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Cultural Correlates of Ceramic Styles

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In 1961, John L. Fischer employed a cross-cultural analysis to demonstrate that art styles correlated with social hierarchy and postmarital residence patterns. He suggested that with further work, these correlations might be developed into useful predictors of variation in social hierarchy and postmarital residence in archaeologically known societies. This article is a step in that direction. It replicates Fischer's original study using ceramic data, and proposes several ways archaeological ceramics might be used to predict social characteristics of extinct societies.

Keywords: *cross-cultural research; archaeology; ceramic analysis*

In one of the few systematic cross-cultural studies of variation in expressive art, John L. Fischer (1961) examined the connection between art and social structure. He suggested that the expressive arts "bear a definite relation to the real and desired social situations of the artist and his society," or, in other words, that "man [sic] projects his society into his art" (Fischer, 1961, p. 80). Fischer's theory to explain variation in expressive art derived from the culture and personality school of anthropology, and particularly from the work of comparative psychologist Herbert Barry. Barry (1957) posited that an individual artist's personality is expressed in the style of his or her art, and that personality is developed through socialization. Since socialization practices are shared broadly within cultures, Barry further posited that one should find a general correlation between socialization and art style. He tested this idea using a sample of 30 cultures coded by Whiting and Child (1953) on socialization, and two rather complicated scale variables for art style: complexity of design and complexity of style (Barry, 1957). Barry found that cultures with more severe forms of socialization tended to have pictorial art with both more complex designs and more complex styles.[1]

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Fischer expanded Barry's rather specific focus on socialization to consider social structure more generally. Fischer hypothesized that more hierarchically organized societies required greater differentiation of social roles and statuses, and this differentiation would be reflected in more complex art (Fischer, 1961, pp. 81–83). Fischer found strong support for this hypothesis in a sample of 29 cultures coded by Murdock (1957) on a variety of sociocultural variables. He also replicated Barry's findings, and disconfirmed several additional hypotheses of his own (Fischer, 1961, pp. 84–89). Fischer (1961, p. 89) concluded that "we may regard a work of art as a sort of map of the society in which the artist—and his public—live." Fischer also suggested that the analysis of art style might prove to be a way for archaeologists to learn about past societies, but to date only one paper has been published that directly follows up on this suggestion (Dressler & Robbins, 1975).

Dressler and Robbins (1975) applied Fischer's findings to the design elements on ancient Greek vases. They coded 31 vases selected by random sampling from photographs in published sources on three variables: complexity, presence of empty space, and design enclosure. Empty space and design enclosure were coded because the authors hypothesized that "A crowded vase may imply a lack of social mobility," and would reflect a more highly stratified society (Dressler & Robbins, 1975, p. 433; cf. Hodder, 1990, pp. 132–135). They found that, as they had hypothesized, vases produced during periods of greater social stratification had more complex designs, more enclosed designs, and less empty space (Dressler & Robbins, 1975, pp. 432–433). While their article supports Fischer's results, Dressler and Robbins did not explicitly determine whether his results are applicable to ceramics or to prehistoric contexts.

In this article, I attempt to explicitly test Fischer's findings with archaeological data and to determine whether art styles can indeed help us to learn about ancient societies. It is important to note that I am not attempting to test Fischer's theory about the relationship between art styles and cognition; rather, I am seeking to identify correlates between art styles and cultural characteristics, correlates that might be useful to archaeologists trying to understand ancient societies. The correlations that Fischer identified and which I discuss later may or may not be caused by the factors Fischer identifies—I am neither testing nor offering support for his theory.

Methods

A vast array of expressive art can be found in the archaeological record, but ceramics may be the most common. Do the decorative elements found

Table 1
Kendall's tau-b Correlation Coefficients of Ceramic and Social Variables for 16 Ethnographically Described Cultures

	Political Integration	Social Stratification
Complexity of design	.231	.424*
Complexity of style	.372*	–.098

*Statistically significant at the .05 level.

on ceramics conform to Fischer's general results? To answer this question, the designs on ceramics used by all of the ethnographically described cultures with files in the eHRAF Collection of Ethnography were coded.[2] Only 16 cultures still making their own ceramics were present in the files, so the sample of cases is rather small. Regardless, the results do tend to support Fischer's findings.

Table 1 presents Kendall's tau-b correlation coefficients for the 16 culture sample. The ceramic design variables follow Fischer (1961) and Barry (1957).[3] The social variables were taken from Murdock and Provost (1973), and recoded to follow Fischer (1961). Two independent coders analyzed each case by examining images and descriptions of ceramic vessels included in the eHRAF files. While the complexity of design variable appears to require a high degree of inference, the two coders rarely disagreed. There were, in fact, more disagreements on the apparently more concrete complexity of style variable. Intercoder reliability was high for both variables: 98% agreement for the complexity of design variable and 84% for the complexity of style variable. Initial analyses were conducted removing the few cases where the two coders disagreed (following the suggestion of Ember & Ember, 2001, pp. 133–134), but this had little effect on the results, and those cases were used in the results presented here (a resolved code for each case of disagreement was created using the coders' notes).

Table 1 shows that complexity of ceramic design is significantly correlated with social stratification, while complexity of ceramic style is significantly correlated with political integration. These results appear to replicate Fischer's. Fischer's (1961, pp. 82–83) basic argument was that design would become more complex as society became more complex, with greater levels of hierarchy and more diverse roles and statuses. While we might expect higher degrees of social stratification to be correlated with greater complexity of design and style, both Fischer's results and those presented here also suggest a correlation with greater complexity of social roles, and that is what

Table 2
Kendall's tau-b Correlation Coefficients of Ceramic and Social Variables for 42 Archaeological Cultures

	Political Integration	Social Stratification
Complexity of design	.561**	.531**
Complexity of style	.392**	.331*

*Statistically significant at the .05 level.
**Statistically significant at the .01 level.

is directly measured (in the political realm) through the political hierarchy variable.

These results demonstrate that Fischer's findings hold true for ceramic decoration, and allow the possibility of applying them to archaeologically derived ceramics. But do Fischer's results actually hold true for prehistoric cultures? To answer this question, the ceramics used by the random sample of archaeological traditions from the *Outline of Archaeological Traditions* (Peregrine, 2006) sampling universe with files in the eHRAF Collection of Archaeology were coded for complexity of design and style.[4] These ceramic scores were then correlated with data previously coded for these cases by Peregrine (2003).

Results

Table 2 presents Kendall's tau-b correlation coefficients for the ceramic and social variables.[6] The robust correlations suggest that complexity of ceramic design and style are strongly associated with the complexity of social roles. Thus Fischer's results appear to be confirmed, and should allow us to extend his findings to the archaeological record. It appears that archaeologists can confidently analyze ceramic collections using the variables presented here, and, through them, estimate the degree of political hierarchy and general cultural complexity for a given archaeological culture. This adds to a growing body of identified material correlates of social organization (see Peregrine, 2004, for a review).

However, the political hierarchy and general cultural complexity of an archaeological culture can be inferred by other means (e.g., settlement hierarchy, public architecture, craft specialization), so Fischer's results do not add much new information for archaeologists, at least regarding social complexity. But Fischer (1961, pp. 85–88) provided two additional results that

Table 3
***T* tests Comparing 30 Archaeological Cultures With and Without Large Dwellings**

	Dwelling Size†	Mean	T value	Significance
Complexity of design	Small	3.71	2.170	.043
	Large	2.17		
Complexity of style	Small	5.33	.000	1.0
	Large	5.33		

†Small dwellings are defined as being less than 80 m^2 in area, large dwellings as being greater than 80 m^2 in area.

do not currently have a material culture correlate: (a) male solidarity in residence (simplified as patrilocal residence) was found to be associated with curved lines and more complex designs, as was (b) polygamous marriage.

To test whether these additional results might hold true for the archaeological record, the archaeological cases coded for ceramics were also coded for floor area of typical dwellings.[5] It has been well established that cultures in which typical dwellings have floor areas greater than 80 m^2 tend to be matrilocal in their postmarital residence patterns (Divale, 1977; Ember, 1973), and this material correlate of matrilocality has been usefully applied to the archaeological record in several cases (e.g., Peregrine, 2001). Thus floor area provides a way to measure female solidarity in residence, which, if Fischer's findings are correct, should not be associated with more complex designs or with curved lines.

Table 3 presents the results of *T* tests comparing the mean ceramic design complexity of archaeological cultures with typical dwellings having floor areas less than or greater than 80 m^2. It appears that cultures with typical dwellings greater than 80 m^2 in floor area have significantly less complex ceramic designs than those with smaller dwellings. Thus Fischer's results regarding the association of male solidarity in residence with more complex art appears to be supported in the archaeological record. However, the relationship between curved lines and male solidarity in residence appears to be disconfirmed (Table 4; tau-b = 0). We can provisionally conclude that Fischer's work provides archaeologists with two previously unidentified material correlates of social organization: more complex ceramic designs suggest the presence of patrilocal residence and polygamous marriage.

More useful archaeological indicators of social organization based on design complexity are offered in Tables 5, 6, and 7. Here the complexity of design variable has been dichotomized, as have the cross-tabulated social

Table 4
Cross-Tabulation of Curved Lines With Typical Dwelling Floor Area

	Typical Dwelling < 80 m2	Typical Dwelling > 80 m2
Curved lines present	20	5
Curved lines absent	4	1

Table 5
Cross-Tabulation of Dichotomized Complexity of Design Variable With Typical Dwelling Floor Area

	Typical Dwelling < 80 m2	Typical Dwelling > 80 m2
Complexity of design 0–4	17	6
Complexity of design 5–10	7	0

Table 6
Cross-Tabulation of Dichotomized Complexity of Design Variable With Dichotomized Social Stratification Variable

	Egalitarian (Stratification = 1)	Inegalitarian (Stratification = 2–3)
Complexity of design 0–4	8	23
Complexity of design 5–10	0	11

Table 7
Cross-Tabulation of Dichotomized Complexity of Design Variable With Dichotomized Political Integration Variable

	Autonomous communities (Integration = 1)	Hierarchical communities (Integration = 2–3)
Complexity of design 0–4	4	27
Complexity of design 5–10	0	11

variables, to create simple 2 × 2 tables. There is a zero value cell in each table, and this is particularly useful for archaeological purposes because one can assume it is highly unlikely that one will find a case that falls into that category. Thus, considering Table 6 as an example, an archaeologist who finds an archaeological culture with highly complex ceramics can be fairly certain that the society is not egalitarian. Similarly, based on the results in Table 7, the same society is unlikely to have autonomous communities.

Discussion

Archaeologists have long sought to identify social correlates to ceramic designs. James Deetz (1968), for example, argued that material culture forms (including ceramics) were based on a "mental template" that was socialized into members of a culture. As the mechanisms of transmitting these mental templates change, material culture might change as well. Arguing along similar lines, William Longacre (1968, 1970; also James Hill, 1970) prompted an in-depth discussion of the relationship between ceramic design and social organization. He argued that since women decorated ceramics in historic Southwestern pueblos, it is reasonable to assume they did so in ancient ones as well. Under that assumption, continuity of designs in one location would suggest continuity of women potters and hence, matrilocal residence. There was substantial criticism of this argument, both in terms of the assumed continuity from modern to ancient pueblos (e.g., Cordell & Plog, 1979), and the hypothesis that continuity of design indicated matrilocal residence (e.g. Allen & Richardson, 1971).

I suggest that the flaw in the work of Longacre, Deetz, and others is the same as any archaeological study employing ethnographic analogy to interpret the archaeological record—once one transfers the analogy into the past, one cannot be sure if the analogy holds true (see Peregrine, 2004, pp. 282–283). However, if one can find a strong association between some element of design or form and some aspect of social organization that holds true in a worldwide sample of cultures, then it is reasonable to assume that the association fits human behavior in general and not just the customs of a particular culture or historically related group of cultures. More importantly, it is also reasonable to argue that such an association should hold true for past societies as well (unless there is a clear reason why it would not—see Peregrine, 2004, p. 286). I provide several such associations in this article.

There appears to be a regular pattern of human behavior that associates particular aspects of social organization with particular ceramic design styles.

The cause of this association is unclear—perhaps there are regular "mental templates" or "cognitive maps" created by particular social circumstances. Regardless of the cause, complex ceramic designs appear to be material indicators of inegalitarian social organization and political hierarchy, and appear to be material indicators of patrilocal residence and polygamous marriage as well. These associations, identified from a worldwide sample of both extant and past cultures, provide a way for archaeologists to infer otherwise unidentifiable aspects of social organization from ceramics, potentially opening entirely new avenues for archaeological interpretation. Additional material indicators of various social and political categories are likely identifiable though further examination of ceramic designs, and should be pursued.

1. Neither complexity of design nor complexity of style are given unambiguous definitions by Barry (1957) or Fischer (1961). Considering how each variable is coded (see endnote 3), we can provisionally define a complex design as one with numerous, often unrepeated, figures, and a complex style as one with a variety of different lines used to create decoration and define figure and vessel borders.
2. Sarah Szabo and Kelsey Lutz performed the coding for this study. Their careful work is much appreciated. The coded data they produced for the ethnographic cases is presented as Appendix A.
3. The design variables for both the ethnographic and archaeological cases were coded following Barry (1957) as closely as possible. However, both Barry's and Fischer's (1961) coding schemes are not clearly presented, and some interpretation of how the cases were coded had to be made. The following is the coding as used throughout this study:

Complexity of Design = CD1*CD2

CD1: Number of Separate Figures

1. Design with no figures
2. Design with some figures, some repeated
3. Design with some unrepeated figures
4. Design with many figures, some repeated
5. Design with many unrepeated figures

CD2: Design Complexity

1. Simple design
2. Complex design

Complexity of Style = Σ CS1 thru CS10

CS1: Enclosed figures (Present or Absent)
CS2: Sharp figures (Present or Absent)
CS3: Representative design (Present or Absent)
CS4: Asymmetric design (Present or Absent)
CS5: Border on design (Present or Absent)
CS6: Crowdedness (Present or Absent)
CS7: Oblique lines (Present or Absent)
CS8: Oblique lines (edge; Present or Absent)
CS9: Curved lines (Present or Absent)
CS10: Short lines (Present or Absent)

Both the design variables and the social structure variables were dichotomized to follow the procedure used by Fischer. However, the small sample size for both ethnographic and archaeological cases prevented use of the chi-squared statistic employed by Fischer (because some expected values were less than 1, and many were less than 5), which is substituted throughout this study with Kendall's tau-b statistic.

4. A single coder (Lutz) was deemed sufficient for the archaeological cases because intercoder reliability for the ethnographic cases was high. Coded data themselves are presented as Appendix B.
5. The results here, using archaeological cases, employ the full ordinal scale of these variables, rather than the dichotomized versions used to replicate Fischer's results with ethnographic cases.
6. Twelve of the 42 archaeological cases coded for ceramics lacked sufficient information on dwelling floor area to code them. Student's T was used because of its simplicity and because complexity of ceramic design and style can both be considered interval measures.

Appendix A
Ethnographic Cases

SCCS Number	Name	Complexity of Design	Complexity of Style	Coders Agree?
7	Bemba	6	4	No
12	Ganda	1	2	Yes
16	Tiv	1	2	Yes
21	Wolof	1	2	Yes
28	Azande	1	2	Yes
36	Somali	1	5	No
37	Amhara	1	1	Yes
57	Kurd	4	4	Yes
79	Andamanese	1	3	Yes
92	Orokaiva	1	1	Yes
98	Trobrianders	1	1	Yes
116	Koreans	4	4	Yes
136	Yokuts (Lake)	1	2	Yes
142	Pawnee	1	3	Yes
172	Aymara	2	4	Yes
177	Tupinamba	1	4	No

Note: SCCS = Standard Cross-Cultural Sample.

Appendix B
Archaeological Cases

OAT Number	Name	Complexity of Design	Complexity of Style	Curved Lines	Dwellings Larger Than 8 80m^2
1025	Norton	1	3	Yes	No
1050	Initial Shield Woodland	1	3	No	No
1125	Eastern North American Middle Woodland	1	3	Yes	Yes
1130	Hopewell	2	7	Yes	No
1155	Eastern North America Late Woodland	1	4	No	.
1480	Huatabampo	2	6	Yes	.
1522	Preclassic Maya	1	5	Yes	No

(continued)

Appendix B (continued)

OAT Number	Name	Complexity of Design	Complexity of Style	Curved Lines	Dwellings Larger Than 8 80m^2
1550	Classic Maya	8	9	Yes	No
1560	Postclassic Maya	6	5	Yes	No
1565	West Mexico Postclassic	4	7	Yes	.
2030	Early Northwest South American Littoral	1	0	No	No
2045	Late Caribbean	2	5	Yes	Yes
2205	Highland Andean Early Archaic	1	0	No	No
2225	Highland Andean Formative	6	7	Yes	.
2230	Chavin	4	6	Yes	No
2235	Andean Regional Development	8	6	Yes	No
2250	Tiahuanaco	8	6	Yes	No
2255	Huari	8	8	Yes	.
2260	Andean Regional States	6	7	Yes	.
2270	Aymara Kingdoms	6	7	Yes	No
2275	Inca	4	7	Yes	No
3060	Impressed Ware	2	6	Yes	.
3085	Bell Beaker	2	5	Yes	.
3131	Southeastern European Late Chalcolithic	2	5	Yes	No
3155	Scandinavian Iron Age	2	3	Yes	No
4020	Southeast China Early Neolithic	3	7	Yes	Yes
4030	Dawenkou	4	5	Yes	No
4160	Yayoi	2	6	Yes	.
4420	Early Nomad	2	6	Yes Yes	
4430	Scythian-Sarmatian	1	3	No	Yes
4510	Eastern Central Asia Neolithic and Bronze	4	8	Yes	Yes
5035	Hawaiian	4	5	No	No
5070	New Guinea Neolithic	1	4	Yes	.
5515	Indus Neolithic	2	5	Yes	No

(continued)

Appendix B (continued)

OAT Number	Name	Complexity of Design	Complexity of Style	Curved Lines	Dwellings Larger Than 8 80m^2
5520	Ganges Neolithic	1	6	Yes	No
5540	Central Indian Neolithic	4	7	Yes	No
6100	Khartoum Neolithic	1	5	Yes	.
6115	Upper Egypt Predynastic	8	8	Yes	No
6130	Early Dynastic Egypt	6	5	Yes	.
6185	West African Iron Age	1	5	Yes	No
6265	Early Dynastic 6 Mesopotamia	7	Yes	No	
6365	Iranian Bronze Age	4	8	Yes	No

Note: OAT = Outline of Archaeological Traditions.

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