Stylistic Analyses of Abelam Woodcarving from the Sepik River Papua New Guinea

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Introduction

The eastern Sepik river basin in Papua New Guinea is famous for its cultural and linguistic diversity. There are over 200 languages and 400 dialects within the region of the Sepik river basin. Although the populations interact significantly, the population density, river tributaries, and surrounding terrain act to restrict contact between groups.

In the CSULB collections are 53 carved wood masks and statues that were purchased by May Company from the Abelam tribal area in the Maprik Region in 1965. These wood objects display tremendous variability in both form and design elements. By using stylistic classes to describe these objects, this enables us to generate hypotheses about the structure of interaction among this population.

Figure 1. *Map of Papua New Guinea, East Sepik Province. Maprik region.*
Courtesy Papua New Guinea Department of Tourism & Mining

Aim

The purpose of this analysis is twofold. The first purpose is to determine the relatedness of carving classes using statistical analysis tools of the carvings based on measurements made with paradigmatic classification structure designed to examine stylistic variability in the decorations and expressed on areas of head and face. The second purpose is to evaluate the possible existence of lineages of carvers. We expect that stylistic patterns of attribute classes should form cohesive sets that are transmitted from carver to carver. Given that this collection consists of contemporary examples of wood carving, we believe that stylistic analysis should provide information as to carvers and their unique traditions.

Hypothesis

Given the wide range of stylistic variability expressed in the wood carvings, we expect that patterns of lineages should produce a strong and *consistent* structure using occurrence seriation and Phenetic analysis using hierarchical cluster analysis and cladistic analysis. We expect the patterns to show sequences of stylistic classes that are equivalent to lineages.

Methods

First, we carefully photographed and examined each wood carving and described overall sources of variation. Second, we created a paradigmatic classification to describe the stylistic variation in carving form, expression and decoration. Using these data, we constructed an occurrence seriation, performed a Phenetic analysis using hierarchical clustering algorithms, and generated cladogram. Each analysis provides a different examination of the structure of stylistic variability among the carvings.

Seriation operates on events described in terms of stylistic classes. It orders classes based on the principle that stylistic variability will be patterned by heritable continuity. Since stylistic variability is not subject to performance - only replication, it's patterning is determined by transmission and will vary over time across space. In this case the temporal component is limited to a brief time period during or immediately prior to 1965. Therefore, the pattern we should see is likely due to space and/or social structure.

Phenetic analysis measures overall similarity in carving form and expression. Here the general algorithm assumption is that similarity in overall form should be a reflection of the degree of interaction between carvers. For this analysis we used a hierarchical clustering algorithm to generate groups of similar carvings.

Cladistic analysis measures the degree of relatedness based on the measure of shared derived traits. By focusing on derived traits, cladistics produces a tree that represents how taxa (i.e., classes of carvings) are potentially related to one-another. The cladogram represents relatedness as a function of distance along the tree.

Results

Figure 2 . *Below is the results of a cladistic analysis. The cladogram is an un-rooted 50% consensus tree that we constructed using random sequencing and measures of parsimony. Cladistic analyses order taxa based on their degree of relatedness. The tree demonstrates strong lineage structure consistent with the seriation and Phenetic analyses.*
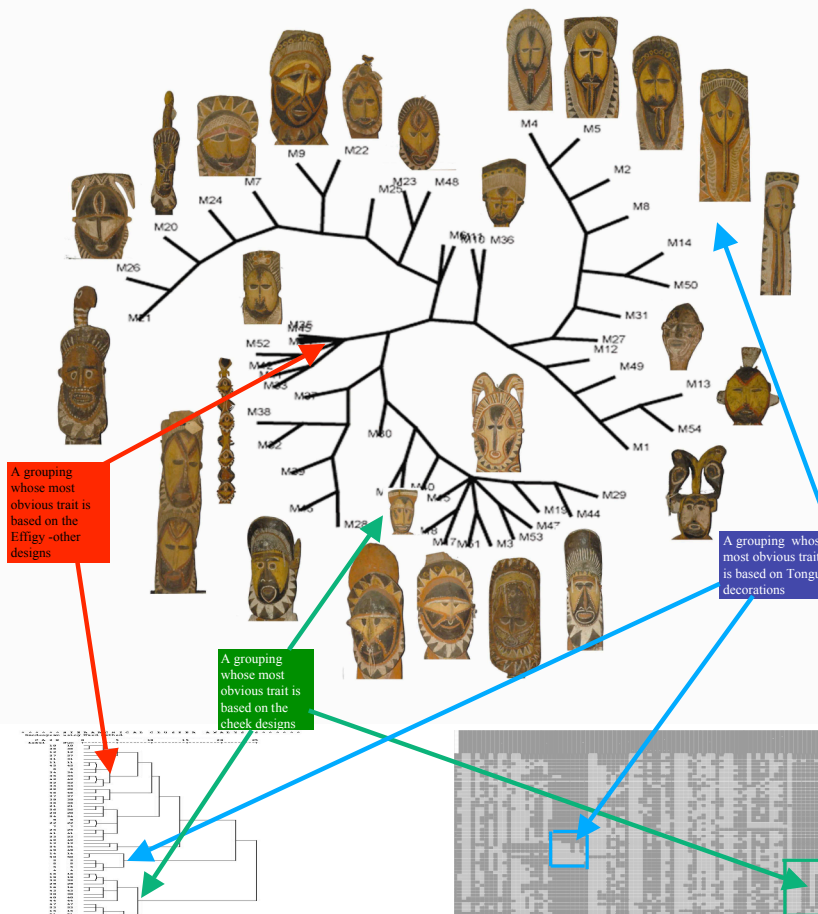

A grouping whose most obvious trait is based on the Effigy -other designs

A grouping whose most obvious trait is based on the cheek designs

A grouping whose most obvious trait is based on Tongue decorations

Figure 3 Phenetic Analysis. *Shown above is the result of a hierarchical cluster analysis. It shows the degree of overall similarity. We created the tree using binary data and Wards method . Cluster Analyses order descriptions based on overall similarity rather than heritable continuity. Each row is a single class of carving and is placed adjacent to masks that most resemble it on either side.*

Figure 4 Occurrence Seriation. *Occurrence seriation orders classes using the concept of heritable continuity. Each column listed above is a single class attribute with the presence of that trait marked in black and absence marked by white. Each row is one carving. Continuous sets of traits represent lineages. Gaps in the sequence suggests that more than one lineage is present in the carving traditions.*
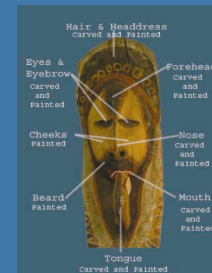
Classification

Figure 5. *The figure above demonstrates the location data and provides and example of the determination of the traits, carved, painted, or carved and painted. The un-carved and un-painted version resembles an "egg" in shape without feature beyond the wood itself.*
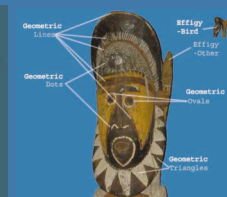

Figure 6. *On the left are examples of the basic classification for designs and their two basic subdivisions geometric and effigy. Effigies are complete entities and have two classes Birds and Other which includes lizards, wings, flowers etc. that would otherwise be statistically insignificant. Geometric shapes include ovals, dots, triangles, and lines. All geometric patterns were placed in five color categories; plain, black, white, red, and yellow.*

Conclusions and Discussion

There are consistent patterns to the three analyses. First, gaps in continuity of the occurrence seriation demonstrate that there is likely more than one lineage present among the carving data. The analysis show that there are at least seven different groups present. Second, the cladistic and Phenetic analysis also suggest that there are multiple discrete lineages. These lineages include groups most obviously based on tongue shape and design, and cheek pattern and design. Additionally, there is a lineage that was not readily apparent in the occurrence seriation most obviously based on the trait of "Effigy." Other lineages are consistent between the Phenetic and cladistic analyses. While we do not know exactly what these lineages represent, they suggest that the patterns of design and expression form structured groups that are consistent with transmission structured populations.

Future Research Avenues

These results are promising. However, additional external information is required to evaluate the hypotheses presented. For example, more information about the social structure of carvers would provide a means for us to distinguish whether we have identified lineages or if other kinds of stylistic classes are represented (i.e., classes related to specific social function). With the addition of this data we could determine the degree to which distance, language, and geography influence the transmission of culture and the emergence of cultural variation with scientifically replicable results. One promising avenue of research would be to measure trace-elements from the wood using LA- ICP-MS. This analysis could potentially allow us to distinguish geological signals related to groundwater uptake by the trees. If trees were harvested in different parts of the valley by different carver groups, this would enable us to test the lineage hypotheses presented here.

For more information

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