Ancestral Remains as Numbers: Problems with Calculating MNI under NAGPRA

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Abstract

Under NAGPRA, human remains are reported as minimum number of individuals (MNI) for inventory purposes. Unfortunately, the MNI value is frequently conflated with actual number of individuals, when the value may actually consist of remains ranging from nearly complete burials to isolated remains. This is problematic because the MNI value is frequently used as a measure of success, with inflated values giving the appearance that museums are repatriating larger numbers of individuals than are likely present. Although textbook methods for computing MNI are relatively straightforward, we must consider the archaeological contexts and taphonomy, the relationship between isolated remains and burial features, and curation history. Using a case study from central California, we will show how MNI values can vary widely when accounting for isolated human remains, burial features, and the multiple dimensions of excavations.

Computing MNI

Minimum number of individuals (MNI) is a commonly used statistical measure employed to account for all the individual bones found in an archaeological assemblage while resolving the problem of specimen interdependence. The MNI value is determined by the most commonly occurring skeletal element in an assemblage while considering other factors. This value only measures the minimum number of individuals that can account for the skeletal assemblage. In contrast, the actual number of individuals (ANI) is difficult to determine unless individuals are represented by articulated skeletons (Lyman 2008:39).

Determining the number of individuals present in an archaeological collection depends largely on taphonomic processes and excavation strategies. In the simplest case, all of the human remains would have been recovered as discrete interments, such as burials of complete or nearly complete skeletons. Yet, taphonomic processes (such as bioturbation by rodents and other organisms) frequently cause skeletal parts of an individual to be transported a distance away from an actual burial. Methods of excavation may also determine how human remains are encountered, and these may vary from highly controlled, scientific based excavations to salvaging remains behind heavy machinery. In such cases, MNI computations must take into account both burial features and isolated human remains.

Aggregation Issues

A variety of problems have been identified with the MNI measure (Lyman 2008:45-6), one of which is the effect of aggregation. MNI values will change depending on whether data from various proveniences are combined or kept separate, with the latter generally resulting in an increase in MNI.

Table 1 illustrates how differing levels of aggregation may result in a range of MNI values. The data were generated from two adjacent excavation units at Kadema. If MNI is computed at the level of each arbitrary excavation unit and level, we reach the greatest MNI value. The MNI decreases when computed at the horizontal level by combining the specimens from the two units by depth, which may account for superposition but ignores post-depositional processes that may transport skeletal parts on the vertical axis. Arbitrary horizontal levels could also be combined to capture a single deposit or temporal period. This example is complicated when considering the three-dimensional aspect of excavation and the presence of both burials and isolated human remains.

The spatial unit of analysis should be clearly defined but the decision may be somewhat arbitrary. Since there is no clear method for determining the potential distance that isolated human remains may have moved through various post-depositional processes, no single rule can be made regarding the proximity of remains for determining MNI. The various formation processes combined with excavation methodology may lead some researchers to compute MNI at the aggregate site level, yet this will result in a low MNI value compared to the ANI value.

Table 1: MNI and ANI determinations for isolated human remains based on various aggregation methods. Data from two adjacent 6x foot excavation units at Kadema. Burials recovered in the vicinity are not included in the MNI computations.

<table>
<thead>
<tr>
<th>Depth (in)</th>
<th>NSP</th>
<th>MNIinvol</th>
<th>NSP</th>
<th>MNIinvol</th>
<th>NSP</th>
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<td>1</td>
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<td>2</td>
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<td>3</td>
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<td>MNIinvol = 16</td>
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</table>

Features, Isolated Remains, and MNI

As a general rule, a burial is identified in the field during excavation and includes both primary interments and secondary interments; a cremation may be considered a special type of burial feature. By definition, a single burial or cremation should have an MNI of 1. Isolated human remains (IHR) are specimens found within the general excavation matrix, or are remains found with a burial that represent a second individual. IHR presumably were displaced from burials through various processes, such as bioturbation, and are frequently confused with faunal remains.

Considering the two distinct ways in which human remains are encountered, combined with the aggregation issue, it is recommended that NAGPRA inventories should compute MNI for the two sets of remains separately: the number of burials present (equivalent to the ANI) and the MNI for isolated remains with the level of aggregation explicitly defined and justified (Figure 2). Although MNI values are not additive (Lyman 2008:45-6), the total of these two values would be reported in the NAGPRA inventory.

Ideally, the requirement to report MNI in NAGPRA inventories should be relaxed to allow reporting of the burial MNI and the number of isolated remains present (i.e., no MNI for IHR). This would allow for greater transparency and greater understanding of the quantity of material present, the latter of which is frequently considered when tribal representatives are determining the final disposition of the remains.

NAGPRA Implications

The MNI for a collection is the only value required under NAGPRA and are frequently used as a measure of success under NAGPRA. When the problems with using MNI are taken into account, such statistics may be misleading. An MNI谈判 by using a particular method of calculation may give the appearance that a museum is repatriating large numbers of individuals.

Another issue with using MNI for NAGPRA purposes occurs if additional human remains are identified after the Notice of Inventory Completion is published. If such remains result in a change of MNI, lengthy delays may result. The museum must provide a summary to affiliated tribes within six months of the discovery, and an inventory within two years (43CFR10.13b). Repatriation could be significantly delayed through the process of publishing a corrected Notice and the restarting of the thirty-day holding period. Further, if repatriation already occurred, isolated human remains cannot be compared with previously repatriated remains to determine whether the MNI has increased. Such efforts may require considerable amount of resources (e.g., monetary, time) from both museum staff and tribal representatives.

Many of these problems were recognized in a letter from the Society for American Archaeology to the National NAGPRA Program (Limp to Tarlar, 2011). Proposed changes to a more meaningful accounting of burials and isolated human remains will go a long way to clear up many of the misconceptions derived from the singular use of MNI.

Figure 1: Excavation at Kadema (CA-SAC-192).

Kadema: A Case Study

Kadema (CA-SAC-192) is located on an elevated terrace on the north bank of the American River, approximately six miles east of downtown Sacramento. The site was first occupied during the Middle Horizon; use of the site continued well into the Historic Period, with the last documented use in the 1930s. In 2011, the Archaeological Curation Facility (CSUS) obtained a National Park Service NAGPRA grant to inventory collections from Kadema and other sites occupied along the American River. The Kadema assemblages derived from various amateur and professional archaeological collections from 1955 to 1965.

One component of the NAGPRA inventory is the determination of MNI. Human remains represent materials recovered from burial features and isolated contexts within the midden. Burial features were generally spatially clustered, while isolated remains were found throughout the excavated portions of the site. A number of isolated human remains specimens anatomically refit to known burial specimens, despite sometimes having been recovered from different contexts.

Figure 3: Excavation at Kadema (CA-SAC-192).