New methods and approaches in the study of finger flutings

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Abstract

Drawing on ten years of the author and her late research partner, Kevin’s Sharpe’s, development of methodologies for approaching the study of finger flutings, this paper focuses on the manner in which one can determine distinct individual cave artists through a confluence of rich data sources which examines finger width, profiles, handedness, applications of Manning’s gender studies to determine sex, depth of fluting, height, and the cataloging of idiosyncratic fluting choices. The study of finger flutings sheds light on the individual cave artist, in that one can look to an individual artist’s corpus of work and can contrast recurring themes with an individual’s choices, as well as a larger host of questions based on how and where individuals or members of a group choose to flute. This paper also focuses specifically on recent work involving the development of methods for studying single fingered figurative images by using laboratory work in comparison with field collected data.

Finger flutings, lines drawn with fingers over soft surfaces appear in a number of Paleolithic aged caves throughout southwest Europe, Australia, and New Guinea. The flutings can appear as figurative images such as those of mammoths, bison, and anthropomorphs found in Rouffignac Cave, the owl of Chauvet, or the fluted bulls within the clay of Altamira. They can also appear as recognized symbolic forms such as tectiforms in Rouffignac and more often as lines which show no recognizable symbol, pattern, or picture.

Clottes and Courtin note that:

“barely a quarter of the finger tracings in some seventy European Paleolithic painted caves have been the subject of surveys and precise analyses. This clearly has to do with the indifferent aesthetic appeal of these depictions, with the technical difficulty their study presents, and with the uncertain and often insufficiently gratifying results that the researcher can expect at the conclusion of the task.” (Clottes & Courtin 1996: 59)

The study of finger flutings has presented, as Clottes and Courtin note, a variety of technical difficulties the most significant of which is a lack of well tested methodologies. Early attempts at the study of flutings looked to examine the temporal sequencing in the creation of the flutings, as established by the work of Marshack (1977) and later used by Bednarik, d’Errico (1992), Lorblanchet (1992, 1995) among

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others. Bednarik’s work (1986, 1999) also examined the impact of the medium on flutings exploring questions regarding the ways in which moonmilk in particular could potentially distort original flutings.

Work by Sharpe and Van Gelder throughout the decade has looked increasingly towards developing reliable scientific replicable methods by which to study finger flutings. As Montelle describes in support of this forensic methodology:

“This is important because it introduces a new (and more effective) set of methodological directions for the fieldworkers, researchers, and scientists...The formulation of testable hypotheses applied to standardized methodology will provide opportunities for the researcher to lean-on the scientific database and formulate verifiable models for the iconographic manifestations and associated evidence.” (Montelle 2009: 12)

In the last five years the emphasis of their work has focused predominantly on the development and testing of methodologies focusing on the accuracy with which one can determine individual fluters within the cave environment. The rationale behind this focus is that if one is able to determine the actions and activities of individuals this will yield far greater insight and information regarding the purpose and meaning of behaviors, thus allowing researchers for the first time in cave art to separate out the idiosyncratic behavior of the individual from more general culture behavior description. Further, it takes these individuals from the abstract and returns them to the unique individuals they once were, imbuing them once more with their individual identities.

This paper gives a brief summary of the methodological advances previously made in the study of finger flutings (see Sharpe & Van Gelder 2006a for the methodology spelled out in detail) with an emphasis on the determination of individuals, and then looks at a new methodological inquiry into the study of single finger fluted figurative images. The corner-stones of this approach have consistently been to include multiple examinations of the flutings being studied, to engage in laboratory work and experimentation, primarily putting aside questions of meaning (as such assumptions can determine what is then seen in the flutings) in favour of posing questions which are answerable. The physical data in the flutings themselves comprise what we seek: how they were constructed, how they functioned, and who were their creators.

A terminology (Sharpe & Van Gelder 2006a; Van Gelder & Sharpe 2009) has been developed to help with the study: a fluting (lines made by fingers on a soft surface) is made by a fluter; a unit (flutings drawn with one sweep of one hand or finger); a cluster (an isolatable group of units that exhibit a unity, for instance because they overlay each other); and a panel (a collection of clusters that appears geographically or otherwise distant from other clusters or on a surface of reasonably uniform orientation). The profile of a unit or a fluter comprises the silhouette of the finger tops left in the medium from the fluting.

**Identifying the individual**

Previous research into the determination of individuals (Van Gelder & Sharpe 2009 a) has suggested that one can ascertain an increasingly more robust image of the identity of an individual fluter by using the width of the measure of a unit three fingers as a basis, because one need not know which is the index or fourth finger as
both are represented in the unit. As one works in the field, however, the question rises as to what is the most accurate point of measure for determining a particular individual since the splay between fingers can become apparent in the course of a single fluted unit and offer a wide range of measures of the same three fingers. In past studies this research team has always relied on one member to be the consistent measurer at the cave wall and has calibrated her measures in subsequent trips against her previous measures. Her margin of error is generally ±1mm.

In making this form of study more accessible it seems wise to establish that the most successful point of measure, when possible, is a unit in which there is no evidence of splay between the fingers and that the measure takes place from the outermost corner of the fourth and second fingers as close to the top of the lines as possible, or at a point where the fingers are at their closest but do not overlap as shown in Figure 1.

When visible and clear it is also of importance to note the shape and width of the finger tops themselves. The profile of the finger tops can help to establish individuality in three ways. First, when there are units which have four fingers (either a thumb or more often the last finger) a right or left hand can be established. The researcher can then apply Manning’s (2008) work on sexual dimorphism and identification in hands to attempt to establish the fluter’s sex (see Van Gelder & Sharpe 2009 for an in-depth discussion of this methodology and results in Rouffignac). Second, specific unique characteristics of the individual’s profile can be established particularly when distinctive or idiosyncratic. In clear instances, one can calculate the actual distance between finger heights for an individual using triangulation. Third, the thick or thinness of finger tips can be noted to assist in the determination of the age of the fluter. For example, the fluted unit below was created by an individual who has a 28mm three fingered measure in Rouffignac Cave. This individual falls statistically into the realm of a child (see Sharpe & Van Gelder 2006a) and through Manning’s method has been sexed as female. By examining the finger tops in this fluting one can see the very small circumference of the finger tip which adds further data to establishing the identity of this particular individual in multiple locations in the cave.

While the study of profiles is of great assistance in determining individuals, the researcher need note in examining finger tops and profiles that there are times and circumstances where the fluter will have brought the three fingers to the same start height and they must be aware that the same fluter may use this style or the full profiled style. Same height start points are often found in circumstances where the fluter is reaching to a greater distance than perhaps his/her height allows, such as a ceiling, or is fluting in an especially hard material. It is often difficult to distinguish whether or not these instances are the ‘true’ profile of the hand or are circumstantial to the fluter’s purpose and it is worthwhile to examine closely the physical situation in which the fluter has worked to make a determination.
Limitations to this method

The challenge to this method is that it is based largely on the width of three fingers of an individual as being a measure which is both constant and individual. If there were a group of ten people who all had an identical measure of their three fingers would we truly be able to tell them apart? Either we would have to use other distinguishing features as described here, or we would have to accept that we can only know the minimum number of people in a particular group who have been identified but we cannot know with certainty the maximum number as it is possible that multiple members of the same group or a later group of fluters would have the same hand measure. Preliminary experimental work in studying the flutings of contemporary family groups have not yielded identical hand width measures, however they have pointed to similarities in tendency towards the splaying of fingers (especially between third and fourth) and a similar profile of finger tops.

Even given these challenges, with present technology and site limitations this still offers us very worthwhile information and the beginnings of a picture of who visited the caves and fluted them. In Rouffignac this application of this methodology over the last ten years has led to the identification of at least seven individuals (Van Gelder & Sharpe 2009) and in Gargas, at present, at least three individuals.

Applying the finger measure method to single digit lines

Much of the research of the last decade has focused on the non-figurative flutings found in Rouffignac and Gargas caves. While these flutings make up the vast majority of the flutings there are also, in both caves and many others, fluted animals.
In the following section of this paper, I explore whether or not it is possible in a scenario where we know the three fingered widths of particular individuals to determine the individual who created a single-fingered drawing of an animal or symbolic object such as a tectiform.

Single finger drawn animals appear in both Gargas Cave (Sharpe & Van Gelder 2006c) and Rouffignac Cave among many others. This study looks at eight different finger drawn mammoths in Rouffignac cave and contrasts the data found there with experimental lab work using contemporary individuals who created a series of single fingered mammoths with both right and left hands in gib plaster smoothed onto cardboard sheets which were held up at chest height to simulate a wall placement.

The central question of this inquiry is: Can we determine the individual who created a single fingered animal using a method based on the measurement of fingers?

Other questions which then arose in the course of trying to determine a response to this were:

1) If we know the three fingered width of an individual and know the measure of their drawing finger does it stand that we will be able to identify them based on that measure when they are drawing an animal?

2) Does that single finger vary in the width of the line it makes? If so: what are the causes of the variability? (the material into which they flute? Shape of line? Different aspects of the finger –tip vs flat– to achieve certain forms? Directionality in their conception of drawing the animal (upward strokes vs downward), confidence and familiarity of the subject to the fluter?)

3) If there is variability in the measure of a single fingered line? Where is the best place to measure on an animal (in this case a mammoth) to determine the most reliable correlation to a ‘known’ three fingered measure’s single finger?

4) If one can reliably identify an individual with this method, what factors account for differences in the way in which a known individual has different measures when creating the same animal?

Figure 3 shows Mammoth 223 (located in Galerie Henri Breuil) in Rouffignac.

This mammoth has a three fingered unit within it, is drawn primarily as a single fingered line, and includes a section of the mammoth’s back where there are two fingers. The mammoth is located in a somewhat difficult spot in that the fluter would have had to balance on a small ledge or otherwise slide into a bear pit which is located directly beneath. The ledge juts from the wall at approximately 1m from the floor so the fluter would have had to reach over this space as well, which likely accounts for the three fingered stream having finger tops at all the same height as described previously. The material on the wall here is thick moonmilk and somewhat crumbly, leading to the creation of wider markings than a harder surface would produce. This is the last (or first) mammoth of a series which extends more than twenty meters through Galerie Henri Breuil ending with the Patriarch.
When this mammoth was analyzed and measured on site, the following measures were collected (Fig. 4). The head of the mammoth was drawn first, from top to bottom. The back of the mammoth was drawn second, possibly with the middle finger as the drawing finger because the two fingered section across the back suggest the dragging of the index finger when reconstructed.

The data collected on this one mammoth shows that within a single line drawn by a same finger (the head for instance) there is a variation of 5mm from the narrow start point to the widest point at the trunk. Similarly on the back, though drawn with
the same finger, there is a variation of 3mm between the 13mm at the end point at the
16mm at the top of the back.

In the next example (Fig. 5), the mammoth faces the opposite direction. This is
Mammoth 212 located in Galerie Henri Breuil, one of a panel of eleven mammoths.

Like the previous mammoth, a three fingered unit drawn inside the mammoth is
helpful to use for comparison. In this instance the wall material is hard. This
mammoth is part of a series of eleven mammoths, some drawn with fingers and
some drawn with a combination of fingers and tools.

![Fig. 5](image)

This mammoth appears to be constructed in two pieces where the back of the
mammoth was drawn after the head and based on the way in which the material on
the wall drags in the line, appears to have been drawn from the top downwards.

In this instance, the range of measures across the back varies by 3mm and across
the head by 4.5mm. Whereas in the previous mammoth the widest measure was
found on the trunk, here it is the narrowest. Measures within the mammoth do not
seem wildly divergent from the three fingered stream found within it. However, that
does not mean that the fluter of the mammoth is indeed the fluter of that three
fingered stream who has been identified at 38mm.

Mammoths 17 and 18 (Fig. 6-7), located in Galerie G and known as *Mammouths
de la Découverte*, in appearance facing each other, afford the opportunity to explore
whether or not these two mammoths were made by the same person or different
people. Of their characteristics, they face each other, are drawn at different heights,
have an abundant collection of fluted streams nearby (which have been identified as
having been fluted by at least two individuals with hand measures of 38mm and
48mm) and have tusks interwoven which suggest that they were created at the same
time. Mammoth 17 is beneath the lower tusk of Mammoth 18 but the trunk is over top
of the upper tusk.
Like the others, it appears that the head was drawn first and that the back was drawn over the top of the last piece of the head. In this we see a variation of 2.5mm in the head lines and 2mm in the back section with a range of measures in total for the mammoth of 3.5mm.
Mammoth 18 (Fig. 7) is drawn over a series of fluted streams. This does not occur in many other instances in this cave. The four fingered tight hand streams which the back bisects are all measures of approximately three fingers at 38mm. Within the mammoth the measures of the two fingered streams have single measures of 12mm and 13mm although the deeper divot marks in the mammoth’s head range from 11 and the narrowest tip points to 15mm at the widest.

Mammoth 18’s head lines range from 11mm at the downward slope of the top of the mammoth’s head to 14mm on the downward slope of the trunk. This gives again a range of 3mm in variation. Across the mammoth’s back measures range between 13mm and 15mm. A range of ± 2mm.

The top two tusks (there are six here which complicates this drawing) have measures between 14mm towards the top and most upright sections to 11mm towards the bottom. This again shows the ± 3mm variation.

In looking at the two mammoths next to each other we note:
– Mammoth 17’s finger ranges are from 13.5-17mm;
– Mammoth 18’s finger ranges are from 11-15mm.

These results raise questions as to whether or not these mammoths were drawn by the same people and whether or not they were drawn by the fluters of the accompanying panel.

Mammoth 249 (Fig. 8) is located in Chamber I of the cave. It is distinctive for a number of reasons. It is drawn partially with a crayon of manganese dioxide and partially with a finger. It is also very low to the ground, with the apex of the mammoth at 62 cm from the cave floor. A three fingered stream of 3mm is near, just to the left of the mammoth and there are no other flutings nearby.
This small segment of line has a variation of 2mm from top to bottom. And also note that the top measure corresponds with one of the single fingers of the three fingered stream located nearby.

From the data collected within the cave, the following conclusions can be drawn:

1) the variation in the measure of a single finger on a segment of the same line has been ± 3mm within the same line and up to 5mm across a single mammoth;

2) almost all of the mammoths that have been completely drawn with finger have been constructed where the head has been drawn first and the back begins as a second piece where the head ends;

3) the mammoths appear to be constructed in such a way that both pieces begin at the top of the mammoth and move downwards. This is evidenced by the directionality of the fluted material within the lines which they have moved in the process of dragging their fingers;

4) most of these mammoths have had a three fingered stream either within it or in close proximity. While there is nothing to say that these are directly related, they offer an opportunity to measure against the singled fingered widths of each finger to see if there is an increased likelihood that they have been created by the same individual or not.

Laboratory Experimentation

In keeping with our methodological approach, the questions raised by the data collected within the cave were brought back to the laboratory for experimentation in a more controlled environment to come to understand whether or not it would be possible to determine individuals based on their single fingered drawings.

In the laboratory environment, the following questions were examined:

1) If one knew with certainty that the three fingered fluter was the same individual as the mammoth artist (thus removing that variable), what could be ascertained about the variation in single fingered width in the construction of the mammoth?

2) Would there be substantially different measures for the same individual if she drew a mammoth facing right or left?

3) Where would be the best place to measure on a mammoth if one did know the single fingered width based on a fluted stream to find the most reliably consistent measure point?

Results

Figures 9 to 11 were drawn by a 41 year old right handed female.

In Figure 9 across the back line there is a variation of 5mm. And across the head we find a variation of 4mm. Also, almost none of the measures correspond with the measured fluted width, although the top of the head comes closest.
In Figure 10 across the back line there is a variation of 3mm. Across the head it is 8mm because of the very narrow tip over the trunk.

In Figure 11 there is a back line variation of 6mm and a head line variation of 6mm again because of the same narrow tip. We could perhaps say that this individual has an idiosyncratic drawing style!

One may note as well, that there were many more data points collected on this mammoth than on any of the ones in the cave thanks to the ease of the lab environment as opposed to the cave. It is clear is that one need know where are the best places to measure on a mammoth so as not to have too much data or too little.
In our next instance we examine at another two mammoths drawn at the same time (Fig.12 L&R) by a 26 year old male.

The measures across the back of the right facing mammoth have a 1mm difference and this measure is the same as the fluter’s index finger width. Across the head is a 3mm spread where the widest point is at the head top and the narrowest at the top of the trunk. This corresponds with the measured finger tip width of this individual. In left facing image, the mammoth back has a range of 5mm. On the head there is a range of 6mm with the narrowest point being at the forehead of the mammoth and the widest being at the top of the head.
Based on the laboratory experiments one can draw the following conclusions:

1) A single finger can vary from up to 6mm in the width of a line it draws. This seems to be based on:
   a) the thickness and variability of the medium in which the fluter flutes
   b) the ways in which the finger moves from the use of the tip to draw certain aspects of an animal versus using the flat of the finger in other instances.

2) Choosing good points to measure seems essential. On a mammoth it seems that the best areas to measure are at along the trunk, head, top of head, top of back, and along the back slope.

3) Even with the knowledge of a fluter’s fluting finger’s width one cannot determine with ease the line s/he will make.

Conclusions

Ultimately, based on both the laboratory work and observations within the cave, it does not seem that the measure of finger width alone is an accurate means by which to determine the identity of an artist for an image created with a single finger. One cannot correlate with any accuracy three fingered flutings to say whether or not they were fluted by the same artist as a figurative line or even to identify whether nearby fluted units were created by the same individual. Although it would seem likely, if relying solely on the data, one must say that it is not possible to connect those lines with each other to reveal individual identity. Laboratory work such as that described here is imperative for researchers focused on developing adequate and accurate methods which can yield reliable data in the field.

New technologies and methodologies will, in the future, no doubt produce new and better means which may allow for further exploration of the identities of individuals based on the physical data they leave behind through their use of fingers and hands. At this stage, while the measuring of single finger fluted animals is important, the measure of the line is not as of yet a suitable means and method for determining an individual’s identity even among a known group of individuals.

On the larger scale, the use of the three fingered measure for determining individuals continues to prove to be a successful approach which is continually being fine tuned through repeated observation. As more researchers begin to use this approach and refine its use, undoubtedly the corpus of our knowledge about the fluters of the Upper Paleolithic will continue to grow.

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BIBLIOGRAPHY


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