One-color Frieze Patterns in Friendship Bracelets: A Cross-Cultural Comparison

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Abstract

In this paper, we investigate symmetry preferences in an emerging craft of a global online community, that of the friendship bracelet. We compare the frequencies of the seven frieze patterns from a sample of friendship bracelet patterns found in the online global database Braceletbook with previous studies of frieze pattern frequencies from eleven studies of decorative arts created by artists of different cultures.

Many cultures have incorporated frieze patterns, designs that repeat in one dimension, into decorative arts. Washburn and Crowe [17] give an extensive history of studies that demonstrate that cultural groups exhibit a strong preference for specific frieze patterns. Many studies of this type simply indicate which symmetry type is most prevalent in a collection without giving complete data; for example, Shepard classified 61% of the bands on Mesa Verde Black-on-White pottery as $p112$ [16], and Lekka and Dascalopoulos found 65% of a sample of frieze patterns of Greek woven textiles belonged to the $pmm2$ class [14]. Readers interested in learning the details of this history as well as viewing examples from a wide variety of cultures can read more in Washburn and Crowe’s book; we use the naming conventions described in the book for the seven one-color frieze symmetries discussed here.

Figure 1: Friendship bracelets classified by one-color frieze symmetry patterns. From top to bottom, $pma2, p1a1, pm11, p112, pmm2, p1m1, p111$

In this paper, we investigate symmetry preferences in an emerging craft of a global online community, that of the friendship bracelet. Friendship bracelets are a type of macrame typically knotted out of embroidery
floss; bracelets of each of the seven one-color frieze symmetry patterns appear in Figure 1. The history of friendship bracelets is unclear. Although there does not seem to be peer reviewed research available, many popular press articles speculate that friendship bracelets originated in Guatemala in the 1960s and then spread worldwide. While the designs and coloring of friendship bracelets from the early period have patterns similar to those seen in indigenous Mayan cultures, the method of constructing a friendship bracelet does not seem to be related to any traditional crafts [8]. Online databases of friendship bracelets first appeared in 2009.

In an online website and database called Braceletbook, started in 2010 [13], users design friendship bracelet patterns and submit them for consideration to be part of the collection. Although the thumbnail images on the website often show only a portion of the pattern, design requirements in the application require every friendship bracelet in this collection to be a frieze pattern. The full collection consists of over 7500 designs. Artists participating in this venture form a global community, with people from all 6 inhabited continents submitting designs and over 140,000 registered users. An analysis of all two-color normal friendship bracelets constructed from 9, 10, 11, 12, or 13 strings in the Braceletbook database appears in [2]. Here, we focus on uncolored patterns from the data collected to compare the specific percentage breakdown of frieze symmetries found in friendship bracelets to previous studies on other cultural artifacts. We restrict our attention to other investigations that examine a significant number of samples and which give details about all data collected. The selection of comparison studies used is not exhaustive, but it is extensive, representing a broad collection of cultures across a breadth of historical time periods using a variety of artistic mediums.

We compared data collected from 481 friendship bracelet designs on Braceletbook to eleven studies.

2. Chidtavong studied frieze symmetries on 874 traditional and contemporary textiles from Laos. [4]
3. Hann investigated 113 patterns on traditional Han textiles in China. [7]
4. Hann analyzed traditional patterns that appeared on 1,544 Miao textiles in China. [7]
5. Campbell examined 54 pieces of prehistoric pueblo pottery from Starkweather in New Mexico, USA. [3]
6. Crowe studied patterns carved on 230 tobacco pipes excavated in Begho, Ghana. [5]
7. Aslaksen and Poh investigated 73 enameled Peranaken porcelains from the 19th and 20th century in Malaysia, Indonesia and Singapore. [1]
8. James D., James A., and Kalisperis studied 417 ornamental plasterwork friezes on facades in Pirgí, Greece. [9, 10]
9. Aslaksen and Poh analyzed 159 frieze patterns on Chinese Yuan and Ming blue and white porcelain dating from the 14th to the 17th century. [1]
10. Salman analyzed 143 frieze patterns in iron, stone, mosaic, marble, and color painting decorations in the Al Madina Mosque in Saudi Arabia. [15]

Table 1 shows the percentage breakdown between each symmetry class for friendship bracelets and the 11 comparison studies. The second to last row in the table gives the averages of the percentages of the 11 previous studies for each symmetry class, and the last row shows the percentages of symmetry patterns in friendship bracelets. Figure 2 gives box-and-whisker plots of all of the relevant studies where just the seven percentage values shown in each row in Table 1 are used as data. Analyzing these percentage values removes information about the specific frieze classifications and focuses instead on how preferences spread across the seven symmetry types. We have chosen to extend the whiskers to the maximum and minimum values instead
Table 1: Percentages of artifacts found in each frieze symmetry class

<table>
<thead>
<tr>
<th>Artifacts</th>
<th>pm2n</th>
<th>pm11</th>
<th>pm2a</th>
<th>p12</th>
<th>p1m1</th>
<th>p111</th>
<th>p1a1</th>
</tr>
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<tbody>
<tr>
<td>European Folk Costumes</td>
<td>37</td>
<td>32</td>
<td>12</td>
<td>5</td>
<td>3</td>
<td>9</td>
<td>2</td>
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<tr>
<td>Lao Textiles</td>
<td>48</td>
<td>20</td>
<td>0</td>
<td>2</td>
<td>19</td>
<td>11</td>
<td>0</td>
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<tr>
<td>Han Textiles</td>
<td>21</td>
<td>23</td>
<td>19</td>
<td>7</td>
<td>3</td>
<td>19</td>
<td>7</td>
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<td>Miao Textiles</td>
<td>47</td>
<td>13</td>
<td>26</td>
<td>6</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Starkweather Pueblo Pottery</td>
<td>4</td>
<td>13</td>
<td>9</td>
<td>59</td>
<td>2</td>
<td>13</td>
<td>0</td>
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<tr>
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<td>10</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Peranakan Porcelain</td>
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<td>68</td>
<td>1</td>
<td>10</td>
<td>0</td>
<td>18</td>
<td>1</td>
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<td>41</td>
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<td>8</td>
<td>11</td>
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<td>4</td>
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<tr>
<td>Ming Porcelain</td>
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<td>42</td>
<td>8</td>
<td>13</td>
<td>1</td>
<td>18</td>
<td>13</td>
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<tr>
<td>Saudi Arabia Mosques</td>
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<td>1</td>
<td>2</td>
<td>7</td>
<td>17</td>
<td>3</td>
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<tr>
<td>Tonga Handbags</td>
<td>21</td>
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<td>4</td>
<td>2</td>
<td>2</td>
<td>30</td>
<td>2</td>
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<tr>
<td>Averages from 11 previous studies</td>
<td>29</td>
<td>30</td>
<td>8</td>
<td>11</td>
<td>5</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>Friendship Bracelets</td>
<td>21</td>
<td>16</td>
<td>11</td>
<td>14</td>
<td>15</td>
<td>19</td>
<td>4</td>
</tr>
</tbody>
</table>

Figure 2: Distributions of the percentage of occurrence of the seven frieze symmetries in artifacts from different cultures

of labelling outliers. These boxplots are, on one hand, a crude tool given that there are only 7 symmetry classes, but they do help visualize differences in the distributions of the strength of symmetry preferences in the studies under investigation. In particular, Figure 2 shows that friendship bracelets have the smallest spread and the smallest interquartile range. Friendship bracelets also have the smallest maximum at 21%.

The Braceletbook community, unlike the overwhelming majority of cultures studied, does not express a strong preference for a particular type of symmetry. Only one symmetry type, \( p1a1 \), is significantly less represented in the collection, and it is the only class representing less than 10% of the full collection. While \( p1a1 \) is not the least represented symmetry type in every culture (see [1, 7, 9, 10], for example), the author was unable to find any cultures for which \( p1a1 \) is the preferred symmetry type.

Our evidence indicates that there is not, at this time and for the specific craft of friendship bracelets, a global preference for a particular type of frieze symmetry. We hypothesize that users are creating designs based on symmetry preferences of their local culture, and thus the designs that appear on Braceletbook might...
be viewed more as an average of local symmetry preferences. Our conclusion, of course, is based on a very early examination of these particular cultural artifacts, as the online database is only 11 years old. The concept of a global online culture is relatively new, and it would be interesting to perform a similar study of frieze patterns in friendship bracelets in the future to see if changes occur and preferences begin to coalesce around a certain symmetry type.

References


