

PUNCTATE VARIATION AMONG THE LA CROSSE AREA
ONEOTA CERAMICS AFTER THE 1500s

by

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ABSTRACT

In observing the ceramic assemblage of State Road (LC34176) at the Mississippi Valley Archaeological Center, I identified unrecognized stylistic variations among the decorated sherds present. While other studies have examined the larger picture, this analysis narrows the focus to variations within punctates in relation to motifs. Each sherd was visually examined for variations in tool use, punctates, trail marks and rim decoration. The study revealed that variation in punctates was due to tool choice, application and motif. In addition, V-Filler/Chevron motifs were typically created with a sharp tool, whereas the Repeating Rectangle motif was primarily composed of a blunt tool. These numerous variations, described as isochrestic and symbolic variation, indicate that variation among punctates is due to individual expression and human agency. Through graphs and visual observations, variations among punctates in Oneota pottery reveal a group of people who wished to express themselves outside of the larger material culture.

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INTRODUCTION

The Oneota of the La Crosse locality were an Upper Mississippian culture, occupying the La Crosse region between A.D. 1300 – 1625 (Boszhardt 1994:212). Chronology can be determined through three phases as defined by changes in pottery motif. The first phase was Brice Prairie, which lasted from A.D. 1300 – 1400. The second is Pammel Creek, A.D. 1380 – 1520, the third being Valley View which lasted between A.D. 1530 – 1600 (Boszhardt 1994:184,212). Around A.D. 1625 the Oneota abandoned the La Crosse region, headed for the East to the open plains, eventually becoming the Ioway (Boszhardt 2008:194).

The defining characteristic of the Oneota as a culture is shell tempered pottery, globular in shape with geometric motifs composed of trail marks and punctates. A punctate is defined as a depression in the clay, formed by an instrument or fingertip. The most commonly found motifs include geometric designs with variations of chevrons, triangles and punctates (Benn 1989:243). It is thought that this combination of nested chevrons and punctate-filled triangles are meant to represent the spotted feathers of a thunderbird, or hawk, of Oneota iconography (Benn 1989:241). Various combinations of the punctates and trail marks that form such designs were observed during the visual ceramic analysis of the Valley View phase. Potters placed these designs on the shoulder of the pot, beginning at the neck and continuing through the shoulder. The anatomical design of a pot can be compared to that of the body, beginning at the torso of the body, moving upwards and ending at the lip (Figure one).

This ceramic study will be looking at the range of variation in Valley View ceramics in the La Crosse locality, focusing on punctates. Although multiple motifs and tools have been

described within ceramic types, the range of variation has not been documented. This thesis explores how flexible or organized potters were in their application of punctates within motifs. My ceramic analysis and sample is from the State Road Coulee site (LC176) of the Valley View phase.

A design can be defined as a pattern or combination specific geometric shapes, whereas a motif is comprised of these various patterns in which specific designs create categories, better known as motifs. As mentioned previously, designs within motifs during the Valley View phase were primarily chevrons and punctates which tended to form a “V”, followed by several trail marks (e.g. figures 10 and 11). Robert Boszhardt (1994) observed variation among rim and lip-top decoration, handle placement and punctates which formed a geometric design. These variations in design created numerous variation among motifs. Observations, quoted below, were officially documented, and have since used by researchers of the Oneota culture in their analysis and typologies (Boszhardt 1994:186).

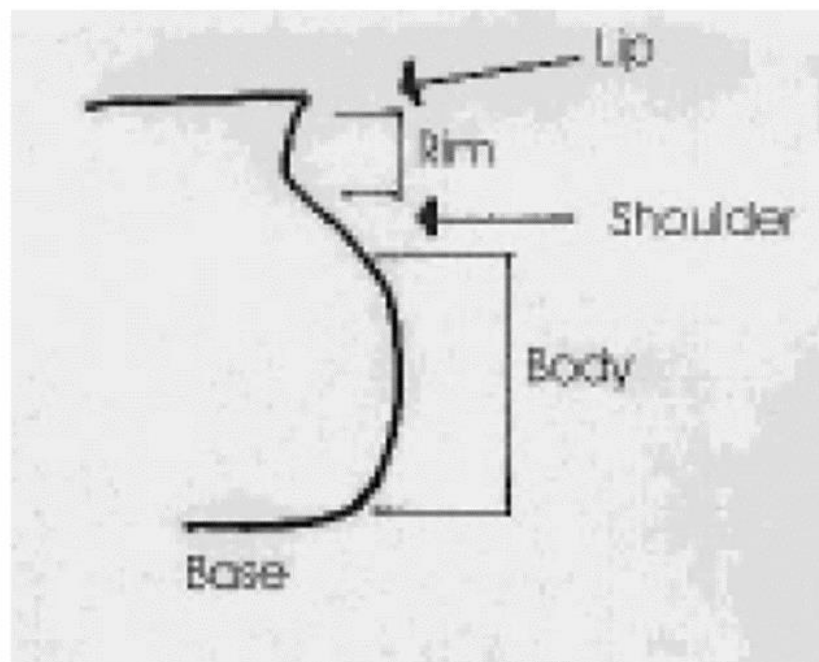


Figure 1. Ceramic anatomy terminologies. (Arzigian, Jirasek 2012:283)

“Rim: Decoration: Relatively fine notching, usually applied with tool, on top of lip or along entire rim. Notches may be oriented perpendicular to rim, or oblique to right or left. Neck: Wide range of heights (3- 8 cm) but generally higher through time. Shoulder: Decoration: the distinguishing feature is zones filled with punctates. These zones are often found between either oblique tool trails (created triangular punctate filled zones) or vertical tool trails (creating rectangular punctate-filled). A few examples have only punctate filled zones. Later in time width of tool trails and punctates decreases, trends move toward fine incision and slashes” (Boszhardt 1994:234).

In my analysis I describe four previously observed variations in design, using these classifications of motif: V-Filler/Chevron, Repeating Rectangle and the Alternating V. The Alternating V motif is an interpretation of the ‘Alternating Triangle’ from Wood (1962). Wood provides a description of a motif found in the Pammel Creek assemblage in which a triangle in the form of punctates varies between upright and inverted (Wood 1962:30). This classification of motif is not used because Boszhardt had not yet provided independent phases regarding specific motifs. For example, the Alternating Triangle would have belonged within the Valley View phase due to the Allamakee Trailed design which the trail marks and punctates patterns comprise; quite the misfortune for Wood.

Boszhardt (1994) defines the punctates patterns or zones within the Repeating Rectangle motif (figure 12) motif as such: “These zones are often found between zones of either oblique tool trailsor vertical tool trails (creating rectangular punctate-filled)”. I have elaborated upon this standardized description by providing it with a motif to be recognized by. Even so, it is important to note that Boszhardt (1994) and Anderson et al. (1995) included photos or descriptions of pottery which displayed attributes of such a motif, indicating that this design has not been ignored.

To assess variation among punctates, analysis was completed on the ceramic assemblage of the State Road site. The assemblage was provided by Dr. Constance Arzigian of the University of Wisconsin La-Crosse of the Mississippi Valley Archeology Center (MVAC). My sample consists of sherds that had punctates in an identifiable motif with portions of either the shoulder, neck or rim present as well. All undecorated sherds, those without punctates, smaller sherds with incomplete motifs, and sherds which could not be identified as to what portion of the vessel it belonged to were not included. After doing the initial observations and taking notes, information gathered was entered into a Microsoft Excel spreadsheet and then placed in specific classifications.

BACKGROUND

The Oneota were an Upper Mississippian culture, which occupied a large area of the Midwest (Figure 2). However, they are not relatives of Middle and Lower Mississippian cultures. Origins of Oneota are hotly debated among researchers. Between A.D. 950 – 1150, there was cultural transformation from Woodland peoples, hunter gathers known as the Effigy Mound culture, to the tribal Oneota (Boszhardt 1994:433). James Griffin (1960) takes an evolutionary view of this transition, arguing that the Oneota were occupants of Aztaltan, or ‘Old Cahokia’ as Griffon (1960) referred to it, a Late Woodland, Middle Mississippian village (Theler and Boszhardt 2006:438). When Aztaltan fell, the remaining Upper Mississippian people continued to pass on their cultural traits, such as shell tempered pottery and agriculture, leading to the development of the Oneota. Boszhardt (1994) continues on this evolutionary trajectory by arguing that the

transition from Woodland to Oneota culture was a result of Late Woodland and Middle Mississippian interaction in the Redwing area.

To the contrary, Robert Hall (1962) uses his taxonomic system, beginning with occupation of Carcajou Point, to create a timeline of Oneota cultural development. Each progressive phase is dependent on separate excavations and material culture artifacts recovered, then radiocarbon dated. These systems were Emergent Oneota, Developmental Oneota and Classical Oneota (Theler and Boszhardt 2006:438). Unlike Griffon, who interpreted civilizations prior to the Oneota and related material culture to Oneota development, Hall employed radio carbon dates of cultural materials from individual, regional excavations.

Regardless, the development of the Oneota is archaeologically seen through ceramic changes including decorative motifs, surface treatment and the use of shell temper rather than sand. Pottery transitioned from the cord marked vessels characteristic of Woodland peoples to the geometric designs associated with the Oneota culture (Boszhardt 2008:193). This change in temper and stylistic choices occurred alongside the introduction of intensive agriculture, marking the transition from Woodland peoples to the classic conception of the Oneota (Gibbon 1972:167).

As agriculturalists, the primary crop of the Oneota was maize (Gibbon 1972:168). While terrain such as the flat plains of Iowa were excellent areas for intensive agriculture, the sandy soils of La Crosse topography proved to be a bit more challenging. In response, the Oneota constructed ridged fields to prevent erosion, planting beans and squash in addition to maize, maximizing the potential of overall food production (Gallagher et al. 1985:608). Large game hunting was also a part of the Oneota lifeway with white-tailed deer, bison, and the occasional elk (Anderson 1995; Schroeder 2004). Wild plant resources included cranberries, wild rice,

cattails and reeds, while the Mississippi River also offered abundant fish, shellfish, waterfowl, otter, and other small animals (Anderson 1995:50; Boszhardt 2006:441).

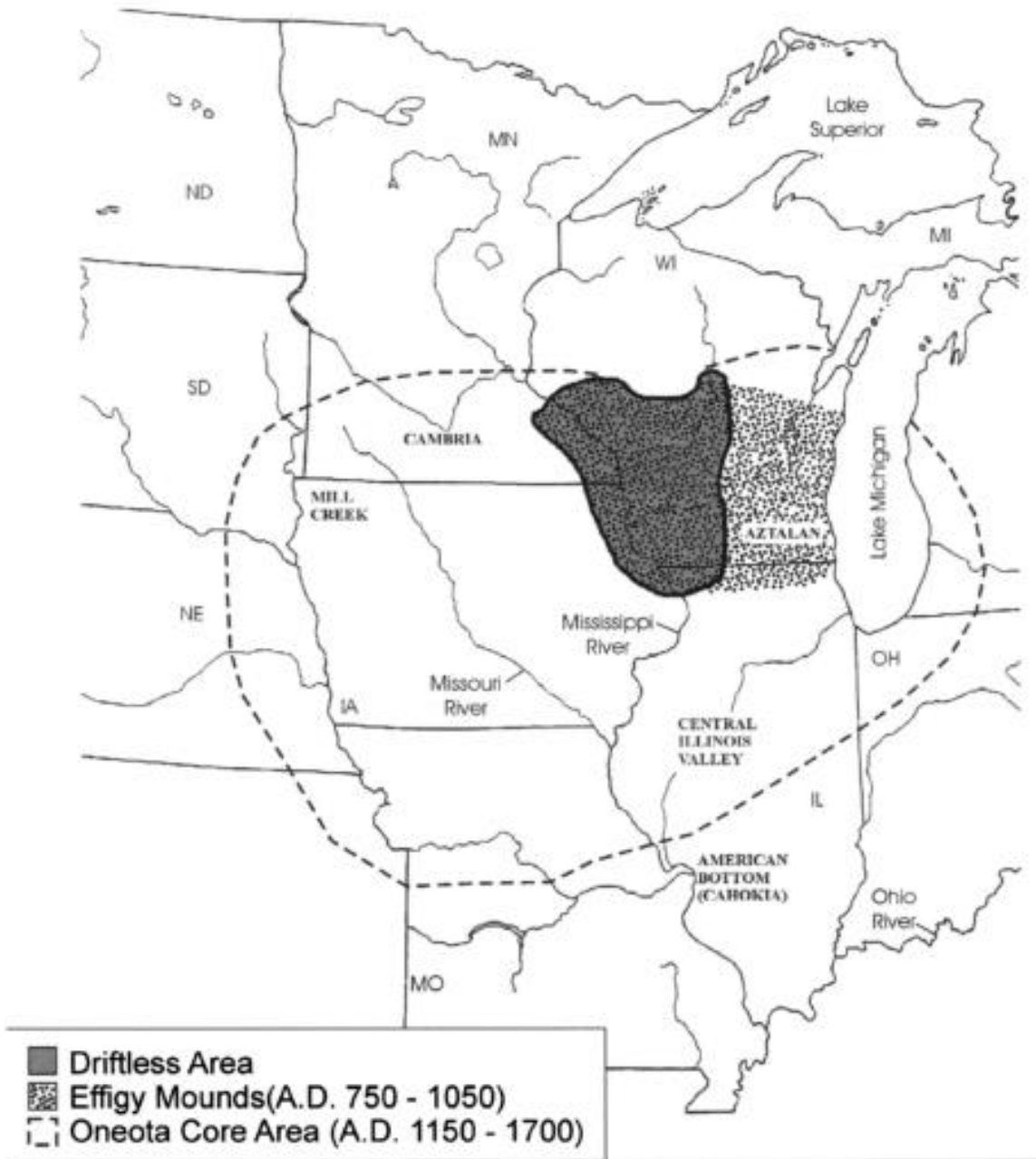


Figure 2. Oneota area of occupation (Theler and Boszhardt 2006:435)

Settlement patterns for the Oneota can be seen through the changes of village and site

location. For example, sites move chronologically along the Mississippi River during the 1300s

then towards the bluffs in the 1400s, providing substantial timelines (Boszhardt 1994:212-214). Temporary settlement sites indicate seasonal settlement patterns, or mobile living during the colder seasons which were not suitable for agriculture, during which time they hunted bison (Boszhardt 2006:438)

By analyzing ceramic motifs recovered at sites, in specific settlements, periods of occupation can be determined by ceramic phase. During the Brice Prairie phase, Oneota settlements were placed on open terraces along the flood plains of the Mississippi River. During the 1400s, settlements began to move closer towards the bluff line, though river resources were not abandoned all together. Around the early 1500s settlements are situated along the bluff lines in more defensive locations rather than in open areas, reducing vulnerability to attacks. Towards the end of the century, settlements moved to strategic locations along the river (Boszhardt 1994:214).

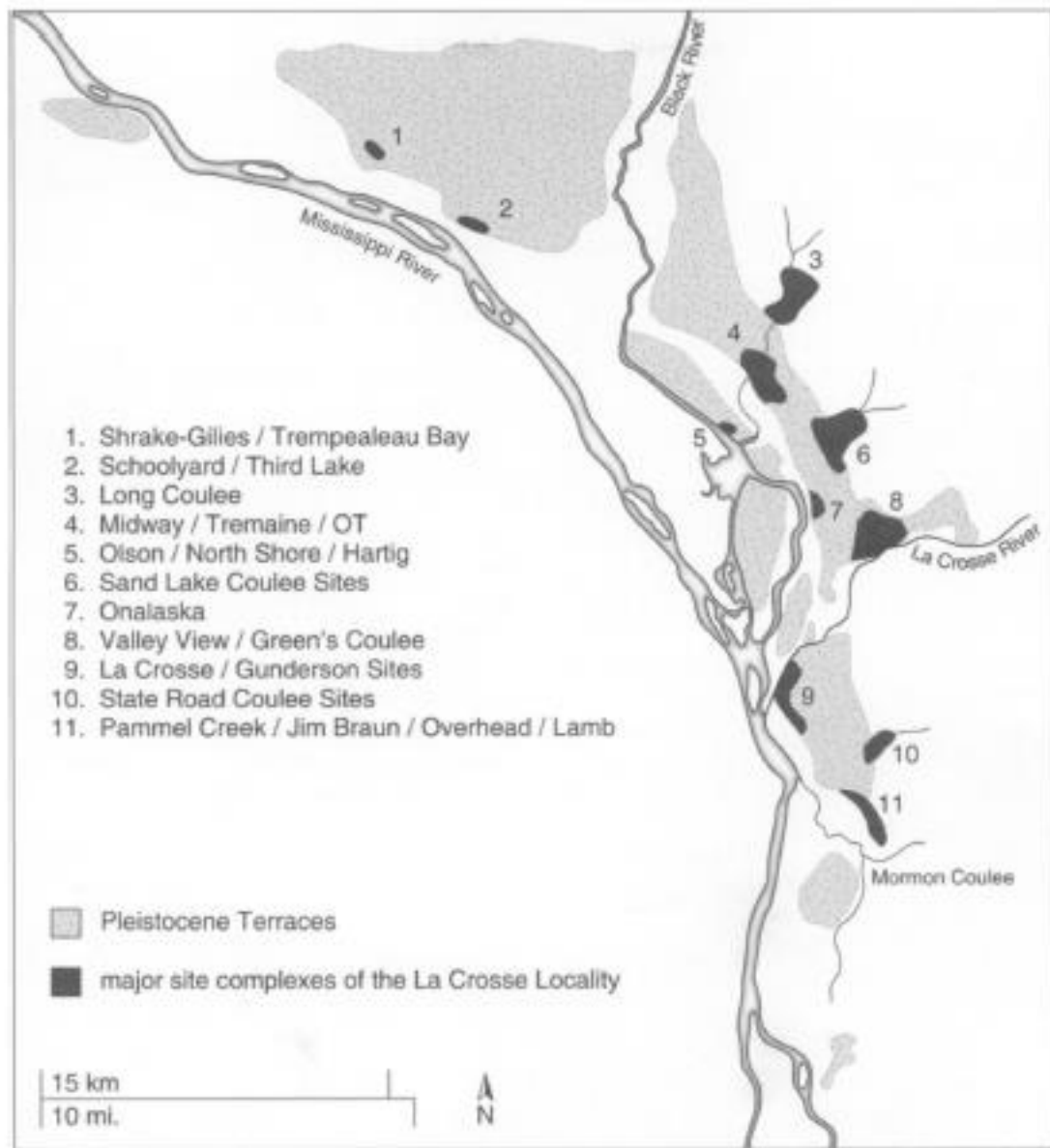


Figure 3. La Crosse locality sites. Brice Prairie through Valley View phases (O’Gorman 2010:589)

State Road Excavation

The State Road site itself is located in the southeast end of La Crosse, Wisconsin, located along a tributary of the Mississippi River where State Road Coulee begins (Figure 3) (Anderson et al. 1995:49; Boszhardt 1994:178). The area of interest, which contained a ceramic assemblage, is a midden formed from numerous disposals of unwanted cultural materials into a tributary of the

Mississippi River (Anderson et al. 1995:48). A midden can be defined as area where unwanted material remains, such as damaged lithics or pottery, are disposed of. The site was radiocarbon dated to the early sixteenth century, with a total of 43,642 Oneota shell tempered sherds and 529 grit tempered Woodland sherds recovered (Anderson et al. 1995:131.) Shoulder punctates were observed on pottery types including Valley View incised, Koshknong Bold, Midway Incised, Allamakee Trailed and a Repeating Rectangle pattern. Ten miniature ceramic vessels were recovered, classified by rims which were 10 cm in diameter. In addition, several bowls and pottery disks were recovered, which could suggest gaming pieces. One red slipped sherd was also recovered, a rare find as red-slipped wares are not common in Valley View phase pottery. Boszhardt did note that a single red-slipped sherd from a funerary vessel had been recovered at the Pammel Creek site (Lc61) of the La Crosse locality (Anderson 1995:144).

Pottery sherds recovered were placed into three categories regarding decoration and location of handles: rim decoration placement, handle placement, and placement of punctates to create a design. These categories are based off Boszhardt's (1994) requirements for a stylized Allamakee Trailed vessel and motif. Sherds which displayed a variety of these attributes were considered to represent group continuity and Oneota development through time (Anderson 1995:145). Sylistic can be defined as a design in which punctates and trail marks are equally aligned, spaced and oriented, applied with equal pressure and depth (Figure 4).



Figure 4. Alternating V. Concentric tip tool, dot punctates. Stylized. State Road, personal photo 2016. Starting on the left side of the sherd, an upright V is formed by punctates. Five trail marks are then present, with punctates forming an inverted V

Theoretical Framework

Three possibilities have been proposed by Wiessner: isochrestic, symbolic and iconological (Wiessner 1984:195, Conkey et al 1990:62). Isochrestic variation is acquired through the repeated immersion and imitation of culturally specific behavior and practices, resulting in the automatic and unconscious replication of said cultural practice. For example, if someone were to live learn from a family of potters, designs and motifs created would eventually become secondhand nature. However, human agency is an unavoidable response to expressing ones individuality, regardless the amount of cultural immersion. While pottery motifs would keep within the culture parameters, the impulse to include ones individual interpretation or signature design, is humanly inevitable.

Wiessner's second proposal is that of symbolic variation, succinctly defined as variations in symbolic behavior. "Behavioral basis in the fundamental human cognitive process of personal and social identification through stylistic and social comparison" (Conkey et al. 1990:62). Simply put, it is through symbolic variation in which people compare, ignore, imitate or create their own rendition of a particular design through individual expression, based upon social identification and comparison (Conkey et al. 1990:62; Wiessner 1994:94). i.e., variations within motifs are signatures of personality and social identification. Subtle differences identify one as belonging to a specific group or social identification within the larger community (Wiessner 1994:194).

Wiessner's third and final theory is iconological variation. This type of variation is when a design is directed towards a particular population, carrying a culturally specific message. An example would be a basic motif which is representative of a larger population, modified towards sub-sections of the larger community. Iconological variation of the motif would perhaps be a slightly different of trail marks or punctate placement and tool use in the creation designs. As such, people would be able to identify according to motif variation within the larger cultural context (Wiessner 1994:194).

Isochrestic and symbolic variation will be used to interpret the geometrical motifs in Oneota pottery as they provide opportunities for individual expression within the cultural and stylistic norms. Often seen on Oneota pottery, geometric motifs in the form of chevrons, festoons, arcs or other triangular designs are thought to be stylized representations of the tail feathers of the thunderbird (Benn 1989:243). When stylized, these chevrons and festoons are geometric substitutions for the thunderbird in its entirety, known as metonymy. "The substitution

of an attribute, effect or association of a thing”. If taking into account human agency, metonymy provided Oneota potters with unfettered opportunities for individual expression (Berres 2001:148). Ian Hodder (1992) wrote “The symbolic meanings are built upon, by association or metaphor, the material world” in reference to images being symbolic of the material world. (Berres 2001:144).

Wiessner (1994) suggests that stylist variation and social comparison are intertwined, with stylistic choices influenced by social comparison and vice versa. Stylistic variation is also a form of creating social change, as differences and similarities can generate either social solidarity or separate individuals. By creating a vessel whose motif differentiated from stylized patterns, a potter could either be identifying with a social group or asserting a self and/or familial identity. On the other hand, by creating a highly stylized motif a potter would increase group solidarity. (Wiessner 1994:194). However, because very few sherds displaying a stylized motif have been recovered, it is possible that individual and social identification was valued over increasing group solidarity.

Spiritual beliefs can be very influential, easily open to personal interpretation within or outside the group. The thunderbird was one of the more prominent symbols in Oneota culture, representing power in nature. Stylized depictions of it can be found in the various geometric motifs of Oneota vessels (Berres 2001:148). In regards to variation among punctates, each variation is an interpretation of not only symbolic culture but material culture. Young Oneota potters, immersed in a material culture which viewed the thunderbird as source of spiritual power, would be naturally inclined to portray this belief in their art, especially if the potters were family members living in the same household (Berres 2001:165). While the motifs remained

somewhat the same, due to isochrestic variation, the variation of punctates within the motif is an indication of symbolic variation, individual expression and human agency

METHODS

The first step in collecting my sample was to systematically browse through the six boxes of sherds from the State Road assemblage, all of which are kept at the Mississippi Valley Archaeology Center (MVAC) in La Crosse, Wisconsin. Before selecting a sherd to be analyzed, I established that it met the required specifications: a shoulder piece with identifiable punctates and motif or a sherd which was an entire shoulder, neck, rim and lip (Figure 1). I then drew up an Excel spreadsheet with the following categories. Punctate tool and location(s), trail mark type, tool and location, motif, rim diameter, rim height, acquisition number and handle. Before each sherd was photographed, attributes were entered into the data base. Categories for tool use were bone, dowel or stick, later narrowed to simply sharp or blunt. Additional comments were documented on loose leaf paper: personal observations and interpretations, precision of artwork, possible similarities and individual attributes such as neck height compared to shoulder curvature were all recorded. Lastly, the acquisition number and rim diameter were documented as supplementary information.

Photographic Methodology

The first round of photos was taken with a phone camera which had low resolution, though the following round were photographed at a resolution of 13 mega pixels. I emphasize this because it was the high contrast which allowed a detailed, visual analysis outside of the lab successful.

There were three basic steps in the photography process. The first was to place the sherd on a dark surface for contrast. Second, a centimeter measuring stick was placed before the piece for comparison in size. Third, a light was then shone on the sherd from an angle which would allow the camera to capture choice attributes of punctate and motif placement while also being scientifically photogenic. Subsequently, photographs were taken from several angles, all focusing on attributes I felt were important to assessing variation of both punctates and motif design.

Categorization Process

After a day at the lab sherds were sketched, shading each and ensuring that the sketch was as close to scale as possible. Everything from the exact placement and shape of punctates and trail marks were drawn. This process, a detailed and lengthy analysis, allowed me to recognize minute differences and commit to memory. Notes were taken with each drawing and acquisition number included. After this process I then spread them out on the floor, moving them around until they formed categories, or what constituted a category at that time. Note, this was the very beginning of the ceramic analysis and I had not yet created terminologies. At this point, sherds were mostly categorized by tool use. Lastly, I would enter these categories into a new Excel spreadsheet which was more formalized, using single terms to identify the attributes of a sherd rather than descriptions. This process continued for about one and a half weeks. This detailed analysis would later prove to be quite helpful, as about two months later almost 50 percent of the photographs were lost due to an over confidence in technology to automatically back up my files.

Data Recovery and Graphing

My categories and terminologies refined and confident that my photos had been backed up sufficiently for a final visual analysis, I drew up an Excel spreadsheet which would allow me to

find and graph correlations between variables and observations. However, in my over confidence in technology I had not backed them up sufficiently. As a result, a repeat, impromptu photo session of ceramic analysis was required. Fortunately, the meticulous documenting of acquisition numbers served as a works cited section in the search for the corresponding sherds, creating a streamlined process. My records of each acquisition number allowed me to recover 60 of the original 79 sherds. To ensure that I had not recorded one sherd several times I cross checked my photos, drawings, and Excel data. This data, once correctly entered, was used to find variation between tools, punctates, and motifs seen in the sample. Bar graphs were choice visuals for a quantitative representation of variations between punctates, tools used and motif.

Observations

The main observation was that punctates could be placed into three categories: tool, style of punctate, and motif. It was necessary to separate these factors because of the wide variation.

Tools used to create punctates can be classified into two categories: blunt and sharp. They type of tool used was based upon the application method of the punctate.



Figure 5. Blunt tool with conical end

http://www.conquergoodcreative.com/uploads/1/0/2/8/10288444/126019_orig.jpg



Figure 6. Conical, blunt tool punctates. Irregular. State Road. Photo taken by author 2016

It is important to recognized that the shape of punctates vary according to the method of application, not tool shape. A bunt tool would have been a stick with either conical or uneven tips (Figures 5). As wet clay is extremely malleable, blunt sticks tend to ‘tear’ into the clay, creating relatively rough and irregular edges. However, if the stick had a conical tip and equal pressure was applied when forming the punctate, a soft, rounded imprint would result (Figure 6).



Figure 7. Blunt tool. Dot/stab technique punctates. V-Filler design, irregular pattern.
Photo taken by author 2016

Sharp tools were determined by a clean slice through the clay. Possible tools used in this manner are small animal bones, such as bird or fish, which had been filed down. Flint knapping debitage or sticks with a tapered tip are equally possible. As clay tends to mimic the shape of the tool used, ‘finger prints’ are left behind. If the potter was observant or dedicated, they would have recognized that sharper instruments such as bone or flint knapping debitage create cleaner punctates and trail marks. Even so, the finest of sharp tools could be used to create irregular punctates, trail marks or motif. (Figure 11). For a close comparison of a filed bone and a sharpened stick, see Figures 8 and 11.



Figure 8. Stylized example of bone/sharp tool incisions. Tear drop punctates. Irregular. State Road. Photo by Author 2016

Punctates

Punctates were not restricted particular motif or tool, easily modified with tool choice and application method. Depending on the method of application, punctates fit into one of three styles: teardrop, bird track or dot/stab. More importantly, tools were often interchanged between punctate and trail marks on the same vessel. As motifs tend to display particular punctates more often than others, when categorizing punctates it is essential to focus on the application method rather than motif and shape.

A teardrop stylized punctate is described as the shape formed when a tool pierces the clay from a downward angle, gradually pulling upwards to form an oval (Figure eight). Variations are seen in figures 10 and 11. The second type of punctate, bird tracks, can be best described as thin, elongated and oval depressions which are tapered at each end (Figure nine). While the length can vary, the main attributes placed these punctates in a category separate from tear drops. Last of all, the dot/stab punctate is a depression in the clay which resembles a rounded hole (Figures six and seven) This punctate can be jagged such as figure seven, or smooth and oval-shaped (Figure six).



Figure 9. Bird track punctates, tapered tool. Repeating Rectangle motif. Irregular design and pattern. State Road. Photo by author 2016

Motifs

Three motifs based upon punctates were observed in this analysis: Repeating Rectangle, Alternating V, and V-Filler/Chevron. The V-Filler/Chevron and Alternating Triangle motifs are relatively similar, as they use the same basic pattern of punctates, creating a 'V' followed by trail marks. The most common pattern of a punctate zone is six, seven, five, four, four, three, two, two, one followed by nine trail marks to form a notched chevron, at which time this design repeats itself (Figure 10). However, there are many circumstances in which this pattern deviates (Figures 12 and seven). The Alternating V follows a similar pattern to the V-Filler/Chevron. The punctates zones themselves alternate between an inverted triangle, followed by five trail marks, and an upright triangle (Figure four)



Figure 10. Tapered tool. Teardrop punctates. Allamakee Trailed V-Filler/Chevron motif. Stylized design. State Road. Photo by author 2016



Figure 11. Allamakee Trailed V-Filler motif, tapered tool and teardrop punctates. Irregular design. State Road. Photo by author 2016.

A stylized Repeating Rectangle motif can be recognized by a row of punctates in the repeating pattern of four across, with nine trail marks separating each punctate column (Figure 12). How

far down the shoulder this pattern continues has yet to be determined. Variations between stylized and irregular punctate motifs (figures seven and nine) were calculated in accordance to the category belonged to. While the motif is uncommon, attributes of the Repeating Rectangle are described by Anderson et al. and Boszhardt 1995.



Figure 12. Repeating Rectangle motif. Dowel tool, dot punctate. Stylized. State Road.
Photo by author 2016

RESULTS

Numbers of Punctate Columns by Motif

Table 1. V-Filler design. Comparison of punctate columns per zone in stylized versus irregular including tool used and punctate choice

Sherd Number	Rows of punctates	Columns	Alignment	Tool	Punctate
1	? , 6, 5, 5, 4, 3, 3, 2, 2, 1	10	irregular	sharp	dip-drag
2	6, 5, 4, 4, 3, 4, 2, 2, 1	9	stylized	sharp	tear drop
3	? 6, 6, 6, 5, 5, 4, 4, 3, 3, 2, 2, 1	13	irregular	sharp	dip-drag
4	7, 6, 6, ?????	5	stylized	sharp	tear drop
5	? , ? 8, 6, 6, 5, 4, 3, ????	8	stylized	sharp	tear drop
6	8, 7, 6, 5, 4, 4, 3, 2, 1	9	stylized	sharp	tear drop
7	6, 5, 3, 4, 4, 3, 2, 1, 1	9	irregular	sharp	tear drop
8	6, 5, 4, 4, 3, 3, 2, 1	8	irregular	sharp	tear drop
9	6, 7, 6, 5, 5, 5, 5, 4, 4, 3, 2, 1	12	irregular	sharp	tear drop

Table 1 explains the correlation between punctate columns and rows within the V-Filler design and variation between stylized and irregular punctate zones in relation to tool and punctate choice. Significantly higher proportions of tear drop punctates are stylized, the favored punctate in V-Filler/Chevron motifs. Stylized tear drop punctates are formed with a sharp tool and typically have columns between nine and eight. The punctate pattern typically begins at seven across, though there is some variation (e.g. sherd six). Dip-drag punctates are commonly found in irregular V-filler designs, shreds one, three and five, all of which display a relatively common of pattern punctates per row and column. These punctates are formed in the relative pattern of six, five, five, four, four, three, two, one with 10 to 13 punctate columns. To summarize, punctate zones with lower numbers of columns consist of stylized tear drop punctates of nine columns and punctates in rows of six, five, four, four, three, two, two, one.

Table 2. Repeating Rectangle motif. Analysis of punctates in regards to rows versus columns, and alignment, tool and punctate choice.

Sherd Number	Rows of punctates	Columns	Alignment	Tool	Punctate
1	3	4	irregular	blunt	stab
2	4	2	irregular	conical/blunt	dip-drag
3	4	2	irregular	conical /blunt	dip-drag
4	2	4	irregular	sharp	tear drop
5	3	3,4,5	irregular	sharp	bird tracks
6	2	2	irregular	sharp	bird tracks
7	4	2	irregular	conical/blunt	dip-drag
8	4	4	stylized	conical/blunt	dot

Table 2 is representative of the Repeating Rectangle motif and the variation between punctates, rows and stylized versus irregular alignment. Tool use and the type of punctate is also addressed. The most common punctate pattern in the Repeating Rectangle motif is four rows of punctates across and two columns down with an irregular alignment. With the exception of one sherd, all pieces have four columns, are of irregular in alignment and created with a conical/blunt tool

Tool Use Examined by Motif

Figure 13 demonstrates differences in the use of blunt tools between Repeating Rectangle and V-Filler/Chevron motifs. Results demonstrate that regardless of tool choice, motifs tend to be equally stylized and irregular. In addition, it demonstrates how the V-Filler design, the punctate element of a V-Filler/Chevron motif, is favored.

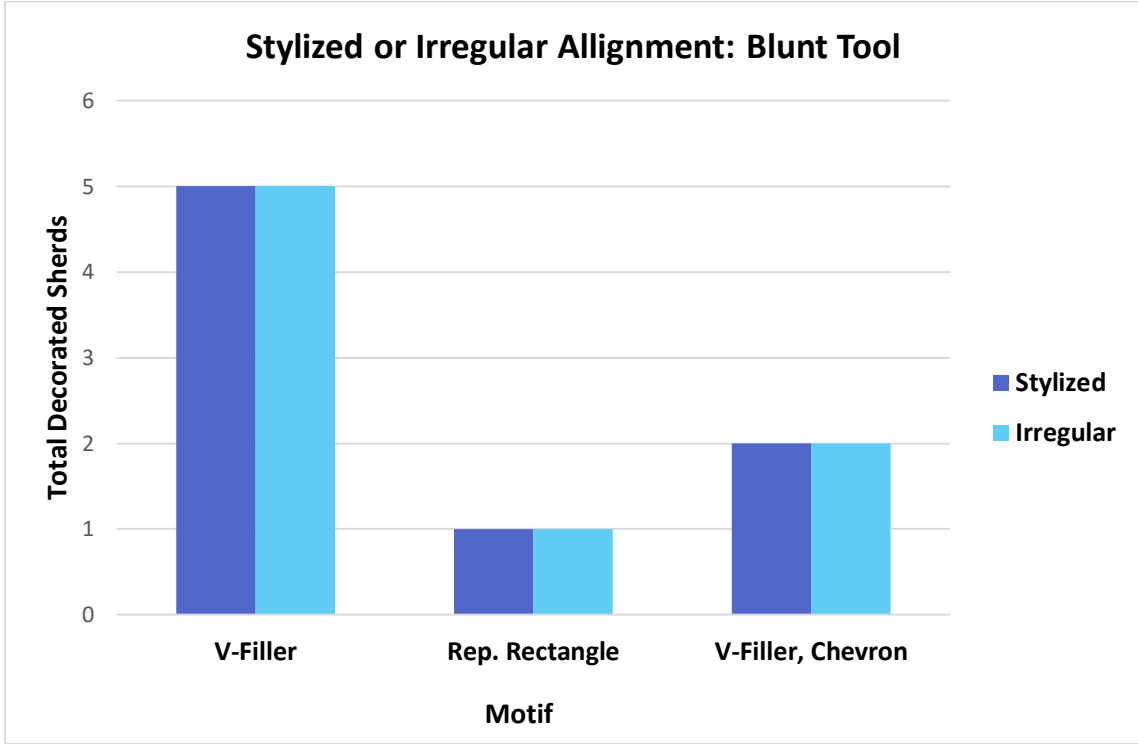


Figure 13. Comparison of stylized and irregular sherds with punctates and motif design (e.g. figures 9 and 12).

Figure 14 explains how often sharp tools are used between motifs and the amount of stylized or irregular motifs present across the sample. All motifs being equally stylized or irregular in design, with sharp tools rarely being used to create a Repeating Rectangle or Alternating V motif. Finally, while the V-Filler design is created most often with a sharp tool, use of such a tool in the creation of a Repeating Rectangle or Alternating V motifs is either rare or obsolete.

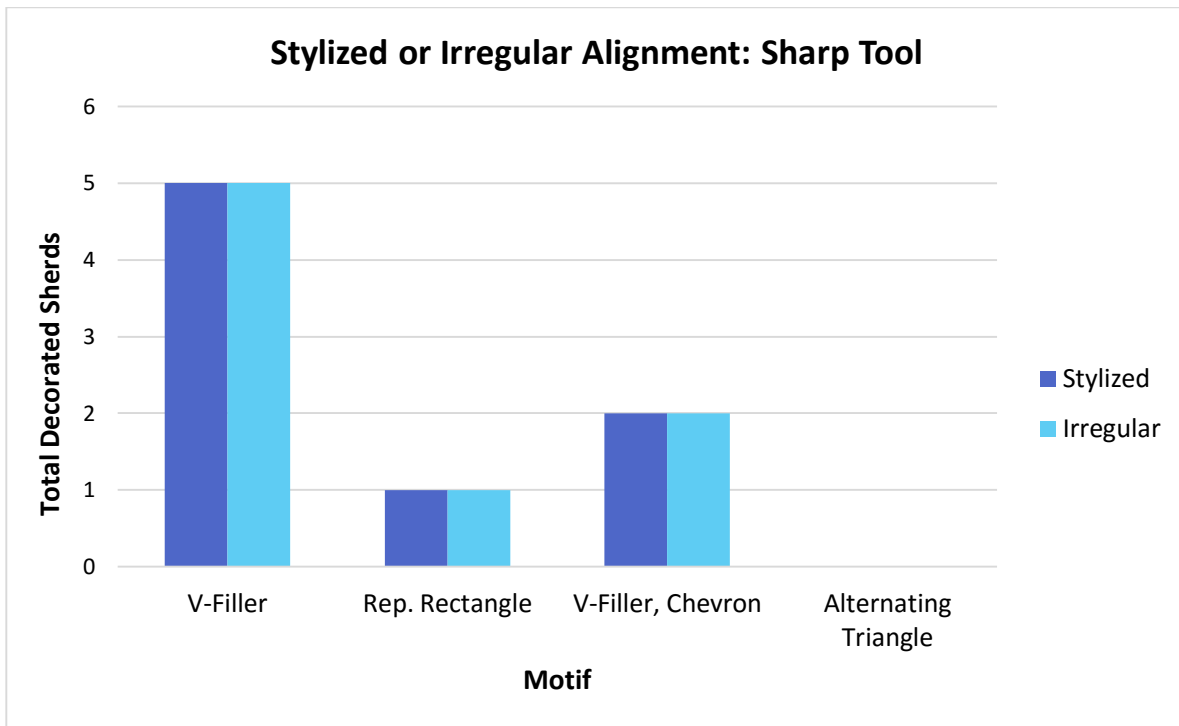


Figure 14. Comparison of stylized and irregular punctates created by a sharp tool in association to motif and design

Figure 15 displays how tool use, or choice, varies in punctate choice and motif. In general, there is a high amount of variability with the exception of the dot/stab punctate, in which stick and dowel tools are used equally. However, in the case of dip-drag and tear drop punctates there are

high amounts of variation in tool choice, indicating a high amount of individual expression between tool use and punctate choice.

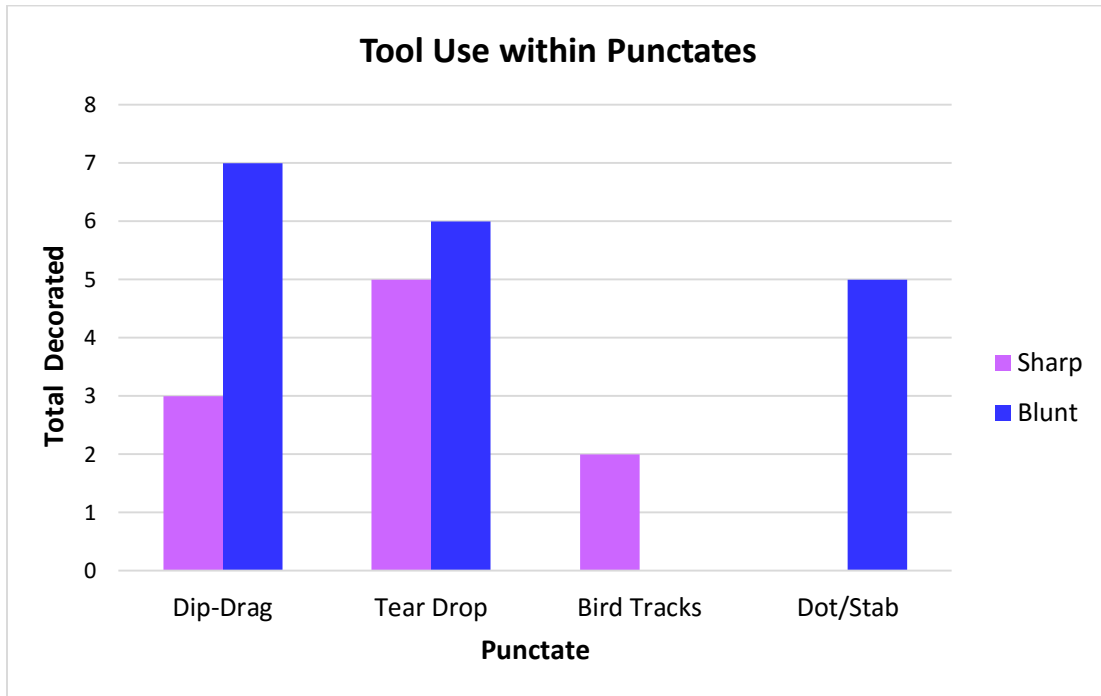


Figure 15. Comparison of variation of tool used and type of punctate

Quantitative Results Summary

Figure 16 is a comprehensive expression of the thesis question. Each motif tends to have a distinct pattern in tool choice and use. The V-Filler design is created almost equally with blunt and sharp tools with equal stylized and irregular alignment throughout tool choice. Conversely, Repeating Rectangle motifs are often formed with a blunt tool, with irregular in alignment. V-Filler/Chevron motifs are equally stylized and irregular when formed with a sharp tool, although punctates are less uniform when a blunt tool is used. Lastly, Alternating V motifs are only created blunt tools.

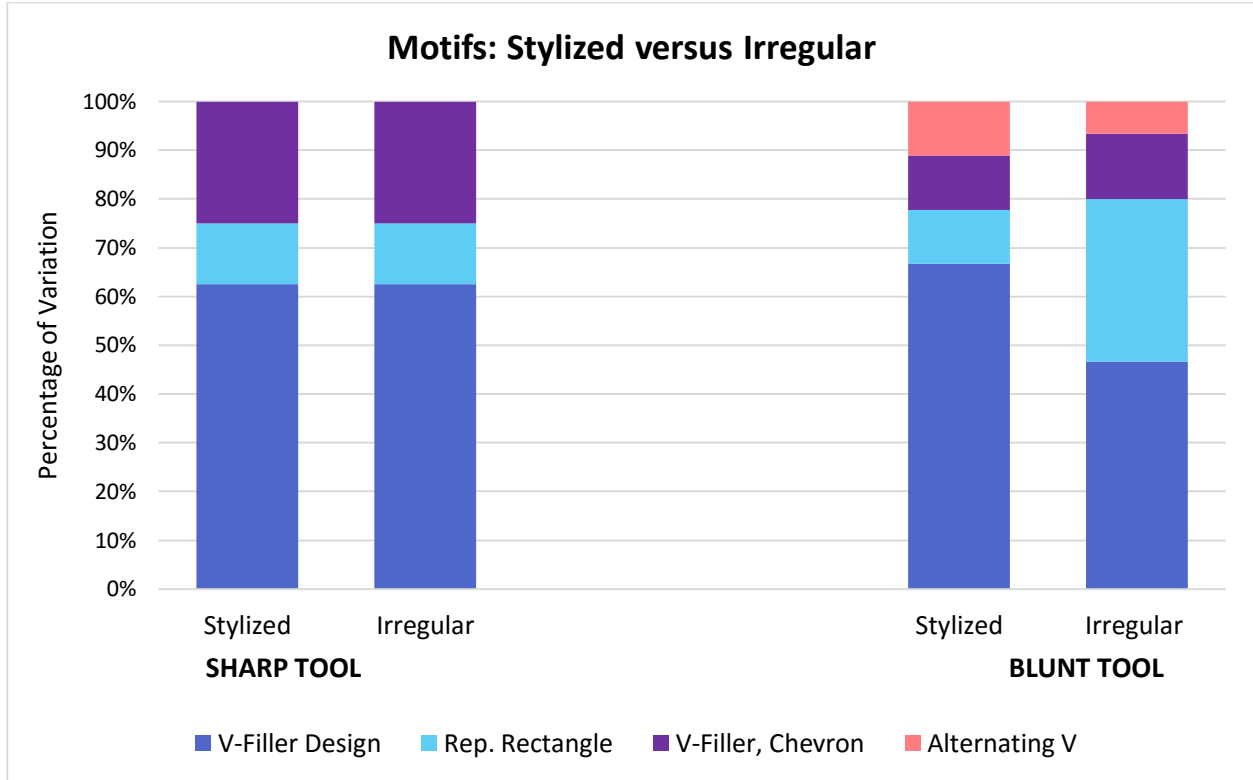


Figure 16. Comparison of motifs and tool by stylized or irregular alignment

Figure 17 is a comparison between tool use of stylized versus irregular design in rim sherds. The majority of rim punctates are irregular, incised and formed by a blunt tool. A comparison of all rim punctates of stylized versus irregular design indicates that potters often created irregular rim designs with sharp, blunt or fingernail tools. Punctates formed by fingertips were the exception, almost consistently created in a stylized fashion. Punctates formed by fingertips or nails were not only uncommon but specific as to irregular or stylized. To summarize, there is very little variation between choice in sharp or blunt tools in punctate formation.

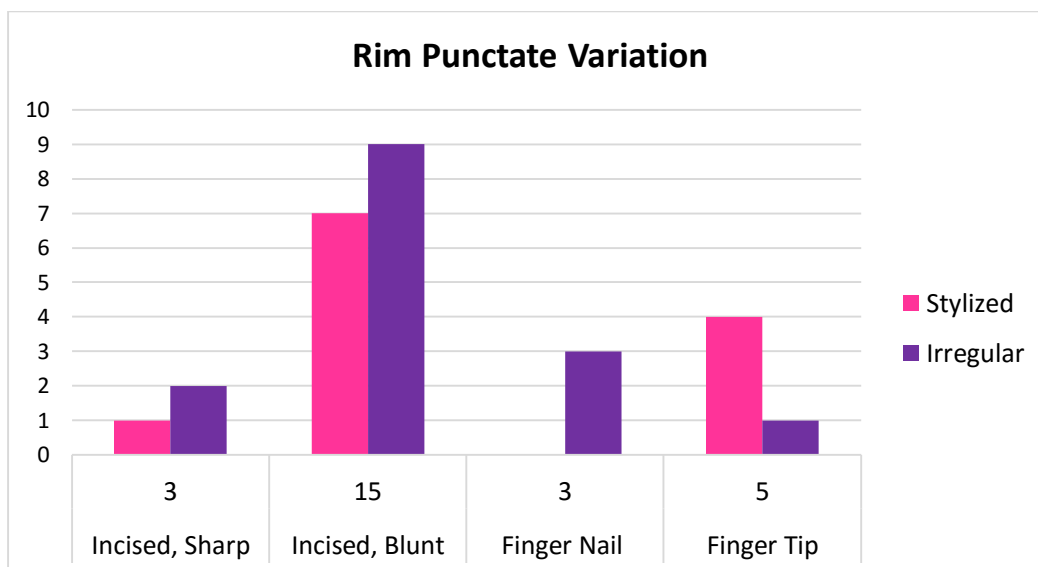


Figure 17. Comparison of tools and stylized versus irregular design on rims. Fingertip punctates have the highest variability, more often stylized. Incised, blunt punctates are more common, though have little variability between stylized or irregular pattern.

Discussion of Graphs

The graphs above are representative of the variation between tools, punctates and motifs using the terms ‘stylized and irregular’ to provide a clear background for the amount of variability within a theme or graph. The noticeable variations between the use of blunt and sharp tools, particularly regarding motif and style. Blunt tools were never used in the making of V-Filler/Chevron motifs, and sharp tools were rarely used in the making of Repeating Rectangle motifs. Only one sherd with a Repeating Rectangle motif has sharp tool punctates. Alternatively, V-Filler/Chevron motifs (figure 11) were frequently created with sharp tools, although a blunt tool was occasionally used. Furthermore, sharp tools are most commonly used in creating a motif with a V-Filler design. Variation in rim and shoulder punctates are of equal importance as they two have favored tools. Rim punctates are commonly made with a blunt stick or fingertip, though a finger nail is occasionally used in place of a sharp stick (Figure 17).

Qualitative Observations of Individual Expression within Motifs

The Repeating Rectangle motif is defined by a rectangular pattern of four punctates across, continuing down through the shoulder. Nine trail marks are then present, the rectangle pattern repeating (Figure 12). The same tool is used for punctates, trail marks and handle punctates. Conical, blunt tools are frequently used in this motif (figure six) though there are a few sherds which vary in tool and punctate choice (Figure seven). Not only is it irregular, but a sharp tool is used to form bird tracks punctates, rather than the common dip-drag or dot. Most importantly, individual expression can be seen through trail marks which are soft finger depressions. To emphasize these variations, the loop handle is decorated with finger trails. Altogether, figure eight is a contradiction to the stylized pattern which constitutes a Repeating Rectangle motif. Not only were separate tools used for punctates and trail marks but handle decoration is in the form of finger trails rather than punctates.

V-Filler/Chevron motifs typically have little variability in tool and punctate choice, frequently displaying stylized punctates (Figure 10). To the contrary, the V-Filler design has an equal amount of variability within stylized and irregular alignment, often formed with a sharp tool, with blunt tools being used as a substitute. Sharp tools often created teardrop punctates, whereas dip-drag punctates were formed by blunt tools. This difference between tool use and punctates can be seen as an attempt to create teardrop punctates with a blunt tool in place of a sharpened tool with a tapered end. While the application method is identical, the punctate formed may be dependent on the tool selected.

V-Filler Design

Tool use determines how a punctate is applied. As seen in figures four and six, Alternating V punctates follow a pattern form an inverted or upside down triangle, applied in a strict pattern across in which punctates never overlap. They continuing equally spaced and aligned until the final punctate, forming the tip of the triangle. This pattern can be formed ‘correctly’ in one of two ways. The first is a column of punctates from left to right, creating a **V**. This technique can be seen by as a slight pull from the left corner of the punctate, creating an angled punctate by tool was drawn through the clay, forming dip-drag punctates (Figure 11). Tear drop punctates on are formed by applying punctates straight across, forming a **V** of punctates as it narrows inwards (Figure 10). There is less of a drag through the clay but the clean incision of a finely sharpened tool. Various reasons why someone may choose one tool or punctate over the other, as to whether if it was a pre-designated pattern for novices or experts, I cannot confidently state, as irregular designs can easily be mistaken for inexperienced potters.

In the V-Filler design, the punctate **V** zone is placed between trail marks. The stylized version of such a design is punctate zones forming rows in a relative fashion of eight, seven, six, five, four, four, three, two, two, one. The nine trail marks on either side are typically angled to form a notched chevron, with a new **V** pattern repeating. Dip-Drag and teardrop punctates have a high variability in tool choice, while dot/stab punctates have equal amounts of variability among blunt tools, though sharp tools were never used. To create a bird track punctate, only sharp tools were used. giving this motif an almost uniform choice in variation of tool choice. Teardrop punctates are defined by the method of application, not tool. A stated above, the tool used must come in at a downwards angle, piercing the top of the punctate then pulling softly upwards. Tear drop punctate are favored in V-Filler/Chevron motifs, as defined by a V-Filler design which is

then surrounded on either side by a notched chevron. Trail marks are typically seven to nine in number on either side of the chevron. A V-Filler design marks the beginning of a new chevron. To summarize, punctates typically form a relative V shape, though this sherd has quite the variation in placement of punctates. Trail marks on either side are made with a thin, blunt stick.

Rim Decoration

The differences in rims decoration can be seen through the method used. As clay is extremely sensitive to even the slightest pressure, capturing the slightest details, each tool leaves a signature. A fingernail incision will be thin with a slight curvature, usually to the left. Sharp stick incisions may also be thin, though less of a clean cut but a slight depression in the clay. Most importantly, the deciding factor between categorizing an incision as either ‘finger nail or sharp stick’ was the presence of a soft depression to the left of the incision, assuming the potter was right handed. If the potter was left handed, the incision would curve to the right, with a soft depression right of the incision.

There is little variability in whether punctates were placed on lip-top or interior of the rim (Figure 17). Only sharp tools were used to create incisions or depressions on the interior of the rim whereas the majority of tools used for lip-top punctates are blunt sticks and fingertips. There is the exception of vessels with the V-Filler/Chevron motif which have a rim diameter of 12 to 15 centimeters, in which the vessel is almost guaranteed to have interior rim punctates. The type of tool used to make punctates and trail marks are regularly used on lip top or rim punctates. In particular, a pot decorated with a conically tipped, blunt tool would have rounded impressions on the rim and handle (Figure 5).

Shoulder Decoration

Shoulder punctates are relatively equal in tool use, though tool use for dot/stab and bird track punctates are the exception. Sharp tools use only used in creating bird track punctates, while dot/stab punctates are created only by blunt sticks. It is this relationship between the tool(s) used for the shoulder punctate, trail marks and rim punctates or incisions which is quite intriguing. Quantitatively, the same tool is used for both shoulder punctates and trail marks, with finger tips and blunt sticks tend to predominate lip-top decoration. The exception is when a sharp stick is used for a V-Filler or V-Filler/Chevron, with conical, blunt depressions being the least common with the exception of Repeating Rectangle motifs. Vessels which have only trail marks for a design were created with a blunt tool.

Overview of Quantitative Variation

V-Filler/Chevron motifs are equally varied in design, though this can be disputed because the numerical pattern of punctates varies between sherds. Repeating Rectangle motifs are commonly irregular, though this could be a discrepancy due to the small selection within more popular ones such as the V-Filler design. The Alternating V motif is found only twice in this entire sample, organized in formation, with conical, blunt tool used in the application method. This variation between shoulder and rim punctates, tool use, style and motif choice calls into question why the variation in types of punctates; why are some tool and motifs preferred over others?

DISCUSSION

It is very important to recognize the differences between results from graphs, and visual observations. Graphed results, numerical in essence and design, illustrate variations between numerical variables, such as tool use and motif choice or tool use and punctate choice. While this information could be extremely valuable in future studies regarding numerical attributes, it does not capture the human aspect. Despite these differences, the central theme of this thesis relies on understanding how numbers, graphs and the result section, and visual analysis contribute equally to understanding punctate variation and human agency as individual expression.

By summarizing what each graphs represented three main themes appeared, all of which revolve around human agency (Figure 16). Numerically, it indicates a high amount of variability between tool use and punctate choice. However, when these results are taken out of their numerical context, it is evident that people either did not feel the need to conform to Oneota pottery standards or that individual expression was encouraged. Regardless, it is well known fact that while people tend to follow cultural patterns there are times when someone choses to diverge from the mainstream population, or regular routine. This divergence from the mainstream, or stylized, can be seen in the various techniques and rendition used in designing single motif.

The next insight to variation among punctates is the close correlation between the choice of punctate and motif (Figures 13 and 14). A comparison of the graph immediately indicates that while there is plenty of variation among punctates and motif, each motif also exhibits a

preference towards a particular punctate, if not tool. To find the human aspect of this, erase this image from your mind, instead focusing on the similarities of between figures six and seven.

Punctates found in the Repeating Rectangle are either dip-drag or dot, with a dowel being the only tool used. The only exception to this is one sherd which has bird track punctates, formed by a bone tool, with the motif itself deviating considerably outside of the stylized pattern of punctates, trail marks and handle decoration (Figure nine). In fact, the only aspect in which it conforms to a stylized Repeating Rectangle motif (figure 12) is the tapered loop handle, attached just below the rim.

Culture is learned from those around us, and with that material culture and traditions passed on. Using this example, one can see that when in creating the art the extent of the imagination is endless, at times going beyond the parameters of the social and cultural norm. However, because State Road was probably created around the beginning of the 16th century and the Oneota left the La Crosse area around A.D. 1625, it is possible that there was very little group continuity, which is defined as lengthy occupation in which group stability is created and ceramic designs change with time. (Anderson et al. 1995:51; Boszhardt 1994:176). While there were plenty of opportunities for potters to add variety to their designs, and did, it is because of a possible lack in group continuity that specific motifs were designed more often with specific punctates and tool use. While punctates varied, they did so in application method and organization, essentially giving them an ‘organizational variability’ to them.

CONCLUSION

Punctate variability among Oneota ceramics at State Road was dependent on individual expression, even though it is possible that there was a lack of group continuity. The quantitative results from the graphs reveal distinct patterns in variation among motifs, tool use and punctate choice. These results are extremely helpful during visual analysis as one can easily become confused and agitated by the overwhelming amount of visual information before them. However, this does not mean that visual analysis does not have its validity. To the contrary, visual analysis is quite complimentary by providing visuals of punctates, or qualitative results, to the numerical analysis of variation within punctates. By combining these results, individual expression can be substantiated on both a numerical and observational level.

Individual expression as seen through symbolic and isochentric variation, specifically in artwork or material culture, is not a new concept. Centuries before the Oneota, people were expressing their individuality through illustrations of bison hunts, depictions of deities, gods or visions, even creating hand prints on cave walls. The fact that the Oneota choose to do so through pottery is a completely natural behavior, one which should not be seen as childish or random modifications in 'normal' Oneota pottery. The variations seen within punctates demonstrate a desire to push beyond conventional motifs, to explore the possibilities of personal, if not familial, preferences when designing a motif.

Of all the images offered in this thesis, not one begins to touch upon the incredible amount of variation found within a single sherd, regardless of its size. If possible, I would submit a portfolio of every image I have photographed, sketched or saved on my laptop in the attempt to

document the incredible amount of variation in punctates in Oneota pottery. Even then, it would represent less than 25 percent of possible variation among motifs, an observation which, if pursued, could reveal extraordinary results and insight into the material culture of the Oneota.

WORKS CITED

Anderson, Adrain., Allen Westover., Terrance Martin, Mathew Murray, Susan Myster, Barbara O'Connell, L. Anthony Zalucha.

1999 The State Road Coulle Site. 47 LC 176. In *The Wisconsin Archaeologist*. 1995 76 (1-2):48 – 230

Benn, David

1989 Hawks, Serpents and Birdmen. Emergence of Oneota Mode of Production. *Plains Anthropologist*. 34 (125): 233-260.

Berres, Thomas

2001 Thunderbird Symbolism and Material Culture. In *Power and Gender in Oneota Culture: A Study of Late Pre-Historic People*. Northern Illinois University Press, DeKalab, Illinois

Boszhardt, Robert

1994 Oneota Group Continuity at La Crosse. The Brice Prairie, Pammel Creek and Valley View Phases. In *The Wisconsin Archaeologist*. 75 (3 – 4): 173 – 236

2008. Shell Tempered Pottery From the Upper Mississippi Valley. *Southeastern Archaeology: Shell Tempered Ceramics in the Eastern Woodlands*. 72 (2):193 - 201

Christine Hashorf., Margret Conkey

1990 Stylistic Variation among the American Southwest. In *New Directions in Archaeology. The Uses of Style in Archaeology*, chp. 7. Cambridge University Press, Cambridge, New York.

Gallagher James., Robert F., Boszhardt., Robert F. Sasso., Katherine Stevenson

1985 Oneota Ridged Field Agriculture in Southwestern Wisconsin. *American Antiquity*. (50) 3: 605-612

Gibbon, Guy

1969 The Walker-Hooper and Bornick Sites – Two Grand River Phase Oneota Sites in Central Wisconsin. Ph. D dissertation, Department of Anthropology, University of Wisconsin, (*city not given*)

1972 Cultural Dynamics and Development of the Oneota Way-of-Life. *American Antiquity*. 37 (2): 166 – 185

Jirasek, Rachel., Constance Arzigian

2002 Stylistic and Visual Pattern within Oneota Pottery. Department of Sociology/Archaeology: 281 – 300

Overstreet, David

1995 The Eastern Wisconsin Oneota Regional Continuity. In *Oneota Archaeology. Past, Present and Future*, edited by William Green, pp: 33-64. State Historical Society of Wisconsin, Office of the State Archaeologist University of Iowa, Iowa city.

Stevenson, Katherine

1985 Oneota Subsistence Related Behavior in the Drift-less Area: A Study of the Valley View Site at La Crosse, Wisconsin. Ph. D. dissertation, Department of Anthropology, University of Wisconsin, Madison

Theler, James., Robert Boszhardt

2003 Twelve Millennia Archaeology of the Upper Mississippi River Valley. University of Iowa Press, Iowa City

2006 Collapse of Crucial Resources for Culture Change: A Model for the Woodland to Oneota Transformation in the Upper Midwest. *American Antiquity*. 71 (3): 433 – 472

Wiessner, Polly

1994 Reconsidering the Behavioral Basis for Style – A Case Study of the Kalahari San. *Journal of Anthropological Archaeology*. 3: 190 - 234

Wood, Raymond W.

1962 A Stylistic and Historical Analysis of Shoulder Pattern on Plains Indian Pottery.
American Antiquity. 28 (1): 25

http://www.conquergoodcreative.com/uploads/1/0/2/8/10288444/126019_orig.jpg

APPENDIX

Legend

Red, italicized: sherds to be used or referenced to for prime example

Black: sherds sampled meant only for general reference

Un. Dec: Undecorated sherd

	SHOULDER PUNCTATES					RIM PUNCTATES			
Sample	Tool	Style	Motif	Stylized	Tool	Style	Motif	Stylized	
1	bone	dip-drag	V-Filler	NO	bone	sharp	n/a	NO	
2	n/a	n/a	n/a	n/a	finger tip	depression	n/a	YES	
3	n/a	n/a	n/a	na	finger tip	depression	n/a	NO	
4	bone	dip-drag	V-Filler	YES	stick	sharp	n/a	NO	
5	n/a	n/a	n/a	n/a	stick	blunt	n/a	NO	
6	n/a	n/a	n/a	n/a	stick	blunt	n/a	NO	
7	n/a	n/a	n/a	n/a	finger tip	depression	n/a	YES	
8	stick	dip-drag	V-Filler	NO	stick	blunt	n/a	NO	
9	stick	dip-drag	V-Filler	YES	stick	blunt	n/a	NO	
10	n/a	n/a	n/a	n/a	dowel	depression	n/a	YES	
11	bone	bird tracks	Rep. Rec.	YES	stick	blunt	n/a	NO	
12	n/a	n/a	n/a	n/a	stick	blunt	n/a	NO	
13	dowel	dip-drag	Rep. Rec.	YES	stick	blunt	n/a	NO	
14	dowel	dip-drag	V-Filler	NO	dowel	depression	n/a	NO	
15	bone	dip-drag	Rep. Rec.	NO	n/a	Un. Dec	n/a	YES	
16	bone	tear drop	V-Filler	YES	bone	sharp	interior	NO	
17	n/a	n/a	n/a	n/a	dowel	blunt	n/a	YES	
18	bone	teardrop	V-Filler	NO	stick	blunt	interior	YES	
19	n/a	n/a	n/a	n/a	finger tip	depression	n/a	NO	
20	dowel	dot	Rep. Rec.	YES	dowel	depression	n/a	YES	
21	n/a	n/a	n/a	n/a	finger tip	depression	n/a	YES	
22	n/a	g	n/a	n/a	finger tip	depression	n/a	YES	
23	bone	teardrop	V-Filler	YES	finger nail	sharp	interior	YES	
24	n/a	n/a	n/a	n/a	finger nail	depression	n/a	NO	
25	stick	dip-drag	V-Filler	YES	n/a	n/a	n/a	n/a	
26	stick	dip-drag	V-Filler	YES	n/a	n/a	n/a	n/a	
27	bone	teardrop	V-Filler	YES	n/a	n/a	n/a	n/a	
28	n/a	n/a	n/a	n/a	stick	blunt	n/a	NO	
29	bone	tear drop	V-Filler	YES	n/a	n/a	n/a	n/a	
30	stick	dot	V-Filler	NO	n/a	n/a	n/a	n/a	
30	dowel	dip-drag	V-Filler	YES	finger nail	sharp	n/a	YES	
31	stick	stab	Rep. Rec.	YES	n/a	n/a	n/a	n/a	
32	n/a	n/a	n/a	n/a	finger nail	sharp	n/a	NO	
33	dowel	dot	Rep. Rec.	YES	stick	sharp	n/a	YES	
34	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

35	n/a	n/a	n/a	n/a	finger nail	sharp	n/a	NO
36	stick	dot	V-Filler	NO	n/a	n/a	n/a	n/a
37	n/a	n/a	n/a	n/a	stick	sharp	n/a	NO
38	n/a	n/a	n/a	n/a	stick	blunt	n/a	NO
39	bone	tear drop	V-Filler	YES	n/a	n/a	n/a	n/a
40	bone	bird tracks	V-Filler	NO	n/a	n/a	n/a	n/a
41	stick	stab	V-Filler	NO	n/a	n/a	n/a	n/a
42	dowel	dot	V-Filler	NO	n/a	n/a	n/a	n/a
43	n/a	n/a	n/a	n/a	finger tip	depression	n/a	YES
44	stick	dot	Rep. Rec.	YES	finger nail	sharp	n/a	NO
45	n/a	n/a	n/a	n/a	finger tip	depression	n/a	YES
50	dowel	dot	Rep. Rec.	NO	finger tip	depression	n/a	YES
51	stick	tear drop	V-Filler	YES	bone	sharp	interior	YES
52	bone	teardrop	V-Filler	NO	n/a	n/a	Un. Dec	YES
53	dowel	dip-drag	Rep. Rec.	YES	finger tip	depression	n/a	YES
54	dowel	dot	Inverted V	YES	stick	blunt	n/a	YES
55	stick	teardrop	V-Filler	YES	bone	sharp	interior	NO
56	stick	dip-drag	V-Filler	NO	stick	blunt	n/a	NO
57	stick	tear drop	V-Filler	YES	bone	sharp	interior	YES
58	n/a	n/a	n/a	n/a	finger tip	sharp	n/a	NO
59	n/a	n/a	n/a	n/a	n/a	n/a	Un. Dec	YES
60	n/a	n/a	n/a	n/a	n/a	n/a	Un. Dec	YES
61	n/a	n/a	n/a	n/a	finger tip	depression	n/a	NO

	HANDLE PUNCTATES				TRAIL MARK			
Sam ple	Tool	Stylized?	Motif	Stylized	Tool	Motif	Stylized ?	
1	n/a	n/a	n/a	n/a	bone	V-Filler	NO	
2	n/a	Un. Dec.	n/a	n/a	n/as	n/as	n/a	
3	n/a	Un. Dec.	n/a	n/a	stick	Verticl e	YES	
4	n/a	n/a	n/a	n/a	stick	V-Filler N. Chevro n	YES	
5	n/a	n/a	n/a	n/a	finger tip	Verticl e	NO	
6	n/a	Un. Dec.	n/a	n/a	stick	Notche d	YES	

	HANDLE PUNCTATES				TRAIL MARK		
						Chevron	
7	n/a	n/a	n/a	n/a	stick	Angled	NO
8	n/a	n/a	n/a	n/a	stick	V-Filler	YES
9	n/a	n/a	n/a	n/a	stick	V-Filler	NO
10	n/a	n/a	n/a	n/a	dowel	Chevron	YES
11	n/a	n/a	n/a	n/a	bone	Rep. Rectangle	YES
12	blunt	TM: Verticle	n/a	YES	bone	Verticle	NO
13	n/a	n/a	n/a	n/a	dowel	Rep. Rectangle	YES
14	finger	TM: Verticle	n/a	YES	stick	V-Filler	NO
15	finger	TM Verticle	n/a	NO	finger tip	Rep. Rectangle	NO
16	<i>finger tip</i>	<i>depressions</i>	<i>n/a</i>	<i>YES</i>	<i>stick</i>	<i>V-Filler</i>	<i>NO</i>
17	n/a	n/a	n/a	n/a	bone	Chevron	NO
18	n/a	n/a	n/a	n/a	bone	V-Filler, Chevron	YES
19	n/a	n/a	n/a	n/a	finger tip	Verticle	NO
20	<i>blunt</i>	<i>verticle</i>	<i>V-Filler</i>	<i>YES</i>	<i>dowel</i>	<i>Rep. Rectangle</i>	<i>YES</i>
21	n/a	n/a	n/a	n/a	stick	Chevron	NO
22	n/a	n/a	n/a	n/a	stick	Verticlr	NO
23	finger tip	depressions	n/a	YES	stick	V-Filler	NO
24	n/a	n/a	n/a	n/a	stick	Chevron	NO
25	n/a	n/a	n/a	n/a	stick	V-Filler N. Chevron	NO
26	n/a	n/a	n/a	n/a	stick	V-Filler	NO
27	n/a	n/a	n/a	n/a	stick	V-Filler	YES

	HANDLE PUNCTATES				TRAIL MARK		
28	n/a	Un. Dec.	n/a	n/a	stick	Verticle	NO
29	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30	n/a	n/a	n/a	n/a	stick	V-Filler	NO
30	dowel	verticle, dip-drag	Rep. Rec	NO	dowel	V-Filler	YES
31	n/a	n/a	n/a	n/a	finger tip	Verticle	YES
32	n/a	n/a	n/a	n/a	stick	Angled	NO
33	n/a	n/a	n/a	n/a	stick	Verticle	NO
34	stick	teardop	Rep. Rec	YES	n/a	n/a	n/a
35	n/a	n/a	n/a	n/a	finger tip	Verticle	YES
36	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37	bone	verticle, dip-drag	Rep. Rec	NO	n/a	n/a	n/a
38	n/a	n/a	n/a	n/a	stick	Verticle	NO
39	n/a	n/a	n/a	n/a	stick	V-Filler	YES
40	n/a	n/a	n/a	n/a	bone	V-Filler	NO
41	n/a	n/a	n/a	n/a	stick	V-Filler	NO
42	n/a	n/a	n/a	n/a	stick	V-Filler	NO
43	dowel	verticle	n/a	YES	dowel	Verticle	NO
44	n/a	n/a	n/a	n/a	stick	Verticle/Rep. Rec	NO
45	n/a	n/a	n/a	n/a	dowel	Angled (notched)	YES
50	n/a	n/a	n/a	n/a	dowel	Rep. Rectangle	YES
51	finger tip	TM: Verticle	n/a	YES	stick	V-Filler N. Chevron	YES
52	n/a	Un. Dec.	n/a	YES	bone	V-Filler	NO
53	dowel	Punc: Verticle	Rep. Rec	YES	dowel	Rep. Rectangle	NO

	HANDLE PUNCTATES				TRAIL MARK		
54	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>dowel</i>	<i>Alternating V</i>	YES
55	n/a	n/a	n/a	n/a	dowel	V-Filler	YES
56	n/a	n/a	n/a	n/a	dowel	V-Filler	YES
57	<i>finger</i>	<i>TM: Verticle</i>	<i>n/a</i>	YES	<i>stick</i>	<i>V-Filler N. Chevron</i>	YES
58	dowel	Punc: Verticle	n/a	NO	finger tip	Verticle	NO
59	<i>finger tip</i>	<i>Punc: Verticle</i>	<i>n/a</i>	YES	<i>stick</i>	<i>Chevron</i>	YES
60	<i>dowel</i>	<i>Punc: Verticle</i>	n/a	YES	n/a	n/a	n/a
61	dowel	Rep. Rectangle	na	NO	dowel	Verticle	YES

Sample	Acquisition Number
1	91.3221.126
2	91.3219.732
3	91.3276.149
4	91.3276.264
5	91.3200.275-274
6	91.3221.128
7	91.3222.62
8	91.3262.142
9	91.3222.79
10	91.3244.245
11	91.3299.69
12	91.3219.718
13	91.3242.254
14	91.3206.486
15	91.3148.296
16	91.3044.749
17	91.3028.175
18	91.3092.03
19	91.3048.534
20	91.3035.623
21	91.3039.93

Sample	Acquisition Number
22	91.3025.263
23	91.3044.750
24	91.3098.371
25	91.3091.617
26	91.3091.616
27	91.3050.601
28	91.3070.342
29	91.3037.159
30	91.3044.764
30	91.3050.602
31	91.3097.550
32	91.3075.479
33	91.3097.560
34	91.3028.176
35	91.3094.175
36	91.3075.407
37	?
38	91.3416.19
39	?
40	91.334.72
41	?
42	?
43	? Kiddy pot
44	?
45	?
50	?
51	?
52	?
53	?
54	?
55	?
56	?
57	?
58	?
59	91.3025.269
60	?
61	