
Revisiting the Individual in Prehistory: Idiosyncratic Engraving Variation and the Neolithic Slate Plaques of the Iberian Peninsula

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Experiments in replicating facsimiles of Late Neolithic engraved slate plaques from southwestern Iberia suggest that variation related to fine-motor skills is greater between individual engravers than within the work of a single engraver. This implies that the work of different individuals producing certain classes of material culture may be distinguishable on the basis of repetitive, idiosyncratic traits. These studies also generate otherwise unobtainable information about the experience of plaque making. We examine past and present methodological attempts to differentiate unconscious, individual styles from intentional, culturally mediated styles, and discuss why in some cases it is extremely difficult to separate such variation. We explore the link between individual variation and theoretical notions of the individual, and its implications for understanding the organization, transmission, and shared expression of ancient social practices.

Introduction: tracing individuals

For archaeologists, the individuals who lived in the past are often no more than an abstraction, lost in the mix of patterns that subsume them. Because of the palimpsestic nature of the archaeological record and the normative models used to interpret it, material culture is often treated as a mass of facts behind which individuals and their decision-making processes remain hidden (Tringham 1991; Whittaker 1987). In order to avoid an account of the past as a dynamic process which is 'somehow devoid of people' (Pauketat 2007, 42), some archaeologists have focused on reconciling the meaningfully constituted actions of individuals with the larger structures which constrain them. Although individuals may play only a small part in these social and environmental processes, they are not 'cultural dopes' (Garfinkel, in Outhwaite 1990, 64), but rather shape social practices to cope with a host of historical circumstances not of their choosing (Marx 1978 [1851], 595; Giddens 1979; 1984, 281; Sewell 1992; Barrett 2001). Until recently, archaeologists interested in accounting for the recursive relationship between

processes and individuals had little recourse: although agency concepts were rich theoretically speaking, few methodologies were attuned to addressing specifically archaeological data and research interests (Dobres & Robb 2000, 14). There have been relatively few attempts to improve this imbalance, a process hampered by basic disagreements about the meaning and merit of the concept of the individual (see Whittle 2003, 50–54; J. Thomas 2004; Knapp & van Dommelen 2008), and a marked gap between these 'theoretical individuals' and possible archaeological methods for discerning them. One avenue that has demonstrated the potential to give dimensionality to individuals – however we may define them – is the study of the highly personal and idiosyncratic ways in which people tend to produce objects.

Historically, studies of intra-individual (within individual) versus inter-individual (between individuals) variation have focused predominantly on craft specialization, which often served as a proxy or barometer of social complexity. Studies of individual variation have also contributed to how archaeologists conceptualized material variation, skill or stylistic

qualities (Hill & Gunn 1977b; Wiessner 1983; Whittaker 1987). These studies proposed ways in which to distinguish and categorize individuals via unique aspects of their motor abilities and performance skills, and how this information reflects social and economic organization. Ultimately, the goal of processual research related to the individual was to develop new analytical tools to understand site dynamics in the archaeological record more effectively: exchange and distribution relationships, burial relationships, the organization of labour, the movement of people, factional affiliation, etc. (Hill 1977, 58–9). Individuals were not necessarily being examined for their own sake or in light of their own motivations, and thus in many ways remained highly atomized or hollow.

More recently, tracking prehistoric signatures has been recognized as one way in which to integrate more holistically-conceived individuals into discussions of personhood (Whittle 2003; Knapp & van Dommelen 2008), specialization as a social practice rather than an economic response (Flad & Hruby 2007), and individual agency (Hodder 2000). One critique of agency with regard to individuals is that archaeological conceptions of it have been too diffuse to implement: ‘Few authors are explicit in their use of the term, nor has there been sustained consideration of basic methodological and epistemological issues so as to make it applicable and appropriate to the premodern past.’ (Dobres & Robb 2000, 3). In addition to this, ‘agency’ and ‘individual’ have often been used interchangeably, even when it is clear that the terms are not synonymous (Moore 2000, 260). Thus it is important to point out that our examination of individual variation is not necessarily the same as ‘doing agency’ (*sensu* Dobres & Robb 2005). Agency does not look at specific individuals *per se*, but seeks to explore qualities, relationships or resources that individuals require in order to enact change (Miller & Tilley 1984; Shanks & Tilley 1987; Sewell Jr. 1992; Hodder 2000). However, the methodological aspects of incorporating individuals and individual agency into our understanding of prehistoric social organization require that archaeologists at some level confront the ‘faceless abstraction’ (Whittaker 1987, 465) with practical attempts to extricate individuals from the ‘faceless blob’ (Tringham 1991, 94). In an effort to address some of these basic methodological and epistemological issues, our study revisits previous and present attempts to distinguish individuals involved in the production of different types of material culture (Hill & Gunn 1977b; Whittaker 1987; Van Stone 2000; Ingold 2001; Van Keuren 2001; Crown 2007), and points out ways of pursuing more holistic and practically viable individuals.

The Late Neolithic engraved slate plaques

For this study, we compared the individual engraving styles of experimentally-produced slate plaques with Late Neolithic plaques from southern Iberia. The original plaques, dated to 3500–2500 BC, are some of the most enigmatic expressions of European prehistoric art. Thousands of plaques have been recovered from over 200 burials in southwestern Iberia (Lillios 2004b). While several of the largest Late Neolithic tombs contain hundreds of these objects (e.g. 167 at Escoural, 134 at Olival da Pega, 110 at Ante Grande do Zambujeiro) (Leisner & Leisner 1951, 240; Santos & Ferreira 1969), plaques are usually discovered one at a time or in small groups (Rui Boaventura pers. comm. 2006). With the exception of Águas Frias (Évora), where the entire *chaîne opératoire* of plaque production is attested to (Gonçalves & Calado 2006), plaque workshops are absent from the archaeological record. Thus a single modality for plaque making is unlikely. It appears that a spectrum of plaque making existed across different production contexts, perhaps culminating in their ritual production at the largest megalithic tombs by the end of the Late Neolithic.

In the past, plaques have been interpreted as depictions of the European Mother Goddess (e.g. Almagro Gorbea 1973; Rodrigues 1986a,b; Gimbutas 1991; Gonçalves 1992; 1999), as heraldry (Lisboa 1985; Schuster *et al.* 1986; Schuster & Carpenter 1996), or as ethnic identifiers (Bueno Ramírez 1992). Based on an analysis of over 1300 plaques catalogued in ESPRIT, *The Engraved Stone Plaque Registry and Inquiry Tool* (<http://research2.its.uiowa.edu/iberian/index.php>) (Lillios 2004a), Lillios has suggested that the majority of the plaques functioned as mnemonic or genealogical markers (Lillios 2002; 2003; 2004b). When found with an articulated individual, the engraved plaques are usually placed on the chest of, or next to, the skeleton (Gonçalves 1999, 87). Because of the commingled nature of the skeletal remains, and their generally poor preservation, it has not been possible to determine whether there is a correlation between the age or sex of individuals and the type or motifs of the plaques. Because the minimum number of individuals (MNI) in a tomb is always higher than the number of plaques recovered (Spindler 1981, 224; Silva 1999, 356–7), it is clear that not everyone in the Late Neolithic was interred with a plaque. This suggests that they might have been a ritual or prestige object, or restricted in some other sense. The existence of social differentiation in southern Iberia during the Late Neolithic is consistent with our understanding of the period as one of fluctuating agricultural dependence, population

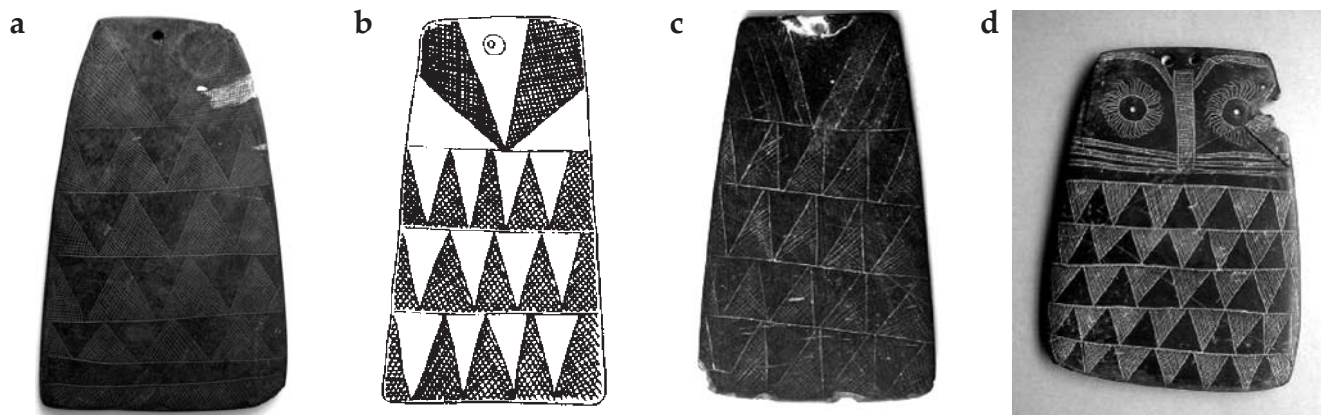


Figure 1. Examples of southwestern Iberian Late Neolithic engraved slate plaques: a) the Late Neolithic Classic plaque from Pedra Branca, Portugal used as a template in this experiment; b) a variation of this very common design from Pedra Branca (Ferreira et al. 1975, fig. 11, 8); c) a similar variation from a Late Neolithic tomb at Praia das Maças, approximately 65 km distant from Pedra Branca; d) a biomorphic plaque which incorporates another variation of this triangular motif from Valencina de la Concepción, located over 450 km away in Spain.

aggregation and sociopolitical integration and fragmentation (Gilman 1987; Chapman 1990; Díaz-del-Río 2004; Díaz-del-Río & García Sanjuán 2006). The part of the plaques in this process is less clear.

With a few exceptions, Late Neolithic plaques are made from slate. They are about the size of a hand (c. 15 cm high), and perforated with one or two holes at the top, ostensibly for cordage. Most are thin (c. 0.5 cm), trapezoidal and engraved on one side, although some plaques are partially or completely engraved on the obverse side. Typically, these engravings conform to a fairly specific repertoire of design elements: zigzags, triangles, chevrons, checkerboards, herringbones and occasionally zoomorphic or anthropomorphic imagery (Lillios 2004b). This decorative imagery is found on other classes of Iberian Neolithic material culture, such as megalithic art (Bueno Ramírez 1992; Bueno Ramírez & Balbín Behrmann 1992; Bradley 1997; 2002), limestone figurines, and ceramics, as well as on later Bell Beaker ceramics (Harrison 1974, 105). Though the engraved plaques represent a coherent element of a larger corpus of Iberian visual imagery that existed prior to and following the Late Neolithic, relatively little is known about plaque making as a social practice or type of ritual specialization. While archaeologists have contested the meaning of plaque imagery, it evokes other Late Neolithic material culture such as stone axes, dolmen orthostats and capstones, ceramics, basketry, textiles and other woven materials (Lillios & Thomas in press). Thus, although the plaques are contextually associated with death, their form and imagery simultaneously reference aspects of Late Neolithic domestic life (Bradley 2005).

As a material, slate lends itself to archaeological and experimental analysis. Slate is a durable but easily worked material: it is malleable and highly responsive to engraving tools of varying hardnesses. Incisions made on slate tend to endure even in harsh conditions, and to some degree record the directionality and force of the motion that created them. Against the dark lustre of slate, engraved lines appear much brighter and are easily analysed visually or with microscopy.

By producing a large set of replicas of a single plaque, we hoped to hold as many aspects of variation — material, functional, technological, and decorative — as constant as possible, and thus better interpret variation in archaeological assemblages (which we have done for two Late Neolithic sites, Pedra Branca and Granja de Céspedes; see below). This research more broadly allows us to sort out the organization of their production and the character of plaque-making expertise — that is, whether plaque makers might have been ritual or independent specialists (or otherwise). Although we focus on a specific data set here, the results of this study have implications for understanding the dynamics of individuals involved in social practices at other times and places.

Previous approaches to identifying individuals in prehistory

During the mid-1970s, archaeologists developed statistical techniques to differentiate and identify the work of different craftspeople through experimental and ethnoarchaeological analyses of repetitive, idiosyncratic variations related to individual fine-motor

skills. An outgrowth of a 1974 Society for American Archaeology (SAA) symposium, Hill & Gunn's *The Individual in Prehistory: Studies of Variability in Style in Prehistoric Technologies* (1977b) illustrated that it is possible to isolate the work of an individual reliably by analysing pottery designs (Redman 1977), pottery painting (Hardin 1977; Hill 1977), flintknapping styles (Gunn 1977; Johnson 1977), basketry (Adovasio & Gunn 1977; Croes & Davis 1977) and handwriting (Hill 1977). These analyses were predicated on the concept that variability related to an individual's fine motor skills is (a) unique, (b) largely unconscious and, therefore, unlearned and nontransferable, and (c) separable from culturally-mediated variability.

This approach to identifying individuals was not a new one. Although *The Individual in Prehistory* was the first unified attempt to present this method within a replicable, processual framework, the isolability of unique aspects of a person's work had been known for over a century. In the late nineteenth century, the art historian Giovanni Morelli first used the repetitive, idiosyncratic manner in which different artists depicted small details in their work to verify the identity of Renaissance painters. The Morellian method was subsequently introduced to English-language scholarship largely under the auspices of critic Bernard Berenson, who championed the notion that individual artists and schools could be identified through a close scrutiny of faces, hands, spatial relationships, tone and other details (Berenson 1962; Campbell 1980; Muller 1977). A modified version of the Morellian method later flourished in Classical archaeology, specifically in Attic black-figure and red-figure vase connoisseurship, through the work of John Beazley and scholars who applied Beazley's methodology (Beazley 1956; 1963; 1971; Sourvinou-Inwood 1975; Whitley 1997).

Applying a motor-performance framework to tracing individuals in the archaeological record has found a more recent application in the analysis of lithic assemblages. Because individual flint knappers tend to have highly repetitive and idiosyncratic ways of knapping, certain types of variation within lithic assemblages can be used diagnostically. Like Gunn (1975; 1977), Whittaker (1987) was able to use flake-scar patterning, an attribute of flint-knapping variation which is idiosyncratic to the individual knapper and not consciously controlled, on points from Grasshopper Pueblo in east-central Arizona (c. AD 1300–1400) to illustrate that the flint knappers in residence there were not occupational or even highly-skilled specialists. By distinguishing between separate knappers, Whittaker illustrated that point

assemblages from several contemporary graves were not produced by a few specialists, but by at least 16 different knappers, 'some clumsy, most ordinary, and a few capable of superb work' (Whittaker 1987, 475). Without an understanding of which aspects of point variation flint knappers could intentionally control and which aspects they were unconscious of producing, this determination would not have been possible.

Individual variation has also been used to discern the work of distinct Mayan glyph carvers. Van Stone (2000) differentiated the work of seven artisans in a group of carved glyphs on the Temple XIX Platform at Palenque. By analysing highly repetitive glyphs elsewhere at Palenque, Van Stone found that although Mayan glyph carvers shared a 'house style', a variety of individual styles was clearly evident when the same glyphs within a tableau were juxtaposed with each other. Outside the field of archaeology, motor-specific variability in handwriting was and continues to be used by forensic scientists to verify the identity of individuals in legal cases (Srihari *et al.* 2002).

Revisiting the individual in prehistory

Despite its utility for understanding social organization and site dynamics, *The Individual in Prehistory* did not have a large-scale impact outside research in the American Southwest for several reasons. Although the book was successful in showing that motor-related variation was demonstrably greater between individuals than within the work of a single individual, it was less clear how distinguishing 'individual styles' from 'group styles' contributed to the volume's ambitious goal of developing a broader theory of style (Hill & Gunn 1977a; Hill 1977, 99) or form (Plog 1977, 17–20). This was one of the primary criticisms cited in reviews shortly after the book was published (Bayard 1978; Kaplan 1980).

Although the methods developed by the authors neatly wedded experimental archaeology and ethnoarchaeology with the tenets of the New Archaeology (Bayard 1978, 680), the scale of analysis — the individual — was not seen as particularly valuable for answering large-scale processual questions. Similar to earlier considerations of individuals within culture history, there was limited space for individuals in processual archaeology, with the exception of rather one-dimensional forms at the top of social hierarchies (Big Men, chiefs, etc.) (Whittle 2003). At the time, differentiating the actions of specific individuals in the archaeological record was also not an attractive concept to proponents of systems theory, neoevolutionary or ecosystems perspectives, all of which had been

relatively successful in using normative frameworks to explain cultural phenomena.

Alternately, interpretive archaeology has also 'not done very well by the individual' (Whittle 2003, 51). Despite its potential applicability as a practical methodology for looking at individual variation within the context of social practices, the research presented in *The Individual in Prehistory* was not embraced by archaeologists interested in agency or in practice theory, both of which were emerging as influential forces at the time (Giddens 1984; Hodder 1986; Shanks & Tilley 1987). On the surface, the results of *The Individual in Prehistory* would seem to be complementary with interpretive efforts to understand how the choices of human agents relate to larger social structures. Perhaps because of its theoretical orientation or perhaps simply because of poor timing, *The Individual in Prehistory* methodology was not recognized by post-processual archaeologists, despite their vocal interest in individuals. A disconnect between theoretical and methodological individuals, or a lack of consensus on how to operationalize this relationship, rendered many early interpretive enquiries into individuals hollow and faceless (Whittle 2003, 52).

Another reason that many archaeologists have been reticent to build on the work developed in *The Individual in Prehistory* is an uncertainty about whether the discipline should be trying to identify the work of *specific* individuals in the first place. Conceptualizations of the individual were first recognized as central to agency through discussions in which the term 'individual' became a sort of stand-in for *intentionality*; subsequent to this, an emphasis was placed upon the individual's potential for novel action as a move away from behaviourist or deterministic perspectives (Hodder 2000, 22). Later, agency came to be seen as the potential which an individual could bring to bear to affect change (Shanks & Tilley 1987). Ultimately, it now seems to be accepted that no interpretation of the past is complete without some reconciliation between individual action and large-scale processes (Hodder 2000). Although Hill and Gunn stated that they were concerned with differentiating the actions of individual people in the contexts of these processes (Hill & Gunn 1977a, 4), with the exception of Plog's chapter, 'Archaeology and the Individual' (1977), the volume had very little to say about the theoretical individual, or at least its linkage to the methodology in question. Most importantly, no distinction was made between the universal capacity for individual action, consciousness or agency (i.e. 'individuality') and the intentional styles through which this capacity is actualized (i.e. 'individualism') (see Rapport 1996; Whittle 2003 for a more detailed discussion).

In our view, studies of individual variation in some ways lend themselves to methodological approaches to agency precisely because of their scale of inquiry. As Dobres & Robb have pointed out, agency has been difficult to implement partly because its archaeological applications are still in the process of being worked out (2000, 3). We suggest that fine-grained examinations of variation are in part an answer to what Hodder has cited as the 'long-standing inability of the discipline to cope in theoretical terms with the individualized and with the small-scale' (Hodder 2000, 22).

Although it did not deal with the power of individuals to act, as archaeologists presently conceive of agency, one persistent misconception is that *The Individual in Prehistory* was looking for individuals in the same way that Classical archaeologists were seeking to identify Attic vase painters. Although Hill and Gunn, like some Classical archaeologists, were indeed looking for the 'hands' of artisans in the past, they were looking for the hands to *count them* – to contextualize them within a specific archaeological problem – rather than to create historical identifications (e.g. 'Kleophrades, the Attic red-figure vase painter'): 'The primary goal in this research, however, is to contribute to the development of theory, method, and technique to be used in studying human groups, populations, and organizations, not individual behavior *per se*' (Hill & Gunn 1977a, 1). While the authors in *The Individual in Prehistory* borrowed a methodology from connoisseurs such as Berenson (Muller 1977, 24–5) and Beazley, their goals were almost completely disassociated from connoisseurship and carried little of the fascination with the individual often prominent within classical archaeology (see Shanks 1996). In contrast, agency theory has neatly sidestepped this problem altogether by focusing on individuals' *potential* for action rather than the individuals themselves (Hodder 2000), embedding this concern within a recognition that people in the past were not automata, but rather calculated in their responses to their circumstances.

More broadly, these concerns reflect a larger theoretical debate within the social sciences with respect to the relative validity accorded to methodological holism, in which social or environmental systems *constrain* individual action, or methodological individualism, in which social behaviours are explained *through* individual action. Methodological individualism developed largely as a nuanced, phenomenological response to holism, long the dominant paradigm within anthropology and sociology. In many ways, agency and practice theory attempted to reconcile this divide (seen as a central problem within

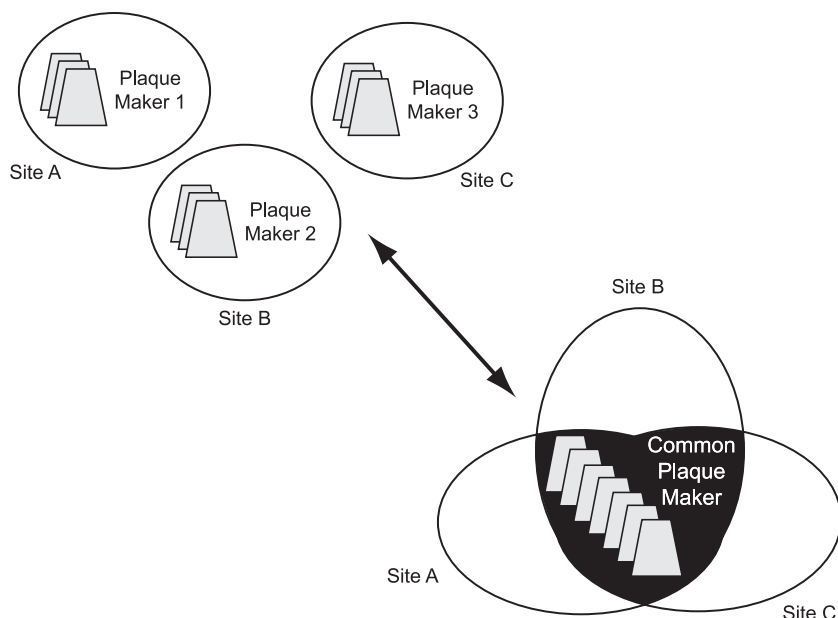


Figure 2. *Examples of plaque production scenarios.*

social theory) by demonstrating a dialectical relationship between larger social structures and individual agents in which neither can be seen as ‘trumping’ the other due to their dynamic interplay (Gillespie 2001). Archaeologists, however, have the burden of actually demonstrating this relationship, rather than simply recognizing its existence.

Exploring individuals via plaque replication experiments

This study emerges from a broader interest in how Iberian plaques reflected and shaped social practices in the Iberian Neolithic (Lillios 2004b), and builds on earlier experimental studies regarding how such objects were seen and worn in the past (Hristova 2001; Woods & Lillios 2006). Because the visual repertoire and shape of the plaques are very consistent, experimental studies offer the potential to contribute to an understanding of the production of these objects. Who was allowed to make these objects, i.e. how restricted a practice was plaque-making? Were the plaques produced as ‘one-offs’, as emulations of other plaques, or in large batches that indicate more systematic craft production, or by ritual specialists? Were many individuals involved in plaque-making, or were a handful of related individuals responsible for this relatively short-lived phenomenon? How skilled or specialized were these plaque makers? Did plaques move around the landscape, or did they

circulate predominantly within local contexts? To address these questions, the plaque-making process needs to be better understood.

In a previous use-wear experiment (Woods & Lillios 2006), replica plaques were created and worn by volunteers around their necks (using different cordage materials) each day for over a month, to determine if actual archaeological plaques showed signs of daily use. The results of these studies showed that slate, when worn in daily contexts, absorbs oils which quickly obscure lighter-coloured engraving lines. The perforations on this set of experimental plaques were also analysed in order to determine if the archaeological plaques were worn by living (and moving) peoples or suspended on a stationary object prior to their deposition in burials.

The vast majority of archaeological plaques show little to no wear on their perforations, but it was unclear whether wearing a plaque around the neck or hanging a plaque on a stationary object would leave traces of wear. The use-wear experiment on the replica plaques (both those suspended and worn by the volunteers) demonstrated that several different types of cordage leave very distinct evidence of wear not present on archaeological plaques. Because few archaeological plaques had any wear, it was concluded that the plaques were likely placed on the dead (or around their necks) at interment, rather than worn on a regular basis or suspended from a stationary position. The fact that the engraving lines on archaeological plaques are still quite bright even today suggests that they were likely worn by the dead at interment rather than in day-to-day life.

The acquisition of the raw materials was likely much easier for us than for our ancient Iberian counterparts: the slate that was used in this project was salvaged from a discarded chalkboard and thus exhibits a uniform mineral composition and colour. Because our slate is from the same source and our production methods the same, we assume that the conclusions of the previous use-wear experiment in terms of surface wear, perforation wear and oil absorption hold for the second set of replica plaques. Although we cannot presume that the various types of slate used to make the original engraved plaques found in southwestern Iberia are identical in hardness, attempts to use varied types of slates in other plaque replications have

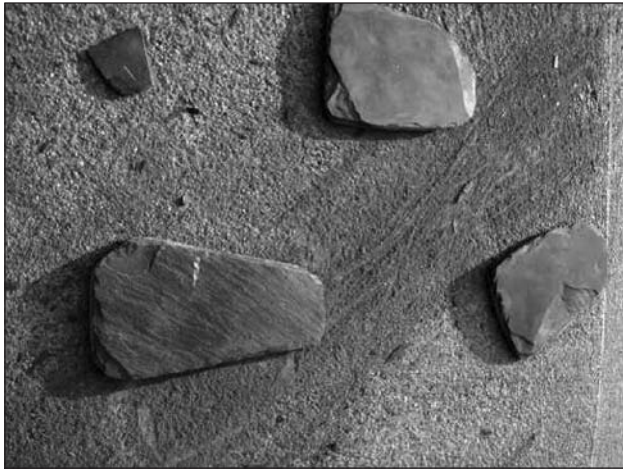


Figure 3. Replica plaques in various stages of production: plaque 'rough-outs' being ground into shape (left); polished plaque 'blanks' ready for engraving (right).

shown that most slate works, cleaves and wears in an analogous manner (Woods & Lillios 2006, 3).

The production of the replica plaques for this experiment was based on the methods employed by Woods & Lillios. As suggested by the discovery of unfinished slate plaques from Neolithic contexts in Portugal (see Gonçalves 1983–84; Gonçalves & Calado 2006) and our experimental predecessors, we began making plaque 'rough-outs' by breaking/grinding pieces of slate into trapezoidal shapes of roughly the desired size. A large stock of standardized blank slate plaques was produced. After individual rough-outs were broken into trapezoidal shapes, their edges were ground to the desired size on concrete, which was 15 cm in height, with a minimum width of approximately one-third the height, an average width of one-half of the height (7.5 cm), and a maximum width of approximately two-thirds of the height. Although it is certain that archaeological plaques were not ground on a cement sidewalk or pavement, Neolithic Iberians would have had a variety of slates, limestones, sandstones, granites and other types of coarse stones on which to grind their own plaques. After bevelling the edges of the replica plaques, a sanding pad was used to smooth the engraving face, and then a piece of leather was used to bring out the lustre of the slate surface. The surfaces of the replica plaques are, to the eye, indistinguishable from their Neolithic counterparts (although distinct surface-wear and trace elements left by engraving tools are detectable using a scanning electron microscope). It took approximately two hours to prepare a blank, unengraved plaque.

For our experiment, we asked four students to make five copies of the same archaeological plaque

from Pedra Branca (plaque no. 460 in ESPRIT: Lillios 2004a) over a five-week period. Each student engraver was a right-handed, 21- to 22-year-old male undergraduate with both limited knowledge of the archaeological plaques and no formal art training. Our selection of these age and gender classes does not reflect our assumptions about the original plaque makers. In our view it is likely that plaque makers were people familiar with the production, use and meanings of plaques, regardless of their sex, age, or skill. In subsequent experiments, we hope to include plaque makers of both sexes and handedness from a variety of ages and vocations.

Each week student plaque makers randomly selected a blank plaque and engraved it using a knapped flint burin. Flint was chosen for several reasons. While copper tools existed at the end of the Late Neolithic, they would have been difficult to obtain. Flint is a workable and durable tool that was in widespread use throughout southwestern Iberia at this time (Forenbaher 1999); flint was also used in the initial use-wear experiment (Woods & Lillios 2006). Thus, flint seemed to be the most parsimonious solution when deciding upon an engraving tool. For the fifth set of plaques, each student used either a copper or a quartz tool for subsequent microscopic analysis. We have included one plaque engraved with copper in the statistical analysis (see Fig. 6, Engraver B's fifth plaque [B5]).

Using a photograph of archaeological plaque no. 460 to work from, the student engravers were asked to copy it as closely as possible each week. The resulting twenty plaques were engraved with an identical design motif, although executed with

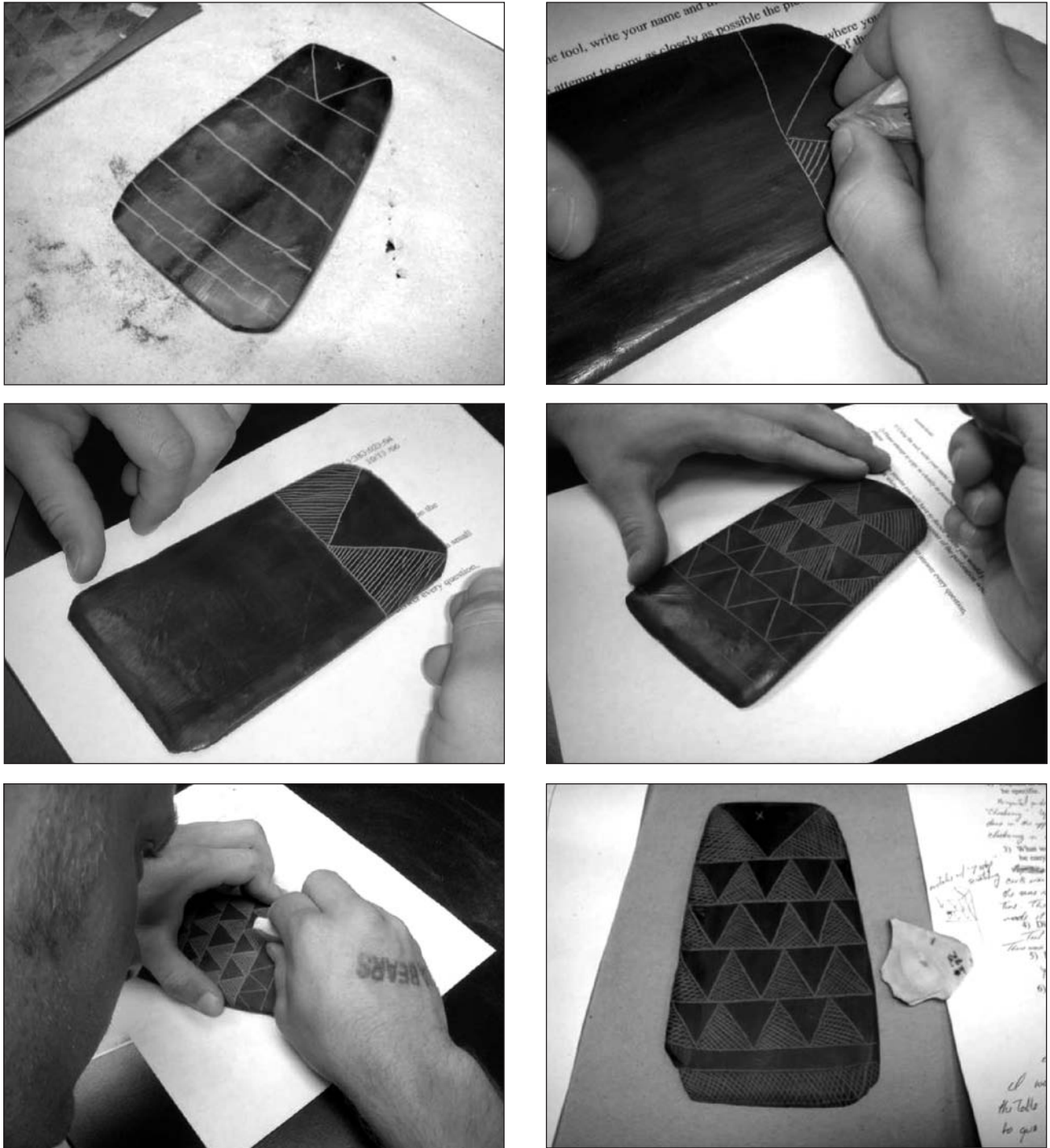


Figure 4. Student engravers at work.

individual styles. By having these ‘standardized’ students attempt to create identical versions of the same plaque using standardized blanks and tools, we hoped to hold stable as many variables as possible (gender, age, handedness, initial skill, raw material, form, implements, and the culturally-mediated style of the design motif) so that the differences in our set of replica plaques primarily reflected individual variation in fine-motor skills. The archaeological plaque selected for replication represents one of the most common types – the Classic type – and is decorated with one of the most commonly found geometric motifs, the triangle. The triangular shapes are also relatively easy to draw in comparison to some of the more complicated anthropomorphic or zoomorphic plaque motifs.

After the first week, it became clear that our student plaque makers were primarily proceeding from their mental template of the design. While they occasionally referred to the photographs, each plaque maker spent a majority of his time concentrating on engraving and only occasionally consulted the photograph for landmarks and visual verification. The engraving sessions lasted approximately 30 to 60 minutes and were followed by exit interviews.

In the exit interviews, student plaque makers indicated that replicating the design motif on the archaeological plaque was surprisingly difficult. Curiously, they showed little improvement in terms of ‘neatness’ (determined by line straightness, line parallelism, hatch spacing consistency, shape and shape-size consistency, and angular consistency) between their first and last attempts at making a plaque. Because of the difficulty of engraving, each plaque maker often took a slightly different approach in composing the elements of the motif (e.g. starting their engraving at a different point on the plaque, orienting their right hand differently, etc.). Although each student clearly developed his own individual style, some ‘oddball’ plaques were created which did not conform to their overall idiosyncratic style. Usually oddball plaques did conform to a plaque maker’s style *below* the level of design element (in line regularity or angle of incidence for instance), but diverged from their ‘holistic’ or ‘global’ style because of a serious miscalculation in spacing/proportion at the beginning of the engraving process. The student engravers also reported quickly developing a sense of ‘plaqueness’, i.e. what conventions could and could not be broken in order for the plaque to still appear acceptable. Although they were timed, our plaque makers self-determined when their plaques were completed. There was only a weak correlation between the length of time it took to make a

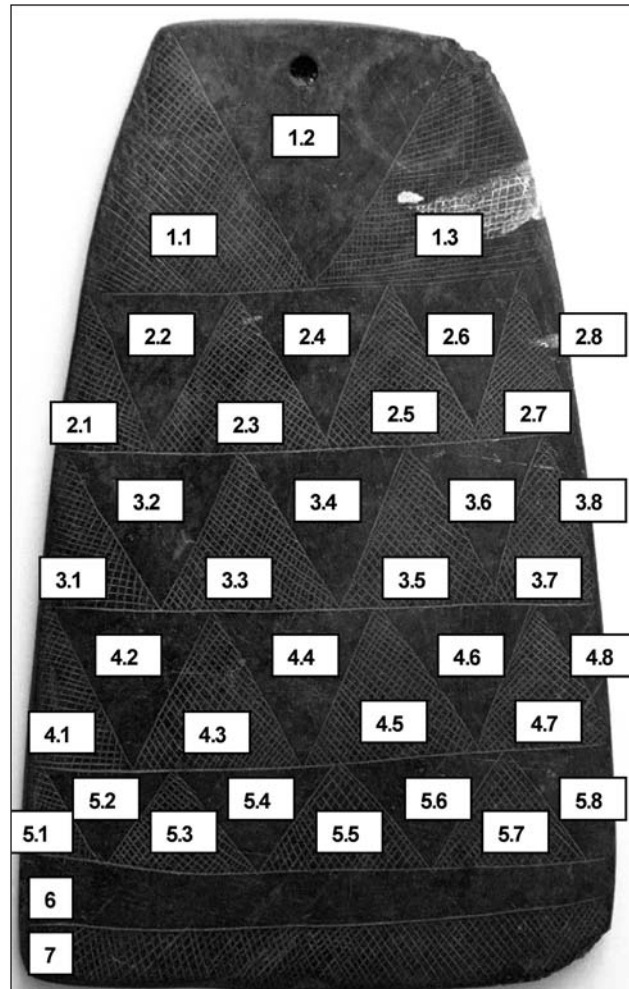


Figure 5. Archaeological plaque no. 460 with map of plaque landmarks for morphometric analysis superimposed.

plaque and neatness. One of the most expert plaque makers (Engraver B, who was easily distinguished statistically; see Fig. 6) was always the first to finish, while less-skilled plaque makers often took longer.

Analysis of morphometric data

For the purposes of discerning patterns of intra-engraver variation *vs* inter-engraver variation, a hierarchical cluster analysis was performed on measurements collected from actual plaques using digital callipers and protractors. For this analysis, plaque attributes were measured at 37 landmarks in order to see if specific clusters of variables would load on specific student plaque makers. These 37 landmarks were arrived at by dividing archaeological plaque no. 460 into a template of seven fields, which were

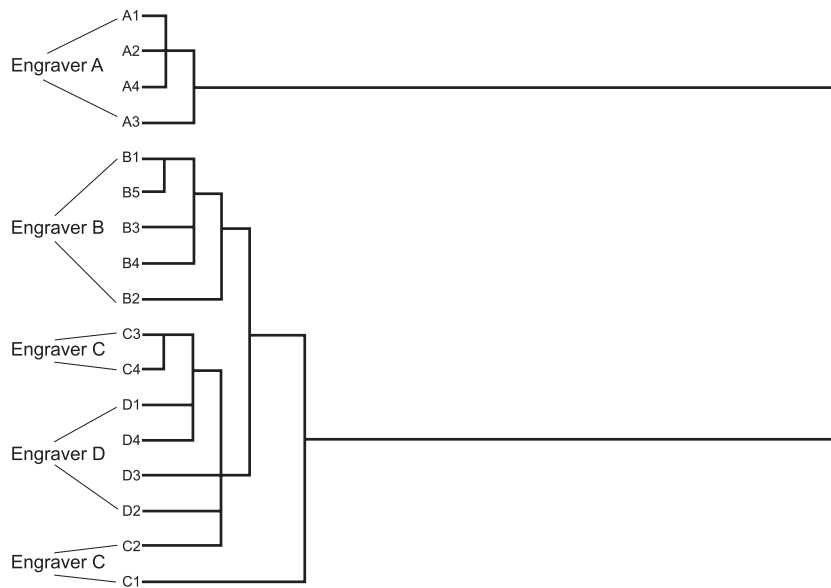


Figure 6. Dendrogram showing distribution of plaque engravers (A1 = Engraver A's first plaque, B2 = Engraver B's second plaque, etc.)

then each sub-divided into up to eight units (see Fig. 5). The morphometric data collected were primarily attributes which the plaque makers were unconscious of making: the measure of the angles of incidence of each triangle, the density of hatching per square centimetre, the height of different units in proportion to each other and to other plaques, the shape and size of quadrilaterals created inside cross-hatching, and the regularity (straightness and parallelism) of lines in each part of the plaque including the cross-hatching. In addition to the morphometric data, engraving regularity was rated using a composite index of each student's relative neatness in each unit and globally.

The initial results of the hierarchical cluster analysis showed a significant difference between inter-engraver variation and intra-engraver variation. Some plaques appeared to cluster on their respective plaque makers, showing less 'between-engraver' variation. When a second hierarchical cluster analysis was produced using only some of the morphometric attributes (engraving regularity combined with the measurements of the angle of incidence at each triangle), we were able to predict accurately a plaque maker from a plaque 75 per cent of the time.

The two most distinct plaque makers (Engravers A and B) were notable in that they displayed greater regularity in terms of the geometric shapes they were asked to engrave, and appeared to be more skilled, at least in terms of their engraving consistency. Ethnographic and experimental studies of specialists tend to corroborate the idea that patterned variation correlates

closely with skill (Shelley 1990; Stout 2002; Whittaker 1994). In our case, this meant that the more skilled the plaque maker, the easier it was for us to distinguish repeated personal details on plaques from random ones. The implication for this data set is that there is also a close correlation between the accuracy of clusters and the skill of the plaque maker. Most importantly, the results of this analysis confirm which *types* of plaque attributes can help us differentiate plaque makers, and which variables have less value in this regard.

In addition to the hierarchical cluster analysis, we wanted to see if an opportunistic sample of volunteers could sort the replica plaques by maker, and if they would do so using criteria similar to our own.

We asked 20 people (both students and non-academics, of varying ages and sex) with no knowledge of the plaques or the experiment to sort the replica plaques by plaque maker. They were given no information about how many plaque makers were involved, the number of plaques per group, or the variables used in our statistical analysis. The informal pile-sort by the volunteers was able to correctly group the plaques by maker *c.* 67 per cent of the time, somewhat lagging behind the accuracy of the hierarchical cluster analysis. One of the volunteers was able to determine that there were in fact four distinct groups of plaques, and then proceeded to attribute each plaque to the correct plaque maker. When the volunteers were subsequently informed that there was a total of four plaque makers, the accuracy of their groups for the two most skilled plaque makers (Engravers A and B) matched the accuracy of the hierarchical cluster analysis.

However, we were already aware that Morellian-style analysis works to varying degrees; what was perhaps more interesting was that our sorting-volunteers independently chose nearly the same morphometric attributes which statistically differentiated the plaque makers, such as the angles of incidence of triangles, unit height, regularity or neatness of engraving, and hatching shape and orientation. Because there was a strong correlation between a plaque maker's 'neatness' and our ability to group reliably a plaque using its morphometric attributes, these results were most promising for more technically skilled engravers. The study also provided a large number of important

insights into the experience or phenomenology of plaque making (e.g. the sense of 'plaqueness', the time, effort and concentration required, the differing approaches to engraving, etc.) that provided an understanding of the practice of plaque making otherwise unobtainable.

Plaque makers at Late Neolithic sites

The results of the study suggest that there are both quantitative and qualitative methods to distinguish the motor abilities and performance skill of different individuals. In order to see how the criteria defined for our experiment would work with archaeological plaques, we selected assemblages of plaques from two Late Neolithic burial sites, Pedra Branca (in the Portuguese Estremadura) and Granja de Céspedes (on the western border of central Spain) for analysis. These sites were chosen because they contained large numbers of plaques from contemporary stratigraphic levels (Ferreira *et al.* 1975; Almagro Basch 1961–62). High-resolution digital images of the plaques from Pedra Branca and Granja de Céspedes were analysed using tpsDig 2.10 morphometric software. This software allows digital landmarks to be assigned on different parts of an image, from which both length and angles can then be recorded. Only plaques which the authors had actually seen (as opposed to published drawings) were used in the second study, and extremely fragmentary plaques were excluded from this analysis (see <http://research2.its.uiowa.edu/iberian/index.php>). Data were collected from 25 plaques from Pedra Branca, and 19 from Granja de Céspedes. As in the replication study, plaque features were divided into separate fields and units. The same measurements which had best separated the replica plaques (angle proportions and engraving regularity) were then analysed. Each plaque was assigned a global regularity score based on the neatness (determined by line straightness and parallelism, and shape, size and angular consistency) of the engraving in each unit. The results of the final cluster analysis are shown below.

The same variables used to demonstrate plaque authorship among the experimental plaques suggest that there are between three and six potential plaque makers represented in the assemblages of both Granja de Céspedes and Pedra Branca. While it is impossible to demonstrate an exact number of plaque makers at either site, several groups of plaques are distinct both visually and statistically. Six examples of each group are shown below. At Granja de Céspedes, some plaques display 'wobbly' triangles that are distinct from all other plaques at the site on the basis of angles

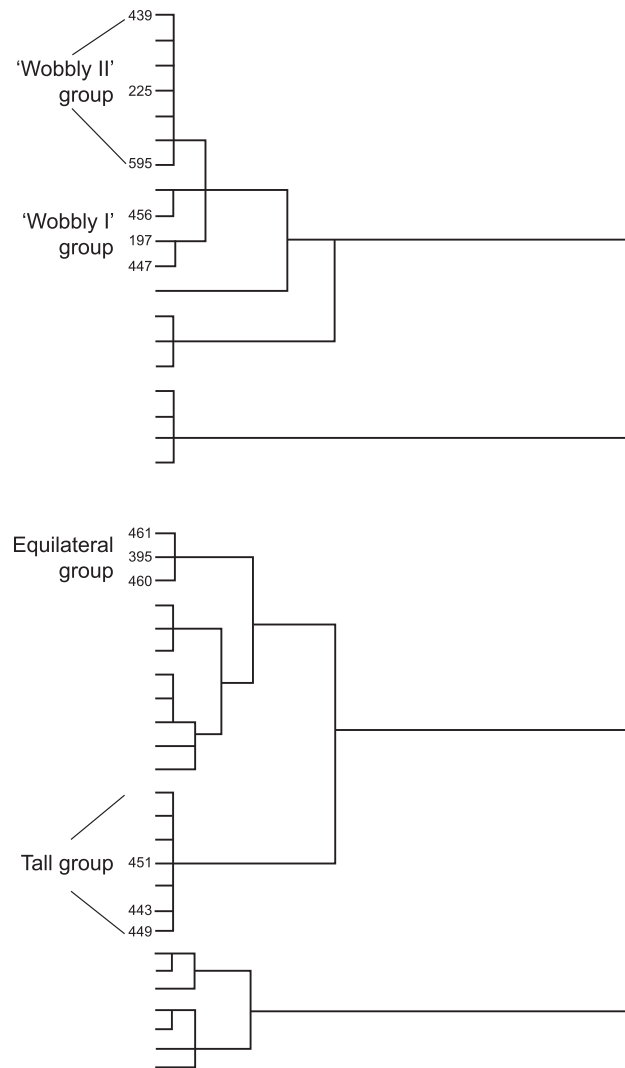


Figure 7. Dendrograms of plaques from Granja de Céspedes (top) and Pedra Branca (bottom). The Granja de Céspedes dendrogram suggests between three and six plaque makers with at least two related groups, 'Wobbly I' and 'Wobbly II' plaque makers (see Figure 8 examples). The Pedra Branca dendrogram also suggests between three and six plaque makers, with two very distinct groups, the 'Equilateral' and 'Tall' plaque makers (see Figure 9 for examples).

and engraving regularity (see Fig. 8a & b). At Pedra Branca, two distinctly different engravers are visible, the 'Equilateral' and 'Tall' triangle plaque makers (see Fig. 9).

Although it is difficult to specify an exact number of plaque makers at each site, several individual plaque makers are distinct using either a visual (i.e. Morellian) or morphometric approach. This information may be useful in understanding roughly how

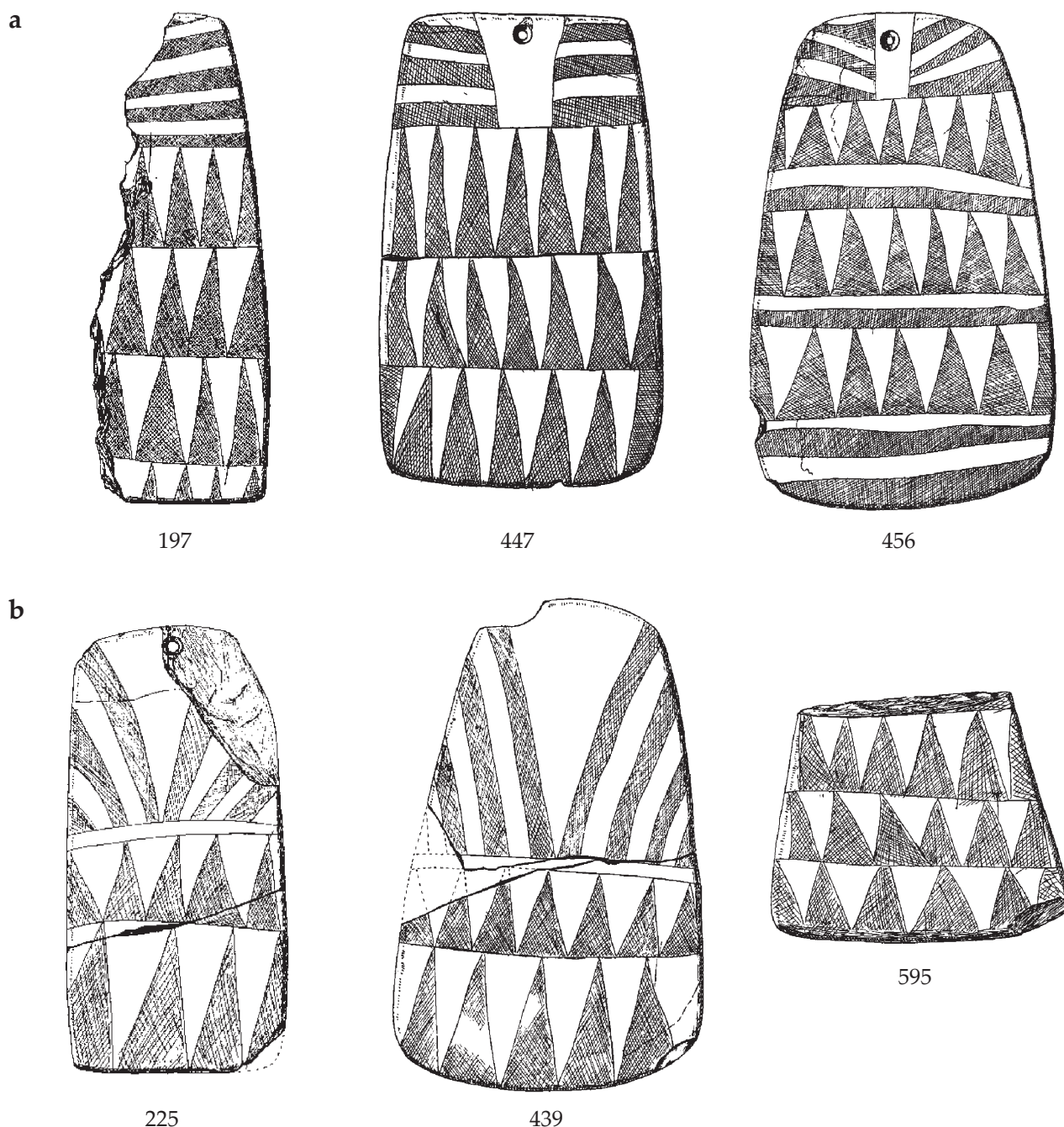


Figure 8. Six related plaques from Granja de Céspedes (out of 43 plaques found at the site). Note: Measurements were taken from actual photographs of the plaques (Almagro Basch 1961–62). a) 'Wobbly I' Plaque Maker: aside from their motif, these plaques share very similar triangle angle proportions, skill level, and cross-hatching style. The engraver also has a tendency to create long, thin, and 'wobbly' triangles of the same size. b) 'Wobbly II' Plaque Maker: this plaque maker also produces 'wobbly' triangles, but ones that are considerably more erratic in terms of line parallelism and hatching consistency than 'Wobbly I'. Furthermore, the slate used to make these three plaques is also distinct from others at the site. While both sets of wobbly plaques share affinities, their relationship is unclear.

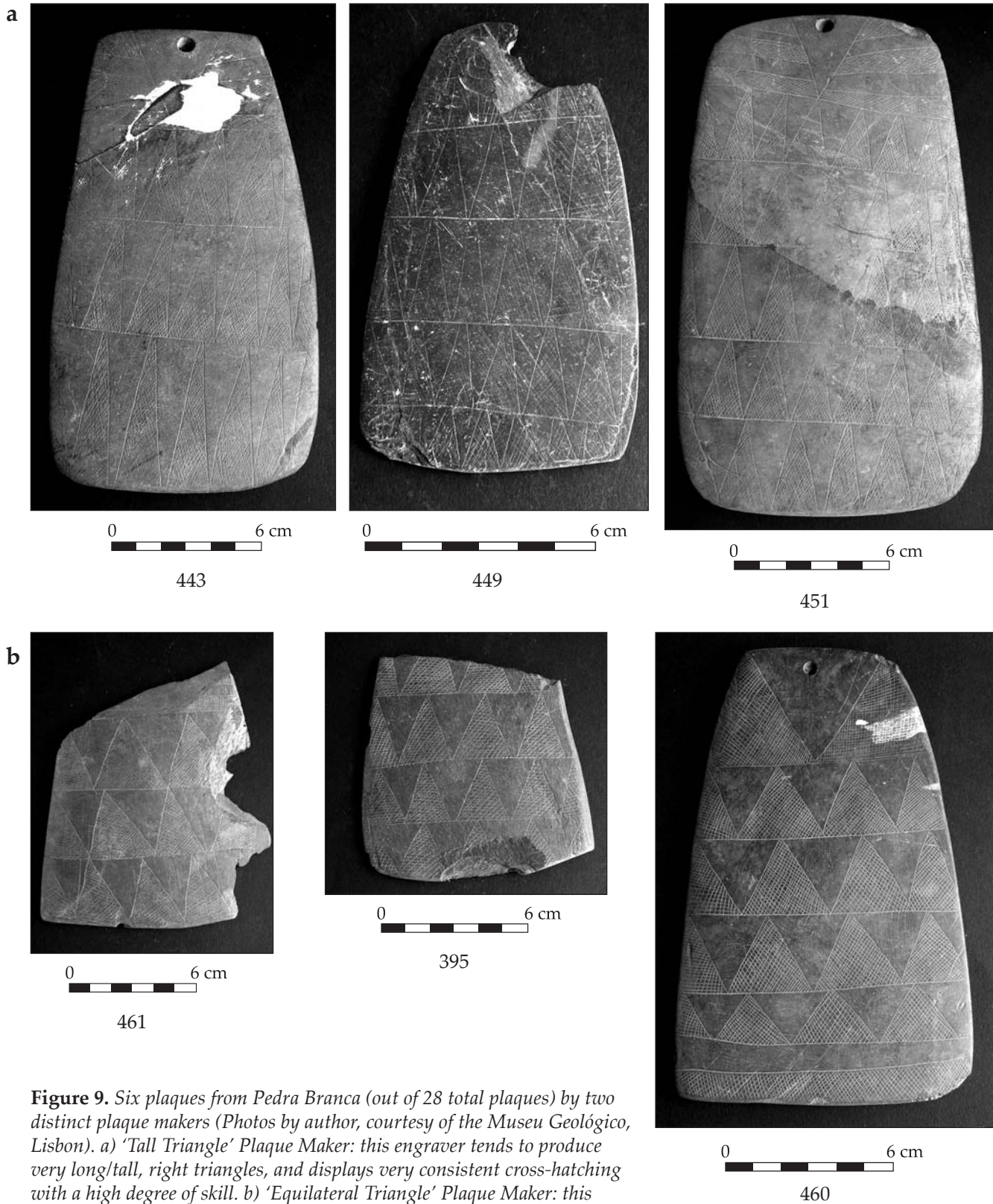


Figure 9. Six plaques from Pedra Branca (out of 28 total plaques) by two distinct plaque makers (Photos by author, courtesy of the Museu Geológico, Lisbon). a) 'Tall Triangle' Plaque Maker: this engraver tends to produce very long/tall, right triangles, and displays very consistent cross-hatching with a high degree of skill. b) 'Equilateral Triangle' Plaque Maker: this engraver produces very distinct and neatly engraved triangles which are close to equilateral or leaning slightly to the left.

many plaque makers contributed to the assemblages at Granja de Céspedes and Pedra Branca, and demonstrate that the plaques there are not ‘one offs’, but possibly created by some type of ritual specialist. This method has potential for examining the dynamics of plaque makers at very large collective tombs in southern Iberia, such as Ante Grande do Zambujeiro, Olival da Pega and Escoural, where hundreds of plaques appear to suggest prestige or ritual specialization (J.T. Thomas in press). Further studies are currently in progress for plaque assemblages from the burials at Praia das Maças and Casa da Moura in the Portuguese Estremadura.

Discussion: exploring individual variation

While this methodology has only indirect implications for examining material culture in other contexts, it does suggest that through experimentation it is easier to define characteristics which correlate well with personal idiosyncrasies related to motor abilities and performance. However, some fairly significant potential problems in its application must be pointed out.

One of the crucial difficulties which this study attempted to grapple with by experimentally reproducing idiosyncratic variation under controlled conditions was reliably differentiating motor-performance variation from other types of variation. As Redman stated in *The Individual in Prehistory*, ‘Although it is possible to identify objects that were made by the same person, it is extremely difficult to demonstrate conclusively that they were made by the same person’ (1977, 42). Indeed, if archaeologists had access to such highly contextualized, conclusive data, piecing together the past would be much easier. It has been noted that even craftspeople knowledgeable enough to identify their own work and that of other individuals are often at a loss as to how they do so (Longacre 1981; Wiessner 1983).

In *The Individual in Prehistory* this was done by trying to locate or isolate individual variation at a scale lower than that of specific design elements (Gunn 1977; Hardin 1977; Hill 1977; Muller 1977). In Whittaker’s study of individual variation at Grasshopper Pueblo, he separated variation into two distinct types: those which produced *attributes of execution* and those which produced *attributes of form* (1987). Individual variation (or individual styles) typically produced *attributes of execution* — unconscious and largely unlearned attributes that are highly idiosyncratic. These attributes have less to do with an individual’s mental template or the intended outcome of the work than they do with the unique aspects of manual

dexterity: coordination, grip, hand and arm strength, and precision. These attributes can in part be caused by varying material qualities, but are largely due to the nature of individual motor performance. Variation that occurs ‘under the surface’ (i.e. unconsciously) is not necessarily predictable outside of the person in question. Attributes of execution are generally not *explicitly* learned, taught, shared or passed along because they are either (a) so minor that individuals are largely unaware of their existence, or (b) so significant that they are precluded from inclusion because they break from stylistic or functional norms.

The second broad category of attribute, *attributes of form*, incorporates variation which results from a desired, preconceived, or intentional design not related to technology. This type of culturally-mediated ‘group’ style is often what archaeologists are referring to when they generally use the term style (Wiessner 1983). Attributes of form typically comprise the conscious, controlled facets of an artefact which are not the result of other functional or material choices: the size, shape, design, motifs and other types of decoration with which object is endowed. They generally reflect the mental template from which an individual was working, and are often derived from a pattern of culturally-mediated styles which are well-known within a larger social group.

The distinction between culturally-mediated styles and variation that results from motor skills (i.e. manual dexterity which is the result of heredity and experience) was made largely to answer separate analytical questions. Because they do not follow normative rules of production, attributes of execution highlight individuals rather than groups. Attributes of form, however, are sought after by individuals and thus may better reflect intentionality and the acceptable ‘rules’ of production.

On the surface it appears possible to decouple these types of stylistic variation, but in reality they are difficult to fully tease apart. One potential problem affecting our ability to understand intra-individual *vs* inter-individual variation is that the interpretation of variability varies according to the observer (Fish 1978; Odell 1981). In this project, we dealt with this issue by having each engraver make identical (in terms of the design) copies of a single archaeological plaque, isolating recognizable individual variation as much as possible. We also double-checked what we perceived to be idiosyncratic attributes with how volunteers who had no knowledge of the experiment approached distinguishing between plaque makers. A second problem for separating inter-individual and intra-individual variation is that they cannot in every

case be completely distinguished from functional, material and technological types of variation (Sackett 1982). Again, this was avoided as much as possible by providing our engravers with a template, and a set of standardized blank plaques and tools made from the exact same materials.

As previously mentioned, skill is another factor that affects intentional and unintentional variation (Shelley 1990; Whittaker 1994; Roux & David 2005; Winton 2005; Holder 2005; Stout 2002; 2005b). Although attributes of form are passed from individual to individual, this transmission is affected by aptitude and experience. Because skills must be developed or at least observed, individual styles are affected by the particular person teaching the method of production. Through social practices such as pedagogy and the gradual development of skill, unconscious variation contains an element derived from conscious variation. We attempted to cope with this in our experiment by limiting instruction: we asked the student plaque makers to copy the same archaeological plaque, but we did not instruct them on how to engrave it. The obvious weakness here is that we cannot recreate how archaeological plaque makers taught others to make plaques; clearly the original plaques were not engraved in a social or cultural vacuum.

Motor memory research suggests that because skill acquisition and long-term recall place different demands upon motor performance, skill perfection by novices is influenced by many factors other than simple manual dexterity (Biryukova *et al.* 2005; Ivanova 2005; Byrne 2005; Cummins-Sebree & Fragaszy 2005; Stout 2005a). While motor skill acquisition strategies seem to be geared towards learning the requisite rudimentary gestures, motor memory is geared towards enhancing the economy of recall and long-term stability (Doyon *et al.* 2002; Shadmehr & Holcomb 1997). The repetition of the fine-motor skills in question is largely responsible for this phenomenon of cementing motor performance patterns in new parts of the brain. Similar to language, mastery of these motor sequences appears to be generative, providing more skilled individuals with a larger repertoire of consistent and reproducible elementary gestures. One factor that distinguished the most skilled plaque makers in our experiment was the consistency with which they produced even minor idiosyncrasies. However, it is important to remember that the character of a person's motor skills changes greatly over time, and thus a single plaque maker may have many distinct signatures or styles over the course of his or her lifetime.

Attributes of execution can also be copied unknowingly from experts by novices, and emulated to a point at which they become attributes of form. Alternately, unwanted individual idiosyncrasies may be noticed over the course of time and eventually 'corrected' for. Although we found it easier to distinguish the more skilled plaque makers in our experiments, research regarding lithic variation indicates that less skilled individuals also tend to make very predictable types of mistakes regardless of their comprehension of doing so (Whittaker 1987; Shelley 1990; Stout 2002; 2005b).

In any case, the most important point here is that it is difficult to avoid the cross-over of culturally-mediated styles into individual ones and *vice versa*. The fluid, complex interaction between the two should cause us to rethink our conception of them as entirely separable entities in order to better understand the nature of their synergistic relationship. It also points to the fact that although motor variation is consistent and predictable, the 'end product' is still subject to cultural and historical forces. Recently, Crown (2007) has demonstrated that isolating the work of individual potters in the American Southwest is problematic for several potential reasons. Unlike the reductive process of plaque engraving or knapping stone, the production of even a single ceramic vessel is additive and often communal. Therefore, the labour-intensive production sequence of ceramic vessels might incorporate the work of several individuals. In addition to this, ceramics may be altered or repainted over the course of time, further obscuring their initial authorship. Although blank fields on archaeological plaques certainly might have been added to over time, the nature of the engraving process on slate usually betrays any secondary process of incision or modification. Although plaque making is not as labour-intensive as ceramic production, we also cannot rule out the possibility that several plaque makers worked on the same plaque. In our experiment, we attempted to control for this as far as possible by analysing idiosyncratic elements *below the design level* (see above discussion). It is extremely unlikely that plaque engravers were working in tandem on a single line or triangle angle. In any case, Crown's analysis shows that identification of the work of specific individuals on artefacts with especially complex life histories can be misleading due to the palimpsestic nature of cooperation in workshops, and because of the reappropriation of objects after their initial creation, and should be approached with caution.

Conclusion: approaching ‘difficult individuals’

Interest in distinguishing individuals by unique aspects of their work ranges from the ‘hand paintings’ created 30,000 years ago at Chauvet Cave to debates over the authenticity of recently discovered Jackson Pollacks. Outside experimental or ethnoarchaeological contexts, however, it is difficult to demonstrate conclusively that specific artefacts were made by an individual because of the complex life-histories of objects (Redman 1977; Crown 2007). Studies which examine the ‘methodological individual’ such as *The Individual in Prehistory* have been critiqued for this reason, and for essentializing individuals as miniature systems (Thomas 2004; Knapp & van Dommelen 2008, 16).

Parallel to this, the ‘theoretical individual’ has also emerged as a legitimate research focus over the past three decades, and is increasingly viewed as an inherent and unavoidable aspect of archaeological inquiry. For several reasons, though, interpretive prehistory has struggled to conceptualize fully these often ‘difficult individuals’ (Whittle 2003). Although post-processual archaeologists initially showed a great deal of interest in the subject, this was not necessarily followed up by a better characterization of the identity, values or motivation of the individual (Whittle 2003, 51), or by a methodology for appropriately exploring such questions (Dobres & Robb 2005). In our view, this is because of a gap or disconnect between the goals in formulating methodological and theoretical individuals, and because of a lack of agreement on what is meant by individuals, ‘dividuals’ (Chapman 2000), ‘individuality’, ‘individualism’, and so on (see Rapport 1996; Whittle 2003). The very concept of the individual has been challenged as an inaccurate and even narcissistic modern construct (Thomas 2004; see Knapp & van Dommelen 2008 for a detailed discussion).

In our view, although a sense of ‘individuality’ may be largely relational, and past and present notions of personhood are doubtlessly quite different, ‘experiencing oneself as a living individual is part of human nature’ (Knapp & van Dommelen 2008, 15). The long-standing archaeological interest in using artefacts and the archaeological record to operationalize aspects of personhood such as gender, class, age, learning, skill or sodality (Brumfiel 1992; Crown 2001; 2007; Kamp 2001; Whittaker & Kamp in press; Stout 2002; 2005b) shows no sign of abatement. Although most discussions of agency are not centred exclusively on the individual *per se*, the individual is one appropriate scale for the investigation of agency, and thus may provide a valuable point of departure for archaeologists in this regard. Information pertaining to distinct individuals also

continues to be relevant to our understanding of site dynamics, labour organization and craft specialization (Flad & Hruby 2007; J.T. Thomas in press).

The specifics of our experiment best reflect the relationship of individual plaque makers to plaque making as a social practice in the Iberian Late Neolithic, but also constitute possible ways to approach individuals in other archaeological contexts. Ultimately, multiple analytical approaches are likely required to recover what is left of the dynamic interplay of individuals and larger processes. This reflects a trend in archaeology towards recognizing that methodological holism and individualism are not mutually exclusive, and for using experimental work to bridge normative and phenomenological information about the people — and not the plaques, potsherds, or postholes — who populated the past.

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