

Cemeteries and significance tests

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Introduction

This note arises in part from E. Swift's paper, "Late-Roman bead necklaces and bracelets," in *JRA* 16 (2003) 336-49. In it, Swift explored various aspects of the use of bead strings as shown by grave finds; and drew attention to the association between amber beads and children within the empire. This was described in terms of percentages of adult/child graves with such beads, and was illustrated graphically by bar charts. The association was not found in graves beyond the frontier.

These are the sort of associations that can be formally tested by the use of statistical significance tests. We feel that the use of such tests, in addition to the simple description of the data, would often be beneficial. They enable the researcher to establish whether the observed pattern is likely to have come about by chance. If it has not, then the pattern is likely to have some archaeological meaning that can be explored further. They are particularly useful in studies of funerary rites where the information provided by the human bones as to the age and sex of the deceased provides a natural framework for studying pyre and grave good associations. Establishing the patterns in these associations allows us to gain insights into the community's attitudes as to what was appropriate for young and old, as well as for males and females.

Here we present a methodology for using significance tests that was developed during post-excavation analysis of a cemetery of the 3rd c. A.D. at Brougham (N England).¹ It involved looking at not only the number of funerary deposits with a particular feature, but also the number without it. With the aid of the tests, we were able to demonstrate that the whole funerary ritual was very strongly influenced by the age and sex of the person buried. The paper will start by taking two simple examples, one from Swift's paper and one from Brougham, to explain the approach and how significance tests work. There follows a more extended technical consideration of the nature of significance tests and when it is appropriate to use them. The two final case-studies show how the methodology can be used with data derived from settlement sites, and in situations where pattern is to be expected. The examples have been chosen to demonstrate how the methodology works. It is not our purpose to discuss in any detail the implications of the patterns observed. Establishing patterns in data is only the first step of any analysis. Once it can be shown that a pattern is most unlikely to have come about by chance, it is the archaeologist's, not the statistician's, task to provide explanations of why this should be. Explanation is likely to come from setting the pattern within the wider archaeological context of the project from which the data were generated.

Amber beads in the *Barbaricum*: the chi-squared test

In Swift's paper, figures are given² for the numbers of graves in the *Barbaricum* which have amber beads amongst their grave goods. She concentrates on looking at the cases where amber beads are present, but to fully understand what is happening it is also important to look at the graves which do not have them. When this is done, the data can be expressed as a 2 x 2 contingency table showing the numbers of adult female and child graves both with and without amber beads (Table 1).

	With amber	Without amber	Total
Female	30	40	70
Child	23	123	146
Total	53	163	216

Table 1. Incidence of amber beads in the *Barbaricum*

Such tables can be explored using a significance test to see if there is any association between the variables, here the presence/absence of amber and the age of the deceased. The null hypothesis is that there is no association between them. In this case this would mean that adult females were no more or less likely to have amber beads in their graves than children. If the hypothesis is rejected at the 5% level, then there is good

- 1 H. E. M. Cool, *The Roman cemetery at Brougham, Cumbria: excavations 1966-1967* (Britannia Monograph 21, 2004).
- 2 Swift p. 343, using data from M. Tempelmann-Maczynska, *Perlen im mitteleuropäischen Barbaricum* (Römisch-Germanische Forschungen Bd. 43, 1985).