Similarities and Differences Between Upper Gila and Mimbres River Valley Ceramic Designs

Jakob W. Sedig[1], Patricia A. Gilman[2], Darrell Creel[3]

Robust databases of Mimbres pottery now contain images and information on thousands of bowls, their designs, and their chemical compositions. We used these rich data to delineate similarities and differences between Mimbres river valley (MRV) and upper Gila/western Mimbres (UG) ceramics. Archaeologists have anecdotally noticed differences in Mimbres design elements, especially those associated with the UG and made some attempts to quantify them. However, most discussion of particular design elements has focused on distinguishing specific chronological types (Gruber 2007; Shafer and Brewington 1995). Here, we use design element data gathered from hundreds of UG and MRV vessels to examine whether similarities and differences exist and the larger implications these may have for Mimbres archaeology.

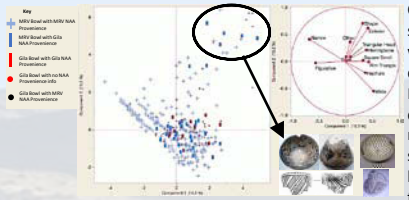
The majority of the vessels we examined were excavated from sites on the map to the left. We examined virtually every vessel from the UG from CE 850/900-1130 (n=116) available in the Mimbres Archive database. The MRV has a much larger corpus of bowls, and so we took a sample from several sites (n=510), the largest of which is Swarts (n=439).

We began by coding 10 elements (table below), many of which we hypothesized were associated with UG vessels. In some instances, we coded simply for absence/presence, while in others we counted particular elements/varieties of elements.

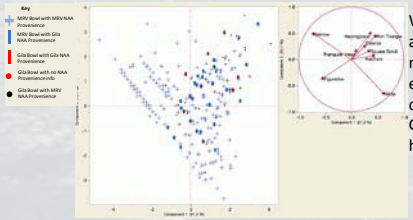
Key elements circled on bowls and highlighted in table

Element	Code	Element	Code
Type	1=Boldface 2=Transitional 3=Classic 4=Boldface/Trans 5=Trans/Classic 6=Indeterminate	Triangular Head	0=absent 1=present
Shape	1=hemispherical 2=flare rim 3=jar 4=other	Square Scroll	0=absent 1=present
Hachure	0=absent 1=present 2=present/touching 3=other	Narrow Rim Band	0-10+
Herringbone	0=absent 1=present 2=indeterminate	Wide Rim Band	0-10+
Rim Triangle	0=absent 1=present/hachure 2=present/solid 3=both	Other Rim Band	0=absent 1=present
Figurative	0=absent 1=present	Exterior Design	0=absent 1=present

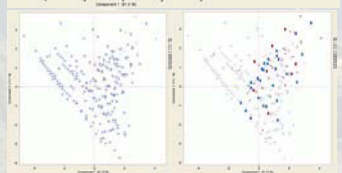
Data Analysis



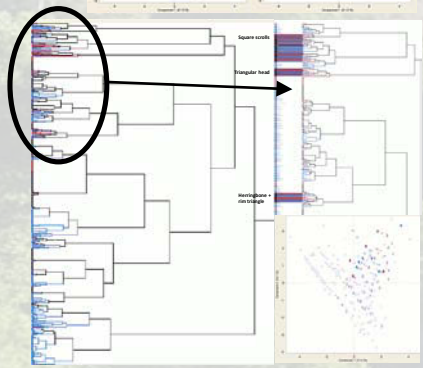
Once the elements were coded, we performed statistical analysis in JMP Pro 12.0. We started with Principal Components Analysis (PCA) to determine if bowls from particular river valleys or NAA sources could be associated with unique design elements. It was immediately clear that rare attributes we had coded, including irregular shape, style, or rim bands, were causing some bowls to group as outliers, and so we removed these attributes and replicated the analysis.



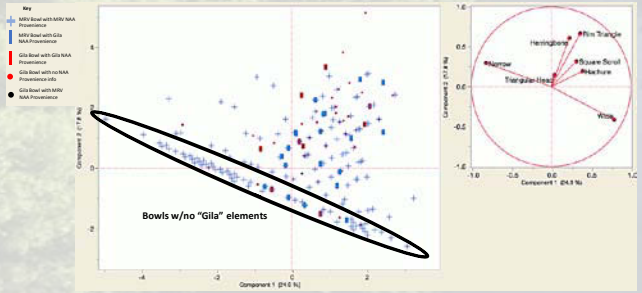
With the outliers removed, two general patterns are apparent in the PCA. First, figurative elements are much more common in MRV bowls. Second, the elements we initially suspected to be "Gila" do correspond with vessels from Gila sites and/or with Gila NAA sources, although some MRV bowls also have those elements.



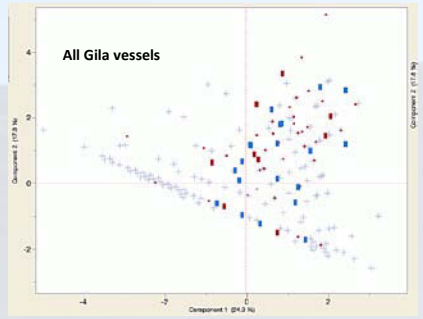
These are the same PCA plots as above but separated by river valley. The left plot is vessels excavated from MRV sites with MRV NAA sources. The right plot is vessels excavated from Gila sites and/or with Gila NAA provenience. Most of these vessels are in the upper right quadrant of the PCA, which contains the Gila elements.

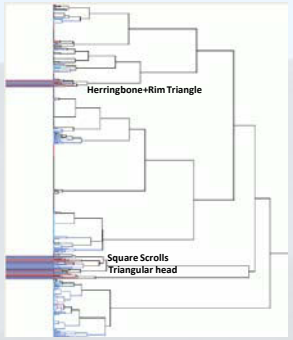


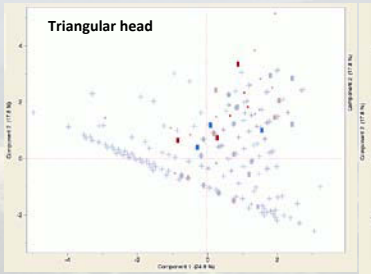
To further examine how elements grouped together, we performed a cluster analysis in JMP Pro 12.0. The tree constructed by the cluster analysis revealed that bowls with Gila provenience (either site or NAA; in red) do tend to have similar design elements. A closer examination (upper right) revealed three distinct clusters: vessels with square scrolls, vessels with triangular heads, and vessels with both herringbone and rim triangles. These bowls are identified on the lower right PCA plot.

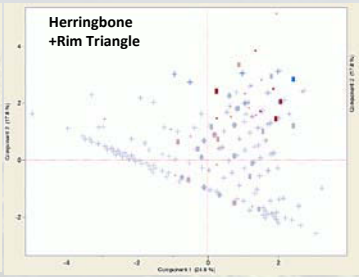


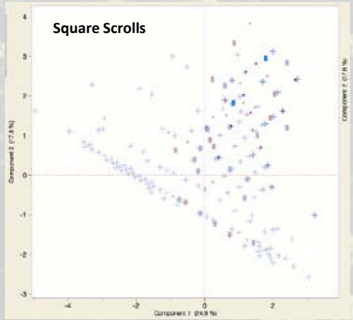
We then performed another PCA analysis, since some clustering of Gila bowls was apparent. In this analysis, we removed the figurative elements and retained only "Gila" elements. One group immediately apparent (circled in black) was vessels with no Gila elements, descending by number of rim bands. The majority of these are MRV vessels. As with the previous analysis, the Gila vessels tend to be in the upper right quadrant.

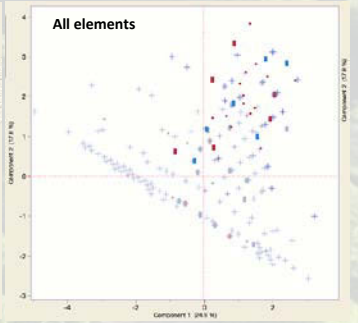












We also performed another cluster analysis on the isolated Gila elements. As before, this analysis revealed clusters with the greatest number of Gila provenienced vessels were herringbone and rim triangles, square scrolls, and triangular heads. Vessels in these clusters are highlighted in the PCA plots to the left below.

Implications and Conclusions

With the results of our analyses, we feel confident making several claims about the design elements of MRV and UG vessels:

1) Figurative elements are strongly associated with MRV vessels.
2) The triangular head element is strongly correlated with UG vessels.
3) Vessels with both herringbone and rim triangles tend to have UG proveniences, although the combination of these elements is also found on some MRV bowls.
4) Hachure and square scrolls do not appear to be strongly associated with a particular river valley.

Our analyses can provide insight into how and why people had different pottery designs (and pueblo architectural layouts) in two river valleys in the Mimbres region.

Many figures are likely from the Hero Twins origin saga (Gilman et al. 2014), which perhaps denoted a change in religious beliefs in the Classic period. Perhaps people in the UG chose not to participate in this new religion or were not allowed to participate. Therefore, UG pottery designs continued as they would have without the Hero Twins religion, and perhaps instead with one associated with the "triangular head" element seen on UG bowls.

It is also possible that the UG population density was lower than the MRV's during the Middle and Late Mimbres Classic periods (A.D. 1060-1130; Sedig 2015, Sedig et al. in press). This could explain the absence of figurative elements, if these flourished during the Middle/Late Classic period in the MRV.

Future Research:
While we are encouraged by this first attempt to use big data to quantify similarities and differences between UG and MRV pottery styles, we view this only as a first step. We next plan to examine whether particular design elements are more common in different segments of the river valleys, or even in particular room blocks. We plan to continue coding vessels and adding them to our database. At this point, we have focused only on complete (or nearly complete) vessels; we may also start adding large sherds to our coded database. We also plan to continue examining other examples in the archaeological literature of changes in religious belief systems that correspond with transformations in pottery design, along with micro-stylistic variation amongst archaeological sub-regions.

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Citations:
Citations are provided on the handout associated with this poster.

Affiliations: 1) Reich Laboratory of Medical and Population Genetics, Harvard Medical School. 2) Department of Anthropology, University of Oklahoma. 3) University of Texas, Austin