néolithique*. Paris: CNRS. [https://doi.org/10.1016/S0016-6995\(94\)80052-9](https://doi.org/10.1016/S0016-6995(94)80052-9)
- 2000. *The birth of the gods and the origins of agriculture*. Cambridge: Cambridge University Press.
- ÇELİK, B. 2011. Karahan Tepe: a new cultural centre in the Urfa Area in Turkey. *Documenta Praehistorica*: 38: 241–54. <https://doi.org/10.4312/dp.38.19>
- CERÓN-CARRASCO, R. 2007. The marine molluscs, with a note on an echinoid fossil and the terrestrial snails, in B. Finlayson & S. Mithen (ed.) *The early prehistory of Wadi Faynan, southern Jordan*: 362–66. Oxford: Oxbow.
- CHILDE, V.-G. 1928. *The most ancient East*. London: Kegan Paul.
- CLARE, L. *et al.* 2019. Ritual practices and conflict mitigation at Early Neolithic Körük Tepe and Göbekli Tepe, Upper Mesopotamia: a mimetic theoretical approach, in I. Hodder (ed.) *Violence and the sacred in the ancient Near East: Girardian conversations at Çatalhöyük*: 96–128. Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781108567626.006>

- COHEN, M.N. 1977. *The food crisis in prehistory: overpopulation and the origins of agriculture*. New Haven (CT): Yale University Press.
- COLLEDGE, S., J. CONOLLY, B. FINLAYSON & I. KUIJT. 2018. New insights on plant domestication, production intensification, and food storage: the archaeobotanical evidence from PPNA Dhra'. *Levant* 50: 14–31.  
<https://doi.org/10.1080/00758914.2018.1424746>
- CRASSARD, R. *et al.* 2013. Beyond the Levant: first evidence of a Pre-Pottery Neolithic incursion in the Nefud Desert, Saudi Arabia. *PLoS ONE* 8: e68061.  
<https://doi.org/10.1371/journal.pone.0068061>
- DIETRICH, L. 2021. *Plant food processing tools at Early Neolithic Göbekli Tepe*. Oxford: Archaeopress.
- DIETRICH, L. *et al.* 2019. Cereal processing at Early Neolithic Göbekli Tepe, southeastern Turkey. *PLoS ONE* 14: e0215214.  
<https://doi.org/10.1371/journal.pone.0215214>
- DIETRICH, O., J. NOTROFF & L. DIETRICH. 2018. Masks and masquerade in the Early Neolithic: a view from Upper Mesopotamia. *Time and Mind* 11: 3–21.  
<https://doi.org/10.1080/1751696X.2018.1433354>
- DIETRICH, O., L. DIETRICH & J. NOTROFF. 2019. Anthropomorphic imagery at Göbekli Tepe, in J. Becker, C. Beuger & B. Müller-Neuhof (ed.) *Human iconography and symbolic meaning in Near Eastern prehistory*: 151–66. Vienna: Austrian Academy of Sciences Press.  
<https://doi.org/10.2307/j.ctvvh865z.12>
- DIETRICH, O., Ç. KÖKSAL-SCHMIDT, J. NOTROFF & K. SCHMIDT. 2013. Establishing a radiocarbon sequence for Göbekli Tepe. State of research and new data. *Neo-lithics* 1(13): 36–41.
- DIETRICH, O. *et al.* 2012. The role of cult and feasting in the emergence of Neolithic communities: new evidence from Göbekli Tepe, south-eastern Turkey. *Antiquity* 86: 674–95.  
<https://doi.org/10.1017/S0003598X00047840>
- EDWARDS, P. 2007. The context and production of incised Neolithic stones. *Levant* 39: 27–33.  
<https://doi.org/10.1179/lev.2007.39.1.27>
- (ed.). 2013. *Wadi Hammeh 27, an early Natufian settlement at Pella in Jordan*. Leiden: Brill.  
<https://doi.org/10.1163/9789004236103>
- 2016. The chronology and dispersal of the Pre-Pottery Neolithic B cultural complex in the Levant. *Paléorient* 42: 53–72.  
<https://doi.org/10.3406/paleo.2016.5720>
- ERDAL, Y.S. 2015. Bone or flesh: defleshing and post-depositional treatments at Körtik Tepe (southeastern Anatolia, PPNA period). *European Journal of Archaeology* 18: 4–32.  
<https://doi.org/10.1179/1461957114Y.0000000072>
- FEYNMAN, J. & A. RUZMAIKIN. 2018. Climate stability and the origin of agriculture, in S. Hussain (ed.) *Climate Change and Agriculture*: 1–18. London: IntechOpen.  
<https://doi.org/10.5772/intechopen.83344>
- FINLAYSON, B. & S.J. MITHEN. 2007. *The early prehistory of Wadi Faynan, southern Jordan*. London: CBRL.  
<https://doi.org/10.1017/ehs.2019.9>
- FINLAYSON, B. & C. MAKAREWICZ. 2018. Contextualising Beidha in the Southern Levantine PPNB: communal architecture and chronology. *Paléorient* 41: 35–56.  
<https://doi.org/10.3406/paleo.2018.5784>
- FRIESEM, D., I. ABADI, D. SHAHAM & L. GROSMA. 2019. Lime plaster cover of the dead 12 000 years ago: new evidence for the origins of lime plaster technology. *Evolutionary Human Sciences* 1: e9.  
<https://doi.org/10.1017/ehs.2019.9>
- FUJII, S., T. ADACHI & K. NAGAYA. 2019. Harrat Juhayra 202: an early PPNB flint assemblage in the Jafr Basin, southern Jordan, in L. Astruc, C. McCartney, F. Briois & V. Kassianidou (ed.) *Near Eastern lithic technologies on the move: interactions and contexts in Neolithic traditions*: 185–98. Nicosia: Astrom.
- GORING-MORRIS N. & A. BELFER-COHEN. 2011. Neolithization processes in the Levant: the outer envelope. *Current Anthropology* 52: 195–208.  
<https://doi.org/10.1086/658860>
- GOURICHON, L. 2002. Bird remains from Jerf el Ahmar, a PPNA site in northern Syria, with special reference to the Griffon Vulture, in H. Buitenhuis, A.M. Choyke, M. Mashkour & A.H. Al-Shiyab (ed.) *Archaeozoology of the Near East V*: 138–52 (ARC-Publicatie 62). Groningen: ARC.
- GRESKY, J., J. HAELM & L. CLARE. 2017. Modified human crania from Göbekli Tepe provide



- evidence for a new form of Neolithic skull cult. *Science Advances* 3: e1700564.  
<https://doi.org/10.1126/sciadv.1700564>
- GROSMAN, L. *et al.* 2016. Nahal Ein Gev II, a late Natufian community at the Sea of Galilee. *PLoS ONE* 11: e0146647.  
<https://doi.org/10.1371/journal.pone.0146647>
- 2017. A human face carved on a pebble from the Late Natufian site of Nahal Ein Gev II. *Antiquity* 91: e2. <https://doi.org/10.15184/aqy.2017.122>
- HAMILTON, M.J. *et al.* 2007. The complex structure of hunter-gatherer social networks. *Proceedings of the Royal Society B* 274: 2195–202.  
<https://doi.org/10.1098/rspb.2007.0564>
- HAUPTMANN, H. 1999. The Urfa region, in M. Özdoğan & N. Başgelen (ed.) *Neolithic in Turkey, the cradle of civilization, new discoveries*: 65–86. Istanbul: Arkeoloji ve Sanat Yayınları.
- HAYDEN, B. 1995. An overview of domestication, in T. Price & B. Gebauer (ed.) *Last hunters-first farmers: new perspectives on the prehistoric transition to agriculture*: 273–300. Santa Fe (NM): School of American Research.
- HODDER, I. & L. MESKELL. 2011. A ‘curious and sometimes a trifle macabre artistry’: some aspects of symbolism in Neolithic Turkey. *Current Anthropology* 52: 235–63.  
<https://doi.org/10.1086/659250>
- IBÁÑEZ, J.J. *et al.* 2016. Developing a complex network model of obsidian exchange in the Neolithic Near East: linear regressions, ethnographic models and archaeological data. *Paléorient* 42: 9–32.  
<https://doi.org/10.3406/paleo.2016.5718>
- JOHNSON, G. 1982. Organizational structure and scalar stress, in C. Renfrew, M. Rowlands & B. Seagraves (ed.) *Theory and explanation in archaeology*: 389–421. New York: Academic Press.
- KARUL, N. 2011. Güşir Höyük, in M. Özdoğan, N. Başgelen & P. Kuniholm (ed.) *The Neolithic in Turkey. New excavations & new research: the Tigris Basin*: 1–177. Istanbul: Archaeology & Art Publications.
- KENYON, K. M. & T.A. HOLLAND. 1981. *Excavations at Jericho, volume 3: the architecture and stratigraphy of the tell*. Jerusalem: British School of Archaeology.
- KHALAILY, H. & F.R. VALLA. 2013. Obsidian in Natufian context: the case of Eynan (Ain Mallaha), Israel, in O. Bar-Yosef & F.R. Valla (ed.) *Natufian foragers in the Levant*: 193–202. Ann Arbor (MI): International Monographs in Prehistory.  
<https://doi.org/10.2307/j.ctv8bt33h.20>
- KODAS, E. *et al.* 2018. Çemka Höyük: a Late Epipalaeolithic and Pre-Pottery Neolithic site on the Upper Tigris, southeast Anatolia. *Neo-lithics* 20: 40–46.
- KOZŁOWSKI, S. & O. AURENCHE. 2005. *Territories, boundaries and cultures in the Neolithic Near East*. Oxford: Archaeopress.  
<https://doi.org/10.30861/9781841718071>
- KUIJT, I. & N. GORING-MORRIS. 2002. Foraging, farming, and social complexity in the Pre-Pottery Neolithic of the Southern Levant: a review and synthesis. *Journal of World Prehistory* 16: 361–440. <https://doi.org/10.1023/A:1022973114090>
- LEV-YADUN, S., A. GOPHER & S. ABBO. 2000. The cradle of agriculture. *Science* 288: 1602–603.  
<https://doi.org/10.1126/science.288.5471.1602>
- MAKAREWICZ, C. & K. ROSE. 2011. Early Pre-Pottery Neolithic settlement at el-Hemmeh: a survey of the architecture. *Neo-lithics* 11: 3–29.
- MAZUROWSKI, R. 2003. Tell Qaramel excavations, 2002. *Polish Archaeology in the Mediterranean* 14: 315–30.
- MITHEN, S.J. 1997. Did farming arise from a misapplication of social intelligence? *Philosophical Transactions of the Royal Society B* 362: 705–18.  
<https://doi.org/10.1098/rstb.2006.2005>
- 2003. *After the ice: a global human history 15 000–5000 years ago*. London: Weidenfeld.
- 2022. Shamanism at the transition from foraging to farming in SW Asia: sacra, ritual, and performance at Neolithic WF16 (southern Jordan). *Levant* 54: 158–89.  
<https://doi.org/10.1080/00758914.2022.2104559>
- MITHEN, S.J., B. FINLAYSON & R. SHAFFREY. 2005. Sexual symbolism in the Early Neolithic of the Southern Levant: pestles and mortars from WF16. *Documenta Praehistorica* 32: 103–10.  
<https://doi.org/10.4312/dp.32.6>
- MITHEN, S.J. *et al.* 2018. *WF16, the excavation of an Early Neolithic settlement in southern Jordan: architecture, stratigraphy and chronology*. London: CBRL. <https://10.5284/1034377>
- 2022. Birds as indicators of Early Holocene biodiversity and the seasonal nature of human activity at WF16, an Early Neolithic site in

- Faynan, southern Jordan. *Quaternary Science Reviews*. <https://doi.org/10.1002/jqs.3429>
- MİYAKE, Y. *et al.* 2012. New excavations at Hasankeyf Höyük: a tenth millennium cal BC site on the Upper Tigris, southeast Anatolia. *Neo-Lithics* 1: 3–7.
- MOORE, A.M.T., G.C. HILLMAN & A.J. LEGGE. 2000. *Village on the Euphrates: from foraging to farming at Abu Hureyra*. Oxford: Oxford University Press.
- PAGE, A.E. *et al.* 2017. Hunter-gatherer social networks and reproductive success. *Scientific Reports* 7: 1153. <https://doi.org/10.1038/s41598-017-01310-5>
- PETERS, J. & K. SCHMIDT. 2004. Animals in the symbolic world of Pre-Pottery Neolithic Göbekli Tepe, south-eastern Turkey: a preliminary assessment. *Anthropozoologica* 39: 179–218.
- PETERS, J., A. VON DEN DRIESCH, N. POLLATH & K. SCHMIDT. 2005. Birds in the megalithic art of Pre-Pottery Neolithic Göbekli Tepe, southeast Turkey. *Documenta Archaeobiologiae* 3: 223–34.
- POWERS, S.T. & L. LEHMANN. 2014. An evolutionary model explaining the Neolithic transition from egalitarianism to leadership and despotism. *Proceedings of the Royal Society B* 281: 20141349. <https://doi.org/10.1098/rspb.2014.1349>
- RICHTER, T., A.N. GARRARD, S. ALLCOCK & L.A. MAHER. 2011. Interaction before agriculture: exchanging material and sharing knowledge in the final Pleistocene Levant. *Cambridge Archaeological Journal* 21: 95–114. <https://doi.org/10.1017/S0959774311000060>
- RICHTER, T. *et al.* 2019. Ochre, ground stone, and wrapping the dead in the Late Epipalaeolithic (Natufian) Levant: revealing the funerary practices at Shubayqa 1, Jordan. *Journal of Field Archaeology* 44: 440–57. <https://doi.org/10.1080/00934690.2019.1645546>
- ROSENBERG, M. 2011a. Hallan Çemi, in M. Özdoğan, N. Başgelen & P. Kuniholm (ed.) *The Neolithic in Turkey. New excavations & new research: the Tigris Basin*: 61–78. Istanbul: Archaeology & Art Publications.
- 2011b. Demirköy, in M. Özdoğan, N. Başgelen & P. Kuniholm (ed.) *The Neolithic in Turkey. New excavations & new research: the Tigris Basin*: 79–87. Istanbul: Archaeology & Art Publications.
- ROSENBERG, M. & R. REDDING. 2002. Hallan Çemi and early village organization in eastern Anatolia, in I. Kuijt (ed.) *Life in Neolithic farming communities: social organization, identity, and differentiation*: 39–62. New York: Kluwer. [https://doi.org/10.1007/0-306-47166-3\\_3](https://doi.org/10.1007/0-306-47166-3_3)
- SCHMIDT, K. 1999. Boars, ducks and foxes: the Urfa-Project 99. *Neo-Lithics* 3(99): 12–15.
- 2012. *Göbekli Tepe: a Stone Age sanctuary in south-eastern Anatolia*. Berlin: exOriente. <https://doi.org/10.1093/oxfordhb/9780195376142.013.0042>
- 2013. Von Knochenmännern und anderen Gerippen: zur Ikonographie halb- und vollskeletierter Tiere und Menschen in der prähistorischen Kunst, in S. Feldmann & T. Uthmeier (ed.) *Gedenkschrift für Wolfgang Weißmüller*: 195–201. Erlangen: Dr Faustus.
- SHAHAM, D. & L. GROSMAN. 2019. Engraved stones from Nahal Ein Gev II: portraying a local style, forming cultural links, in L. Astruc, C. McCartney, F. Briois & V. Kassianidou (ed.) *Near Eastern lithic technologies on the move: interactions and contexts in Neolithic traditions*: 133–42. Nicosia: Astrom.
- SMITH, S., B. FINLAYSON & S. MITHEN. 2019. The end of the PPNA in southern Jordan: insights from a preliminary analysis of chipped stone from WF16, in L. Astruc, C. McCartney, F. Briois and V. Kassianidou (ed.) *Near Eastern lithic technologies on the move: interactions and contexts in Neolithic traditions*: 159–72. Nicosia: Astrom.
- SNIR A. *et al.* 2015. The origin of cultivation and proto-weeds, long before Neolithic farming. *PLoS ONE* 10: e0131422. <https://doi.org/10.1371/journal.pone.0131422>
- SOLECKI, R.L. 1977. Predatory bird rituals at Zawi Chemi Shanidar. *Sumer* 33: 42–47.
- STINER, M.C. *et al.* 2022. An endemic pathway to sheep and goat domestication at Aşıklı Höyük (central Anatolia, Turkey). *Proceedings of the National Academy of Sciences of the USA* 119: e2110930119. <https://doi.org/10.1073/pnas.2110930119>
- STORDEUR, D. & F. ABBÈS. 2002. Du PPNA au PPNB, mise en lumière d'une phase de transition à Jerf el-Ahmar (Syrie). *Bulletin de la Société Préhistorique Française* 99: 563–95. <https://doi.org/10.3406/bspf.2002.12712>
- THOMAS, S. 2022. Is an unknown, extraordinarily ancient civilisation buried under eastern Turkey? *The Spectator*, 8 May 2022. Available at:

- <https://www.spectator.co.uk/article/does-an-unknown-extraordinarily-ancient-civilisation-lie-buried-under-eastern-turkey> (accessed 24 April 2023).
- WEIDE, A., L. GREEN, J.G. HODGSON *et al.* 2022. A new functional ecological model reveals the nature of early plant management in Southwest Asia. *Nature Plants* 8: 623–34.  
<https://doi.org/10.1038/s41477-022-01161-7>
- WEISS, E., W. WETTERSTROM, D. NADEL & O. BAR-YOSEF. 2004. The broad spectrum revisited: evidence from plant remains. *Anthropology* 101: 9551–55.  
<https://doi.org/10.1073/pnas.0402362101>
- WHALLON, R. 2006. Social networks and information: non-‘utilitarian’ mobility among hunter-gatherers. *Journal of Anthropological Archaeology* 25: 259–70.  
<https://doi.org/10.1016/j.jaa.2005.11.004>
- WHITE J. *et al.* 2021. The bird remains from WF16, an Early Neolithic settlement in southern Jordan: assemblage composition, chronology, and spatial distribution. *International Journal of Osteoarchaeology* 31: 1030–45.  
<https://doi.org/10.1002/oa.3016>
- WILLCOX, G. & D. STORDEUR. 2012. Large-scale cereal processing before domestication during the tenth millennium cal BC in northern Syria. *Antiquity* 86: 99–114.  
<https://doi.org/10.1017/S0003598X00062487>
- WOBST, H.M. 1974. Boundary conditions for Palaeolithic social systems: a simulation approach. *American Antiquity* 39: 147–78.  
<https://doi.org/10.2307/279579>
- YARTAH, T. 2004. Tell 'Abr 3, un village du néolithique précéramique (PPNA) sur le Moyen-Euphrate, première approche. *Paléorient* 30: 141–58.  
<https://doi.org/10.3406/paleo.2004.1017>
- 2013. Vie quotidienne, vie communautaire et symbolique à Tell Abr 3 - Syrie du Nord: données nouvelles et nouvelles réflexions sur l'horizon PPNA au nord du Levant 10 000–9000 BP. Unpublished PhD dissertation, Lyon: Université Lumière Lyon 2.
- ZEDER, M.A. & B. HESSE. 2000. The initial domestication of goats (*Capra hircus*) in the Zagros Mountains, 10 000 years ago. *Science* 287: 2254–57.  
<https://doi.org/10.1126/science.287.5461.2254>
- ZEDER, M.A. & M.D. SPITZER. 2016. New insights into broad spectrum communities of the Early Holocene Near East: the birds of Hallan Çemi. *Quaternary Science Reviews* 151: 140–59.  
<https://doi.org/10.1016/j.quascirev.2016.08.024>
- ZIMMERMANN, T. 2019. Snakes in the plain: contextualizing prehistoric Near Eastern snake symbolism and early human behaviour. *Anatolica* 45: 17–27.