Painting as Agency, Style as Structure: Innovations in Mimbres Pottery Designs From Southwest New Mexico

Michelle Hegmon[1,2] **and Stephanie Kulow**[1]

The act of painting a design is a form of agency, and the overall style of that design in part can be conceptualized as a kind of structure. This perspective is used as a basis for analyzing chronological changes in designs on Mimbres Black-on-white pottery (ca. AD 750–1150) from Southwest New Mexico. Specific focus is on a methodology that can be used to detect innovations, that is, the introduction of novel designs that are incorporated into the design corpus and thus transform the structure. The conceptualization of a particular tradition (in this instance, pottery painting) as a form of structure analogous to general structure in Giddens' sense thus provides important insights into the recursive relationship between agency and structure.

INTRODUCTION

Agency concerns everything humans do that has an effect on the world. This perspective offers great promise for the archaeological study of agency, in that it suggests that the archaeological record can be interpreted as a product of agency (Shennan, 1993). However, this perspective is so broad that it does not provide a means of theorizing agency, or understanding its role in the social realm. One solution is to focus on the recursive relationship of agency and structure, and thus on how agency is part of social processes extending across time and space, such as the formation, persistence, and dissolution of community. The recursive relationship between structure and agency is also key to the process

[1] School of Human Evolution and Social Change, Arizona State University, Tempe, Arizona 85287-2402.

[2] To whom correspondence should be addressed at School of Human Evolution and Social Change, Arizona State University, Tempe, Arizona 85287-2402; e-mail: michelle.hegmon@asu.edu.

of structuration and to formulations by Giddens (1979, 1984) that are frequently cited by archaeologists. The goal of this article is to provide an example of such focus on the structure–agency dialectic, and to develop a methodology whereby the relationship between agency and structure can be examined in terms of the process of innovation. Analysis thus considers a narrow range of phenomena— the painting of designs within the Mimbres tradition—in order to focus on this relationship.

Mimbres painted pottery is unique in the American Southwest and renowned for its spectacular designs, including representational images (animal, supernatural, and sometimes human figures), which were most common during the AD 1000–1130 Classic Mimbres period in Southwest New Mexico (Fig. 1). Although the designs are elaborate, and varied in content, they were laid out according to a few basic and identifiable structural rules (Brody, 2004: Figure 131). We have both (Hegmon *et al*., 1998; Kulow, 2004) argued that these repeated structures, as well as other evidence of Classic Mimbres material culture homogeneity, are indicative of social conformity (probably imposed from within, not dictated from above, see also Kohler *et al*. (2004)). Dramatic changes in material style, including an increase in diversity, were associated with major social and cultural changes at the end of Classic, specifically the depopulation of aggregated villages, a shift to a more mobile dispersed settlement strategy, and a change in the nature of communities (Hegmon *et al*., 1998). Thus, an understanding of agency and structure in this specific instance of material style change is relevant to a broader understanding of social change.

The basic premise of this paper is that the act of painting a design on a vessel is a form of agency, and the overall style of that design in part can be conceptualized as a kind of structure. This is both a theoretical and a methodological statement, and as such it recognizes the futility of separating method from theory. Theoretically, this premise emphasizes the recursive relationship of agency and structure, and supports the argument that agency is best interpreted in the context of this relationship (i.e., that there is no separate 'agency theory' (Clark, 2000)). Methodologically, the premise directs our analysis towards individual designs as instantiations of agency, and towards the rules of design layout that can be discerned in the overall corpus as structure. Furthermore, while all designs can be considered to be part of the overall structure, instances of innovation (i.e., changes in structure) are particularly significant for investigating the recursive relationship between agency and structure. This directs our attention towards the identification of innovations, which (following Torrence and van der Leeuw (1989)), are understood as processes that include both invention and adoption, the introduction of a novel form and its acceptance. Focus here is on the development of the relevant methodology, which ultimately can be used to investigate the context and content of those innovations, and thus to consider more broadly the source and role of agency in structural change.
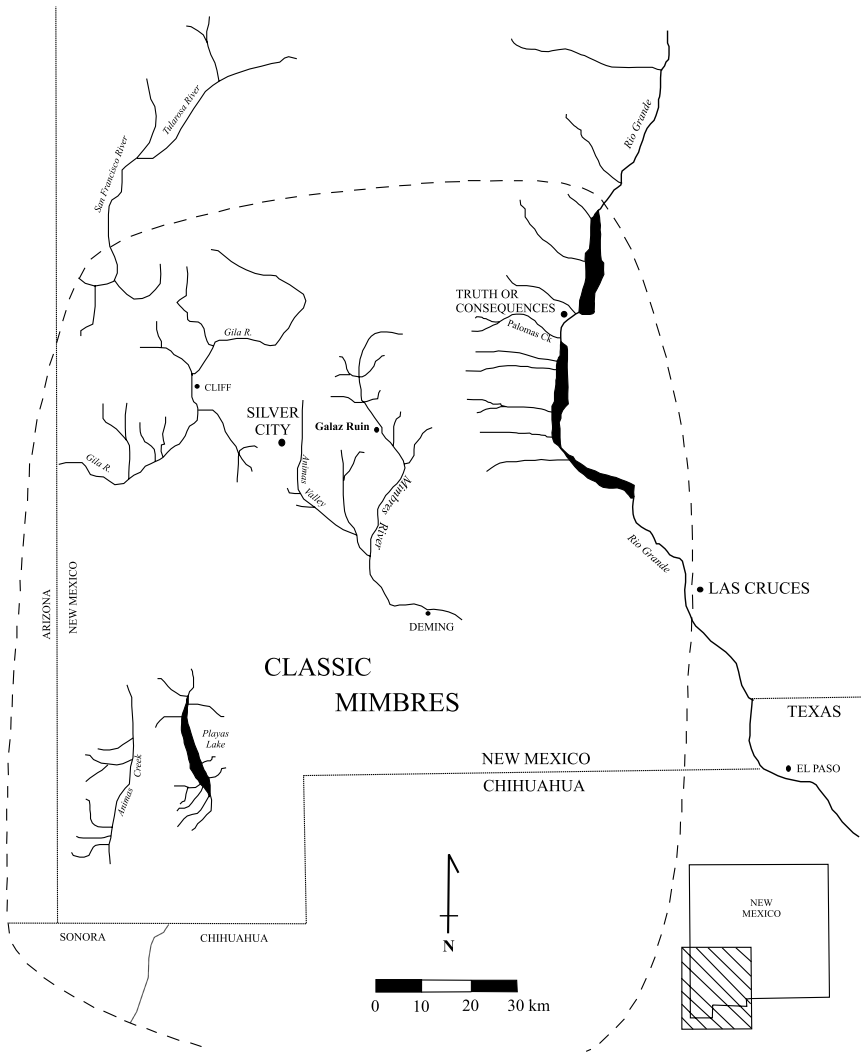
Fig. 1. The Mimbres region in Southwest New Mexico, showing the location of the Galaz ruin.

We begin by justifying our methodological approach from a theoretical perspective. We then provide a brief overview of the relevant details of Mimbres archaeology, focusing particularly on design and material style in relation to general social processes. The analysis is then presented in two parts, the first reviewing the chronological basis for the study, the second developing and applying the method with which we identify novel designs and innovations. The conclusions then emphasize the theoretical implications of the methodology.

POTTERY DESIGN AS AGENCY AND STRUCTURE

The relationship between the execution of particular pottery designs and the design tradition represented by a corpus of vessels can be neatly conceptualized in terms of the duality of agency and structure. Agency refers to people's capacity for doing things (Giddens, 1984, p. 9), which should be understood as a "socially significant quality of action" (Dobres and Robb, 2000, p. 8). People do not possess agency, rather they *exercise* it, and one result of this exercise is the creation of material culture. In their exercise of agency, people draw upon structure, which Giddens conceptualizes as the rules and resources involved in the reproduction of social systems. "Structure exists only as memory traces, the organic basis of human knowledgeability, and as instantiated in action" (1984, p. 377). Thus, structure exists only in so far as it is reproduced by the conduct of actors, so the exercise of agency can reproduce, reinforce, or transform structure.

The interpretation of pottery painting as a form of agency is probably uncontroversial, in that it is something that people do that affects the world around them. It may be that the resulting designs, in their eventual effects on the world, can also be said to have agency (Gell, 1998), although we do not explore that dimension here. More complicated and possibly controversial is our linkage of design structure with the social–theoretical concept of structure. While we do not argue that the two are identical, several lines of reasoning support our argument that they can be approached analogously. The result of this analogical reasoning is that social theory can be used to gain insights about painted designs and design structure becomes relevant to general social theory. Archaeologists and other students of material culture have long recognized that artistic and technological traditions are dynamic (or dynamical (van der Leeuw, 1993)) phenomena, "always in the process of becoming" (Pauketat, 2001, p. 80). Considerable attention has been paid to the ways traditions are maintained and transformed, especially the process of innovation (Lemmonier, 1993; van der Leeuw and Torrence, 1989). Recently, some theorists have specifically referred to the role of practice in the maintenance and transformation of cultural and technological traditions (Pauketat, 2001). Thus, we suggest that the step (see Robb, this issue) between tradition and structure is not excessively large, and can be taken with carefully designed analysis.

Potters and painters work within design traditions, and archaeologists have devoted considerable attention towards the identification and analysis of the structures underlying these traditions (Friedrich, 1970; Hardin, 1983; Hegmon, 1995; Smith, 1962), including Mimbres pottery (Brody, 2004, pp. 120–136; Washburn, 1992). In a number of cases, analysts have argued for linkages between design and social structure (e.g., the relative boundedness of art and society (Conkey, 1982; Hodder, 1984)), or between design symmetry and cultural identity (e.g., Washburn, 1983, 1992, 1999). The concept of "design structure" is not identical to the concept of structure as developed in social theory; for example, Giddens views structure as linked to social systems but "out of time and space" (1984,

p. 25). However, the similarities among these constructs, particularly the empha-sis on organization, suggest the step between design structure and structure in social theory is not excessively large.

Finally, design traditions can also be interpreted to encompass the rules and resources that are central to some conceptualization of structure. Resources include potters' knowledge of how to execute designs, their relationships with other potters, their tools, and the corpus of vessels that they see and can use as models. The rules of design structure—including how the designs should be executed (van Keuren, 1999) as well as what the final designs look like—likely reside at various levels of consciousness, including in practical consciousness (which is key to Giddens' formulation (1984, pp. 41–45)). As the potter builds a pot and paints the design, and especially when the finished vessel becomes part of the overall corpus, the pottery becomes part of the structure. The potter may reproduce the rules, or may (intentionally or not) introduce novel forms. And some artists—perhaps those with special skills or status—may be more likely than others to introduce new forms that are accepted (i.e., innovations) and thus that affect and change the structure. This is an example, writ small, of structuration.

MIMBRES ARCHAEOLOGY: BACKGROUND FOR THE CASE STUDY

The analysis presented here concerns Mimbres Black-on-white pottery from the Mimbres region of Southwest New Mexico, part of the larger Mogollon area. Recent systematics, culture history, and research issues are summarized by Anyon *et al.* (1981), Hegmon *et al.* (1999), and Hegmon (2002). Comprehensive, book-length analytical discussions of Mimbres pottery include Brody (1977, 2004), Brody *et al.* (1983), Brody and Swentzell (1996), and LeBlanc (1983, 2004). A recognizable Mimbres pottery tradition (first plain brown, then decorated with red, white, and eventually black paint) began by AD 200. Black-on-white decorated pottery in this tradition was first made in the eighth century AD (the latter part of the Late Pithouse period, AD 550–1000). Black-on-white pottery became increas-ingly common and elaborate during the Mimbres Classic period (AD 1000–1130), which was a time of residence primarily in above-ground pueblos. The majority of Mimbres pottery designs are non-representational geometrics, but representational designs that depict animals and occasionally other figures were also common, espe-cially during the Classic. The end of the Classic is generally associated with the end of this pottery tradition, although there is increasing evidence that Mimbres Black-on-white pottery continued to be used, if not made, in the Reorganization phase of the Postclassic (i.e., through the twelfth century (Nelson and Hegmon, 2001)).

The social context, as indicated by settlement and economic analyses as well as previous studies of style, provides important background for this analysis. The Late Pithouse through Classic periods (AD 550–1130) were times of generally

increasing intensification, in agriculture and settlement, although the process was not necessarily unilineal. The degree of Mimbres settlement continuity—many villages were occupied fairly continuously for centuries, from the beginning of the Late Pithouse into the Postclassic period—is remarkable for the pre-1300 Southwest; similar continuity is well documented only in Hohokam (southern Arizona) settlements dependent on large-scale irrigation. Ritual organization changed dramatically in the latter part of the Late Pithouse period; great kivas were deliberately collapsed and burned (apparently a valley-wide event) and later rituals were housed either in smaller kivas or in plazas, but never again in great kivas (see Creel and Anyon, 2003). By the beginning of the Mimbres Classic period, some parts of the Mimbres region, especially in the Mimbres River valley, were densely settled with closely packed aggregated villages. Subsistence included an array of resources, but increasingly relied on fairly intensive agriculture, with some small-scale canal irrigation, and resulted in environmental degradation (Minnis, 1985). There are some indications of subtle social inequalities (Hegmon, 2004), but no clear evidence of vertical ranking (Gilman, 1990). Although the Classic is associated with the most spectacular pottery designs, it was also apparently a time of considerable social and subsistence stress, interpretations based on both environmental data and subsistence remains (Minnis, 1985) and evidence of stylistic conformity and limited extra-regional interaction (see Hegmon *et al*., 1998). The end of the Classic, which was also a time of climatic downturn and drought, is characterized by the depopulation of the aggregated villages and a shift to dispersed settlements across the region, the beginning of the Reorganization phase (Nelson, 1999).

Because Mimbres pottery has black designs on a white background (like white wares from the northern southwest but unlike many brown wares from the Mogollon area) it had once been thought to be a product of northern (Puebloan) influence or even migration. But it is now well established that Mimbres pottery (actually a white-slipped brown ware) was a local development (e.g., Shafer and Taylor, 1986), although early Mimbres designs seem to have been influenced by the Hohokam tradition to the west (Brody, 2004, pp. 81–86; Hegmon and Nelson, 2005). Both bowls and jars are decorated, but bowls are more numerous and elaborate, and virtually all representational designs are on bowls. The analysis discussed here considers only bowls.

The application of concepts of agency and structure to pottery design painting is appropriate in many situations; however, the Mimbres case is particularly intriguing from this perspective, for at least two reasons. First, compositional analyses clearly indicate that Mimbres Black-on-white pottery was made in many locations, probably at most villages and possibly at many smaller sites as well (Gilman *et al*., 1994; James *et al*., 1995). Furthermore, LeBlanc (1983, 2004; LeBlanc and Ellis, 2001) suggests that relatively few small-scale specialists were painting the designs and that the artists may have been competing with each other. Given these conditions, design painting, including acts of innovation or conformity, would have been a carefully considered activity, and one individual could

have had a major impact on the overall tradition. Thus, the artists' intentionality may have been a significant factor. We note that while agency need not involve intentionality (Giddens, 1984, p. 9), and the effects or consequences of particular actions may be independent of the actor's intentions, this does not mean that intentionality should be ignored theoretically. As Dornan (2002) notes, intentionality is often a particularly interesting *component* of agency; thus, while intentionality should not be equated with agency, it should be investigated when possible, and discernable innovations provide an important avenue for such investigation (see also David, 2004).

Second, there is reason to think the Mimbres style had a special significance to its makers and users, possibly more so than many archaeologically recognized design styles. It truly was unique for its time in the southwest; there are a few other traditions that incorporate representational elements, but none that depicts either scenes of daily life or naturalistic detail seen on Mimbres bowls (in some cases the species of animals depicted can be identified (e.g., Creel and McKusick, 1994; Jett and Moyle, 1986)). In addition, both the content of the designs and the contexts of the pottery suggest that the designs were highly charged symbolically. Specifically, some bowls depict what are interpreted as mythological scenes such as emergence (Brody, 2004, p. 175; Kabotie, 1982), death and the underworld (Brody, 2004, pp. 174–175; Moulard, 1984), mythological figures such as the Hero Twins (Brody, 2004, pp. 174–175), or deities, such as the goggle-eyed Tlaloc (Schaafsma, 1999). Furthermore, many of the bowls with representational designs were recovered from burials, typically covering the skull with a small 'kill' hole punched out of the bottom of the bowl.

Brody (2004, pp. 102–104) suggests that Mimbres pottery painting "would have been largely tradition bound" (p. 102), but he also notes that within the tradition there was room for some degree of personal expression. Assuming his characterization of Mimbres pottery painting as fairly conservative is correct, it does not necessarily preclude some invention of novel forms, and Brody notes (p. 104) that in later periods change in pottery traditions could happen very quickly, including the swift incorporation of innovations into the overall corpus. In more recent times, the influence of individual artists and rapid incorporation of innovations is seen in the cases of Nampeyo at Hano (the Tewa village at Hopi) around 1890, and Maria and Julian Martinez at San Ildefonso around 1910.

In summary, it is certainly likely that some painters of Mimbres pottery, even if they were working within a well-established design tradition, could have introduced novel combinations, and that these novelties could have been incorporated into the overall design tradition, as innovations. It is difficult to imagine that this kind of process did not happen, to some degree. Furthermore, given the apparent symbolic importance of Mimbres pottery and its designs, it is likely that such invention and innovation was a significant social process, recognized not only by fellow painters but also by most members of Mimbres society. Focus here is on developing a methodology by which we can detect this process, in order to

understand when (and in later analyses, where and in what contexts) it occurs, and thus how it relates to social dynamics in general.

DATABASE AND CHRONOLOGY

Analysis is based on data from more than 700 black-on-white bowls from the Galaz ruin (Anyon and LeBlanc, 1984). The site, including small vessel photographs, is very well published (Anyon and LeBlanc, 1984); selected high quality and/or color photographs of the Galaz vessels are shown in Brody and Swentzell (1996), and all are also available in the Mimbres Archive at the Maxwell Museum, University of New Mexico. Galaz was one of the largest Mimbres villages, it was occupied throughout the time when Mimbres Black-on-white pottery was made (i.e., in the Classic as well as parts of the preceding Pithouse and subsequent Postclassic periods). There are also suggestions, based on its geographic position (in the central Mimbres River valley, near a natural cross-valley corridor) as well as compositional analysis of pottery (Powell, 2000), that Galaz was centrally located with regards to interregional exchange and interaction. Thus, it is reasonable to expect that potters at Galaz would have been well positioned to introduce innovations. It is likely that a majority, though by no means all of the pottery vessels found at Galaz, were made locally. Thus, analysis should be able to detect innovations introduced by Galaz potters, as well as innovations introduced in other areas but accepted by Galaz consumers. We do not attempt to differentiate between the two.

Temporal control provides an essential baseline for the analysis. A general, well-established chronology divides Mimbres Black-on-white pottery into Styles I, II, and III (sometimes called Boldface, Transitional, and Classic (see Scott, 1983)). Scott (1983) also recognized some finer distinctions within these styles, and recent work by Shafer and Brewington (1995) systematized those distinctions and established a finer chronology based on 'microstyles,' that is, details of designs that can be used to subdivide the three styles. Their original methodology emphasized details of rim bands and hachure, but also considered some aspects of the overall designs, including structure and layout. In order to apply the microstyle chronology as a basis for the present analysis, we considered only microstyle attributes relating to rim treatment and hachure to insure that the chronology is independent of the analysis of the layout and symmetry of the overall designs. The chronological resolution and the distribution of bowls by microstyle are indicated in Table I. This chronology was also applied in a related analysis (Hegmon and Nelson, 2005) that considered Mimbres interregional interaction as indicated by design style, and it is explained in considerable detail in that work.

ANALYSIS: DETECTING AGENCY

The production and painting of pottery, in general, can be interpreted as instantiations of agency that become part of the design tradition and corpus,

Table I. Chronological Resolution Allowed by Microstyle Classification and Distribution of Galaz Ruin Mimbres Black-on-White Bowls by Microstyle

Style or microstyle	Dates (AD)	No. of bowls
Late Style III	1110–1130/1150	29
Mid/Late Style III	1060–1130/1150	1
Style III	1010–1130/1150	46
Middle Style III	1060–1110	261
Early Style III	1010–1080	139
Style II/III	970–1020	86
Late Style II	970–1020	54
Style II	880–1020	16
Early Style II	880–980	35
Style I or Early Style II	750–980	40
Style I	750–900	11
Total		720

that is, the structure. In order to understand this relationship between agency and structure, we focus on aspects of that relationship that are most visible, specifically the introduction of novel designs and the incorporation of some that become incorporated into the design tradition, that is, innovations. To the extent that these new designs change the corpus of pottery and the historically constituted tradition of pottery painting, they can be considered to have resulted in structural transformations.

The analysis is based on a subtle but analytically essential set of distinctions between a set of related, but not isomorphic concepts, with regards to the painted designs. An *anomaly* is an unusual design, which deviates from the norm in some respect, and can be detected as such. Because this analysis is concerned primarily with variation over time, anomalies are often new or novel forms, different from anything seen before. (A different analysis that considered multiple different but contemporaneous contexts might detect anomalies that are not necessarily novelties.) To innovate is to make changes, thus an *innovation* is a new form, detected as an anomaly in a given period, which is subsequently incorporated into, and thus transforms the design tradition (following Torrence and van der Leeuw (1989)). In contrast, we use the term '*isolated anomaly*' to refer to unusual designs that were not incorporated and that thus are assumed to have had little or no effect on the design tradition. These conceptual distinctions can be applied to particular designs only by considering the designs in the context of the overall, historically constituted corpus. That is, a design that is unusual in a given context is detected as an anomaly. If the anomaly is subsequently incorporated into the corpus (e.g., it becomes more common in later periods), then it is considered to be an innovation. This process, the introduction, acceptance, and spread (possibly followed by decline), is the basis of seriation. If the anomalous design is not incorporated, then it is considered to be an isolated anomaly. Specific methods

for detecting anomalies, and discerning whether they should be considered to be innovations or isolated anomalies, are developed further below.

Because the analysis is concerned primarily with *innovations* (i.e., new forms that were accepted and incorporated into the structure) we chose to omit the five apparently new or different designs that, for lack of better term, appear to have been crudely executed (e.g., Anyon and LeBlanc, 1984, Plate 36b; Brody, 2004, Fig. 93), and thus are unlikely to have impacted the overall design tradition. We interpret this kind of execution—characterized by rough linework and not-quite filled in 'solid' areas—as indicative of painters who lacked the skills to apply a design consistently. Rough or crude designs should not necessarily be interpreted as insignificant in all artistic traditions. However, Mimbres designs are known to have become increasingly fine over time (the earliest style is called 'Boldface'), and there is some indication that the most finely painted bowls received special treatment, in that they often had little use wear (Bray, 1982). Thus, the exclusion of crudely executed designs (possibly made by novices or children (Crown, 2002)) is justified, in this case. We did not include irregular/asymmetrical designs with fairly clean linework (e.g., Fig. 2a) in this category of 'crudely executed' designs because, even though the lack of symmetry *may* be indicative of a lack of skill (a possibility suggested by one reviewer), we did not feel this judgment should be made *a priori*. Thus, unless they had crude brushwork, irregular designs were considered as anomalies that might be isolated anomalies or that might have been incorporated as innovations.

Recent critiques of 'origins research' (e.g., Conkey and Williams, 1992) have noted that the search for the earliest instance of an attribute may overemphasize that attribute's importance, sometimes reifying or naturalizing it for the analyst. Thus, development of a classification system used for detecting the introduction of new attributes has theoretical as well as methodological implications. However,
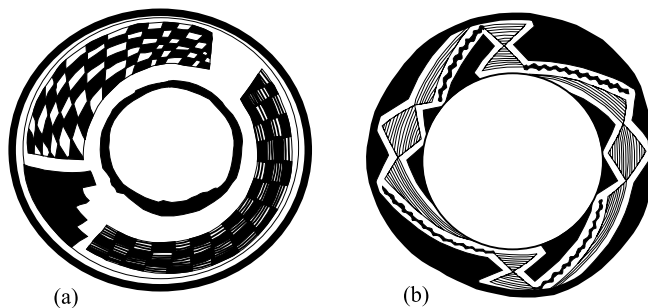

        (a)   (b)

Fig. 2. Apparently anomalous designs: (a) Asymmetric geometric, Middle Style III (after Anyon and LeBlanc, 1984, Plate 11a); (b) Combination of early (design comes up to rim) and late (fine hachure and frame) character-istics, Style II/III (after Anyon and LeBlanc, 1984, Plate 12e).

our emphasis on understanding innovation as a process, which includes both the introduction of a new form and its incorporation into the structure, is helpful in this regard, because the incorporation can be taken as an indication that the attribute was important to the artists of the past who adopted it. Furthermore, the assumption that what we detect analytically as innovations were culturally meaningful can be given some support if the attributes are found to have been used regularly, that is, if rules of design style can be discerned (see Hegmon, 1995). The detection of such 'rules' by the analyst does not imply that the same rules were consciously employed by the artists who painted the designs, but it does indicate that there was some structure underlying the design system.

In the case of Mimbres designs, a high degree of structure has been noted by various analysts (it is this structure that facilitates the development of the microstyle chronology), and systematized by Brody (2004, Fig. 131). The coding system used to record the data considered in this analysis builds upon Brody's description of the basic layout patterns of Mimbres bowl designs. The entire coding system, used in a series of analyses (see Hegmon and Nelson, 2005), was used to record a large number of attributes, including microstyle, basis for microstyle assignation, presence and kind (animal, human, flower) of representational designs, artistic conventions such as the use of negative designs, details and types of symmetry, and the presence of conventions or motifs associated with other regions. All the Mimbres Black-on-white bowls from the Galaz ruin were recorded and classified according to this coding system, including 720 that could be assigned to a chronological period based on microstyle.

The analysis presented here focuses on three sets of variables particularly relevant to the study of innovation: (1) microstyle, as a basis for chronological designation (see Table I); (2) design layout; and (3) representational design. Design layout includes information on how the design is situated on the bowl as well as symmetry (which was always rotational and sometimes also mirror). Layout categories include those discerned by Brody (2004, Fig. 131) as well as a few additional ones detected in our analysis; they are summarized in Table II. These categories are based primarily on our and Brody's consideration of the later part of the sequence (i.e., Styles II and III), and thus can be used to detect anomalies in the earlier part of the sequence that later became incorporated as innovations. Designs that do not fit neatly into these categories (i.e., possible isolated anomalies) are also considered in the analysis discussed below. Finally, salient variables regarding representational designs are simply the presence or absence of clear cut animal and/or human figures. Very few flowers or other plants are represented (see Hays-Gilpin and Hegmon, 2005), and the rare representations of plants in this corpus were associated with animals or humans, thus they were not considered separately. Representational designs, especially humans, were more common later in the Mimbres sequence; thus their analysis, including the identification of early instances (when they were anomalies), is an important means of studying the process of innovation.

Table II. Design Layout Categories (Bowl Count[a])

1. (B) Four quarters, each with the same design (17).		14. (B) Pair of opposed but non-interacting designs, implied bisection of design field (16).	
2. (B²) Four quarters, with two alternating designs (7).		15. (B) Two (or more) opposed designs, incorporated into overall framing design, central space blank (80).	
3. (B) Four offset quarters (11).		16. (B) Group of framed interacting figures oriented to center (20).	
4. (B) Four offset quarters with center space reserved (11).		17. Like #10 but with thick band of design below rim (144).	
5. (B) Single design on vessel wall, quarters are implicit (16).		18. Like #17 but with representational designs in band (13).	
6. (B) Overall pattern, sometimes called a "wallpaper" pattern (2-d symmetry) (5).		19. Like #10 but with representational design in center (4).	
7. (B) Three equal wedge-shaped segments (3).		20. Spiral or concentric design fills field (10).	
9. (B) Three segments, divided vertically, center dominant (12).		21. Opposed interacting figures that fill center of field (11).	
10. (B) Thin band of design below rim, white center (69).		22. More than 6 wedge shaped sections (55).	
11. (B) Thin band of design below rim frames; top-bottom oriented design in center (150).		23. Like #17 but with representational figure in center (8).	
12. (B) Like 11, but center design is curved rather than top-bottom oriented (10).		24. Like #15 but with representational figure in center (17).	
13. (B) Representative figure in center incorporated into overall design (9).		25. Band of design along rim and geometric design in center, separated by white space (5).	

[a]$N = 703$; 17 bowls were not assigned design layouts.
[b]Layouts marked (B) are based on categories originally identified by Brody (1977, Fig. 85; see also 2004, Fig. 131).

Table III. Distribution of Isolated Anomalous Designs, by Chronological
Period

Style or microstyle	Isolated anomalies, count and (period %)	All analyzed bowls, count
Late Style III	3 (10.3)	29
Mid/Late Style III	0	1
Style III	0	46
Middle Style III	3 (1.1)	261
Early Style III	44 (31.7)	139
Style II/III	2 (2.3)	86
Late Style II	3 (5.7)	53
Style II	0	16
Early Style II	2 (5.7)	35
Style I or Early Style II	0	40
Style I	0	11
Total	57 (7.9)	720

The method for detecting anomalies and possible innovations includes two components. First, we identified rules of design—a sort of simple grammar—which were essentially codified in our classificatory categories (see Hegmon (1995, Chapter 7) for development of a similar procedure with a different corpus), and we used these rules to detect well-executed anomalies. Because these anomalies were detected in comparison with the assemblage in its entirety, we conclude that they were never adopted into the design tradition. That is, they are 'isolated anomalies that never became innovations. These anomalies were identified according to two sets of criteria: (1) Structures that could be easily defined by our rules, but that were rare in the assemblage (less than 8% overall, see Table III); (2) Designs that seemed to 'violate' our rules, and incorporated aspects of two of our categories. These two kinds of anomalies were not necessarily different from the painters' perspective, nor do they represent different kinds of social processes, the difference is just in how we identified them. Asymmetric geometrics (Fig. 2a) are anomalous in that asymmetry is common with representational designs, especially in portrait format (Table II, categories 11 and 12), but unusual when designs are entirely geometric. The coincidence of apparently early and late traits is similarly anomalous. Specifically, the bowl illustrated in Fig. 2b has fine-line hachure surrounded by fine framing lines (a late trait), but a design that rises all the way to the rim (an early trait).

The chronological distribution of isolated anomalies, identified according to one of the two sets of criteria discussed above, provides information about their context in terms of the sequence of Mimbres developments. Table III shows the distribution of isolated anomalies, in comparison to all bowls, divided by chronologic sub-period. Interpretations of these data must take into account the variable lengths of the time periods represented by the various microstyles (see Table I). However, because Table III gives figures for the proportion of anomalies

within each period, it can still be used to examine the relative distribution of isolated anomalies over time. Isolated anomalies are strongly overrepresented earlier in the sequence, especially in Early Style III (AD 1010–1080, the early part of the Classic period), when 31.7% of the bowl designs were identified as isolated anomalies; calculated differently, 77.2% of all anomalies but only 19.3% of all bowls date to Early Style III. The cultural significance of these temporal patterns is discussed subsequent to the second part of the analysis, at the end of this section.

The second component of the analysis focuses directly on detecting early instances of designs known to have become an important part of the painting tradition in later periods, that is, on anomalies that became innovations. This component focuses on representational designs, both because they can be detected and classified in a straightforward manner, and because the use of elaborate representational designs makes the Mimbres tradition unique in the southwest.

The distribution of various kinds of representational designs, ordered chronologically, is shown in the rightmost columns of Table IV. As expected, based on the general literature about Mimbres painting, representational designs are most common late in the sequence (77% are Style III (i.e., the top five rows in Table IV)), and early humans are even more uncommon than early animals. Because the designs were eventually incorporated into the tradition, the early instances can be interpreted as anomalies that became innovations and can be examined to understand the source of these innovations. For example, the single Style II animal representation (Fig. 3) has characteristics (the horned toad motif, the interacting scrolls) suggestive of the Hohokam tradition in southern Arizona,

Table IV. Characteristics and Distribution of Representational Designs

Microstyle	N	Design structure Incorporated	Portrait	Opposed	N	Figure represented Animal	Human
Late Style III	9	0	7	2	9	8	1
Mid/Late Style III	1	0	0	1	1	1	0
Middle Style III	125	4	108	13	126	111	15
Style III	6	0	2	4	6	5	1
Early Style III	18	3	10	5	18	18	0
Style II/III	41	2	34	5	40	34	6
Late Style II	3	1	2	0	3	3	0
Style II	2	1	1	0	2	2	0
Early Style II	1	0	0	1	1	1	0
Style I or Early Style II	2	0	2	0	2	2	0
Style I	0	0	0	0	0	0	0

Explanation: Includes only bowls with representational designs ($N = 208$). 1. Each *bowl* is one case in the "Design structure" section of the table; $N = 208$. 2. Each *motif* is one case in the "Figure represented" section of the table; $N = 208$. (a) Three bowls have two different types of images, and thus are counted twice in the "Figure represented" section (they have both the animal and human motifs). (b) Three bowls included in the tabulation for the "Design structure" section were not assignable to "Figure represented" categories because the designs were not well preserved.
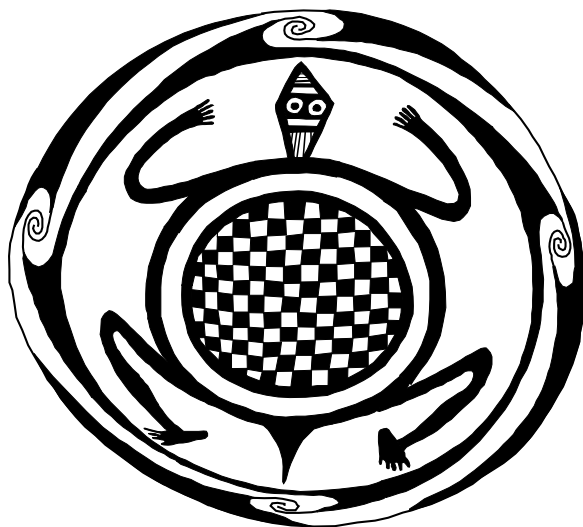
Fig. 3. Early (Style I/Early II) representational design (after Anyon and LeBlanc, 1984, Plate 113d).

which has long been interpreted as a source of early Mimbres designs (Brody, 2004, pp. 81–86; Hegmon and Nelson, 2005). Thus, although this bowl is clearly Mimbres technologically, and was very likely made locally (in the Mimbres valley if not at Galaz itself), the design itself may have been inspired by interregional interaction to the west.

Other anomalies that became innovations can also be detected by considering the structure of the paintings that included representational designs (Table IV, left side). For this portion of the analysis, the layouts of the representational designs were grouped into three general categories. *Incorporated* (Table II, category 13; Fig. 4a) means that the representational figure, in the center of the bowl, is integrated into a larger (often geometric) overall design. *Portrait* (Table II, categories 11 and 12; Fig. 4b) means that the design is surrounded by white space and there is a clear top–bottom orientation to the design. *Opposed* (Table II, categories 14 and 15; Fig. 4c) indicates that two or more figures stand across from each other, with rotational symmetry. Incorporated representational designs are rare throughout the sequence. Thus, the presence of a representational design in Middle Style III times may be interpreted as an innovation (i.e., an earlier anomaly that became incorporated into the design corpus), while the presence of this particular layout may be an isolated anomaly, because it is rare (4/125) and does not become accepted later in the sequence. This interpretation illustrates the fine but interpretable line between isolated anomaly and innovation. Unincorporated designs, both in portrait and opposed form, become increasingly popular later in the sequence, thus
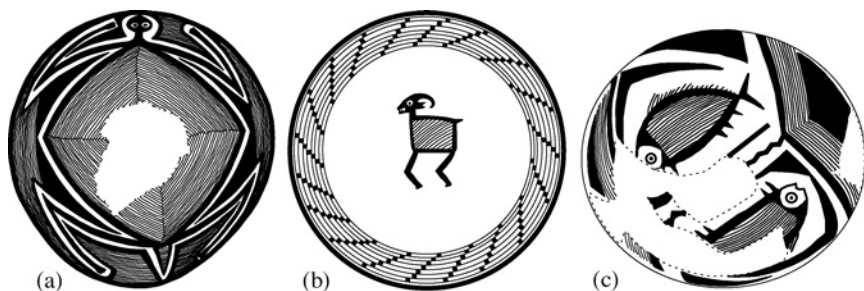
Fig. 4. Various early usages of representational designs. (a) Incorporated, Style II (after Anyon and LeBlanc, 1984, Plate 119c; (b) Portrait, Style II (after Anyon and LeBlanc, 1984, Plate 7c); (c) Opposed, Early Style II (after Anyon and LeBlanc, 1984, Plate 63e).

early instances of these forms can be interpreted as early anomalies that became innovations. Finally, much has been made of Mimbres portrayal of human figures. Humans appear only late in the sequence, but there are six instances of humans on Late II/Early Style III bowls (e.g., Fig. 5) that are possible instances of a rapidly accepted innovation.

Table IV shows the overall distribution of representational designs, including anomalies that became innovations and eventually were incorporated into the overall corpus. Thus, it is not possible to draw a clear line between the introduction and acceptance of an innovation; indeed, it may not be possible to draw such a line even with detailed ethnographic data, as some anomalies might (depending on context) immediately become innovations. However, Table IV does suggest a general trend of more novel/anomalous designs in Style II/III and Early Style III, the same time that isolated anomalies become more common (Table III).

Style II/III and Early Style III are associated with the early part of the Mimbres Classic period, times of change in architectural and ceremonial organization,

Fig. 5. Early depictions of humans on Mimbres bowls: (a) Style II/III (after Anyon and LeBlanc, 1984, Plate 76f); (b) Style II/III (after Anyon and LeBlanc, 1984, Plate 93c); (c) Style II/III (after Anyon and LeBlanc, 1984, Plate 109c).

including a shift from residence in pit houses to above-ground pueblos, and from great kivas to small kivas and plazas. The apparent flurry of new designs at this time (both isolated anomalies and innovations) is consonant with these other indications of social flux. People were experimenting with new forms (of painting, architecture, organization, etc.) though not all the new forms were necessarily incorporated as innovations. The relative dearth of anomalies after this time is consonant with our previous finding (Hegmon and Nelson, 2005; Hegmon *et al.*, 1998) that the Mimbres design and architectural traditions became more homogeneous, indicative of conformity, in the later periods. These changes, in the social context and in the relative frequency of new designs, suggest that the relationship between agency and structure is not constant and that there may be contexts in which agency is particularly likely to affect change, a point to which we return in the conclusions.

To summarize, our analysis as presented here focuses on developing a method to identify anomalous designs, including those that were never adopted into the overall tradition (i.e., isolated anomalies) and those that were adopted (i.e., innovations). The difference between isolated anomalies and innovations is subtle, and in at least one instance designs (incorporated representational) that were anomalous in one respect might have been innovations in another respect. This method for identifying novel designs and their acceptance (or not) is important because it allows us to identify their context, in this case the time of change associated with the beginning of the Classic period. A different analysis that considered spatial distributions could be used to examine whether such vessels with innovative designs were associated with a particular geographic area or were more or less frequently exchanged than other vessels. The method also provides insights into the relationship between structure and agency, which is the focus of the following concluding section.

CONCLUSIONS: THE THEORY OF THE METHOD

Agency is everywhere, in archaeological discourse, and in what people do. On the one hand, this means that (as Shennan, 1993 noted) we should be able to detect agency with ease in the archaeological record. But if agency is omnipresent, then it becomes a catchall with little theoretical salience or explanatory power. While agency may be everywhere, we argue that it can only be understood in terms of its recursive relationship with structure; thus, analytically we are most likely to learn the most by focusing on situations in which we can see both components of that relationship, the goal of the analysis described here.

We treat the act of painting a design on a vessel as a form of agency, and the overall style of that design is part as structure. The conception of painting as agency is fairly straightforward, in contrast to interpretation of a design tradition as structure. A design tradition fits Giddens' conception of structure (i.e., "rules

and resources recursively implicated in the reproduction of social systems" (1984, p. 377)) closely, but not exactly. Design structure does not directly reproduce *social* systems; it is more limited in scope. However, we suggest that considering design traditions—as well as other structured phenomena—as analogous to structure in Giddens' sense, can lead to important insights. For example, in an analysis quite similar to the one presented here, Pollock (1983) considered how innovations were introduced in the creation of value at the Royal Cemetery of Ur. Although she did not use the terminology, some of the processes she discussed (e.g., emulation) could be conceptualized as agency, and the system of value that resulted can be viewed as structure. Another example is Varien's (1999) discussion (which does use Giddens' terminology) of settlement in the Mesa Verde region of Southwest Colorado. People exercised their agency and located new settlements within the context of the existing social, landscape, and settlement structure, and in so doing they affected decisions of generations to come. Over time, community continuity and settlement density increased, and the structure was transformed.

Archaeological discussions of agency most often focus on social and political issues, and thus fit nicely with Giddens' definition of structure involving *social* systems. The three examples discussed above (design painting, graves and value, settlement systems) are obviously related to social issues, though less directly. This indirect relationship is not necessarily problematic, however. It may be that one of the best ways for archaeologists and other social theorists to explore issues of structure and agency is to seek out cases in which *both* parts of the duality can be studied. Sometimes it may be possible to do this by examining structures that involve overall social systems. However, in many cases we may learn more by considering structures or aspects of structure that are more limited in scope but for which the recursive relationship with agency can be clearly examined. The result will be a better understanding of individual cases as well as a better understanding of the structure–agency duality.

The chronological ordering of bowls that formed the basis for this analysis allowed the identification of anomalous designs that were apparently novel when they were introduced early in the sequence. In some cases, these new designs were present for only a short time, they were not incorporated into the overall tradition; these are what we identified as isolated anomalies. In other cases the anomalies were accepted and incorporated; these are conceptualized as innovations. All the designs—every instance of painting a pot—involves agency. We do not suggest that some people or some acts have 'more' agency than others; agency is not a possession, and it cannot be quantified. However, the isolated anomaly/innovation distinction suggests that the relationship between agency and structure is variable. Agency may reinforce, reproduce, or transform structure. Some people may have more opportunity to exercise agency than others, and thus will have more effect on the structure. Similarly, there may be situations that facilitate the exercise of structure-transforming agency, including possibly times of stress (see Aldenderfer,

1993; Schachner, 2001), or expansive socio-cultural traditions that value innovation (see Wiessner, 2002). Conversely, there are also situations in which novelties were apparently discouraged, in favor of conformity (Kohler *et al*., 2004), such that agency seem to have reinforced and reproduced, but not transformed the structure. Innovations (i.e., novel forms that are accepted and passed on) can also be understood from the perspective of information transmittal (Washburn, 2004).

Finally, the issue of innovation also has implications regarding the relationship between agency and intentionality. This is a complex issue because agency does not necessarily imply intentionality (Giddens, 1984, p. 9), and intentionality is not a unity phenomenon. While an artist may 'intend' to paint a rabbit rather than a quail, it would be difficult to understand—even with ethnographic interviews— intentions at a different scale, whether the painting was intended to reproduce, reinforce, or change an extant tradition. However, as David (2004) notes, innovative acts are more likely to be intentional challenges to tradition. While we do not suggest that every novel design should be interpreted in this way, continued investigation of the context of innovations might provide important insights into the issue of agency and intentionality. If innovations consistently come from one source, then it might be reasonable to suggest that the potter or potters associated with that source were intentionally introducing innovations into the design structure. Once again, consideration of the relationship of agency and structure in one particular sense—a design tradition—can shed light on general theory regarding agency and structure.

ACKNOWLEDGMENTS

REFERENCES CITED

Aldenderfer, M. (1993). Ritual, hierarchy, and change in foraging societies. *Journal of Anthropological Archaeology* **12:** 1–40.

Anyon, R., Gilman, P. A., and LeBlanc, S. A. (1981). A reevaluation of the Mogollon-Mimbres archaeological sequence. *Kiva* **46:** 209–225.

Anyon, R., and LeBlanc, S. A. (1984). *The Galaz Ruin: A Prehistoric Mimbres Village in Southwestern New Mexico*, Maxwell Museum of Anthropology and the University of New Mexico Press, Albuquerque.

Bray, A. (1982). Mimbres Black-on-white, Melamine or Wedgewood? A ceramic use-wear analysis. *Kiva* **47:** 133–149.

Brody, J. J. (1977). *Mimbres Painted Pottery*, School of American Research Press, Santa Fe.

Brody, J. J. (2004). *Mimbres Painted Pottery*, Revised Edition, School of American Research Press, Santa Fe.

Brody, J. J., Scott, C. J., and LeBlanc, S. A. (1983). *Mimbres Pottery: Ancient Art of the American Southwest*, Hudson Hills Press, New York.

Brody, J. J., and Swentzell, R. (1996). *To Touch the Past: The Painted Pottery of the Mimbres People*, Hudson Hills, New York.

Clark, J. E. (2000). Towards a better explanation of hereditary inequality: A critical assessment of natural and historic human agents. In Dobres, M. A. and Robb, J. E. (eds.), *Agency in Archaeology*, Routledge, London, pp. 92–112.

Conkey, M. W. (1982). Boundedness in art and society. In Hodder, I. (ed.), *Symbolic and Structural Archaeology*, Cambridge University Press, Cambridge, pp. 115–128.

Conkey, M. C., and Williams, S. H. (1991). Original narratives: The political economy of gender in archaeology. In di Leonardo, M. (ed.), *Gender at the Crossroads of Knowledge: Feminist Anthropology in the Postmodern Era*, University of California Press, Berkeley, pp. 102–139.

Creel, D., and Anyon, R. (2003). New interpretations of Mimbres public architecture and space: Implications for cultural change. *American Antiquity* **68:** 67–92.

Creel, D., and McKusick, C. (1994). Prehistoric macaws and parrots in the Mimbres area, New Mexico. *American Antiquity* **59:** 510–524.

Crown, P. L. (2002). Learning and teaching in the prehispanic American Southwest. In Kamp, K. A. (ed.), *Children in the Prehistoric Puebloan Southwest*, University of Utah Press, Salt Lake City, pp. 108–124.

David, B. (2004). Intentionality, agency and an archaeology of choice. *Cambridge Journal of Archaeology* **14:** 67–71.

Dobres, M. A., and Robb, J. E. (2000). Agency in archaeology: Paradigm or platitude? In Dobres, M. A. and Robb, J. E. (eds.), *Agency in Archaeology*, Routledge, London, pp. 3–17.

Dornan, J. (2002). Agency and archaeology: Past, present, and future directions. *Journal of Archaeological Method and Theory* **9:** 303–329.

Friedrich, M. H. (1970). Design structure and social interaction: Archaeological implications. *American Antiquity* **35:** 332–343.

Gell, A. (1998). *Art and Agency*, Clarendon Press, Oxford.

Giddens, A. (1984). *The Constitution of Society*, University of California Press, Berkeley.

Giddens, A. (1979). *Central Problems in Social Theory*, University of California Press, Berkeley.

Gilman, P. A. (1990). Social organization and Classic Mimbres period burials in the SW United States. *Journal of Field Archaeology* **17:** 457–469.

Gilman, P. A., Canouts, V., and Bishop, R. L. (1994). The production and distribution of Classic Mimbres Black-on-white pottery. *American Antiquity* **59:** 695–709.

Hardin, M. A. (1983). The structure of Tarascan pottery painting. In Washburn, D. K. (ed.), *Structure and Cognition in Art*, Cambridge University Press, Cambridge, pp. 8–24.

Hays-Gilpin, K., and Hegmon, M. (2005). The art of ethnobotany: Depictions of maize and other plants in the prehispanic Southwest. In Hegmon, M. and Eiselt, B. S. (eds.), *Engaged Anthropology: Research Essays on North American Archaeology, Ethnobotany, and Museology: Papers in Honor of Richard I. Ford*, Anthropological Papers, Museum of Anthropology, University of Michigan, Ann Arbor (in press).

Hegmon, M. (2004). Beyond the mold: Questions of inequality in Southwest villages. In Pauketat, T. R. and DiPaolo Loren, D. (eds.), *North American Archaeology*, Blackwell Press, pp. 212–234.

Hegmon, M. (2002). Recent issues in the archaeology of the Mimbres region of the North American Southwest. *Journal of Archaeological Research* **10:** 307–357.

Hegmon, M. (1995). *The Social Dynamics of Pottery Style in the Early Puebloan Southwest*, Occasional Paper No. 3, Crow Canyon Archaeological Center, Cortez, Colorado.

Hegmon, M., and Nelson, M. C. (2005). In sync, but barely in touch: Relations between the Mimbres region and the Hohokam regional system. In Sullivan, A. P., and Bayman, J. (eds.), *Hinterlands*

and Regional Dynamics in the Ancient Southwest, University of Arizona Press, Tucson (in press).

Hegmon, M., Nelson, M. C., Anyon, R., Creel, D., LeBlanc, S. A., and Shafer, H. J. (1999). Scale and time-space systematics in the post-A.D. 1100 Mimbres region of the North American Southwest. *Kiva* **65:** 143–166.

Hegmon, M., Nelson, M. C., and Ruth, S. M. (1998). Abandonment and reorganization in the Mimbres region of the American Southwest. *American Anthropologist* **100:** 148–162.

Hodder, I. (1984). Burials, houses, women, and men in the European Neolithic. In Miller, D. and Tilley, C. (eds.), *Power, and Prehistory*, Cambridge University Press, Cambridge, pp. 51–68.

James, W. D., Brewington, R. L., and Shafer, H. J. (1995). Compositional analysis of American Southwestern ceramics by neutron activation analysis. *Journal of Radioanalytical and Nuclear Chemistry* **192:** 109– 116.

Jett, S. C., and Moyle, P. B. (1986). The exotic origins of fishes depicted on prehistoric Mimbres pottery from New Mexico. *American Antiquity* **51:** 688–720.

Kabotie, F. (1982). *Designs from the ancient Mimbreños with a Hopi interpretation*, 2nd edn., Northland Press, Flagstaff.

Kohler, T. A., Van Buskirk, S., and Ruscavage-Barz, S. (2004). Vessels and villages: Evidence for conformist transmission in early village aggregations on the Pajarito Plateau, New Mexico. *Journal of Anthropological Archaeology* **23:** 100–118.

Kulow, S. (2004). *The social context of residential abandonment in the eastern Mimbres area of southwestern New Mexico*. MA paper, Department of Anthropology, Arizona State University.

LeBlanc, S. A. (1983). *The Mimbres People: Ancient Painters of the American Southwest*, Thames and Hudson, London.

LeBlanc, S. A. (2004). *Painted by a Distant Hand: Mimbres Pottery of the American Southwest*, Peabody Museum Press, Harvard University, Cambridge.

LeBlanc, S. A., and Ellis, M. M. (2001). *The Individual Artist in Mimbres Culture: Painted Bowl Production and Specialization*. Poster presented at the 66th annual meeting of the Society for American Archaeology, New Orleans.

Lemmonier, P. (ed.) (1993). *Technological Choices: Transformation in Material Cultures Since the Neolithic*, Routledge, London.

Minnis, P. E. (1985). *Social Adaptation to Food Stress: A Prehistoric Southwestern Example*, University of Chicago Press, Chicago.

Moulard, B. (1984). *Within an Underworld Sky: Mimbres Ceramic Art in Context*, Twelvetrees Press, Pasadena, CA.

Nelson, M. C. (1999). *Mimbres During the Twelfth Century: Abandonment, Continuity, and Reorganization*, University of Arizona Press, Tucson.

Nelson, M. C., and Hegmon, M. (2001). Abandonment is not as it seems: An approach to the relationship between site and regional abandonment. *American Antiquity* **66:** 213–235.

Pauketat, T. R. (2001). Practice and history in archaeology: An emerging paradigm. *Anthropological Theory* **1:** 73–98.

Pollock, S. (1983). *The Symbolism of Prestige: An Archaeological Example from the Royal Cemetery of Ur*, PhD Dissertation, Department of Anthropology, University of Michigan.

Powell, V. S. (2000). *Iconography and Group Formation During the Late Pithouse and Classic Periods of the Mimbres Society, A.D. 970–1140*, PhD Dissertation, Department of Anthropology, University of Oklahoma, Norman.

Schaafsma, P. (1999). Tlalocs, Kachinas, sacred bundles, and related symbolism in the Southwest and Mesoamerica. In Schaafsma, C. F. and Riley, C. L. (eds.), *The Casas Grandes World*, University of Utah Press, Salt Lake City, pp. 164–192.

Schachner, G. (2001). Ritual control and transformation in middle-range societies: An example from the American Southwest. *Journal of Anthropological Archaeology* **20:** 168–194.

Scott, C. J. (1983). The evolution of Mimbres pottery. In *Mimbres Pottery: Ancient Art of the American Southwest*, Hudson Hills, New York, pp. 38–67.

Shafer, H. J., and Brewington, R. L. (1995). Microstylistic changes in Mimbres Black-on-white pottery: Examples from the NAN Ruin, Grant County, New Mexico. *Kiva* **61:** 5–29.

Shafer, H. J., and Taylor, A. J. (1986). Mimbres Mogollon architectural dynamics and ceramic style change. *Journal of Field Archaeology* **13:** 43–68.

Shennan, S. (1993). After social evolution: A new archaeological agenda. In Yoffee, N. and Sherratt, A. (eds.), *Archaeological Theory: Who Sets the Agenda?* Cambridge University Press, Cambridge,

pp. 53–59.

Smith, W. (1962). Schools, pots, and potters. *American Anthropologist* **64:** 1165–1178.

Torrence, R., and van der Leeuw, S. E. (1989). Introduction: What's new about innovation? In van der Leeuw, S. E. and Torrence, R. (eds.), *What's New? A Closer Look at the Process of Innovation*, Unwin Hyman, London, pp. 1–15.

Van der Leeuw, S. E. (1993). Giving the potter a choice: Conceptual aspects of pottery techniques. In Lemmonier, P. (ed.), *Technological Choices: Transformation in Material Cultures Since the Neolithic*, Routledge, London, pp. 238–288.

Van der Leeuw, S. E., and Torrence, R. (eds.) (1989). *What's New? A Closer Look at the Process of Innovation*, Unwin Hyman, London.

Van Keuren, S. (1999). *Ceramic Design Structure and the Organization of Cibola White Ware Production in the Grasshopper Region, Arizona*, Arizona State Museum, University of Arizona, Tucson.

Varien, M. D. (1999). *Sedentism and Mobility in a Social Landscape: Mesa Verde and Beyond*, University of Arizona Press, Tucson.

Washburn, D. K. (2004). Remembering things seen: Experimental approaches to the process of information transmittal. *Journal of Archaeological Method and Theory* **8:** 67–99.

Washburn, D. K. (1999). Perceptual anthropology: The cultural salience of symmetry. *American Anthropologist* **101:** 547–562.

Washburn, D. K. (1992). The structure of black-on-white ceramic design from the Mimbres Valley. In Duran, M. S. and Kirkpatrick, D. T. (eds.), *Archaeology, Art, and Anthropology: Papers in Honor of J. J. Brody*, The Archaeological Society of New Mexico, 18, Albuquerque, pp. 213–223.

Washburn, D. K. (1983). Toward a theory of structural style in art. In Washburn, D. K. (ed.), *Structure and Cognition in Art*, Cambridge University Press, Cambridge, pp. 1–7.

Wiessner, P. (2002). Vines of complexity: Egalitarian structures and the institutionalization of inequality among the Enga. *Current Anthropology* **43:** 233–269.