Dynamic multiscalar approach for structuring and scaling human activities involving lithics

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Abstract:

This paper aims to contribute to the discussion on borders and boundaries from the perspective of lithics. European archaeological and historical research has seen numerous endeavours to create an overarching definition of borders of spatial, social, political, linguistic and religious kinds. This is particularly important in the context of the modern, strongly divided European nation states, and this situation has a strong impact on the archaeological concept of culture. Lithic materials are usually not associated with the concepts of culture and group, which was and often still is the coordinate system for prehistoric communities since the Neolithic. How can we look at prehistoric societies as social units and integrate lithic studies into the overarching archaeological narrative? As a first step, we should put these artificial borders aside and take into account as many variables that can interfere with human behaviour as possible. This paper tries to create a framework (referring to some case studies) at micro-, meso-, and macro-scales for structuring spatial, temporal, social, contextual and habitual variables based solely on lithic materials to demonstrate the importance of stone assemblages and litho-scapes in archaeological narratives. By looking at activities involving lithics, we become aware that borders are very diverse and variable, thus cannot be treated as part of a static system. On the contrary, different boundaries (instead of borders) need to be treated as continuously changing units that function in different ways at different scales. Thus, we should try to use a dynamic multiscalar approach in lithic research.

Keywords: European prehistory, Mesolithic, Neolithic and Copper Age; social organization; translocal communities; scale

1. Introduction

The primary notion associated with borders is that of separation, which undoubtedly expresses their most frequent function. Yet, the notion of a border is understood in very diverse ways, which are reflected in the many terms used for the concept in different languages and the many definitions which vary by regions and periods (Diener & Hagen 2010; Rumley & Minghi 2014). Archaeological, material-based borders are most often defined by the distribution of different object types, pottery styles, settlement structures, burial rituals, *etc*., which are assumed to reflect different social groups or societies (see certain summary publications on archaeological cultures and their research-history and characteristics such as Eggert *et al.* 2012;

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Lichter 2001; Meier-Arendt & Bóna 1992; Preuß 1998). This classic view of a culture is essentially an applied approach in European prehistoric research history, and in this sense, the spatial extension and the duration of a culture are defined by borders (Roberts & Vander Linden 2011: 1-3). These well-known European culture-based prehistoric narratives portray static and often quite rigid social blocks with static borders, an approach which creates multiple difficulties when it comes to interpreting exceptions, atypical features, and mixed archaeological materials (Biehl *et al.* 2002; Roberts & Vander Linden 2011: 2-8; Shennan 1989: 5-9). The interactional zones or, in other words, the peripheries of cultures, typically display hybrid archaeological material, which is thus explained by the idea of interaction between different groups concerning economic issues, knowledge and information (Eerkens & Lipo 2007). This adds a connection function to the border concept. In the history of research, these heterogeneous materials and their connectivity are seen in terms of interactional zones in space or transformational phases in time (Müller *et al.* 2022: 14-15). In my opinion, there are good arguments for focusing on those mixed materials, which are related to heterogenous social groups and emphasise a dynamic interaction between people. Such an approach at least takes into account flexible or fluid borders, in which change is the norm (Rigaud *et al.* 2018).

The vast majority of archaeological cultures are expressed by typical pottery styles (mostly typical decoration and vessel forms), and (secondarily) by settlement structures and mortuary rituals; lithics are usually seen as a means of proving the connection between previously defined cultures through the circulation of stone artefacts and the identification of the original raw material source (Jones 1997; Roberts & Vander Linden 2011; Shennan 1989; Wolf 1984). In the last few years, the archaeological concept of material culture and the people behind it have changed a lot and have started to take into account several other factors, like isotopes and genetic data (Brandt *et al.* 2013; Eisenmann *et al.* 2018; Frieman & Hofmann 2019; Furholt 2018a; 2021; Hofmann 2015; Ion 2017; Müller 2013; Reich 2018; Vander Linden 2016). These new archaeological narratives, which do not rely solely on pottery, take into account the microscopic information gleaned from the human body and the environment, human-made objects and human-modified landscapes (the polythetic culture model by David Clark's terminology) (Clarke 1968; Furholt 2020). In this sense, lithics have become more than spatial markers and are seen as objects that tell stories about technological tradition, individual and social knowledge and production-use skills, human-environment relations, and the mental set of communities (Allard & Denis 2022; Apel 2008; Apel & Knutsson 2006; Audouze & Karlin 2017; Delage 2017; Denis *et al.* 2024; Scharl *et al.* 2021; Szilágyi 2023a). Altogether, these narratives portray social groups as active, constantly changing, dynamic action-based systems, which in themselves are flexible systems; thus, a multilayer approach is undoubtedly better for studying prehistoric communities (Dobres & Hoffman 1999; Edmonds 1995; Högberg 2006).

2. European border phenomena

The border is a recurrent topic in archaeological research all around the world, but it is definitely an evergreen topic on the European continent, which is not so surprising given how many national, linguistic, cultural, and religious borders exist nowadays and existed in the past. European history is closely tied to changes in historical borders by periods and regimes, and these state borders became extremely important during Absolutism (16th and 18th centuries), which is related to the nationalisation process, and in this sense, nations had to define themselves in terms of space, time and their cultural roots (Miller 1990; Wilson 2000; Zmora 2000).

In the later periods, the concept of a nation was expressed by political or state borders, which, as has been demonstrated several times can lead to multiple problems and create serious conflict between countries. One core element of this conflict is that these spatial borders of a

nation often do not coincide with the cultural, ethnic, linguistic and religious borders of the populations. In these cases, the borders function to legally separate one social unit in space, and this results in the misunderstanding and misrepresentation of the diversity of a social group. This approach is very static and emphasizes one or maybe two elements of cultural diversity in order to define the social unit as an integrative and coherent group of people (Bourdieu 1993; Newman 2006; Rumley & Minghi 2014).

In the history of European archaeological research, we can find similar traditions that use the same approach. We see how prehistoric cultures are defined in space and time, and are typically represented with core areas and extended territories; in other words, cultures are thought of as having distribution areas with borders. Archaeological research includes countless attempts and efforts to clarify the concept of the border, be it spatial (centre or core-periphery theory) (Champion 2017; Friedmann 1966; Gibbs 1963; Roberts & Vander Linden 2011; Rowlands 2009; Vander Linden 2011), temporal (technological), natural (rivers, geographical units, mountains, *etc*.), constructed or built (every kind of human-modified landscape and built objects) (Anschuetz *et al.* 2001; Ashmore 2004; Furholt *et al.* 2014; Rumley & Minghi 2014), or cultural (*e.g.* special costumes, cuisine, music and dance, *etc*.). The desire to define the concept of borders, and the evergreen nature of the notion, is also reflected by the terms used to designate them in different languages; in English alone, synonyms include boundary, barrier, frontier, and border. To find a good definition of a border that does justice to the different periods is very difficult, and probably impossible. For instance, the definition of a border is different when it is attempted in the case of circulation of jade polished axes, as opposed to a Roman province, or the maximum distribution of the Yamnaya burial ritual, the existence of tell settlements, the use of the pressure blade debitage technique, and the intra-site activity zone of a Neolithic household. All in all, if we consider the basic function of a border, it can either separate or connect at the same time, which are opposites of each other. This dichotomy is almost always detectable in the case of all kinds of borders.

The different kinds of borders and the different terms used to designate them also indicate that the notion of a border is not simple, one first needs to clarify which type of border one is talking about, as well as which region, scale and period. The goal of this paper is not to be superficial and write generalities about the definition of borders. Rather, it aims to organize, in a structured framework, the multiple influencing variables of boundaries (instead of borders) from 1) spatial, 2) temporal, 3) social, 4) contextual and 5) habitual (in the sense of relating to habitus) aspects at micro, meso, and macro levels, with a view to creating a flexible structure with different variables for identifying potential boundaries based on human activities using a dynamic multiscalar approach.

3. Methods

3.1. Paths for defining boundaries

Above, I discussed the nature of borders, the diversity of border phenomena and their roots in the European concept of culture, but now we turn our focus to lithics in order to explore how stone objects and research on them relate to pattern recognition of boundaries. Relative to the triad of pottery, burial ritual and settlement structure of the culture concept, lithics has not played an essential role in defining Neolithic cultures. While lithics predominate research into the Palaeolithic and Mesolithic, there is a shift in focus for the subsequent Neolithic although, as its name implies (Neo-lithic), stone tools were still an important element of the material culture. Probably due to sheer numbers, lithics were marginalised by the emergence of new aspects of material culture, particularly ceramics, at the beginning of the European Neolithic (Bánffy 2019). Ceramic finds are far more common (often by orders of magnitude) in Neolithic find complexes than lithic ones. In narratives of the Neolithic, lithics have almost exclusively

been used as spatial markers for proving objectively the direct or indirect connection between different cultures through exchange or trade networks, as for instance the Neolithic circulation systems for Jade and obsidian (Biró T. 2014; 2018; Boroneanţ *et al.* 2018; Burgert *et al.* 2017; Cann & Renfrew 1964; Dixon *et al.* 1968; Klassen 2004; Marić 2015; Milić 2016; Pétrequin *et al.* 2012; Renfrew *et al.* 1965; 1966; Ricq-de Bouard 1993).

However, stone tools have a much greater research and information potential, if we only think about what kinds of variables are recognisable by using the lithic technological approach, the concept of *chaîne opératoire* and the biographical view of lithic objects. The concept of *chaîne opératoire* is often referred to as the "French technological approach", which provides a consistent framework for recognising the technological system of a community (Audouze & Karlin 2017; Delage 2017; Le Brun-Ricalens & Potin 2018; Soressi & Geneste 2011). This approach can take into account not only the technological knowledge, skills and abilities of the individual but also the traditions of the community and their connection with the surrounding environment and other communities.

1) Procurement and production processes can be determined based on a technological approach (Andrefsky 2008; Audouze & Karlin 2017; Delage 2017; Inizan *et al.* 1999; Lewis & Arntz 2020)

2) We can study the relationship of a given community with its environment and the surrounding communities

3) Spatial vision and abstract thinking (*e.g.* the concept of core reduction) (Douglass *et al.* 2018)

4) Problem-solving abilities and other different skills (knapping accidents and their correction) (Apel & Knutsson 2006; Bleed 2008; Dobres 2006; Stout 2002; Wynn 1993; Wynn & Coolidge 2014), and memorisation of different lithic technologies (Muller *et al.* 2023; Wynn 1993; Wynn & Coolidge 2014).

5) The use and reuse of stone tools can also provide insights into the range and nature of everyday and symbolic activities (van Gijn 2010; Gosden & Marshall 1999). These all allow us to recognise a single individual (for instance a knapper) and her or his skills and to reconstruct an object biography, in other words a very fine, micro-scale history which goes beyond the perception of lithics as spatial markers (Joyce *et al.* 2015; Kopytoff 1986).

Approaches like object biography or *chaîne opératoire*, in their commonly used forms, do not sufficiently take into account the relevance of scalar differences in several dimensions. The main aim of this paper is to improve this situation.

Altogether, these variables, from micro to macro-scales, support a better understanding of past societies in multiple ways, because the different scales, ranging between individuals and communities, allow possible boundaries to be identified. For instance, the lithic assemblage of a community could indicate different spatial and social connections depending on the raw material procurement or technological behaviour involved. The transfer of technological knowledge can be demonstrated at the personal and community level and does not necessarily involve the physical transfer of raw materials or stone tools. We can also find examples where knowledge, raw materials and stone tools have been transferred from one community to another, in the form of exchangeable items, commodities or gifts, but their deposition occurs in completely different contexts (burials as opposed to domestic features). This suggests that the use or depositional habits associated with the objects were not passed on with the objects, and thus the objects may have had a completely different (symbolic, social, ritual) meaning in the new community than they had originally.

3.2. Scaling the human activities

When studying lithics, one of the most common topics is the original source(s) of raw material used for the manufacture of stone artefacts. Provenance analysis is closely tied to petrological and petroarchaeological research that is quite often completely separated from core archaeological research. The reason for this is twofold: firstly, provenance research requires the use of various scientific instruments, which are generally not part of the basic archaeological analytical toolbox; and secondly, the identification of the original lithic formation involves different scientific issues that tend to be the preserve of geologists. Altogether, the results of provenance research tend to be channelled into the archaeological narrative of where the raw materials came from and how far these sources are from the settlements. In this sense, the distance between the archaeological site and the natural sources is expressed in kilometres. This is a good basis for identifying the local, regional and distant supply regions as a spatial unit for the given site context. The kilometres are converted into the daily walking distance, but of course, this can be very different depending on whether we are dealing with a flatland region or mountains (Alves *et al.* 2020; Appolloni *et al.* 2019).

The other spatial scaling is from the point of view of the raw material source. In this case, the natural source is perceived as the zero-central point with a radial circle representing the spatial distribution of a given lithic type. For instance, the spatial distribution of Carpathian obsidian is calculated in this radial distribution way (Biró T. 1998; 2014; 2018; Milić 2016; Szeliga 2021; Werra *et al.* 2018). Of course, obsidian has many varieties (*e.g.* Carpathian, central Mediterranean, Aegean, Anatolian, *etc*.), which means that in specific cases the locations of the geological sources are point-like or are restricted to relatively small areas (Balkan-Atlı *et al.* 1999; Binder 2002; Chataigner & Barge 2010; Güngördü 2010; Tykot 2019; Williams Thorpe *et al.* 1984).

Spatial distribution analyses can be carried out at micro (local), meso (meso-local and regional), and macro (extra-local, supra-regional and distant) levels based on the distance between the raw material source and a given settlement(s), but in fact the real environmental conditions - for instance, elevation, walking difficulties, river crossings or even the form and weight of the transported objects - are very seldom taken into account. We do not have any archaeological evidence for the way raw materials or other lithic artefacts were transported. Clearly, there is a huge difference between carrying many kilograms of raw material fragments for further use and quantities of final tools, *e.g.* blades or other tools (Szilágyi 2018a; 2018b). Even the raw material nodules, pebbles or bigger blocks would have been difficult to transport; following testing of the material to determine if it was usable for tool making or not, the sharp edges could cut or damage any organic container or even injure the carrier. In short, we do not know the practicalities of how raw materials were distributed in prehistoric times. In their paper on Bohemia and the Moravian Basin, Antonín Přichystal and František Trampota considered how lithic transport by foot and by boat can be modelled (Trampota & Přichystal 2024).

In this article, micro-, meso-, and macro-scales are applied for measuring spatial distance, temporal events and processes, social and ritual activities concerning a single person and a community, and lastly, the habitus ranging from a personal skill to a shared transgenerational technological tradition. Figure 1 summarizes all the variables - principally the initial components of a culture in a classic sense - which are taken into account for detecting and scaling human activities with respect to lithics. This cross-table shows the basic structure, with some examples, of what we call a dynamic multiscalar approach. This is intended to provide a structured set of criteria for the different human activities involving stone tools. The framework is activity and process-based, and thus inherently identifies the processes associated with (stone) objects, operations and the person(s) performing them, and how they change, thus providing a dynamic and flexible framework.

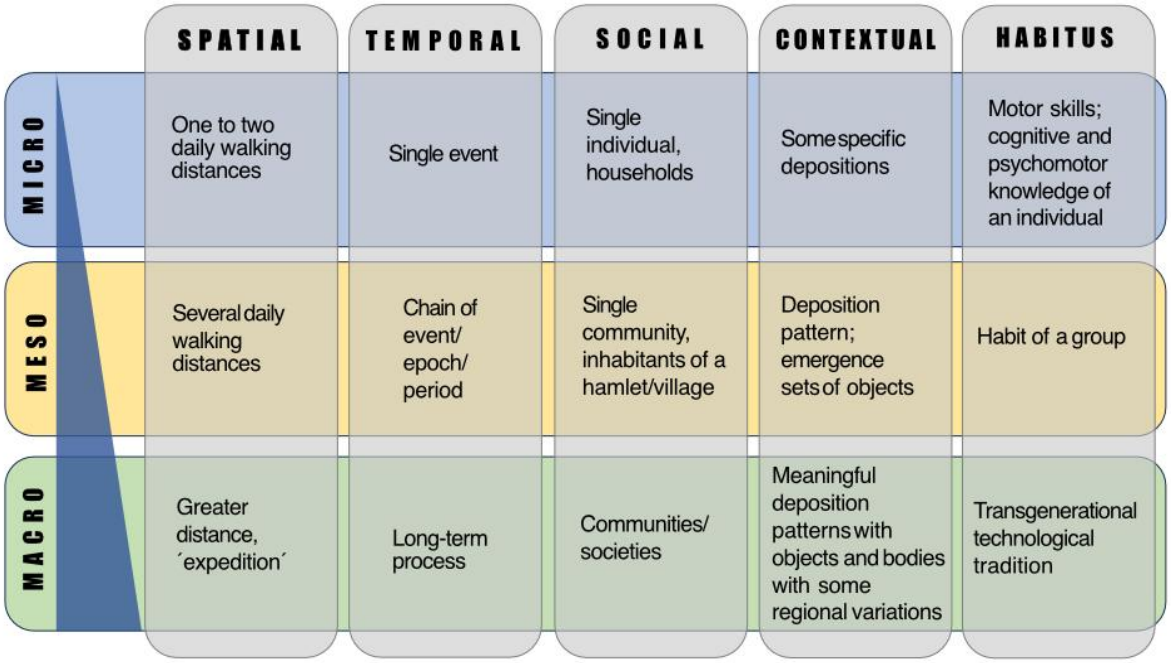

Figure 1. The structure of the analysed variables by micro-, meso-, and macro-scales (figure drawn by author).
Abbildung 1. Die Struktur der analysierten Variablen auf Mikro-, Meso- und Makroskala (Abbildung von der Autorin erstellt).

4. Dynamic multiscalar approach

Instead of the previously mentioned static cultural and spatial borders, this section outlines a suggested multiscalar approach, which allows several activities linked to lithics to be taken into account in the three-level scale. Instead of counting and measuring lithics as a passive record of various kinds of human behaviour, the multiscalar approach detects, at different levels, human activity involving lithics (Massa 2021). Where are the borders in this structure?: we can address the question. Thus, the dynamic multiscalar approach integrates and prefers to use the term "boundary", which implies a flexible demarcation line that is not as strict as a border. These identified boundaries, for example, the difference between the special skills of a knapper and the technological knowledge of a community, can provide information about the extent to which know-how was maintained within, and exchanged between, communities (Allard *et al.* 2017; Király *et al.* 2020; Mester & Tixier 2013).

4.1. Boundaries based on temporal variables

In general, the basic information we possess for a stone implement is the depositional feature in which it was found (*e.g.* cultural layer, pit, ditch, grave, *etc*.); its date is often provided by diagnostic sherds or C14 dating. In the case of multiperiod sites, the stone items are separated and compared according to periods and cultures, and the characteristics of lithics are compared based on the ´pottery chronology´. However, the lithics are usable as chronological markers and for recognising temporal processes in the procurement and the use.

It is rare to identify single-event flint knapping activity, which is indicated by matching stone artefacts, the reconstruction of the reduction process of stone cores, and the physical distribution of chipped debitage products and associated waste material. The Mesolithic site of Duvensee in North Germany, located near a Boreal lakeshore (see Figure 2), has yielded evidence for short-term (likely once-off) activity probably related to a temporary stay by a single individual. Thanks to the excellent preservation conditions provided by peat, a mat of

birch bark was identifiable together with a small hearth with hazelnut shells and stone tools (Bokelmann 1986; Groß *et al.* 2019).

Figure 2. Map showing the archaeological sites included in this study (map drawn by author).
Abbildung 2. Karte mit den archäologischen Fundorten, die in diese Studie einbezogen wurden (Karte von der Autorin erstellt).

In Southern Scandinavia, Northern Germany and Great Britain, there is evidence for several Mesolithic short-term hunting and butchery camps (*e.g.* Årup context 1 (SE), Flaadet (DK), Nørregaard (DK), Star Carr (UK), Seamer (UK), Rørmyr II (NO)), which, based on the spatial analysis and the refitting of the lithic assemblages, indicate a single occupation event (Conneller *et al.* 2018; Skar & Coulson 1986; Sørensen & Sternke 2004; Sørensen *et al.* 2018). These short-term, single-event (mostly Palaeolithic and Mesolithic) camps, associated with a high degree of mobility, which was expressed by the higher relative frequency of retouched artefacts and lower overall density of lithics, have the advantage that refitting is possible (Clark & Barton 2017; Manninen & Knutsson 2014; Roalkvam 2022; Skar & Coulson 1986).

The sequences of use and reuse of a stone tool can be seen as an example of a temporal meso-scale; the biography of objects is a powerful approach for exploring a process that tells not only the life story of a particular stone tool, but also the process of human choices, in which the value concept of the individual and, more broadly, of the community is revealed (Joyce *et al.* 2015; Sørensen *et al.* 2020). Use-wear analysis provides an opportunity to identify past activities and to assign particular functions to a stone artefact (van Gijn 2010; Gurova 2014; Masclans, Hamon *et al.* 2021; Masclans, Tvrdý *et al.* 2021). In the case of chipped stones, renewal of the active parts of tools and the use of multifunctional tools are particularly common in assemblages where there are no useable lithic raw material sources nearby. Polished stone tools also provide a good basis for studying the biography of lithics; moreover, thanks to their

bigger size and fewer techno-typological variations, the use and reuse phases can be easier to recognise, even with the naked eye, in comparison to chipped stones.

An example are the polished stone artefacts from the Late Neolithic tell settlements of Tisza communities at Öcsöd and Szegvár, which were used and reused tools in the community's daily life due to the lack of raw materials in the local area or wider vicinity. Most of the polished stone tools are made of metadolerite and in the main consist of heavy chisels, adzes and shaft-hole axes, which are resistant to high mechanical impact (V. Szilágyi *et al.* 2022). Metadolerite polished stone tools are a common and characteristic element of lithic assemblages from prehistoric sites in the areas east of the Danube (*e.g.* Hódmezővásárhely-Gorzsa, Öcsöd-Kováshalom; Polgár-Csőszhalom, Aszód-Papi földek) (Judik & Biró T. 2001; Szakmány, Kasztovszky *et al.* 2011; Szakmány, Starnini *et al.* 2011; Szakmány *et al.* 2019). The origins of this type of rock have been identified as Szarvaskő (Bükk, North-Hungarian Mountains, Northern Hungary) and the alluvial deposits of the Maros Valley (South-Eastern Hungary, Central Romania), which are more than one or two days' walk from the sites (Szilágyi 2022; V. Szilágyi *et al.* 2022).

When the polished stone tools were broken and the active edges were worn out or became unusable, the Late Neolithic communities had no immediate and constant possibility to produce new tools, so the items were resharpened, recycled and reused as multifunctional tools (Figure 3). There are also a lot of broken and heavily worn tools in the lithic material from Öcsöd and Szegvár sites (Kaczanowska *et al.* 2009; Szilágyi 2022). The biographies of stone tools thus tend to be long; for example, an original shaft-hole axe continued to function as a chisel after it was broken beside the shaft-hole, and was used until the tool was worn down to a length of only a few centimetres. As regards the polished stone material from Öcsöd and Szegvár, several large-sized stone axes bear a cut parallel to the longitudinal axis of symmetry, which was probably used to split the tools in two. This deliberate fragmentation, or splitting, is presumed to have produced two adzes or chisels, which may reflect the maximal use of raw material and stone tools (Figure 4). In many cases these deliberate fragmentations are observed in metadolerite and basalt tools, which are not considered rare, exotic raw materials (such as nephrite, jade, and serpentinite), so we can assume that practical reasoning lies behind these decisions, presumably because the lithic raw material supply was not continuous.

The use of the indirect percussion technique in the Carpathian Basin can be cited as an example of a macro-scale temporal boundary; indirect percussion is not known from Palaeolithic material and its first proven occurrence is from the Second Mesolithic, for example in the Paris Basin around 6200 BCE (Allard 2017), and in *Linearbandkeramik* Culture (henceforth, LBK) contexts in the Carpathian Basin around 5500-5000 BCE (Allard *et al.* 2017; Mester & Tixier 2013). Pierre Allard and his colleagues studied the obsidian assemblages from the site Kašov-Čepegov I (KČ-I) in eastern Slovakia, which is interpreted as a special workshop and important exploitation site associated with Bükk communities (known as the Bükk culture, which is part of the Alföld Linear Pottery culture) (Bánesz 1991; 1993; Šiška 1995). Their particular focus was on blade production to understand the debitage concept, the removal technique and to reconsider the function of the site. Previous lithic analysis and experimental archaeological data suggested the use of the pressure flaking technique, which required the use of special knowledge and skills. Allard and his colleagues proved the use of indirect percussion based on technological features (with special attention to butts) and disproved the originally published idea of a special workshop site by Ladislav Bánesz in 1991, which was probably stimulated by the economic interest of obsidian. The existence of indirect percussion was proved in the case of the Boldogkőváralja lithic deposit (from north-eastern Hungary and associated with the Bükk population), which consists of 566 limnic silicite blades deposited in a vessel (Faragó *et al.* 2019; Király *et al.* 2020: 24-28; Mester & Tixier 2013). Mester and

colleagues argued that the indirect percussion technique was not used in the previous periods, thus this removal mode can serve as a chronological marker (Mester & Tixier 2013: 183).

Figure 3. Heavily used polished stone items from the site of Szegvár (photo by author).
Abbildung 3. Stark abgenutzte polierte Steingegenstände vom Fundort Szegvár (Foto Autorin).

These case studies show us that lithic assemblages can be used as temporal markers, while the technological approach of lithic analysis has the potential to be able to identify single, continuous and regularly repeated actions on stone materials. Some case studies indicate that the removal technique can be used to define temporal units, such as the use of a particular knapping technique (indirect percussion) as a *terminus ante quem*. To be able to identify a temporal division using knapping techniques, we need more published technological studies on different lithic debitage techniques from well-dated archaeological contexts.

4.2. Boundaries based on spatial variables

Spatial boundaries are perhaps the most obvious type, which is not surprising if we think of the classic concept of borders, but let us look beyond the establishment of concrete physical limits, expressed in kilometres. Instead of considering spatial boundaries as the mobility or social network of an individual, and a community as a system of reference that defines what counts as local and distant areas. Within lithic analysis, it is of course essential to know the location of the varieties of rock of an assemblage and the sources of these raw materials, which undoubtedly designate the imaginary coordinate system in which we try to map the spatial pattern of networks operated by a given community.

Figure 4. Evidence of deliberate fragmentation (marked with red arrows). The cut is parallel to the longitudinal axis of symmetry on a polished stone object; the black arrows show the potential use-wear break along the shaft-hole; Szegvár-Tűzköves, Csongrád-Csanád County, Hungary (figure: author).
Abbildung 4. Zeichen einer intentionellen Fragmentierung (markiert mit roten Pfeilen). Der Schnitt verläuft parallel zur Längssymmetrieachse auf einer der polierten Steinäxte; die schwarzen Pfeile zeigen den potenziellen Verschleißbruch entlang des Schaftlochs; Szegvár-Tűzköves, Csongrád-Csanád Komitat, Ungarn (Abbildung: Autorin).

In principle, every analysis of a lithic assemblage requires us to have a conceptual framework and interpretation of supply zones. In the case of sedentary Neolithic communities, regular visits to nearby (within one or two days' walk) raw material sources for acquiring frequently useable raw materials, which corresponds to the local procurement zone and can be considered micro-scale direct activities (Renfrew 1975: 41-48). Those resources that are more than one or two days' walk, could be considered as occasionally acquired raw materials, and indicate the regional supply zone, and represent meso-scale lithic raw material collection activities (Renfrew 1975: 41-48). The procurement of raw materials is indirect when the lithic resources lie at greater distances, requiring that a given community be involved in exchange or trade, necessitating a connection with other unknown social groups (Allard & Denis 2021: 18-20; Andrefsky 2008; 2009; Edmonds 1995: 86; Odell 2000: 278-280; 2006: 26-28; Lech 1990; Renfrew 1975: 41-48).

As Pierre Allard and Solène Denis pointed out in their 2021 paper: "the characteristics of raw material procurement strategies, identified via techno-economic approaches and the notion of litho-space, provide fundamental elements that can contribute to our understanding of how these first sedentary populations perceived their territories" (Allard & Denis 2021: 2). The authors have highlighted the point that technological characteristics are as important as the raw material itself. With this approach, the transfer of technological knowledge between communities can be identified when different communities were involved in the process of lithic procurement. If there was no cooperation between social groups and there was no useable raw material, some members of the communities had to engage in greater mobility for lithic procurement. The authors cited Bischoffsheim, Bylany and Vráble, large LBK settlements with

many houses, as examples, because the lack of stone raw material sources in the immediate vicinity of the settlements would have obliged their inhabitants to travel greater distances to obtain raw materials (Allard & Denis 2021: 19-20).

Allard and Denis presented techno-economic groups, thus recognising debitage sequences for determining the existence of direct or indirect lithic procurement in the Aisne Valley (Bucy, Berry-au-Bac, Cuiry, Menneville), Lorraine (Metz) and Hesbaye (Verlaine) in Belgium. Based on the debitage sequences, the lithic production is reconstructable, which gives us potential scenarios for the territory and lithic resources used by the communities. Furthermore, the authors argued for the coexistence of different procurement territories and emphasized that we cannot presume that stone tools of long-distance origin were only brought to the settlements in the form of final tools (without secondary debitage products in the settlement material). The LBK communities had greater mobility patterns than we had expected before and probably had diverse concepts of space, which strengthens the idea of flexible boundaries and diverse activity patterns (Figure 5).

In light of the combination of procurement activity and the spatial distance between settlements and raw material sources or transmitting communities provide the material basis for a dynamic view that enables us to recognise the degree of mobility and concept of territory from the level of a settlement to the scale of different cooperating communities.

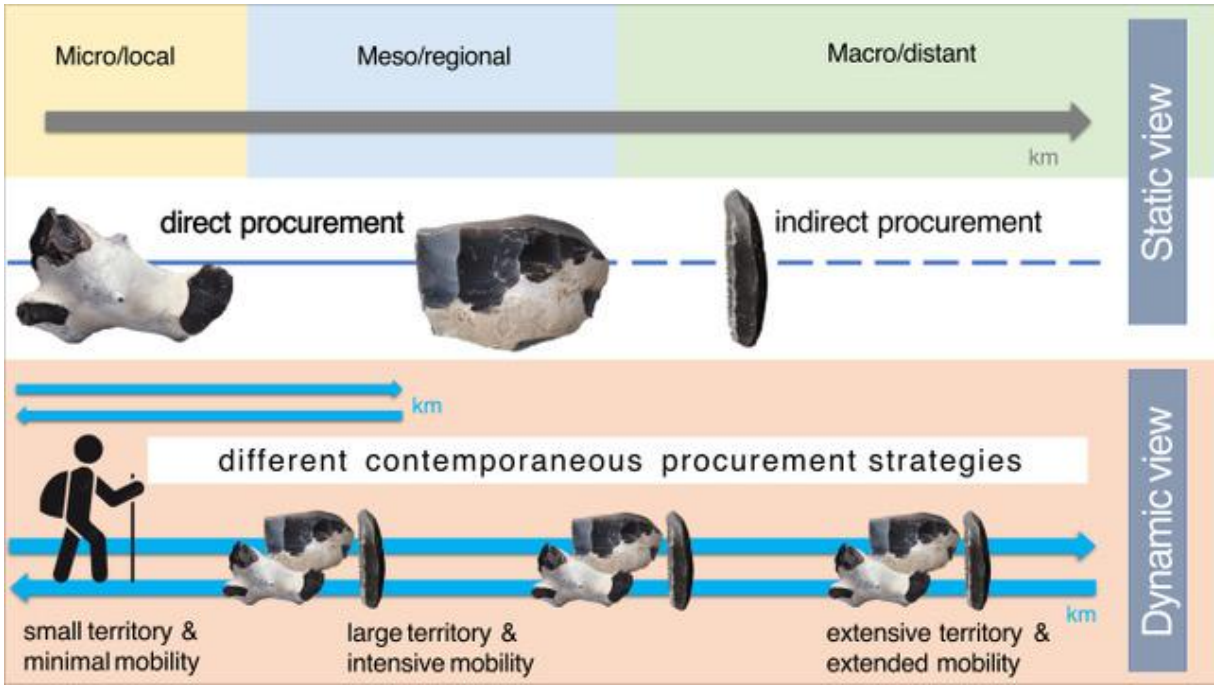

Figure 5. Spatial concepts and procurement strategies of LBK communities according to the static and dynamic approaches (illustration by the author, extending Allard & Denis 2021: 19, fig. 8).
Abbildung 5. Räumliche Konzepte und Beschaffungsstrategien von LBK-Gemeinschaften nach einem statischen und einem dynamischen Ansatz (von der Autorin erstellt auf der Basis von Allard & Denis 2021: 19, abb. 8, und diese erweiternd).

4.3. Boundaries based on social variables

Here I use the model of a network system of the Late Neolithic (5000-4500 BCE) south-eastern and north-Transdanubian Lengyel communities and the method of extracting stone resources as an example of how the differences in variables of social organization shape local and regional boundaries. The high-quality and varied stone raw materials found in Mecsek and the Transdanubian Mountains (mostly Bakony Mountain, around Nagytevel, Kup, and Szentgál) were used throughout the Neolithic (Biró T. 1989a; 1995; 1998; 2003; Biró T. &

Regenye 2007). Some exploitation sites and several workshop sites (Kup-Egyes, Szentgál-Füzikút, Szentgál-Tűzköveshegy) were identified in the Bakony Mountains, where Bakony radiolarite was procured and predominantly used (Biró T. 1989a; 1995; Biró T. & Regenye 2007; Regenye 2001). The colourful and shiny Bakony radiolarite (particularly the red colour Szentgál type) was distributed across Transdanubia and further away in the south-eastern part of Central Europe. The distribution of Bakony radiolarite occurred in a north-south direction from the Bakony Mountains, probably following rivers, the primary arteries of communication and trade towards the south being the Danube, the Sió and Sárvíz Rivers.

In a very different manner as compared to the Bakony Mountains, no exploitation of mining sites has been identified near the outcrops in the eastern Mecsek Mountains (Kisújbánya, Komló, Vékény, Magyaregregy, Hosszúhetény, Kisújbánya). However, intense tool production can be assumed on the Lengyel sites in south-eastern Transdanubia (Alsónyék, Zengővárkony, Villánykövesd, Lengyel, Mórágy, Pécsvárad), with good-quality Mecsek radiolarite as the principal raw material (Biró T. 1989b; 1990; Furholt 2025; Szilágyi 2018b). These Late Neolithic chipped stone assemblages suggest that Mecsek radiolarite was directly accessed and exploited by the producers in the Lengyel communities, which used the raw material for the manufacture of their tools as well as an exchange commodity. The results of lithic technological analysis at Alsónyék suggest that the larger raw material fragments needed for the production of the macro-blades made from Mecsek radiolarite found deposited in burials were not collected from stream beds but from outcrops in the valleys. The bigger-sized dislodged radiolarite blocks of the outcrops were suitable for creating the cores needed for larger blades. A petroarchaeological field survey and the assessment of the various chipped stone assemblages would suggest that while the actual acquisition of locally available rocks did not call for special extraction activities, it did require a good working knowledge of the raw materials, and it seems likely that the communities in question were familiar with the raw material sources in the eastern Mecsek Mountains (Furholt 2025; Szilágyi 2018a; 2018b). Thus, raw material procurement was undertaken by individuals who were adept at tool making, had the necessary knowledge of rocks, were familiar with the area, and knew exactly which stream beds and outcrops were likely to yield suitable raw materials for tools (Furholt 2018b: 308-310).

In this way, it is possible to state that different types organization of raw material procurement, distribution and production of tools reflected very different forms of socially regulated organization - one built upon specialisation of knowledge and mechanisms of control of raw material flows and possibilities of production in the case of Tevel flint and Szentgál radiolarite in the Bakony Mountains, the other built upon a more autonomous, flexible access to materials in the case of the Mecsek radiolarite. It is likely that these differences reflect, or partly also actively contribute to, very different forms of social organization, more complex and regulated ones, as opposed to more autonomous ones, within what is usually called Lengyel culture.

To illustrate the significance of social variables on a larger scale, the pattern of regional and long-distance networks in the burial customs of 3rd millennium BCE Corded Ware communities will be considered. Quentin Bourgeois and Erik Kroon focused on Corded Ware identity as expressed in male burials as a means of reconstructing the network system in Central and Northwest Europe (Bourgeois & Kroon 2017). The hypothesis is that objects placed in burials were arrayed in relation to the body and that their exact position in the graves followed specific configurations. Bourgeois and Kroon (2017) looked at six categories of grave goods as specific artefacts to analyse the networks of information. Three of these types of grave goods are lithics (battle axes, flint axes, flint daggers and blades), the others being amphorae, beakers and amber beads. The study involved a quantitative and qualitative comparison of the grave goods, and also took into account the position of the deceased. The right-flexed male burials

showed very similar burial patterns across Europe, with particularly homogenous burial rituals being observed in Denmark (Koldkur, Mølgård, Trehuse, Torupsgårde, Torup, Brøndum, Brøndumdam, Bovbjerg) and the Netherlands (Bosheide, Hijkerveld, Angelsloo, Bedrijventerrein). This high degree of homogeneity was grounded, it is argued, in intensive communication between different Corded Ware communities. The battle axes and flint axes were placed around the head and in front of the upper body, and the flint blades were mostly positioned around the pelvis. For their part, the similarities between right-flexed male burials indicate a regional pattern; for example, the strongest pattern is in Bohemia (Vikletice) and the Middle Elbe-Saale region (Mittelelbe-Saale-Gebiet in German), Central-Germany (Braunsdorf, Benndorf, Bedra). In the case of left-flexed burials, the lithic grave goods are not as visually prominent as in right-flexed burials, as the flint blades tend to be placed behind the upper body area instead of the pelvis, moreover, the placement of pottery is also contrasted in the two body arrangements. The female burial rituals do not display overarching similarities, on the contrary, there are small groups with very similar grave objects, which are the expression of locally rooted information networks (Bourgeois & Kroon 2017: 13-15).

The two different case studies presented here are intended to illustrate the significance of the role and underlying selection strategies of lithics in domestic and burial contexts. In the Late Neolithic in Transdanubia, lithic materials, selection and distribution of raw materials and production strategies have helped us understand differences in social organization within one and the same archaeological unit. In the Northwest European Corded Ware example, the stone tools placed in burials show the community's selection of stone tools as active participants in the burial ritual, thus indirectly and actively influencing the community's group identity and communicative memory (Assmann 2008; Hamilakis & Labanyi 2008; Jones 1997; 2007).

4.4. Boundaries based on contextual variables

The archaeological context in which lithic artefacts are unearthed provides information about the modality and intentionality of deposition and the potential importance of selection strategies regarding the objects (Hofmann 2020: 9-15). The complexity of the archaeological context may indicate whether the placement of objects was executed carefully in a structured manner, or randomly. The term structured deposition is used in multiple ways. It entered archaeological discourse in the 1980s and its meaning has been transformed several times, mostly in the logic of 'ritual *versus* everyday' activity, independently of period and region. The diverse nature of the concept for defining structured deposition and how it is related to the cultural tradition means that multiple interpretations are not mutually exclusive (Garrow 2012; Richards & Thomas 1984). For this reason, I use the term structured deposition in this paper for patterns that are intentionally created by an individual(s) placing an object in an exact position within a specific context (Ribeiro 2022: 3-5). The object can be an everyday tool or an exceptional item made of an exotic raw material or using a special craft technique, but it is most important that the position and the context should reflect a meaningful depositional practice, and that the entire process was driven by the intentional action of someone (Ribeiro 2022: 2-3). For instance, we could cite a series of matching blade deposited within a vessel or a grave, or a blade core placed upside down in a settlement feature; such phenomena cannot be seen as a coincidence, especially when this depositional pattern appears several times in different communities.

The last example mentioned above can serve as a case study of the micro-scale contextual variable. The deposition of obsidian blade cores is associated with Neolithic LBK communities (5500-5000 BCE) in the Carpathian Basin and several special deposits are known (Kašov-Čepegov, Nyírlugos, Besenyőd) (Allard *et al.* 2017; Biró T. *et al.* 2021; Hillebrand 1928; Kasztovszky *et al.* 2014). However, in the vast majority of cases, their exact archaeological

contexts are unknown. Covering a relatively short time-period, the spatial concentration of obsidian blade core deposits is restricted to the Upper Tisza region, which is very close to the original geological source of the obsidian (Furholt 2024). This obsidian blade core deposition can be seen as a pattern within LBK communities in the second half of the 6th millennium BCE, and all kinds of blade core deposition could be considered as an intentional action. In the LBK settlement at Vráble-Vel´ké Lehemby in Southwest Slovakia, one obsidian blade core was deposited upside down in one of the postholes (object No. 106) of House No. 131, which was dated to 5050-5000 BCE (Staniuk *et al.* 2020: 128). The obsidian blade core was unipolar with one striking platform, which was carefully prepared, indicating that it was the work of a very experienced knapper (Cheben *et al.* 2020: 366, 384, Pl.5.2.2). Given the archaeological context and the positioning of this extraordinary lithic item (considering the raw material and the technological features), we could class this placement as a structured deposition, which was a one-time event and related to a single house (Figure 6).

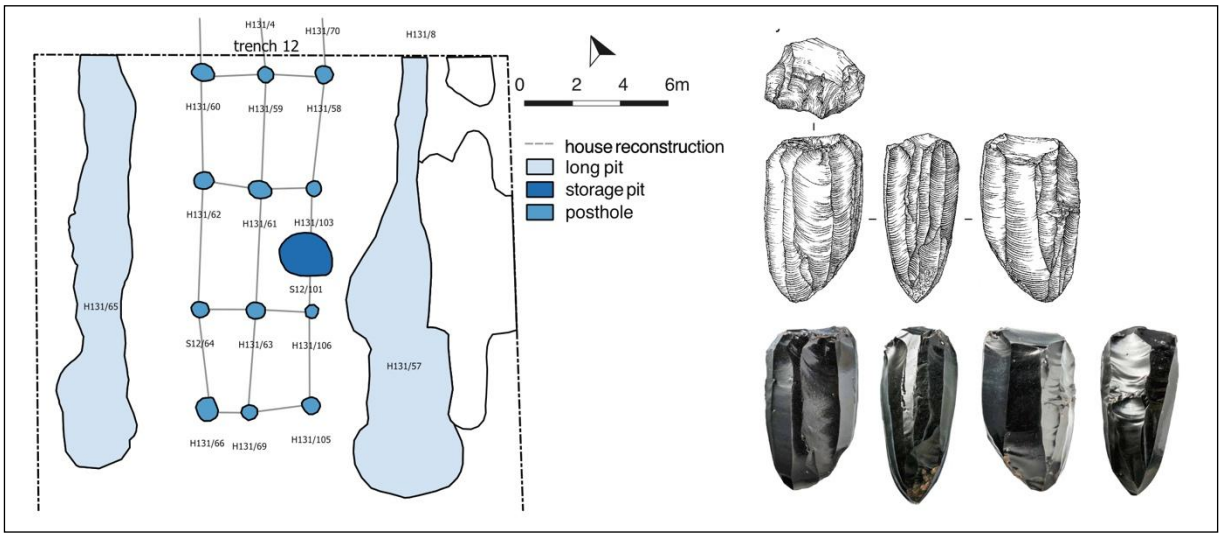

Figure 6. Vráble-Vel´ké Lehemby, House No. 131 and the posthole (No. 106) within which the obsidian blade core was found (sources of the original figures: Left: Staniuk *et al.* 2020: 128, fig. 3.1.32; Right: Cheben *et al.* 2020: 384, Pl.5.2.2).
Abbildung 6. Vráble-Vel´ké Lehemby, Haus Nr. 131 und das zugehörige Pfostenloch (Nr. 106) innerhalb dessen ein Obsidianklingenkern deponiert wurde (Quellen der Originalabbildungen: Links: Staniuk *et al.* 2020: 128, abb. 3.1.32; Rechts: Cheben *et al.* 2020: 384, Pl.5.2.2).

For the meso-scale example, I take those depositional patterns that occurred repeatedly and have several examples, and where many (or at least a few) items were involved in the action. Thus, the process of the deposition suggests that communities practiced it for long time allowing it to become an embedded practice. Burial rituals provide ideal cases for recognising this kind of repeated array of actions. Grave finds, and particularly grave goods, can hardly be simply regarded as the paraphernalia of daily life placed in the burials since the deposited objects were selected according to certain criteria. Thus, in the case of assemblages from graves, special attention needs to be accorded to sets of artefacts in order to determine how homogeneous they are.

In the Late Neolithic burials at Alsónyék-Bátaszék in Southeast Transdanubia (Tolna Country, Hungary), sets of trapezes and blades with a rich array of chipped stones can be used as a case study for meso-scale contextual variable. The grave inventories of several burials included sets of blades and trapezes, which were often deposited together, forming a small heap which might suggest that they were originally placed in an organic container (Furholt 2025; Szilágyi 2019). The trapezes display a high degree of homogeneity, which is reflected not only

in their raw material (made from local and regional radiolarites), but also in their identical morphology and their technological similarity, and several of them physically match. As well as trapezes, there are also several refittable blades within the burial lithic material; thus, this suggests that these lithics were kept together as a set (Szilágyi 2023b). This fact could be explained either by practical reasons like labour economics; the produced blade and trapeze sets could have been stored together (probably due to a single knapping activity) until they were used. Another explanation could relate to particular burial practices, which might integrate several diverse processes with embedded meanings (Aspöck 2013; Hallam & Hockey 2018: 52-55; Parker Pearson 2005: 124-130, 142-146). Another explanation could relate to particular burial practices, which might integrate several diverse processes with culturally attached meanings; this could be reflected in the importance of left-right sides, deposited items around some body parts, specific selection of objects and deliberate fragmentation. While there is no way of determining whether any time had elapsed between the creation of the trapezes and blades and their placement in the burial or even identifying the purpose of the lithic production, still the distinct possibility remains that these sets had been made with the express intention of depositing them in the burials (Figure 7). This is suggested in part by the refittable pieces and in part by the lack of any use-wear traces, belying their function as utilitarian objects. This deposition pattern is observable in many graves in the southeast-Transdanubian group of the Lengyel communities (*e.g.* Zengővárkony, Mórágy-Tűzkődomb) (Zalai-Gaál 2002a; 2002b; 2004; 2005; 2007; 2010).

Besides the blade and trapeze sets, the previously mentioned Lengyel burials at Alsónyék also contained large-sized or so-called macro-blades and polished stone axes, which are also represented in many further Lengyel and post-Lengyel grave sites across the Carpathian Mountains in the territory of present-day Poland. This phenomenon demonstrates macro-scale examples. These similar mortuary rites and grave good deposition customs can be noted in the Samborzec-Opatów and Pleszów-Modlnica groups of the Lengyel culture, Brześć Kujawski, Malice and Lublin-Volhynian cultures (Kadrow 2017: 72-73, 88-90; Kufel-Diakowska & Wilk 2018; Libera & Zakościelna 2011; Wilk 2006; Wilk & Kufel-Diakowska 2016; Zakościelna 2000; 2006; 2018; Zakościelna & Matraszek 2007). For instance, macro-blades are known from the following sites: Książnice 2 (grave No. 1, 4, 5), Strzyżów IA (grave No. 1, 1961), Strzyżów 26 (grave No. 1), Złota, 'Grodzisko II' (grave No. 101); and trapezes from: Jaszczów (grave No. II), Krasne Kolonia 16 (grave No. 4, 7), Książnice 2 (grave No. 1, 4, 5), Strzyżów IA (grave No. 1, 1961), Strzyżów 26 (grave No. 1), Złota, 'Grodzisko II' (grave No. 101) (Zakościelna & Libera 2007: 258, Tab. 1). As well as the similarities in trapeze and macro-blade deposition, flint retouched blade daggers occur in the grave assemblages of South Poland but for now are unknown in the Carpathian Basin. The retouched blade daggers display some differences at macro-scale level; these objects were more often made from Volhynian, Chocolate and Świeciechów flint which are often interpreted as valuable erratic prestigious flints (Zakościelna 2006). Anna Zakościelna argued that the lithic items made from these raw materials indicate a higher social status (mostly adult men), which could be an explanation for why there are some differences in the lithic depositional structure, thus partly also modifying the placement of the lithic items within the grave.

It is necessary to mention that in multiple cases the adult age group of the population is overrepresented and, in many cases, the lack of anthropological analysis of the biological sex means that sex was determined by the position and placement of the human skeleton. Nevertheless, I would like to emphasize one of the most significant elements of the burial ritual, namely that these lithic items had an exact place inside the burial which is consistently repeated as a clear pattern in different periods and regions. The example of the burial ritual of Lengyel and post-Lengyel communities demonstrates that a new lithic item (retouched blade dagger),

and presumably the thought process associated with it, changed the previously used structured deposition habits, not only in terms of the design of the sets but also their placement pattern.

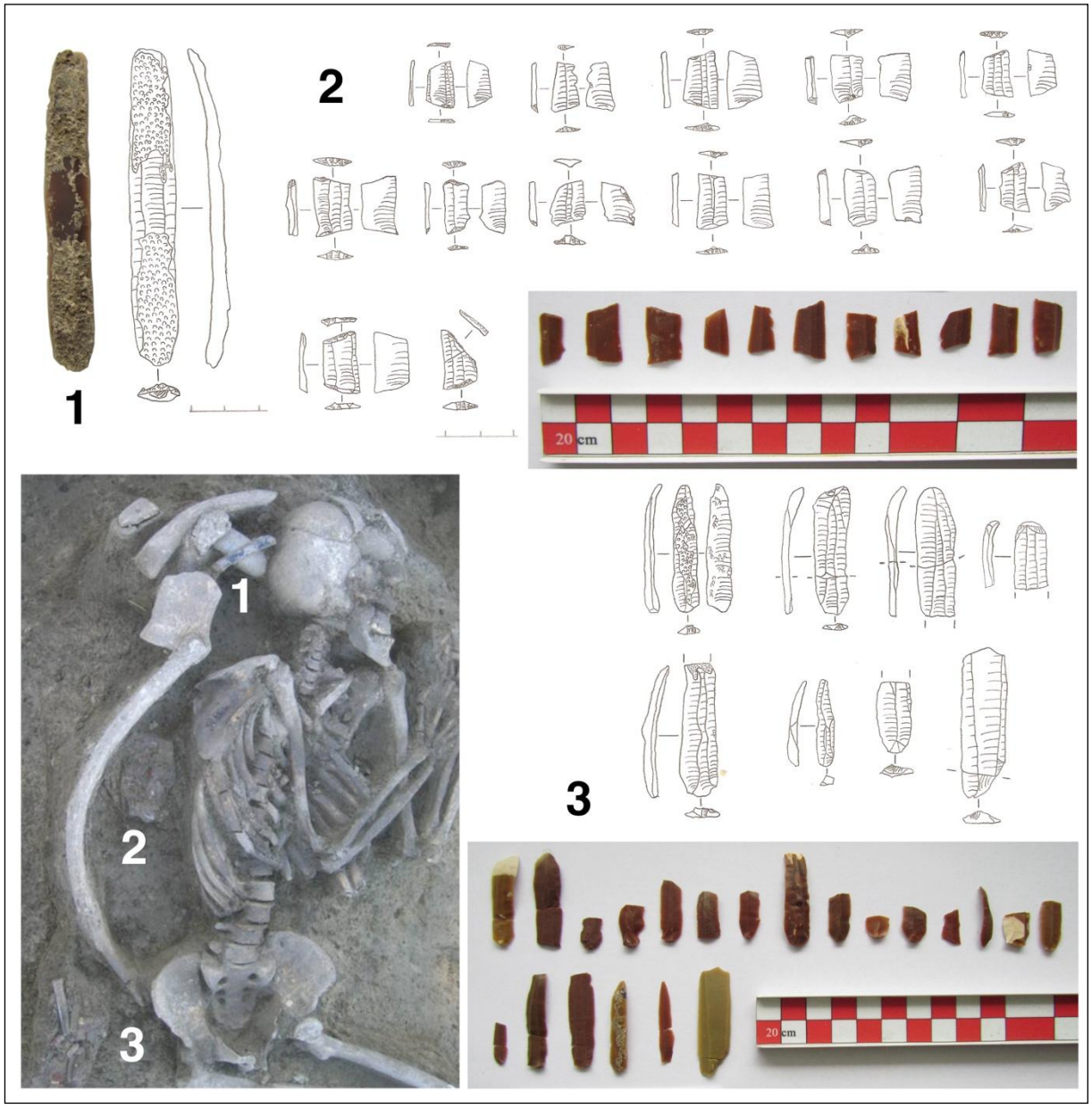

Figure 7. The sets of trapezes and blades placed in a small accumulation near the upper body and the pelvic bone in grave No. 927 at the site of Alsónyék-Bátaszék (photograph by the author). The numbers indicate the position of lithics in the burial.
Abbildung 7. Die Trapeze und Klingen in einer kleinen Konzentration in der Nähe des Oberkörpers und der Beckenknochen im Grab Nr. 927 in Alsónyék-Bátaszék (von der Autorin erstellt). Die Nummern geben die Position der Silexartefakte in der Bestattung an.

Altogether, the archaeological context reflects intentional behaviour involving the placing of lithic objects into the earth in a specific order and burying them so that they are no longer visible. This kind of final action involving the selected items can be seen as a manipulation driven by the habit of a community.

4.5. Boundaries based on habitual variables

Habitus is a social concept introduced by Pierre Bourdieu in the 1970s, aiming to understand patterns of social practices (Bourdieu 1977: 72-86; 1990: 52-65). It can be viewed as an unconscious reproduction of an individual´s sociocultural environment structuring her or his worldview, taste, attitude and courses of action. It is also inscribed into a person´s abilities. We can use this concept to scale activities with lithics from individual motor skills and cognitive and psychomotor knowledge across group habits culminating in a more durable transgenerational technological tradition. Structuring habitual variables can help us level different internalised social structures that shape an individual's life (established over time through personal experiences) and the cultural practices that have governed and been shaped over generations.

Finding archaeological evidence for individual skills and knowledge as micro-scale habitual variants is quite challenging, as the number of case studies identifying a single knapper is limited. Experimental knapping research is of particular importance by providing comparable evidence with archaeological materials for the finest technological signs and enabling us to recognise them. Moreover, it allows us to reconstruct the technique, the tools used for removal and the body position of the knapper, besides recognising the cognitive and psychomotor knowledge and the ideational and motor skills of an individual (Pelegrin 2006; 2012). The technological traces of neuropsychological capacities give information about the underlying elaborate tool production activities and get to know about the apprenticeship, the mental operations and decision making involved in the applied debitage concept (Pelegrin 1990). Certain lithic craft products can be seen as the work of highly skilled individuals, for instance, flint daggers or macro blades, also called superblades. These superblades, which are characteristic of the Neolithic and Copper Age periods, are not very common but very significant finds in Central-Southeast-Eastern European graves (*e.g.* Tiszapolgár-Basatanya, Tibava, Varna, Durankulak) (Budziszewski 1999; Dzbyński 2008; 2011). However, macroblades occur on LBK to Corded Ware sites, that is to say from the 6th to the 3rd millennium BCE (Migal 2006: 387-388). The removal of blades, sometimes over 40 centimetres long, requires specialised knowledge and a high degree of skill, and can, therefore, offer the possibility of identifying a single specialist. The use of the pressure blade technique or lever pressure debitage and additional tools, such as crutches and anvils, was needed to remove the blade from the carefully prepared core with targeted and continuous force and proper control (Manolakakis 2005; 2017). Laurence Manolakakis pointed out that these superblades were made by ´master knappers´ and the number of specialised workshops was very limited. This means that it may be possible to study the social hierarchy and the meaning-symbolism of these items and, thus, the mental-cognitive aspects behind them (Manolakakis 2017: 276-279).

I use the deposition of Late Neolithic adzes and chisels made from “white stone” or "light white stone" as a case study of habitual variables and their boundaries. In the archaeological literature, the name "Vinča white stone" is often used, which in itself assigns the range of interpretation of stone raw materials and tools made from them to the Vinča communities. An article by Dragana Antonović published in 1997 can be considered as a starting point, in which she describes the mass-produced adzes and chisels, Neolithic sites and possible geological sources in the Central Balkan region; she also coined the technical term "light white stone" (Antonović 1997). The raw material source of the "light white stone" is known from geological literature, but to date no targeted field survey has been carried so we do not know the nature of the former extraction. The adzes and chisels representing the Vinča period (5450-4500 BCE) are known mostly from domestic contexts in settlements found in present-day Serbia and Bosnia-Herzegovina, (*e.g.* Gomolava, Selevac, Vinča, Belovode, Obre, Divostin, Obrež, Lađarište) (Antonović 1997; Antonović *et al.* 2005; Voytek 1990). In recent years, Vidan Dimić

has carried out traceological studies on polished stone tools from the Lađarište site and has argued that a significant proportion of them were used for woodcutting and woodworking (Dimić 2015: 66, fig. 24). White stone adzes and chisels were also found north of the Drava from the graves of Late Neolithic Lengyel communities (Alsónyék-Bátaszék, Lengyel-Sánc, Zengővárkony, Villánykövesd, Mórágy) (Figure 8), and some examples are also known from the Late Neolithic tell settlements associated with Tisza communities in the Great Pannonian Plain (Alföld) (Tápé-Lebő, Hódmezővásárhely-Gorzsa, Polgár-Csőszhalom), but their Balkan origin has not yet been proven due to a lack of petrological analyses of the raw material (Raczky *et al.* 2022: 320, fig. 2; Starnini *et al.* 2015). Based only on macroscopic research of these Lengyel and Tisza assemblages, the origin of the white stone can be linked to the Vardar zone, which can be located in the area of Fruška Gora, Šumadija, Zlatibor, Kopaonik in the Western Balkans (Antonović 1997; 2003; 2006; Antonović *et al.* 2005; Robertson *et al.* 2009; Szakmány *et al.* 2021; Szilágyi *et al.* 2022; V. Szilágyi *et al.* 2023). Fruška Gora in Serbia and Srednja Bosna in Bosnia-Herzegovina are the closest geological sources to Alsónyék, but the comparison of archaeological and geological samples remains an ongoing task destined to continue for a few years (Szilágyi *et al.* 2025). In addition to the difference in the archaeological context, another important discrepancy is that the Serbian artefacts show a much larger size range, while the lithic grave finds from south-eastern Transdanubia are much smaller, indeed in many cases they are so small as to be unusable. Based on all of this information, we can suggest that these lithics probably had a symbolic meaning, the objects themselves exchanged between the Vinča and Lengyel communities, however, their different use and deposition suggest different (social and ritual) values. American anthropologist David Graeber emphasized the importance of social values (in plural!) in his book published in 2001 (Toward an Anthropological Theory of Value), and also mentioned that economic value is often mistakenly used or taken in an exclusive sense. He notes that to understand the significance of an object, one must first map the value system of the community that uses it, actively influences it and buries it (Graeber 2001: 14-15). In other words, "light white stone" items cannot be assumed to have a specific meaning; the values of the objects, and thus their different depositional patterns, were associated with the mental map of the Vinča and Lengyel communities.

To sum up, my goal has been to demonstrate the different social values which we can assume lie behind selected objects, in this case lithic artefacts, in a grave context. Craft products can be seen as specific masterpieces, illustrating a high degree of technological knowledge, which is related to the excellent mental skills of a lithic expert. The different depositional patterns of the same kind of exchanged lithic artefacts indicate the divergent concepts of value of the communities involved, which are rooted in social practices and an unconscious reproduction of an individual´s sociocultural environment.

5. Conclusion

In this paper, I have argued that lithic assemblages, especially in combination with other material categories such as pottery can significantly improve our understanding of boundaries. Specifically, I have illustrated five different dimensions in which lithic assemblages can be used to explore phenomena of delimitation, contributing to constitute boundaries of different kinds. First, we saw that lithic assemblages serve as good temporal markers and that the technological approach of lithic analysis has the extra potential of being able to identify single, continuous and regularly repeated actions involving stone artefacts. Second, the spatial distances between settlement and raw material sources or transmitting communities, in combination with our knowledge about procurement activity, provide a dynamic view for recognising the degree of mobility and spatial reach on different scales. Third, the contextual analyses of depositions of lithics and their provenance can show the community's selection of stone tools that are active

participants in the burial ritual, thus indirectly and actively influencing the community's group identity and communicative memory, while lithics found in the domestic context highlight the importance of the connection with the contemporaneous translocal communities in the adjacent region. Fourth, the context of archaeological artefacts reveals intentional or non-intentional behaviour involving the placing of lithic objects in a specific order or random manner and then burying them so that they are no longer visible. When the final action involving the selected items can be seen as an intentional manipulation, which is related to the habit of a community. Fifth, I have sought to demonstrate the different social values which we can assume lie behind a selected group of material, like lithic artefacts, in a grave context. Craft products can be seen as specific masterpieces, illustrating a high degree of technological knowledge, which is related to the excellent mental skills of a lithic expert. The different depositional patterns of the same kind of exchanged lithic artefacts indicate the divergent value concept of the communities, which is rooted in the mental background of a community, and which can also indicate different spatial and temporal extents.

Figure 8. Two adzes made of light white stone deposited in graves (top: grave No. 4295, bottom: grave No. 3949) at Alsónyék-Bátaszék site (photograph by the author).
Abbildung 8. Zwei Dechsel aus hellweißem Stein, deponiert in Gräbern (oben: Grab Nr. 4295, unten: Grab Nr. 3949) auf dem Fundplatz Alsónyék-Bátaszék (von der Autorin erstellt).

There is no question that borders will be used in archaeological narratives as well, but instead of only looking at the separating and connecting function between the comparative

social units, we should apply a dynamic multiscalar approach to understand such complex and often multi-layered phenomena as boundaries. In this way, we can consider boundaries as being 'fluid' and flexible and look at social groups as ever- changing and moving actors of the chain of actions. Hence, we might be closer to recognising fine social-temporal-mental changes and understanding the previous transformational processes along with their triggers. We need to consider multiple variables in light of the fact that the studied social units and their archaeological materials were constantly being shaped by environmental-economic-social influences, which require a dynamic multiscalar approach for understanding prehistoric human behaviour.

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Data accessibility statement

The author confirms that the data supporting the findings of this study are available within the cited articles, which are listed in the references. The lithic data for Alsónyék is related to the author's PhD thesis; these data have either already been published and cited or are contained in the unpublished PhD manuscript which is written in Hungarian. It can be consulted in the repository of the Eötvös Loránd University.
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Ein dynamischer multiskalarer Ansatz zur Strukturierung und Skalierung menschlicher Aktivitäten mit Steinartefakten

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Zusammenfassung:

Der Beitrag zielt darauf ab, die Grenzdiskussion aus der Perspektive der Lithik zu führen. In der europäischen archäologischen und historischen Forschung gab es zahlreiche Bestrebungen, eine übergreifende Definition von Grenzen räumlicher, sozialer, politischer, sprachlicher und religiöser Art zu schaffen, die vor allem im Kontext der modernen, deutlich voneinander abgegrenzten europäischen Nationalstaaten von Bedeutung ist, und diese Situation hat starke Auswirkungen auf den archäologischen Kulturbegriff. Steingeräte werden in der Regel nicht als Grundlage für dieses Kulturkonzept und seine Struktur herangezogen, die das Koordinatensystem für prähistorische Gemeinschaften war und oft noch ist. Wie können wir prähistorische Gesellschaften als soziale Einheiten betrachten und das Studium der Lithik in die übergreifende archäologische Erzählung integrieren? In einem ersten Schritt sollten wir diese künstlichen Grenzen beiseiteschieben und so viele Variablen wie möglich berücksichtigen, die das menschliche Verhalten beeinflussen. In diesem Beitrag wird versucht, anhand einiger Fallstudien einen Rahmen für die Strukturierung räumlicher, zeitlicher, sozialer, kontextueller und habitueller Variablen auf Mikro-, Meso- und Makroebene zu schaffen, der sich ausschließlich auf lithische Materialien stützt, um die Bedeutung von Steinassemblagen und Litho-Landschaften in archäologischen Erzählungen aufzuzeigen. Die Betrachtung von Aktivitäten mit Steinen zeigt, dass Grenzen sehr vielfältig und variabel sind, sie sollten nicht als Teil eines statischen Systems behandelt werden. Im Gegenteil, verschiedene Grenzen sollten als sich ständig verändernde Einheiten behandelt werden, die auf unterschiedliche Weise und auf verschiedenen Maßstäben funktionieren. Deshalb sollten wir versuchen, einen dynamischen, multiskalaren Ansatz in der Steingeräteforschung zu verwenden.

Schlagwörter: Europäische Vorgeschichte, Mesolithikum, Neolithikum und Kupferzeit; soziale Organisation; translokale Gemeinschaften; Skalen