ARTICLE

# Flag Proportions: Thoughts on Flag Families and Artistic Unity within Displays of Multiple Flags

By Steven A. Knowlton and Adam C. Sales*

The proportions of a flag are an integral part of a flag's design. In some cases, the proportions are the only way to distinguish between otherwise identical flags, such as Monaco (16:21) and Indonesia (2:3).[1]

Bruce Nicolls notes that medieval flags were often square or even taller than they were wide, but the seventeenth century saw an increase of their widths, likely due to "the increasing use of flags at sea, where the additional length improved flying qualities and reduced the rate of fraying."[2] Today, almost all flags are rectangular and longer than they are tall. Aside from those common traits, however, flags display a remarkable diversity of proportions, as shown in figure 1.

The proportions of the flags of colonial powers exert an influence on post-colonial flags, even when those flags of independence bear no other graphic resemblance to their predecessors. For example, the unusual ratio of the United States flag, 10:19, is found in only two other national flags: the Federated States of Micronesia and
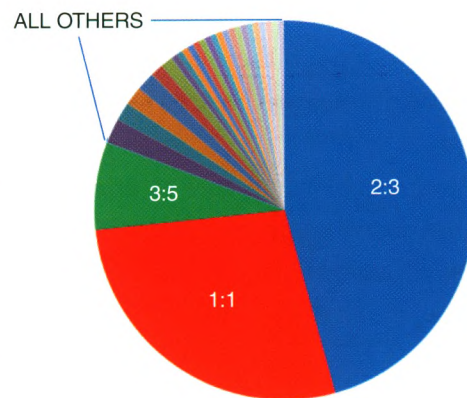


Figure 1. Frequency of proportions occurring in national flags. Source: Compiled from data in *Flags of the World* (www.crwflags.com/fotw/flags/).

A research publication of the
North American Vexillological Association /
Une publication de recherche de
l'Association nord-américaine de vexillologie

FLAG RESEARCH QUARTERLY /
REVUE TRIMESTRIELLE DE RECHERCHE
EN VEXILLOLOGIE

JULY / JUILLET 2016 | No. 9
Page 3

**Knowlton:** Flag Proportions: Thoughts on Flag Families and Artistic Unity within Displays of Multiple Flags

*continued from page 1*

the Marshall Islands—both former American possessions. The British preference for 1:2 flags has been even more influential, as countries with designs as distinct as Canada, Dominica, and the Seychelles have all retained the proportions of the Union Flag. The Soviet Union flew 1:2 flags, whose proportions have also been carried forward by many former Soviet republics.

The case of Nigeria, a former British colony, illustrates the powerful influence of colonial flag proportions. The vertical tricolor of Nigeria may have been adopted as a gesture of pan-African solidarity with many of its newly independent neighbor republics who also flew tricolors (Guinea, Mali, Senegal, Côte d'Ivoire, and Cameroon). However, Don Healy observes that the "republican symbolism" of the other tricolors was taken from the French *tricolore* with its proportions of 2:3 which was repeated among its descendants representing former French colonies, while Nigeria retains the proportions of the British flag.[3] Future studies of "flag families" may find it useful to explore flag proportions as well as common colors and symbols. Table 1 demonstrates the strong correlation between the proportions of a colonizing power's flag and those of its former colonies.

## TABLE 1: NATIONAL FLAGS SORTED BY PROPORTIONS

**1:1**
Switzerland
Vatican City

**1:2**
* Armenia
* Azerbaijan
* Belarus
* Kazakhstan
* Latvia
* Moldova
* Tajikistan
* Uzbekistan
¶ Australia
¶ Bahamas
¶ Brunei
¶ Canada
¶ Dominica
¶ Fiji
¶ Ireland
¶ Jamaica
¶ Jordan
¶ Kiribati
¶ Kuwait
¶ Malaysia
¶ Nauru
¶ New Zealand
¶ Nigeria
¶ Samoa
¶ Seychelles
¶ Solomon Islands
¶ South Sudan
¶ Sri Lanka
¶ St. Lucia
¶ Sudan
¶ Tonga
¶ Tuvalu
¶ United Arab
  Emirates
¶ United Kingdom

¶ Zimbabwe
Bosnia
Croatia
Cuba
Eritrea
Ethiopia
Guinea-Bissau
Honduras
Hungary
Libya
Macedonia
Mongolia
Montenegro
North Korea
Philippines
São Tomé and
  Príncipe
Slovenia
Timor-Leste

**2:3**
§ Algeria
§ Benin
§ Burkina Faso
§ Cambodia
§ Cameroon
§ Central African
  Republic
§ Chad
§ Comoros
§ Congo, Republic of
  (Brazzaville)
§ Côte d'Ivoire
§ Djibouti
§ France
§ Guinea
§ Laos
§ Lebanon
§ Madagascar
§ Mali
§ Mauritania

§ Morocco
§ Senegal
§ Syria
§ Tunisia
§ Vietnam
Afghanistan
Angola
¶ Antigua and Barbuda
Austria
¶ Barbados
¶ Belize
Bhutan
Bolivia
¶ Botswana
¶ Burma
Chile
China
Colombia
Congo, Dem. Rep.
  (Kinshasa)
Czech Republic
Ecuador
¶ Egypt
Equatorial Guinea
Georgia
¶ Ghana
Greece
¶ India
Indonesia
¶ Iraq
Italy
Japan
¶ Kenya
¶ Lesotho
¶ Malawi
¶ Maldives
¶ Malta
¶ Mauritius
Mozambique
Namibia

¶ Pakistan
Panama
Peru
Portugal
Romania
*Russia
Rwanda
San Marino
Saudi Arabia
Serbia
¶ Sierra Leone
¶ Singapore
Slovakia
¶ South Africa
South Korea
Spain
¶ St. Kitts & Nevis
¶ St. Vincent &
  Grenadines
Suriname
¶ Swaziland
¶ Tanzania
Thailand
* Turkmenistan
¶ Uganda
* Ukraine
Uruguay
Venezuela
¶ Yemen
¶ Zambia

**3:4**
§ Gabon
¶ Grenada
¶ Papua New Guinea

**3:5**
¶ Bahrain
Bulgaria
Burundi
Costa Rica

Germany
¶ Guyana
Haiti
* Kyrgyzstan
Liechtenstein
* Lithuania
Luxembourg
Nicaragua
Paraguay
§ Togo

**3:8**
Poland

**4:7**
Iran
Mexico
¶ Oman

**5:4**
Nepal

**5:7**
Albania

**5:8**
Argentina
Guatemala
¶ Palau
Sweden

**6:7**
§ Niger

**7:10**
Andorra
Brazil

**7:11**
* Estonia

**8:11**
¶ Israel
Norway

**9:15**
¶ Trinidad & Tobago

**10:17**
Cape Verde

**10:19**
Marshall Islands
Micronesia, Fed.
  States of United
  States

**11:18**
Finland

**11:28**
¶ Qatar

**13:15**
Belgium

**15:23**
Dominican Rep.

**16:21**
Monaco

**18:25**
Iceland

**18:27**
¶ The Gambia

**19:36**
¶§ Vanuatu

**23:38**
¶ Bangladesh

**28:37**
Denmark

**189:335**
El Salvador

\* former Soviet republic

¶ former British colony, post
  1801 (date of adoption of
  current Union Flag)

§ former French colony,
  post-1830 (date of final
  adoption of tricolore)

JULY / JUILLET 2016 | No. 9
Page 4

FLAG RESEARCH QUARTERLY /
REVUE TRIMESTRIELLE DE RECHERCHE
EN VEXILLOLOGIE

A research publication of the
North American Vexillological Association /
Une publication de recherche de
l'Association nord-américaine de vexillologie

Despite the clear importance of proportions in a flag's design, this element of vexillography is ignored when flags are grouped for display. Numerous examples can be found to illustrate this point. For example, despite the strenuous efforts of the United Daughters of the Confederacy to establish a square-shaped Confederate Battle Flag as the accepted version, most replicas since the beginning of the twentieth century have been made to the same proportions as the United States flag, in order that the two flags will have the same lengths when displayed together.[4] When all U.S. state flags are displayed together, they are typically constructed with uniform rectangular proportions—even flags designed as squares (or nearly so) such as Alabama and Rhode Island. Similarly, displays of Canadian provincial flags often feature all flags with proportions of 1:2 to match the national flag—despite the fact that the flags of New Brunswick and Prince Edward Island, as armorial banners, are designed to be much closer to square (e.g., 5:8). And the British Royal Standard is typically manufactured in 1:2 proportions for display with the Royal Union Flag.

Perhaps the most famous flag grouping is that at the United Nations' headquarters in New York City. All member nations' flags are flown outside the Manhattan complex in alphabetical order, with a few exceptions that produce a felicitous distance between rivalrous nations—for example, North Korea and South Korea are alphabetized as, respectively, Democratic Republic of Korea and Republic of Korea.[5] In 2015, the flags of non-member observer states (such as the Vatican City and the State of Palestine) were added to the display, after the last of the member states' flags.[6] In order to "promote a unified look," all flags are manufactured with the same proportions. Flags for outdoor display are manufactured in proportions of 2:3, and indoor flags are 3:5.[7]

An exception has been made, however, for the flag of Switzerland. Swiss representatives insisted that, "Our flag is square," and a compromise was found to retain the 1:1 proportions but keep the flag's area no larger than other flags at the United Nations (figure 2).[8]



Figure 2. The Swiss flag in square proportions among the 2:3 flags of other countries at the United Nations in New York City. Source: www.eda.admin.ch/eda/en/home/recent/dossie/ch10un.html.

While unified proportions for display of multiple flags do promote visual unity, they affect the look of individual flags. The distortion may be subtle, such as a slight change in the angle at which the arms of a saltire meet; or it may be drastic, as the lions of the Royal Standard, as well as Prince Edward Island and New Brunswick, are "stretched almost to the breaking point" in a 1:2 flag.[9] Many representatives to the United Nations report that their nations' flags look "stretched, or otherwise strange to the eye" in the 2:3 proportions dictated by that body.[10]

If one were seeking to display equality among multiple flags while retaining the proportions intended by each flag's designer, a possible approach would be to extend to all countries the treatment offered to Switzerland. That is, all flags would have the same area but keep the original proportions. The manufacturers could apply the following formula to arrive at an equal area for any flag regardless of its proportions:

Let L=length, H=height, A=Area=height* length=HL, R=Ratio=length/height=L/H.

Given an Area A and a ratio R:
L=RH
and A=HL=HRH=RH2
so H²=A/R
Height = √ (A/R)
Length = A / √ (A/R) = √ (AR)

For example, if all flags in a display were to be 10,000 square centimeters (derived from a square flag one meter high and one meter wide), the following measurements would produce flags of equal areas:

| Flag ratio of 1:2 | Flag ratio of 2:3 | Flag ratio of 3:5 |
|---|---|---|
| A=10,000 | A=10,000 | A=10,000 |
| R=2 | R=1.5 | R=1.666667 |
| Height = √ (10,000/2) = 70.7 | Height = √ (10,000/1.5) = 81.6 | Height = √ (10,000/1.666667) = 77.5 |
| Length = √ (10,000*2) = 141.4 | Length = √ (10,000*1.5) = 122.5 | Length = √w (10,000*1.5) = 129.1 |

While the idea of displaying multiple flags with equal area may have logical appeal, it is not likely to meet with approval from most observers. Pete Van de Putte, proprietor of the Dixie Flag Company of San Antonio, Texas, was asked about this proposal and replied that none of his customers would employ such a display—they always want the flags to be equally-sized and of the same proportions.

A research publication of the
North American Vexillological Association /
Une publication de recherche de
l'Association nord-américaine de vexillologie

FLAG RESEARCH QUARTERLY /
REVUE TRIMESTRIELLE DE RECHERCHE
EN VEXILLOLOGIE

JULY / JUILLET 2016 | No. 9
Page 5

The reasons for such preferences have to do with certain inherent aesthetic preferences among humans. A display of multiple flags is not perceived by the eye as 14, or 51, or 194 separate items; rather, it is a single tableau composed of numerous related elements. In works of visual art, one of the most prized attributes is unity of composition. As François Molnar expresses it, "The composition of a picture, and consequently one's aesthetic emotion, depend to a large degree on the way our eye explores the areas of this surface so as to re-create its totality."[11] That is to say, if a composition allows the eye to move comfortably across its surface, then it has aesthetic unity which is pleasing.
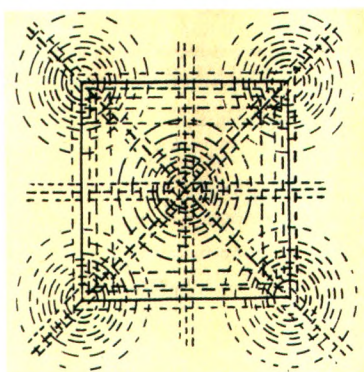


Figure 3. "Structural map" showing how elements of a visual composition draw the eye in certain directions. Source: Arnheim, *Art and Visual Perception*, 4.

Rudolf Arnheim shows that visual compositions have a "structural map," through which the eye is drawn in a particular direction by elements such as parallel lines or diagonal strokes (figure 3).[12] Compositions with a high degree of unity place artistic elements along the axes of the structural map and diminish those aspects of the tableau lying outside the chosen axes. As an example, let us examine one of the most famous flag-related paintings, *La Liberté guidant le peuple* (*Liberty Leading the People*), painted in 1830 by Eugène Delacroix to commemorate the revolution of that year which restored the *tricolore* of the Revolution and Napoleonic eras as the permanent flag of France, supplanting the white flag of King Charles X's Bourbon dynasty (figure 4).[13] Delacroix uses numerous elongated elements, including the cutlass on the left, the musket borne by the top-hatted man, the upraised right arm of the boy, the rifle carried by Liberty, and the flagstaff, employed in nearly parallel lines, to draw the eye upward and rightward to the figure of Liberty and the flag of republicanism.

The phenomenon of the eye following strong lines has not just a psychological rationale, but also a physiological explanation. As the eye moves across a visual field, it is constantly acquiring data in the form of the small section of an image that the eye has focused on; the visual cortex of the brain maps those data into a larger image by retaining the images in short-term memory and contextualizing new data into the set of images previously acquired.[14] Eye movement proceeds along a "scanpath" in which the eye makes small motions in either random or circular patterns. In a process called autocorrelation, when the eye encounters a visual datum that
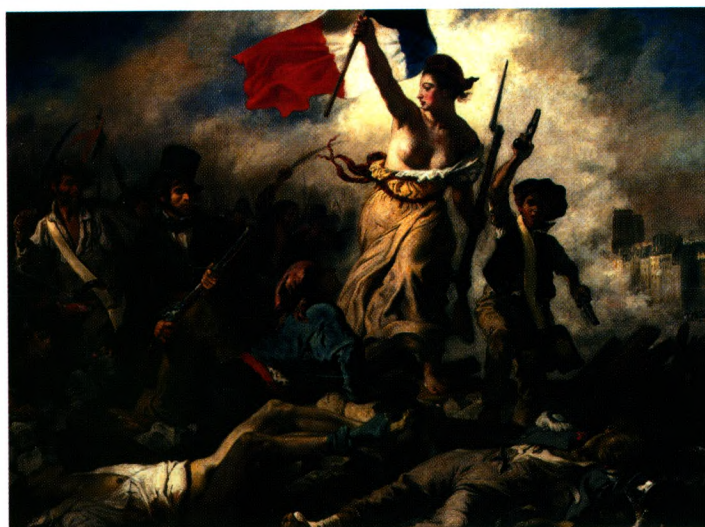


Figure 4. Eugène Delacroix, *Liberty Leading the People* (1830). Source: Eugène Delacroix, commons.wikipedia.org.

corresponds to a very recently encountered image, the eye moves in the direction implied by the pattern established by the location of similar visual data.[15] That is, when the eye encounters similar-looking images in a pattern, it proceeds to move in the direction that reveals how those images are arranged (figure 5). The eye viewing *Liberty Leading the People* may hit upon the barrel of the musket and, seeing a cluster of gunmetal arranged diagonally, will follow that color to the end of the gun.



Figure 5. Eye movements of a person viewing a photograph, demonstrating the process of autocorrelation. Source: Radek Ptak and René M. Müri, "The parietal cortex and saccade planning: lessons from human lesion studies," *Frontiers in Human Neuroscience* 7, article 254 (June 2013): 254.

Artworks in which the eye moves easily along such scanpaths are those that most people find aesthetically satisfying. Even non-representational art, such as that of Jackson Pollock, exhibits reliance upon autocorrelation to achieve its effects (figure 6). Conversely, those pieces where artistic unity is not achieved are often deemed unpleasing.



Figure 6. Jackson Pollock, *Blue Poles* (1952). Source: wikiart.org/en/jackson-pollock/blue-poles-number-11-1952.

JULY / JUILLET 2016 | No. 9
Page 6

FLAG RESEARCH QUARTERLY /
REVUE TRIMESTRIELLE DE RECHERCHE
EN VEXILLOLOGIE

A research publication of the
North American Vexillological Association /
Une publication de recherche de
l'Association nord-américaine de vexillologie

Considered as a single visual presentation, then, a multiple-flag display in which all flags have the same proportions will present artistic unity—the tops and bottoms of the flags (assuming a wind stiff enough to unfurl them) will present a continuous line that provides a scanpath for the eye to follow to the end of the display (figure 7).



**Figure 7.** Flags at the United Nations headquarters, with identical proportions that present a continuous line along both the upper and lower edges. Source: www.undispatch.com, modified by the authors.

On the other hand, a display of flags with equal area but disparate proportions will fail to achieve artistic unity. The edges of the flags will be discontinuous, forcing the eye to continually re-seek its scanpath (figure 8).



**Figure 8.** Flags with identical surface area but varying proportions, presenting a discontinuous line on the lower edges. Illustration by the authors.

An additional complication is provided by the flapping motion of flags in the breeze. The frequency of flapping is a function of the ratio of the length of the flag to the diameter of the pole.[16] Flags of a uniform length in a steady breeze will flap at about the same rate. However, in a display of flags of mixed length, the shorter flags will flap more frequently. The variance in flapping rates also undermines artistic unity.

Flags are, ultimately, visual expressions embedded with deep symbolic significance, and an important part of that visual expression is a flag's proportions. Nonetheless, an individual flag's specified proportions are usually disregarded when flags are displayed in a group. Basic aesthetics dictate that individual flags must be made to appear proportionally identical when displayed together. To do otherwise presents a displeasing, fragmented image that destroys the beauty otherwise present in the banners so beloved by vexillologists and ordinary citizens alike.

## Notes

[1] By convention adopted at the Fifth International Congress of Vexillology in 1973, a flag's proportions are described in terms of a ratio of the length of the hoist edge to the length of the fly edge. A flag which is four feet long on the hoist edge and six feet long on the fly edge is said to have proportions of 2:3. See Bruce Nicolls, "A Sense of Proportion," *Flag Bulletin* 26, nos. 1-3 (1987): 138-142.

[2] Ibid., 139

[3] Don Healy, "Evolutionary Vexillography: One Flag's Influence in Modern Design," *Raven* 1 (1994): 58. Additional discussion of the use of French tricolor patterns in West African flags will be found in Steven A. Knowlton, "Coloniality, Westphalian Sovereignty, and Flag Design: The French West African Case," in a forthcoming NAVA publication.

[4] John Coski, *The Confederate Battle Flag: America's Most Embattled Emblem* (Cambridge, Mass.: The Belknap Press of Harvard University Press, 2005), 56-57.

[5] Gustavo Tracchia, "The United Nations Flags and Poles," *Raven* 8 (2001): 92-93.

[6] United Nations General Assembly, Resolution 69/320. "Raising the Flags of Non-Member Observer States at the United Nations," Sept. 10, 2015.

[7] Elsa B. Endrst, "So Proudly They Wave," …Flags of the United Nations." *UN Chronicle*, December 1992, 74-75.

[8] Clare Nullis, "Swiss Stay Square," *Gazette* (Montréal, Québec), 10 September 2002, A16.

[9] Nicolls, "A Sense of Proportion," 140

[10] Endrst, "So Proudly They Wave," 175

[11] François Molnar, "The Unit and the Whole: Fundamental Problem of the Plastic Arts," in *Module, Proportion, Symmetry, Rhythm*, ed. Gyorgy Kepes (New York: George Braziller, 1966), 205.

[12] Rudolf Arnheim, *Art and Visual Perception: A Psychology of the Creative Eye* (Berkeley: University of California Press, 1967), 4-5.

[13] Frank Anderson Trapp, *The Attainment of Delacroix* (Baltimore: Johns Hopkins University Press, 1971), 93-98.

[14] Brad C. Motter and Diglio A. Simoni, "Changes in the Functional Visual Search Field," During Search with and without Eye Movements." *Vision Research* 48 (2007): 2382; Brad C. Motter and Diglio A. Simoni, "The Roles of Cortical Image Separation and Size in Active Visual Search Performance," *Journal of Vision* 7, no. 2 (2007): 1.

[15] T.D. Keech and Lorenzo Resca, "Eye Movement Trajectories in Active Visual Search: Contributions of Attention, Memory, and Scene Boundaries to Pattern Formation," *Attention, Perception, & Psychophysics* 72, no. 1 (2010): 116-119.

[16] Avshalom Manela and Michael S. Howe, "The Forced Motion of a Flag," *Journal of Fluid Mechanics* 635 (2009): 452.