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THE SPATIAL INTERACTIONS BETWEEN REMAINS IN LARGE DWELLING SPACES

1. Introduction

In studying human behaviours within prehistoric dwelling contexts and their surrounds, exploring the possible range of activities through the distribution analysis of artefacts and bioarchaeological remains, is a pivotal task in gaining any nuanced insight into social patterns of behaviour. Spaces affected by busy occupation and/or re-occupation over time, whose soils provide an intricate palimpsest of refuse deposition, are highly informative in reconstructing patterns of activities (Binford 1978), in some cases even more so than those characterised by the well-known 'Pompeii premise' (Schiffer 1985). Defining spaces and functions is a complex matter that requires the combination of different strands of analysis, from those suited to identifying the agents involved in the stochastic nature (Ferrari 2001) of deposit formation (Ascher 1968; Schiffer 1987; Leonardi 1992; Merrill, Read 2010) to those aimed at functionally characterising the artefacts and ecofacts found (Henrickson, McDonald 1983; Skibo 2012; Recchia *et al.* 2021) to finally mapping them.

Distribution (via a map) interpretation is the final step in the intertwined methodological approaches drawing their data from multi-analytical processes. Given that most human activities include the use of numerous tools and materials, we cannot confine our analysis to single categories of what is found where, rather it is critical to investigate and establish associations among them, albeit this step may have concealed pitfalls. In fact, contextualisation of the empirical data within the specific features of the context under scrutiny, essential to my own theoretical perspective (Hodder 1991; Shanks *et al.* 1995), meets the heuristic character of our decision-making process, something easily affected by the human brain's tendency to filter and simplify the complex palimpsest that makes up a typical archaeological record. As a result, when assessing a depositional set composed of a diverse and huge number of remains, a cognitive bias arising from our knowledge and experience (Kahneman, Tversky 1972; Blanco 2017) may beguile us into recognising the associations expected, whilst missing others hidden or beyond our personal experience.

Exploring such hidden connections in spatial data opens the way to figuring out further activities or actions, with the objects/ecofacts related to them. This article is aimed at providing a methodological approach to deal with this situation. Notably, by modelling all possible pairs of combinations between the categories of remains through the technique of the G-cross function, the proposed analysis will provide a method to address the question of how each category of remains interacts in the space with the other ones present (Baddeley *et al.* 2005, 2015; Gelb 2022). Specifically, this analysis verifies whether a set of points is spatially associated with any other, at multiple distances. Resulting models serve as null-model-based hypotheses, which can be successively tested by contextualising the archaeological data within the sociocultural and technological settings under scrutiny (Hodder 1991). For historical studies this continues to be the primary process to distinguish between merely correlating events and the ones with a causal relationship.

The analysis was performed on the R software environment and the code lines are reported in this work to fully meet the policy of open science based on data transparency, replicability for similar case study and to promote interdisciplinary discussion of the adopted method. It was developed within a three-year PhD project carried out at the Dipartimento di Scienze dell'Antichità, Sapienza University of Rome aimed at investigating the potential uses of an internal area of the fortified settlement of Coppa Nevigata (Northern Apulia, Italy), dated to the advanced Late Bronze Age (to the 12th c. BC). The work was achieved through the spatial analysis of a wide palimpsest of artefacts and bioarchaeological remains yielded by the extensive excavation campaigns.

2. The case study

The Bronze Age settlement of Coppa Nevigata (Northern Apulia, Italy) is part of the wide phenomenon that sees the rise of fortified settlements in the Central Mediterranean in the 3rd and the 2nd mill. BC. It is a reference site for the understanding of historical trajectories involving Southern Italy during the Bronze Age. In 40 years of systematic excavation large parts of the settlement have been investigated, dating from the early 2nd mill. BC to the early 1st mill. BC (19th-8th c. BC), notably those pertaining the late phase of the Late Bronze Age (12th c. BC).

During the last decades, different areas have been investigated by spatial analysis based on a conventional method, namely the mapping of functionally-determinable artefacts and ecofacts, and the visualisation of the same (Cazzella *et al.* 2002; Moscoloni *et al.* 2002). This present new analysis fits comfortably into this branch of research already carried out but adopts an up-to-date approach and focuses on a significantly larger internal area (Fig. 1A). The area concerned dates to the late phase of the 12th c. BC (Late Bronze Age), and it is located on the NE side of the settlement, where the entrance gate from the N leads into a large open space (now partially destroyed unfortunately). The study area can be divided into two subareas: the western

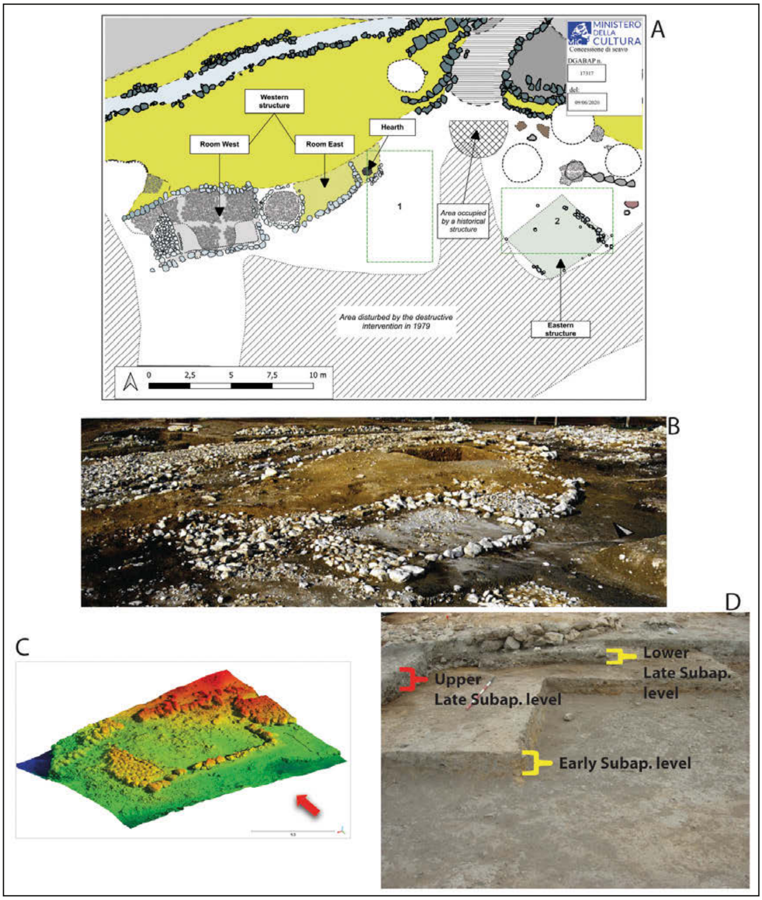

Fig. 1 – Coppa Nevigata: map of the 12th c. BC part of the settlement analysed by integrated spatial analysis (A); picture of the area under scrutiny from the W (B); photogrammetric reconstruction of the Room W of the structure (C); stratigraphic sequence of the area under scrutiny, the red curly brackets highlight the part of the deposit studied by the integrated spatial analysis (D) (Coppa Nevigata Project Archive).

one where a domestic building consisting of two adjoined rectangular rooms and a circular stone structure is present (Fig. 1B-C), and the eastern one, which encompasses a perishable structure, as witnessed by some postholes, and a stone alignment adjoining it to the N. The archaeological deposit inside the structures was poorly preserved, while the open space retained a 20 cm thick deposit resulting from the life of the structures and the contemporary use of external open spaces (upper Late Subapennine level - Fig. 1D). Despite minimal indications of a burning event, which likely involved only part of the structure, no evidence shows any major episodes of collapse or the occurrence of significant hiatus in the usage of space.

The long-lived-in dwelling space yielded thousands of refuse elements (both artefacts and ecofacts) likely resulting from activities carried out on the spot. Here, pottery fragmentation analysis (Lucci 2021) and spatial distribution analysis of single categories of remains (Lucci *et al.* 2020; Recchia *et al.* in press) has revealed that the archaeological deposit was not significantly altered by post-depositional agents, and preserved the spatial patterning of said remains. Unfortunately, on the southern edge of the study area the deposit dating to the Late Bronze Age was damaged by a destructive intervention in 1979 that completely erased the archaeological evidence, so isolating this area from the rest of the settlement.

The above is but a brief description of the study area and settlement features, since the aim of this paper is chiefly related to a methodological aspect. Further and detailed information about the archaeological contexts are provided by the widely available and up-to-date literature on the site published over the last decade (Cazzella *et al.* 2012; Recchia *et al.* 2019, 2021).

3. Materials and methods

The analysis presented in this work is based on the use of R, an extremely powerful programming language for statistics and geostatistics, which is becoming increasingly popular in archaeological research (Marwick 2018). It is an open source software environment, highly flexible and able to work with various types of data files. Based on code lines, it enables the reproduction of the analytical steps, enhancing the open science policy and interdisciplinary dialogue. In order to give the scientific community the chance to discuss, repeat and evaluate the proposed methodological approach, code lines referring to the key analytical steps are reported in this work, along with the results of such analyses.

3.1 *The spatial dataset under scrutiny*

For the area under scrutiny, finds were located by recording their spatial coordinates. In the maps, the spatial distribution and related Kernel Density of each category of remains analysed in this work are visualised (Fig. 1B). Since the goal of this paper is to provide insight into the potential of the analytical method, they represent only a part of the record of artefacts and bioarchaeological remains analysed by the integrated spatial analysis for the area under scrutiny. Faunal remains of major edible species (cattle, sheep/goat, pig, and reed deer) have been processed according to four meat-yielding categories (Barker 1982), basing on previous published work on Coppa

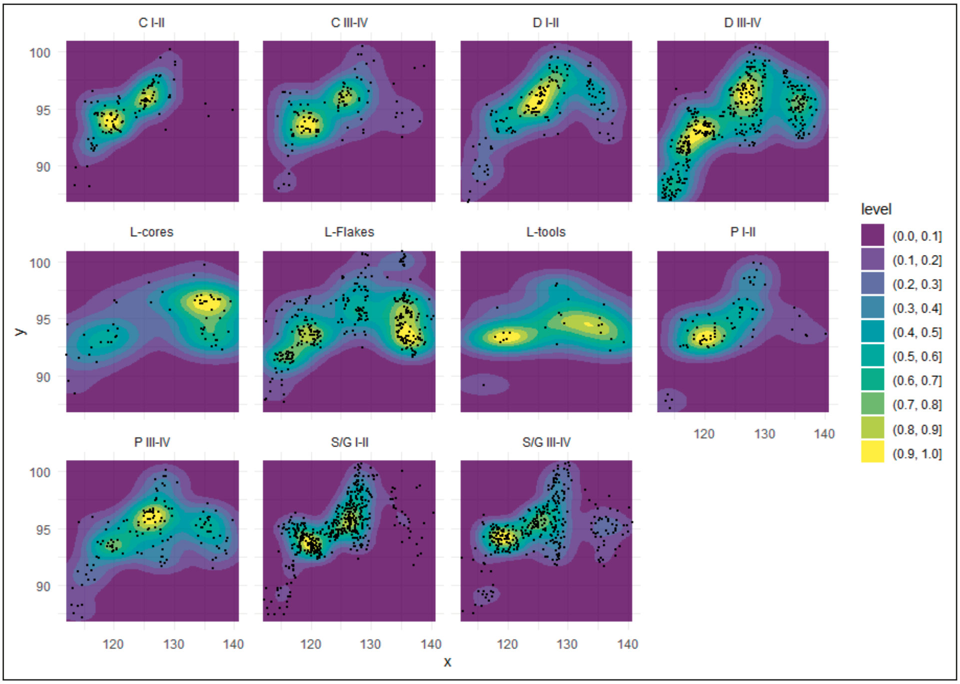

Fig. 2 – Spatial distributions of point patterns concerning lithic artefacts and faunal remains analysed in this work.

Nevigata (Bietti Sestieri *et al.* 2002; Moscoloni *et al.* 2002; Recchia *et al.* 2021) (Fig. 3A). Then, they have been divided into two main groups: the I and II classes, pertaining to torso bones and higher parts of animal legs that were considered 'good' meat-yielding portions, while the III and IV classes, pertaining to animal skulls and lower parts of legs, were considered 'low' meat-yielding portions. Conversely, lithic artefacts have been processed basing on technological categories: flakes, tools and cores (Lucci *et al.* 2020) (Fig. 3A). For the bioarchaeological remains, this analysis focuses on the fauna, as the botanical study is still ongoing and available data only partially covers square grids of the area under consideration.

Overall, the number of remains considered here is 2181, composed of 396 lithic artefacts, chiefly flakes, and 1785 faunal remains, mainly composed by caprines, both good and low meat-yielding portions (i.e. S/G I-II and S/G III-IV), and red deer remains (notably low meat-yielding portions) (Fig. 3B). More quantitative and qualitative details about the spatial dataset obtained from the area under scrutiny are published in the monograph on the PhD project (Lucci 2022) and a further paper in press (Recchia *et al.* in press).

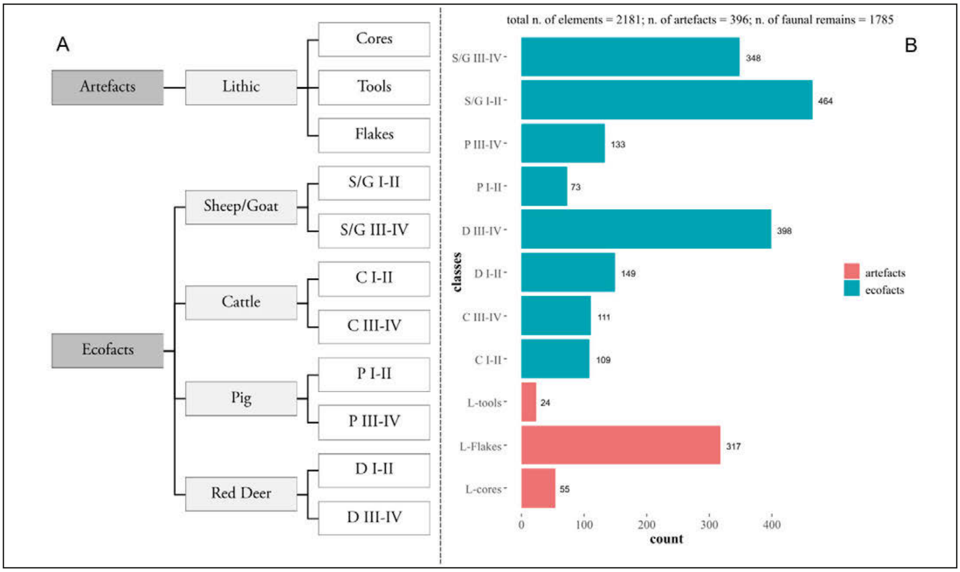

Fig. 3 – Scheme synthesising categories of remains and related functional classes processed by Gcross analysis (A); incidence of each class of faunal remains and lithic artefacts (B).

3.2 *The G-cross function in assessing spatial dependencies of pair combinations at multiple distances*

Stochastic deposit formation and alteration processes (i.e. human activity as well as post-depositional agents that alter primary distribution) can produce a combined depositional effect in a spatial perspective. For example, a distribution can appear homogeneous on a small-range scale while becoming clustered at larger scale. Ripley's K function is a technique used in Point Pattern Analysis (PPA) to assess point pattern distribution in a given area at multiple scales, counting the number of features at defined distances and testing it against a Completely Spatially Random (CSR) point pattern (Dixon 2002; Baddeley *et al.* 2015; Gelb 2022).

With regard to the dataset, to assess the distribution of each single category of remains (e.g. good meat-yield portion of cattle remains or lithic flakes), a specific univariate form of Ripley's K function, namely the variance-normalised L-function (Kiskowski *et al.* 2009), was performed: this helped the contextual understanding of their distribution (Recchia *et al.* in press). The use of the distance-based K-function was addressed to exceed disadvantages of classical methods. For example, area-based methods (e.g. Kernel Density Estimation - KDE), characterised through its first-order properties such as the spatial variation of its points' density, are unable to fully capture how things interact globally; on the other hand, the interactions of objects at different scales are not described by nearest-neighbors approaches. Ripley's K function is a technique used in PPA to assess point pattern distribution in a given area at multiple scales, counting the number of features at defined distances and testing it against a CSR point pattern (Dixon 2002; Baddeley *et al.* 2015; Gelb 2022). L-function is a commonly used transformation of the theoretical Poisson K-function which simplifies visual evaluation of the plot (Baddeley *et al.* 2015, 207). Results of this analysis are reported in Lucci 2022.

However, in this work a further analytical step is presented. After performing this operation, it was necessary to investigate if spatial aggregations between diverse categories of remains were significant: for example, if lithic flake distribution was related to the animal remains as result of butchering activities on the spot or whether they are distributed over the study area without purpose or meaning.

For this reason, I used the 2nd order Multitype Nearest Neighbour Distance Function (Gcross) for exploring whether components of two spatial point patterns were spatially aggregated or not (Stoyan, Stoyan 1996; van Lieshout, Baddeley 1999; Chiu *et al.* 2013). The Gcross is a spatial distance distribution metric that represents the probability of finding at least one given type of remains (e.g., lithic artefacts) within a radius of another given type of remains (e.g., red deer remains). These probability distributions can be applied to assess the relative proximity/association of any two types of remains. Thus, it is an effective method to assess the clustering effect of pairs of different types of remains at several distances. The resulting plot contains several curves related to the different edge-corrected outcomes of the function (i.e., the Hanisch correction, the spatial Kaplan-Meier correction, and the Border correction) against the theoretical Poisson (Gpois (r)) distribution curve. Edge corrections are used to avoid distortion of the performed function when cases along the borders of the study area are processed. Two sets of points can be considered spatially dependent if the generated curves are above the theoretical Poisson curve (the latter corresponds to independent random distributions). The analysis was performed by the function Gcross[1] implemented in the R package spatstat (Baddeley, Turner 2005). The code also included the function foreach of the R package foreach[2] for executing it in loop, in order to analyse the combination of each pair of categories composing the spatial dataset (https://rdrr.io/rforge/foreach/). Furthermore, R Markdown[3] (Xie *et al.* 2020) was used to compile the code and computing, with the aim at incorporating graphs within an organised report.

[1] https://www.rdocumentation.org/packages/spatstat/versions/1.64-1/topics/Gcross.
[2] https://cran.r-project.org/web/packages/foreach/index.html.
[3] https://rmarkdown.rstudio.com/docs/.

3.3 *The R code*

Having imported the spatial dataset as a point pattern (object of class "ppp" identified in the following code-lines as "sd"), a vector composed of the object name of each category of remains composing the spatial dataset was created. In this case, it contains names of categories of the faunal and artefact classes under scrutiny. This vector is functional for the sub-setting of all possible combination of pairs of categories of remains that are processed by the G-cross function. In this case the list of categories is composed in this way:

```
sd #spatial dataset (object of class "ppp")
Categories = c("S/G I-II","S/G III-IV","C I-II","C III-IV","P I-II",
  "P III-IV","D I-II", "D III-IV", "L-tools","L-Flakes", "L-cores")
```

At this point, the analysis may be carried out in two ways: 1) by examining the spatial relationship of a single category of remains with all the other ones, when the examination is specifically focused on a particular category; 2) by performing a cumulative analysis in which all pairs are automatically subsetted and processed. Nothing regarding the actual analysis changes; only the way the results are organised.

1) Code-lines below are referred to the first approach.

```
#to organise plotted outcomes in a grid
par(mfrow = c(2,4))
#use the function "foreach" for sub-setting from categories list
#n is the total number of elements composing the categories list
foreach(b = 1:n) %do% { #sub-set in loop the position "b"
A = Categories[n1] #A is the first element of the analysed pair
  combination
#n1 is a numeric value selected by the user to subset an element from
# the Categories list
B = Categories[b] #B is the second element of the analysed pair
  combination
#b is a numeric value previously set by the function foreach
if(a != b) { #exclude the possibility A = B
G1 = Gcross(sd,A,B) #Cross G function of the pair combination
plot(G1, main = NULL, legend = FALSE, xlim = c(0,1), ylim = c(0,1))}
  #charting result
}
```

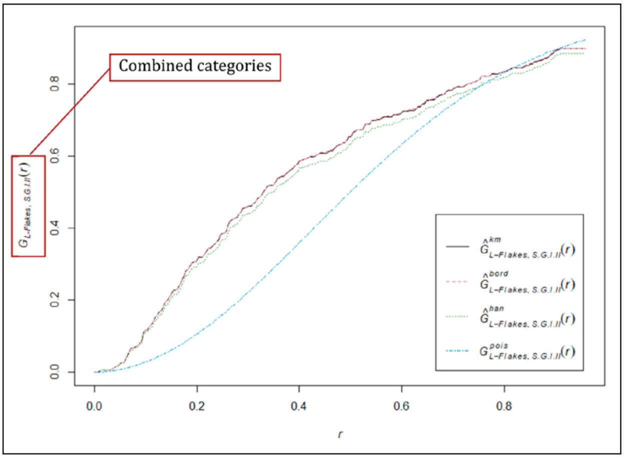

Fig. 4 – Example plot resulting from Gcross focused on two categories of remains.

The function foreach executes the subsetting process from the list of categories of remains in loop (code line 5). In this case it runs on the second element to combine, by defining "b" through the progressive selection of a number from 1 to n (where "n" is the total number of components of the Categories list). This allows one to subset an element from the Categories list, as expressed in the code-line 9 (i.e. 1 selects S/G I-II, 2 selects S/G III-IV, etc.). A (i.e. the first element selected from the Categories list) must be set by the user by a numeric value (n_1). It must be a valid index within that list (in this case between 1 and 11). For example, figuring that I want to observe combination of lithic flakes with other categories, then $n_1 = 11$. Furthermore, it is recommended excluding the possibility B = A (i.e. processing one category with itself) by imposing the condition expressed in the code-line 11.

At this point Gcross was performed and the outcomes plotted. The dotted blue curve refers to the 'theoretical Poisson process' (theo), or complete spatial randomness (CSR), whilst the other curves pertain to different edge-corrected spatial distributions (see § 3.2): Kaplan-Meier (km), Border corrected (bord) and Hanisch (han) (Baddeley, Gill 1997; Dixon 2002; Hanisch 2007). The plot's upper limit for the x axis has been set at 1 metre (xlim = c(0, 1)) and for the y axis at 1 metre (ylim = c(0,1)). The plot (Fig. 4) is an example of the resulting outcome, and it can be used to understand how to read the results of the analysis; in this example, spatial interaction between stone artefacts (i.e. flint flakes) and good meat-yielding portions of sheep/goat has been analysed. Curves pertaining to the different edge-correction estimators of the empirical distribution fall above the 'theoretical' (dotted blue) lines (which correspond to independent random distributions) from small distances until 0.8 m, when spatial correlation starts to lose significance.

It is critical to remember that outcome interpretation must take into account that the two-way relationship between pairs of point patterns is not always true (i.e., the result of Gcross of A to B might not be the same as Gcross of B to A). Here it is necessary to check both these conditions by examining the entire range of pair combinations. By adding a further code-line (i.e. G2 = Gcross (remains, B, A)), it is possible to modify the code so that it processes both plots A to B and B to A next to one another, but this will produce duplicated outcomes. Moreover, it is crucial to explore the framework of the analytical results in its entirety, not merely to consider results showing spatial associations between two categories of remains.

2) The second methodological approach entails the chance to automatically process and visualise any potential combination while avoiding any type of selection procedure. In this case, A is obtained by the same process of B (code-line 5), namely using the function foreach to progressively subset a component from the Categories list. This change only affects part of the code structure and the way in which outcomes are provided by the computing process, thus the methodological structure and result interpretations remain the same.

```
1. #to organise plotted outcomes in a grid
2. par(mfrow = c(2,4))
3. #use the function “foreach” for sub-setting from categories list
4. #n is the total number of elements composing the categories list
5. foreach(a = 1:n) %:% #sub-set in loop the position “a”
6. foreach(b = 1:n) %do% { #sub-set in loop the position “b”
7. A = Categories[a] #A is the first element of the analysed pair combination
8. #a is a numeric value to subset an element from
9. # the Categories list
10. B = Categories[b] #B is the second element of the analysed pair combination
11. #b is a numeric value previously set by the function foreach
12. if(a != b) { #exclude the possibility A = B
13. G1 = Gcross(sd,A,B) #Cross G function of the pair combination
14. plot(G1, main = NULL, legend = FALSE, xlim = c(0,1), ylim = c(0,1))} #charting result
15. }
```

3) G-cross function over different scales. The analysis was performed processing both the whole spatial dataset from the entire area under scrutiny and also focusing on smaller sample areas, in order to observe the range of outcomes and assess their reliability when figuring out the diverse use of the space in the extensive context. Notably, the analysis focused on two sample areas shown in the map (Fig. 1A), corresponding to the open space to the W of the entrance, which includes a small hearth in the NE (i.e. the Sample Area 1) and the open area and a portion of the open space with the wooden structure at the south-eastern side of the entrance gate (i.e. the Sample Area 2).

They have been selected with the sole aim of investigating the analysis outcomes of this work, but they might be tailored to meet different research issues, for example to investigate differences between an internal and an open space. In any case, it is critical that the sample areas have enough components to generate analysis results that are statistically significant. Subsetting of the point-patterns was carried out by the function owin[4] of the R package spatstat.

4. Results and discussion

110 models stemmed from each examined area (i.e., the whole space and the two sample sub-areas), enabling one to visualise and evaluate the spatial relationships between any possible pair of categories of remains. Outcomes are included in a report generated by R Markdown (Report 1[5]) and refer to the second approach mentioned in the previous section. At this point, the computerised phase of the analytical process ended. The subsequent interpretive process, in my opinion, has to revert to a heuristic dimension, led by speculative and cognitive procedures, in which the spatial connections are contextualised in the light of the archaeological and more generally social settings under consideration (Kintigh, Ammerman 1982; Hodder 1991). The accumulated outcomes show that correlations over increasing distances in numerous pairs are observed when plots concern the entire area. This results from the large quantity and density of remains throughout it. But when focusing on sample areas, the outcomes change, revealing a diversified framework of associations between pairs of combinations.

For instance, interesting information emerges on associations between lithic-flakes with faunal remains as well as with further classes of stone objects, cores and tools. As previously observed, when the entire space is examined (Fig. 5), spatial dependencies are generally strong, despite the

[4] https://www.rdocumentation.org/packages/spatstat/versions/1.64-1/topics/owin.

[5] https://github.com/enricolucci/CrossGFunction_CN/blob/85553039bf2bcaa0b2ff9f1c5c724ad1c2a335fc/Report%201%20-%20ELucci.pdf.

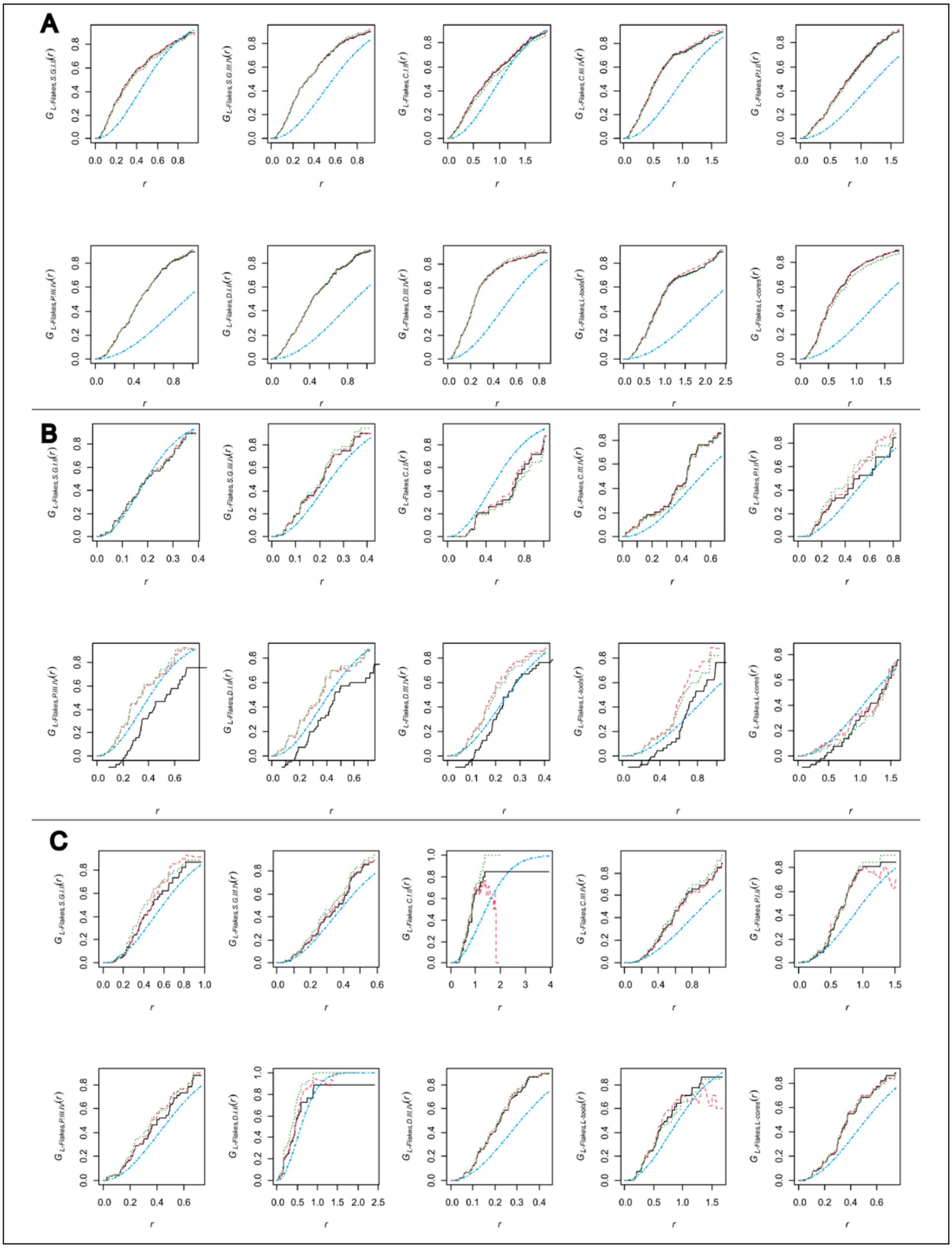

Fig. 5 – Generated plots with pairs combining point patterns of lithic flakes with those of other categories of remains. Outcomes for the entire area (A), for the Sample Area 1 (B) and for the Sample Area 2 (C).

fact that a few differences exist among plots, such as the combination of stone flakes with good and bad meat-yielding portions of caprines (S/G I-II and S/G III-IV), with the latter showing dependency at greater distances. On the other hand, analysis results for the Sample Area 1 reveal a more diversified association framework, with stone flakes generally associated with low meat-yield portions (excepting for pigs), and notably so with the deer remains, which are likewise connected to good meat-yielding portions. Integrating such outcomes with the visual interpretation given in distributional maps, published in previous and in-press papers (Recchia *et al.* 2021, in press; Lucci 2022), it has been hypothesised that the use of these open spaces was for butchering activities. This explanation seems particularly plausible when examining the red deer bones, since the faunal record contains a high quantity of limb distal extremities, which could be the result of the practice of bringing the hunted animals through the main entrance and then dismembering their carcasses right away. Moreover, the spatial relationship with stone tools is quite intriguing. The increase in G(r) values starting at roughly 0.4 m suggests that reliance is appreciable at wider distances, which is expected because the number of tool pieces is substantially lower than flakes in the examined area. In any case, it underlines the likely complimentary use of these things in this space.

Sample Area 2 yielded a further diversified framework of point patterns associations. Here, stone flakes are but weakly associated with caprine remains (both categories), but strongly associated with C III-IV and P I-II (PIII and IV are instead weakly associated) and DIII-IV. The spatial closeness of stone-flakes with low-meat-yield portions of edible species might be connected to butchering activities too. However, a further explanation appears more plausible, since this part of the study area yielded a high number of finds associable with craft production, chiefly antler/bone and metal artefacts (both ornaments and tools/implements, as well as half-processed items and raw materials). Thus, the stone flakes and tools may have been involved in the transformations of by-products (animal skins and bones). But it is also interesting to observe the strong association with stone-cores, which also suggests the potential production of flakes on the spot. As seen above, outcomes of Gcross analysis represent a valuable proxy by which to enhance the interpretation of the spatial dataset, through their integration into a wider contextual interpretive approach.

5. Final remarks

In reconstructing the activities and their organisation within a prehistoric settlement, the analysis of the spatial distribution of each category of remains is crucial, as much as the exploring of how they are spatially associated. Visual examination of distributional maps, in which artefact and bioarchaeological remains are differently characterised, is typically the most common and effective way to evaluate spatial data, notably adopting a contextual interpretive approach (Hodder 1991). On that subject, it is vital to bear in mind the observation of K. Kintigh and A. Ammerman (1982, 33) on a heuristic approach to interpreting spatial data, which «combine the intellectual sophistication of approaches with the information processing capacity and systematic benefits of quantitative treatments». In developing my PhD project, such publications significantly influenced the development of my own theoretical background. Thus, from the beginning of my work, I incorporated quantitative methods into the spatial analysis as an assistance to the interpretation of spatial datasets. In my opinion in fact, there is no other way to approach intrasite spatial analysis than the contextual analysis of functionally characterised artefacts and ecofacts (Binford 1962, 1978; Binford, Binford 1968). However, within this scientific approach to archaeological data, interpretation processes might be affected by knowledge background, experiences and even by the intuitive cognition system (Patterson, Eggleston 2017). Here, quantitative analysis supported the analytical and interpretive process, as a counterweight to cognitive bias. But modelling was confined to a specific question, adopting the approach defined as «scaffolding method» proposed by Llobera (2012).

The analysis illustrated in this work was aimed at investigating a specific question related to spatial analysis: the associations between various categories of remains, specifically how each category spatially interacted with all of the others, in the entire area under consideration as well as involving different subspaces connected to various structures. To achieve this aim, the Gcross function analysis was employed, a 2nd order Multitype Nearest Neighbour Distance Function which explores whether components of two spatial point patterns were spatially aggregated or not (Stoyan, Stoyan 1996; van Lieshout, Baddeley 1999). The analysis was performed on R, a widely used opensource software environment for statistical analysis and graphics; notably the Gcross was carried out by the package spatstat. The decision to conduct the study using R was based on the intention to enable replicability of the proposed methodological approach with other contexts and promote an interdisciplinary discussion within the scientific community. On this matter, full code and dataset will be published in a future endeavour (i.e. further publications containing the entire spatial dataset analysed). Because the goal of this effort is to suggest, describe, and discuss the outcomes of a new tool among the multitude of computer instruments for analysing the spatiality of the archaeological record, only some case studies (e.g., stone artefacts and animal remains) have been examined, but any mapped type of remains can be processed.

Code lines were compiled with the aim at automatising the computing process. Moreover, the use of R Markdown (Xie *et al*. 2020) allowed us to organise plots in cumulative reports that facilitated the consulting of the outcomes. The last represented further assistance in the interpretative process of the spatial data reported on distributional maps, as already discussed in a recent work (Recchia *et al*. in press). Notably, the Gcross outcomes were particularly useful when investigating diversities of spatial relationships between pairs of categories of remains over different sub-spaces of the context under scrutiny, allowing one to enhance the understanding of the social patterns of behaviours connected to the organisation of consumption and productive activities.

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ABSTRACT

Large dwelling spaces, characterised by a continuous human occupation and for different practices, represent crucial archaeological contexts in reconstructing the organisation of production and consumption activities within prehistoric communities. However, the archaeological record related to such depositional contexts often appears spatially disordered and dominated by a chaotic distribution, the result of the interaction of human and natural agencies over time. On this matter, computer modelling offers a wide range of methods to disentangle the apparent spatial chaos and assess the dynamics behind the distribution of the remains, both those deriving from human activities carried out on the spot and those resulting from later disturbances. In this framework, one of the main issues is the reconstruction of the spatial relationships between components in the archaeological record, which may reflect a complex of materials and tools from some human activity. This paper explores the effectiveness of Gcross function analysis to investigate dynamics of interactions between different categories of remains in a large dwelling space, addressing the question of how each category of remains interacts in the space with the others. As a case study, the analysis focuses on a wide area within the Bronze Age fortified settlement of Coppa Nevigata (Southern Italy).