INVESTIGATING THE INDIVIDUAL? AN EXPERIMENTAL APPROACH THROUGH LITHIC REFITTING

Frederick W.F. Foulds[1]

ABSTRACT

Recent years have seen a dramatic shift in the theoretical outlook of Palaeolithic archaeologists. As a result, the interpretive focus of archaeological investigations has begun to shift from the actions of hominin groups to the ways in which individual hominins influenced society. While some maintain that this 'bottom-up' approach is the analytical ideal (Gamble & Gittins 2004), others have suggested that the study of individuals is a goal beyond the resolution of Palaeolithic archaeology (e.g. Clark 1992). More importantly, it has been shown that archaeologists still lack a solid methodological framework that allows theoretical assumptions to be tested and the social aspect of material culture to be fully interpret beyond 'naïve reconstructionism' (Hopkinson & White 2005). This paper discusses the extent to which the 'bottom-up' approach can be sustained. Focusing on the Lower Palaeolithic and using an experimental assemblage of the most prolific data set available — stone tools — coupled with the chaîne opératoire *approach to lithic reduction, it demonstrates whether individual knappers can be traced through the idiosyncratic signatures they leave in their knapping sequences. The possibility of distinguishing individuals in deep Prehistory would grant new insights into hominin identity, interaction and specialisation beyond mere theoretical musings. However, as the results of this experiment show, Palaeolithic archaeologists are currently unable to accurately approach this fine-grained level of analysis, which has obvious implications for any discussion of the individual and their social relationships throughout Prehistory.*

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INTRODUCTION

Since the rise of post-processualism and its emphasis on socially orientated interpretations of the material record, Palaeolithic archaeology appears to have been consistently disconnected from this new social perspective. Instead, archaeologists tend to forego the application of social theory to Palaeolithic assemblages in favour of more processual and evolutionary processes, leaving little room for discussion of the individual (Gamble & Gittins 2004). The primary reason for this reluctance to use social theory appears to be the belief that the available data is rarely rich enough to permit studies of social agency and individual behaviour (Wobst 2000). Therefore, the study of the Palaeolithic from the level of the individual is often regarded as an "impossible goal" (Gamble 1998a). As Clark (1992, 107) states:

> *"The actions of individuals are forever likely to be beyond the resolution of the Palaeolithic archaeological record."*

As a result, most archaeologists have studied hominins from the perspective of the group (Clark 1992; Gamble 1998a; Gamble & Gittins 2004; Gamble & Porr 2005b), leading to a focus on ecology and broad scale social change. Although there have been attempts to gain access to individual behaviour and agency, these tend to be limited to Upper Palaeolithic contexts (Pigeot 1990; Mithen 1991 & 1993; Grimm 2000; Sinclair 2000). This is generally due to the argument that this period presents the first occurrence of fully modern language (Lieberman 1989, 1992 & 2007), a brain capable of modern cognitive processing (Dunbar 2003; Mithen 1996) and evidence for the explosion of "out-of-brain" symbolic storage (Wadley 2001), which allow the social aspect of the archaeological record to be discussed with greater ease. However, recent years have seen an increasing demand for archaeologists to review their approach to the interpretation of all Palaeolithic contexts.

Gamble has been most vocal about the Palaeolithic's lack of social theory, advocating the study of individuals and their social identity through what has become known as the "bottom-up" approach (Gamble 1998a, b, 1999, 2004 & 2007; Gamble & Gittins 2004; Gamble & Porr 2005a). Mithen (1989, 1990, 1991 & 1993) has also stressed an approach

[1]Department of Archaeology, Durham University, South Road, Durham DH1 3LE. Email: frederick.foulds@durham.ac.uk

from the perspective of the individual, especially when searching for decision-making and its effect on social and economic strategies. This has led to a surge in studies into individual behaviour and agency in the Lower and Middle Palaeolithic (e.g. Gravina 2004; Hopkinson & White 2005; Pope & Roberts 2005; Porr 2005; see also papers in Gamble & Porr 2005). However, while it is agreed that the application of social theory will no doubt benefit Palaeolithic research, it is apparent that a methodological framework that allows us to fully interpret the social aspect of the available material culture is currently lacking (Hopkinson & White 2005). This then leaves us with Gamble's (2004, 20) ultimate question:

"How do you unlock the social information in a handaxe?"

This paper will present the results from the experimental analysis of refitting material that aims to show whether this question can be answered. It asks whether the "bottom-up" approach to archaeology can be sustained, beyond mere theoretical insights, by questioning whether we can analyse the Palaeolithic material record at the level of the individual. If successful, the ability to trace individuals will enable a deeper understanding of social constructs and individual interaction in the past, whilst its failure will highlight the problems of moving our understanding of Palaeolithic social processes beyond untested hypotheses.

APPROACHING THE INDIVIDUAL

Although the current emphasis on the "bottom-up" approach in Palaeolithic archaeology has only gained momentum within the last decade, the idea of using individuals as the base element of study is not a new theoretical standpoint. Bradley and Sampson (1986) noted that variability in lithic artefacts begins with the individual. Also, Gunn (1975, 1977) posited a methodology for studying individuals through the scar patterns produced during biface manufacture. However, such studies focused on explaining variability in terms of adaptation and the internal organisation of social systems (Barrett 1988), which reduce the discussion of the individual to elements of idiosyncrasy and creativity within the material record (Shanks & Tilley 1987). Therefore, the social relationships that such artefacts were originally part of become lost in attempts to explain variation in terms of evolutionary processes and to trace ethnicity (Dunnell 1978; Jones 1997).

Research over the past two decades has begun to move away from the functional aspects of these studies in order to focus on the decisions and motivations behind artefact construction (e.g. Schlanger 1994 & 1996). Combined with an emphasis on agency, this provides a more socially orientated approach, in which material culture is seen as more than an aside to human life. Thus, analysis avoids the Westernised view of technology, where the social impact of material culture is seemingly ignored (Pfaffenberger 1988), by linking technology with the larger social constructs that materialise through its use. In addition, the introduction of an anthropological approach, such as that provided by Lemonnier (1992), leads to the realisation that people negotiated their world through social and material interaction (Dobres & Robb 2000). This results in technology being viewed as what Mauss (1950) terms a total social fact, that is, a product of human choices and social processes (Pfaffenberger 1988). Such ideas appeared in earlier archaeological discussions (e.g. Childe 1956, 1; Binford 1962), yet the roles of agency and the analysis of the individual agent were encased in a "black box" within these earlier studies, resulting in the focus on the study of systems (Dobres 2000; Dobres & Robb 2000).

Agency theory has also brought our focus back to the individual actor and how their sociality was formed from individual events (Hodder 2000). By studying these events, such as the refitting of knapping sequences (e.g. Pigeot 1990; Schlanger 1996), the possibility of reconstructing evidence of an individual's agency is realised. However, it is not enough to identify individual actors within specific moments in time, as the isolation of such events prevents us from truly understanding how such actors involved themselves in the social structures that surrounded them (Hodder 2000). In other words, while one can say what an individual may have done, we are unable to extrapolate this to other individuals and, from there, the wider social whole.

Following Redman (1977), some archaeologists have stated that the study of agency should not result in attempts to locate specific actors (Dobres 2000; Dobres & Robb 2000; Sassaman 2000). Instead, studies should focus on actions that can be clearly seen in the physical evidence, revealing how actors expressed themselves through the social practices that form the "*habitus*" of daily life (Giddens 1979; Bourdieu 1990; Sinclair 2000). However, agency is used in the creation of an actor's identity, which in turn is constructed from that actor's experiences, constrained by the larger social whole and expressed through material culture. In this way the agent becomes a "world within the world" (Bourdieu 1990, 56), a social construct that is aligned with the greater "society", but formed from its own specific relationships and experiences. They are contained within society, but also separate from it at one and the same time. Therefore, linking actions to specific single agents, in combination with a broader analysis of action, is of paramount importance when one aims to gain a greater understanding of social relationships and the perception of identity.

So is it possible to trace the actions of individuals through multiple events; and, if so, is it then possible to move beyond the generalisations that are currently presented regarding individuals in Palaeolithic research? If achievable, this may enable the meaningful study of social relations between hominin actors beyond that seen in the Upper Palaeolithic. However, if the material record masks the individual, whether through its palimpsest nature, or because of the wide range of variables involved in its manufacture, then any discussion of individuals and their social relationships within the Palaeolithic would be reduced to theoretical storytelling, limited only by our own imaginative potential. If one now wishes to analyse the Palaeolithic from the level of the individual and trace their actions through the artefacts they created, the question that remains is where to begin?

TOWARDS A METHODOLOGY

In answer to this, a methodology must be designed that deals with the habitual, day-to-day life-ways of ancient hominins. In addition, this method must not limit us to a specific period or genus, but should encompass all Palaeolithic contexts. The obvious focus of such a methodology is the most prolific dataset available to Palaeolithic archaeologists, namely lithic artefacts (Roe 1980: 108).

Stone tools are an appropriate choice, as they reflect the fossilised acts and goals of the hominins that created them. However, the goal now becomes the isolation of these choices within these tools and the techniques used to produce them, in contrast to previous studies that focused on answering questions about behaviour and agency (Pigeot 1990; Schlanger 1996; Pope 2004; Pope & Roberts 2005). To do so, one must look for idiosyncrasies in the manufacture and end products that can be linked to specific individuals and allow the identification of these individuals' works' within assemblages. From this, one may be able extrapolate incidences of an individual's agency within the archaeological record, allowing for ideas, such as identity, to be brought out of theory and into fact. Consequently, a series of experiments were devised to explore the possibility that knappers could be differentiated within an assemblage, and to test whether tools could be traced to the knapper who had created them. This is the first step in identifying the individual: the motivations behind choices and decisions, outside of those influenced by purely mechanical considerations (such as raw material factors), comes later.

These experiments returned to earlier studies of the individual, which emphasised that variability in tools should not only be seen as the result of raw material and design habits, but also the individual knapper's skill and ability to manipulate the reduction strategy in order to obtain their goals (Bradley & Sampson 1986, 29–30). This individual element can be linked to differences in motor habits, which causes subconscious variation to occur within the execution of tool production (Hill & Gunn 1977, 2), suggesting that it is possible to distinguish an individual knapper's imprint upon a finished tool. The possibility to demonstrate skill or idiosyncratic style in lithic artefacts has been attempted through the study of both experimental and prehistoric material (Gunn 1975 & 1977; McGhee 1980; Tomka 1989), showing that there is possibly enough variation in reduction strategy and idiosyncratic elements of tool form to group tools by the knappers who created them.

Using the information presented by these studies, there appear to be two possible courses to approaching an individual's imprint. The first is the analysis of idiosyncrasies within the final form of stone tools, such as flake scar orientation (Gunn 1975). The second approach aims to recreate the knapping strategy used in the production of the tool, observing elements that reflect the knapper's choices and decisions. In order to address these modes of analysis, three main experiments were carried out with the aim of investigating their potential for tracing the imprint of the individual:

1) Analysing refitting sequences and recording traits that are commonly claimed to represent idiosyncrasies.

2) Investigating idiosyncrasies in the three-dimensional form of finished tools.

3) Testing the potential for the knapper's imprint to be contained within the negative scar patterns left on the surface of the finished tool (after Gunn 1975).

The research presented in this paper deals with the first of these experiments.

REFITTING THE INDIVIDUAL

Refitting lithic assemblages allows for the precise reduction strategy applied by a knapper to be established, revealing the variety in the knapper's personal choices. For example, which flakes did they remove first? Which qualities and flaws of the raw material forced them to adjust their techniques? And how did the final form of the tool influence, and was influenced by, the overall sequence? Due to the need to isolate these different elements, the knapping sequence must be approached from a cognitive viewpoint (e.g. Schlanger 1996). The removal of the mechanical aspect of the flaking process would then expose the individual's action in the production of the reduction strategy. This element can then be compared across multiple refitting sequences to test whether it is possible for different knappers to be differentiated and linked to the tools that they produced.

However, with the wide range of reduction techniques used throughout the Palaeolithic, it is necessary to focus on a specific tool technology. Therefore, the experiment discussed here focuses on the manufacture of Acheulian handaxes. This particular Lower Palaeolithic technology was chosen in an attempt to push the analysis of the individual back beyond the Upper Palaeolithic and to test whether the study of the individual is possible during this period of deep Prehistory. That being said, it is currently impossible to trace individuals within Palaeolithic assemblages, as one cannot tell which hominin produced which tools. Therefore, each handaxe and reduction sequence could represent a separate hominin, telling us nothing of their role in creating identity and negotiating society.

As a consequence of this limitation in the archaeological record, there is only one viable way to test any method of analysis prior to its application to Palaeolithic contexts. This, of course, is through the employment of experimental assemblages, where the link between knapper and product is already known. This then allows us to test not only whether the knapper leaves an imprint on the tool and its reduction sequence, but also whether these idiosyncrasies are repeated in the other tools that they manufacture. Although replicating knapping techniques is not the same as replicating a prehistoric technology (Dobres 2000), the attribution of specific tools to the individual that created them through an experimental approach would suggest the possibility that this could be repeated for the archaeological record. In addition, experimental studies will allow the resultant methodology to be refined and its sensitivity to be increased prior to any application to the Palaeolithic. This will, in turn, engender a further reflexive critique of knapping experience and its use in archaeological interpretations.

The Experimental Assemblage

A total of six knappers produced an experimental assemblage of 26 handaxes, on which the three methods of analysis outlined above were tested. In order for this assemblage to bear as close a resemblance to an actual Palaeolithic assemblage, and to reduce any bias in its interpretation, no restraints were placed over the knappers choice of raw material, technique or style. Knappers were asked to produce whatever they chose according to each individual's own skill, mood and the properties of the raw material. In this

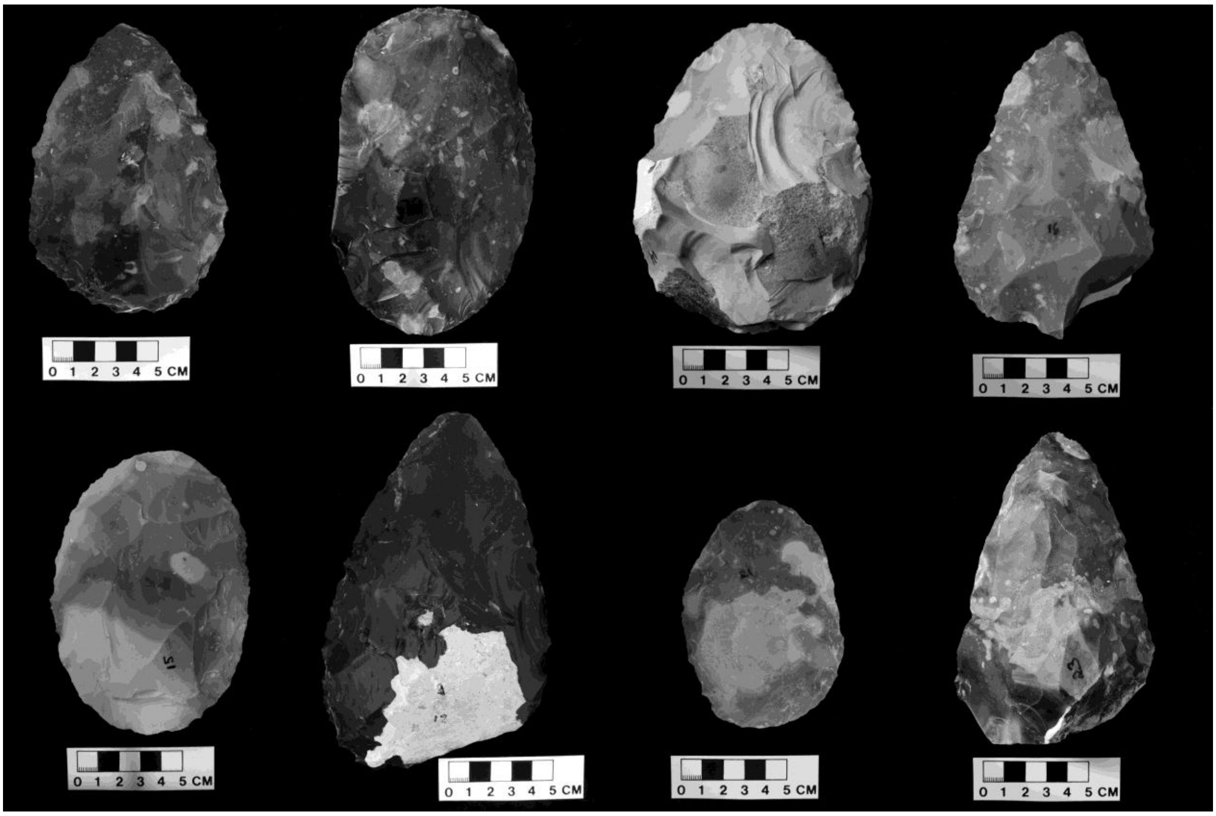

Figure 1. Comparison of size and shape differences between the eight handaxes analysed. Handaxe numbers from left to right across the top: 9, 10, 14 and 16; and across the bottom: 15, 19, 21 and 23.

way, an almost organic assemblage would be produced that, while not directly comparable to Palaeolithic assemblages, provided a close substitute. In the event this produced a range of shapes from each knapper, it would also raise the possibility of seeing if technique transcended shape.

In addition, and in order to perform a rigorous test of each analytical method, the identities of the knappers and the links to the tools they had made remained secret. This attempted to create a blind test condition that mimics the problems of a Palaeolithic assemblage by preventing the results being interpreted with the known values of “who made what” already at hand. The outcome of this strategy was that the results of the analysis could be subsequently compared to the known links between each knapper and their tools, thus confirming whether the conclusions of each technique were correct.

The Refitting Material and its Analysis

From the assemblage, eight of the handaxes were randomly selected and supplied with a complete sequence of refitting debitage. These tools presented a range of sizes and shapes (Figure 1). In addition to these eight, one additional sample of debitage was supplied with no associated handaxe. The importance of this addition is that, due to the experimental conditions, it could not be assumed to be the product of an additional knapper. Instead, it was possible that this sample was produced by one of the knappers involved in the creation of the rest of the assemblage. This addition also provided a test to see if the absence of the tool directly affected the interpretation of the refitting sequence. The sequences were then labelled A through I (see Table 1).

Each of the reduction sequences was refitted with the aim of recreating the knapping strategy in its entirety. However, this was not always possible, due to many of the flakes being fragmented and impossible to piece back together. Also, the smaller flakes produced during the final flaking of the edges often proved exceedingly difficult to refit. Therefore, sequences were reconstructed as completely as possible. This was done with the aid of a temporary adhesive, rather than the more common method of gluing flakes together, as once the sequences had been fitted together they were then taken apart flake by flake. Such a method allowed the deconstruction of the

Refitting Sequence	*Handaxe Number*	*Total Number of Refitting Flakes*	*Percentage of Flakes with Hinge/Step Terminations*	*Percentage of Flakes with Missing Platforms*	*Percentage of Flakes with Platform Preparation*	*Percentage of Fractured Flakes*	*Percentage of Clockwise Rotations*	*Percentage of Anticlockwise Rotations*	*Percentage of Unknown Rotations*	*Percentage of Same Location*
A	9	52	5.8	7.7	21.2	23.1	19.2	36.5385	30.8	13.5
B	23	32	46.9	12.5	9.4	56.3	21.9	31.2500	31.3	15.6
C	21	64	6.3	9.4	26.6	29.7	20.3	23.4375	43.8	12.5
D	None	38	18.4	23.7	15.8	60.5	21.1	28.9474	39.5	10.5
E	14	47	42.6	6.4	25.5	27.7	44.7	21.2766	21.3	12.8
F	15	44	9.1	22.7	27.3	56.8	22.7	29.5455	29.6	18.2
G	10	54	20.4	7.4	35.2	29.6	31.5	50.0000	14.8	3.7
H	16	59	17.0	6.8	20.3	20.3	32.2	20.3390	23.7	23.7
I	19	21	9.5	28.6	57.1	81.0	33.3	42.8571	19.1	4.8

Table 1. The nine refitting sequences and recorded data used in their analysis.

Total Variance Explained						
Component	***Initial Eigenvalues***			***Extraction Sums of Squared Loadings***		
	Total	***Percentage of Variance***	***Cumulative Percentage***	***Total***	***Percentage of Variance***	***Cumulative Percentage***
1	3.177	39.718	39.718	3.177	39.718	39.718
2	2.225	27.815	67.533	2.225	27.815	67.533
3	1.224	15.297	82.829	1.224	15.297	82.829
4	0.873	10.917	93.747			
5	0.426	5.322	99.068			
6	0.074	0.92	99.988			
7	0.001	0.012	100			
8	4.70E-14	5.88E-13	100			

Table 2. The results of the principal components analysis, showing the percentage of variation for each component produced.

Component Matrix			
	Component		
	1	***2***	***3***
Hinge/Step Termination			0.657
Platform Preparation	0.868		
Missing Platforms	0.627	0.605	
Fractured Flakes	0.646		0.579
Clockwise Rotations			
Anticlockwise Rotations	0.787		
Unknown Rotations		0.777	
Same Location			

Table 3. The table shows the degree to which each variable contributed to each component. Where the contribution was negligible, the table has been left blank.

Cluster Membership							
Sequence	***8 Groups***	***7 Groups***	***6 Groups***	***5 Groups***	***4 Groups***	***3 Groups***	***2 Groups***
A	1	1	1	1	1	1	1
B	2	2	2	2	1	1	1
C	3	1	1	1	1	1	1
D	4	3	2	2	1	1	1
E	5	4	3	3	2	1	1
F	4	3	2	2	1	1	1
G	6	5	4	4	3	2	2
H	7	6	5	3	2	1	1
I	8	7	6	5	4	3	2

Table 4. The results produced by the cluster analysis of the principal component data. The most accurate series of groups chosen for consideration have been highlighted in grey.

knapping strategy to be conducted with relative ease.

During the analysis, a description of each flake was recorded, along with a suite of possible sources of variation that might be linked to the knappers own idiosyncrasies. While it is not within the scope of this paper to provide an in depth discussion of how each sequence was formed, the variables that were recorded are presented in Table 1, in addition to the associated handaxe number and the total of flakes that were refitted. Three of these variables (hinge/step fracture terminations;

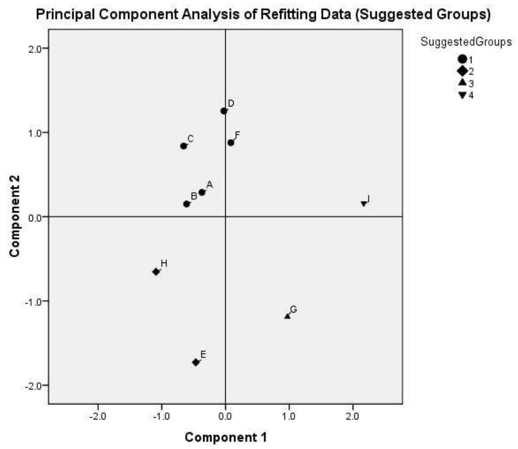

Figure 2. Scatter diagram of components one and two from results of the principal components analysis, with suggested clusters marked.

platform preparation; fractured flakes) were chosen because they have previously been suggested to represent evidence for skill (Gunn 1975). The number of missing platforms was also recorded for each sequence, as this directly affected the number of incidences of platform preparation seen in the sequence. The final four variables that were recorded all describe the rotation of the object between each flake removal and represent the knappers manipulation of the raw material throughout the knapping event. Clockwise and anticlockwise indicates rotation of the cobble one way or the other from the previous flake before removing the next. The unknown variable describes where the knapping sequence was too incomplete, or the knapper jumped from one part of a sequence to a new area, meaning that the precise rotation could not be ascertained. Finally, the same location variable was recorded for those flakes that were removed directly below the previous flake with little or no rotation.

Due to the fact that varying amounts of flakes were refitted as part of each sequence, the numbers of flakes assigned to each of the variables were converted into percentages in order to standardise the data for comparison. Following this conversion, the data was then explored using the SPSS statistics package for Windows (SPSS 17, release 17.0.0).

RESULTS

Principal components analysis was performed using the SPSS program FACTOR, with no rotation applied to the data. As shown in Table

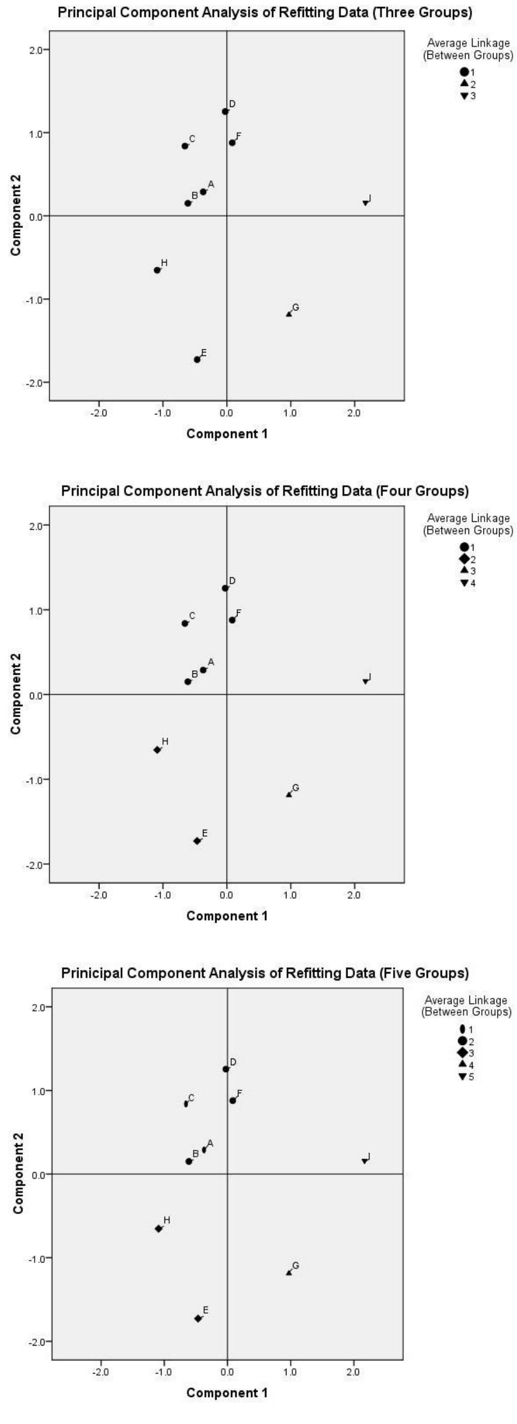

Figure 3. Scatter diagrams of components one and two from the principal components analysis, with the results from the cluster analysis used to divide the data into groups.

2, three components with eigenvalues of greater than 1.0 were extracted, accounting for 82.8% of the total variation. Of these components, the first is produced by variation in the amount of flake fragmentation, platform preparation and anticlockwise rotation (see Table 3). The second component appears to

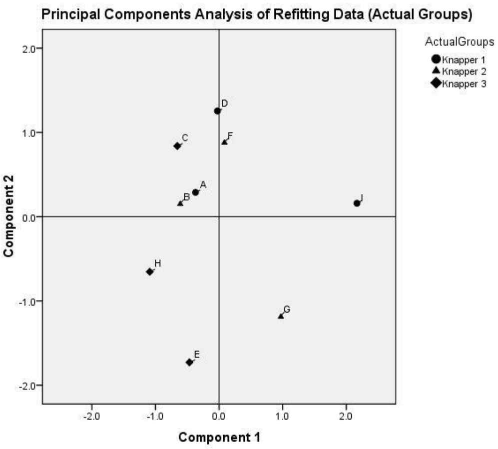

Figure 4. Scatter diagram of components one and two from the principal components analysis, divided into groups using the known values for the knappers who created them.

show variation in the number of unknown rotations and missing striking platforms. The final component is again principally derived from variation in flake fragmentation as well as the amount of hinge and step fractures seen. These results show that the majority of the variation between the refitting sequences appears to be a combination of the amount of platform preparation used and the way in which the cobble was rotated during the reduction process.

The results of the principal components analysis were plotted using scatter diagrams to look for potential clusters. It became apparent that the degree of correlation between components one and two produced clusters that were more clearly defined (see Figure 2). Cluster analysis was then performed on the principal component data using the SPSS HEIRARCHICAL CLUSTER program. This program aimed to divide the refitting sequences into distinct clusters (see Table 4).

From the results, it appears that only those analyses that presented three, four and five groups can be considered accurate. These were chosen for further consideration and were plotted onto scatter diagrams using the principal component data (Figure 3). These show that the plot of four groups conforms exactly to Figure 2, while significant differences are seen in the other diagrams. Therefore, the cluster of four groups was put forward as the most suitable division of the sequences to be compared to the known values that had remained secret.

The sequences were finally revealed to be the product of three individuals. These were then plotted onto the principal component data (Figure 4). There are immediate differences between the groups produced by the cluster analysis and the known values of knappers. At first, this result would suggest that the technique is flawed and that the individual imprint is lost within the inherent variation produced by raw material, shape, size and so forth. However, closer inspection shows that sequences E and H were grouped correctly, as were B and F (although A, C and D were grouped with them). Interestingly, the analysis producing five groups showed that A and C did not group with B and F. The cluster analysis also correctly differentiated between sequences G and I, although it was unable to group them correctly. Therefore, division of the refitting sequences into groups that reflect their individual creators appears to happen to a certain extent, but is distorted by the effect of the other variables.

DISCUSSION AND REFLECTIONS

The question that must be asked now is why this method of analysis was unable to attribute each sequence to the knapper who created it, and what is the source of the variation that masks the individual's imprint? Thus, it was judged necessary to review those refitting sequences that were not correctly attributed in addition to the original data that was collected for analysis. Such reflexion is critical to the identification of possible reasons for the failure of the technique.

Knapper 1: Sequences A, D and I

None of the sequences created by Knapper 1 clustered together. Only sequence I, as a significant outlier, was grouped separately. However, sequence I has the lowest total number of flakes at only 21, which resulted in the data being skewed once it was converted into percentages. It was also noted that this sequence showed the highest proportion of fragmented flakes. Returning to the sequence itself, it was noted that the sequence was formed from a flake (Figure 5). This is opposed to the reduction of a cortical cobble

Figure 5. Refitting sequence I. The handaxe produced was formed from a fan shaped flake, struck from the left.

which was the method of production for all other sequences analysed. The use of a flake blank meant that the knapper proceeded directly to thinning and shaping the tool, resulting in very thin flakes that were easily fractured. This also meant that it was difficult to produce a complete sequence, as many of the flakes proved too fragmented to be refitted accurately.

Sequence D is also important, as this was provided without an associated handaxe. It also has a high degree of fragmented flakes akin to sequence I; but they still do not group together. The reason for this observation may be due to the mode of refitting used for this sequence. Due to the lack of a tool around which to build the reduction strategy, the flakes were refitted in four short sections, as opposed to a complete sequence. It is suspected that this may have severe implications for the interpretation of the manipulation of the cobble by the knapper, which, in turn, influenced the results.

Finally, sequence A provided an almost complete sequence. Although there was some indecision as to the correct sequence for some of the early removals, the reduction strategy could be followed in detail. However, Knapper 1 was revealed to be the only individual who is left-handed and it is possible that this may have influenced the reduction strategy for this sequence.

Knapper 2: Sequence G

Sequence G was the only one attributed to Knapper 2 that did not cluster. As seen in Figure 1, the resultant tool (Handaxe 10) is an elongated ovate. This was produced from the lenticular cobble shown in Figure 6. It is suspected that the shape of this particular cobble directly influenced the reduction strategy used, resulting in the individual's technique having to accommodate the raw material. This may have resulted in the reduction strategy being modified in order to achieve the knapper's goal.

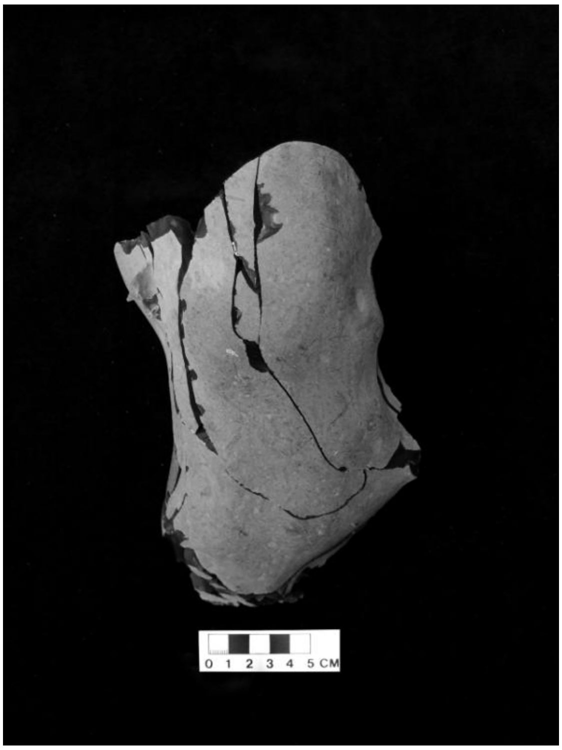

Figure 6. Refitting sequence G. Note the lenticular shape of the cobble chosen. It is suspected that this constrained the knapping technique and resulted in the production of an elongated ovate handaxe (Handaxe 10).

Knapper 3: Sequence C

When returning to the data for sequence C, what stands out is the high frequency of unknown rotations that was recorded (43.75%). This is much higher than those of E (21.28%) and H (23.73%), which were also

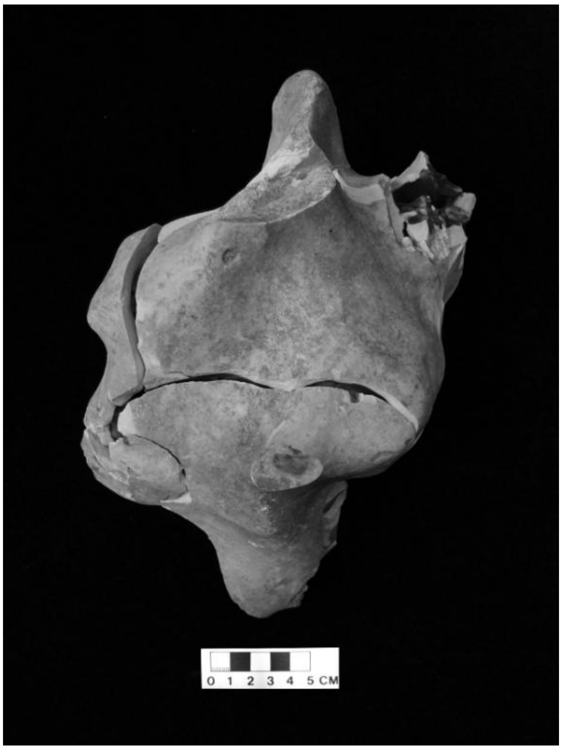

Figure 7. Refitting sequence C. The cobble chosen is globular in form, containing multiple protrusions. These had to be removed prior to shaping the blank, apparently resulting in the knapping strategy being modified extensively.

produced by Knapper 3. Upon returning to the record of sequence C, it was noted that the cobble from which Handaxe 21 was produced was of a globular form (Figure 7). This meant that the knapper was forced to move large distances around the circumference of the cobble in order to shape the blank from which the tool was produced. Due to the distances between knapping episodes, it was almost impossible to ascertain the correct rotation prior to removal with any accuracy. Again, it appears that raw material form constrained the knapper's method of reduction.

Unmasking the individual?

After reanalysing the material, it is clear that the individual imprint was directly masked by a combination of factors. It appears that elements within raw material shape may constrict the knapper by forcing them to adopt alternate reduction strategies from those they would ordinarily choose. In addition, the inability to reconstruct complete knapping sequences, as shown by sequences D and I, together with the handedness of the knapper, may also provide obstacles that need to be overcome. It may be possible to circumvent some of these issues by analysing only those flakes produced from the thinning of the tool. This process has been suggested to make up approximately the final 50% of the knapping sequence (Bradley & Sampson 1986, 36-7). In addition, dividing the sample according to the initial source of the blank (either cobble or flake), and dividing the knappers by handedness may also prove beneficial. Also, use of sequences that are as complete as possible is integral to the analysis, so that the data can be adequately compared. It is important that the method of analysis presented here is revisited, and further testing should take place. It may also be invaluable to revisit the material and examine the variety in experience and skill of the knappers to show if these factors may have contributed to that fact that the individual appears to be masked. However, this is a task for future research in this field.

While this approach may prove valid for an experimental assemblage, any application to Palaeolithic assemblages will be met with problems. There is currently no accurate method that can distinguish handedness in Palaeolithic assemblages, and this is accompanied by the fact that there is a paucity of complete refitting sequences. Those sites that do feature evidence of complete knapping strategies are very often limited to single events, such as the GTP17 horse butchery assemblage at Boxgrove and Marjorie's Core from Maastricht-Belvédère (Pitts & Roberts 1997; Schlanger 1996). This limitation emphasises the difficulties in locating statistically significant samples of refitting material from a single assemblage. These difficulties potentially prevent the analysis presented here from being applied. Therefore, it appears that the individual is to remain concealed for now. However, this does not mean that the study of the individual should be abandoned. Experiments, such as those presented here, will allow the study of the Palaeolithic record to be refined. In turn, this will lead toward more useful approaches to the study of material culture and allow an understanding of the social organisation to be reached through the formulation of testable hypotheses and methodologies.

CONCLUSION

This paper has presented an experimental approach to studying the individual through lithic refitting in an attempt to question current approaches to the application of social theory to Palaeolithic contexts and test the validity of the "bottom-up" approach (Gamble & Gittins 2004). The results of this experiment have shown that, although the individuals responsible for refitting sequences can be ascertained, to a degree, in an experimental assemblage, there are a suite of variables that help mask the knapper's imprint on the reduction strategy. In addition, while this method may be improved upon, it is suggested that inherent complications in the Palaeolithic record may hamper any attempt to apply it to these contexts. Therefore, the outcome appears to be that the individual remains a shadow to archaeologists studying the Palaeolithic. This has obvious implications for the way in which one can both understand and theorise about the social ties that were present in this period of prehistory. As it currently stands, are these theories nothing more than metaphor and rhetoric – theoretical storytelling if you will – that provide a method of thought rather than a mode of analysis? It appears that one must continue to look for new opportunities for exploring the individual, potentially focusing on technological details that are more likely to produce indications of the knapper's identity. Such details could be found in final thinning and shaping of tools, recurring idiosyncratic markers in final tool form, and knapping direction as influenced by handedness. Further experimentation will allow approaches to the study of material culture to be refined, permitting us to move beyond the naïve reconstructionism (Hopkinson & White 2005, 27) which some have seen in current theoretical approaches.

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