

Pleasing the reader by pleasing the eye—Part 2

Page layout and readability

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Abstract

The purpose of page layout is to consciously arrange text and graphics on a page in a way that supports the reading process and allows the reader to effortlessly follow the flow of information. It should blend words and images into an effective whole. Many of the basic principles of page layout in use today date back to the times when book printing was born in the Renaissance. The Industrial Revolution and Gestalt theory likewise have left their distinctive imprints on page design. The page designer's job, then, is to read and digest the text before making specific style choices and creating a layout that supports the writer's message.

Keywords: Readability, Layout, Page design, Gestalt theory, White space, Classical page layout, Modern page layout

A layout is really a piece of abstract art. You're fiddling with basic shapes in different tones and trying to get them to sit comfortably, logically and interestingly together in order to tell a story and impart information clearly.

– David Whitbread¹

In the first part of this series on the role of format and design in readability we left off characterising page layout as the part of graphics design that deals with arranging content on a page, and this is what we will be looking at in this sequel.

The whole is other than the sum of its parts

Page layout is the first thing we perceive when we look at a piece of printed matter. It either draws us into the text or repels us – well before we have

even started reading. The purpose of page layout is to consciously arrange text and graphics on a page in a way that supports the reading process and allows the reader to effortlessly follow the flow of information. It should blend words and images into an effective whole. Page layout is visual information management.²

Book printing and the birth of the Renaissance

Our eyes and brains long for order. This principle was at the very heart of the efforts of Renaissance book printers to devise the perfectly harmonious page, first among them Johannes Gutenberg in the 15th century, whose invention of movable type played a crucial role in the development of the Renaissance, and, ultimately, the Scientific Revolution. So successful were the Renaissance printers in their attempts that their principles are still in use today. Books at the time were not only a luxurious commodity, they were also stunningly beautiful. Their design was based on a set of rules whereby the pages and the blocks of text they carried would work together to form a harmonious unit (Fig. 1).

The golden ratio

One of these rules is that of the 'golden rectangle' (Fig. 2A), whose side lengths use the 'golden ratio,' or 'divine proportion'. Mathematically, the golden ratio is approximately 1:1.618.

Removing a square from the golden rectangle leaves us with another golden rectangle. If this process is repeated again and again, the corresponding corners of the squares combine into an infinite sequence of points on the 'golden spiral' (Fig. 2B). Amazingly, this aesthetically pleasing ratio lies at the heart of many shapes in nature, such as the



Figure 1: Gutenberg Bible, 1 Epistle of John (paper copy), Volume 2 Folios 306v and 307r (courtesy of the British Library Board).³

human face, sea shells, and sun- and broccoli flowers, and it has also been used in architecture and art, such as the Parthenon temple, the Cheops pyramid – and the Apple logo (Fig. 3).

Canons of page harmony

Another set of page design principles, known as the canons, was used in many Renaissance books and later rediscovered by modern-day designers. One of several modern interpretations of this page layout is that by Van de Graaf from the Netherlands, based on analyses of books such as Gutenberg’s Bible of 1455. In his *Divina proporción tipográfica* published in 1947, the Argentinian designer Raúl Rosarivo also analysed Renaissance books and found that their pages were divided into ninths both horizontally and vertically. The diagonals establish the width and height of the text block (Fig. 4, right panel).

In 1953, German typographer Jan Tschichold published his golden canon, which largely reflected what others had found before him. Yet, Tschichold also defined a new rule, namely that the height of the text block is the same as the width of the page, as illustrated by the circle (Fig. 4, left panel).

The industrial revolution and the decline in book printing

The fundamental changes brought about by the Industrial Revolution of the 18th century affected every aspect of life. Mechanisation brought not only unprecedented economic growth, but also a dwindling importance of the arts and crafts, including book printing. In response to these developments, the British *Arts and Crafts Movement* led by William Morris was founded in 1860. Morris held that art should satisfy the needs of society and that the form of an object, rather than mimicking the heavily decorated style of preindustrial times, should reflect its function and the qualities of the new materials being used.

Bauhaus and Gestalt theory

In Germany, another movement, the *Bauhaus*, formed in the wake of World War I. In part influenced by Morris, it shared many principles with the left-wing political and cultural developments following the Russian Revolution, i.e. *Constructivism*, or the Dutch *De Stijl* movement of artists such as Piet Mondrian, who sought to promote functionalism and a machine aesthetic that captured the spirit of the time. Advocating

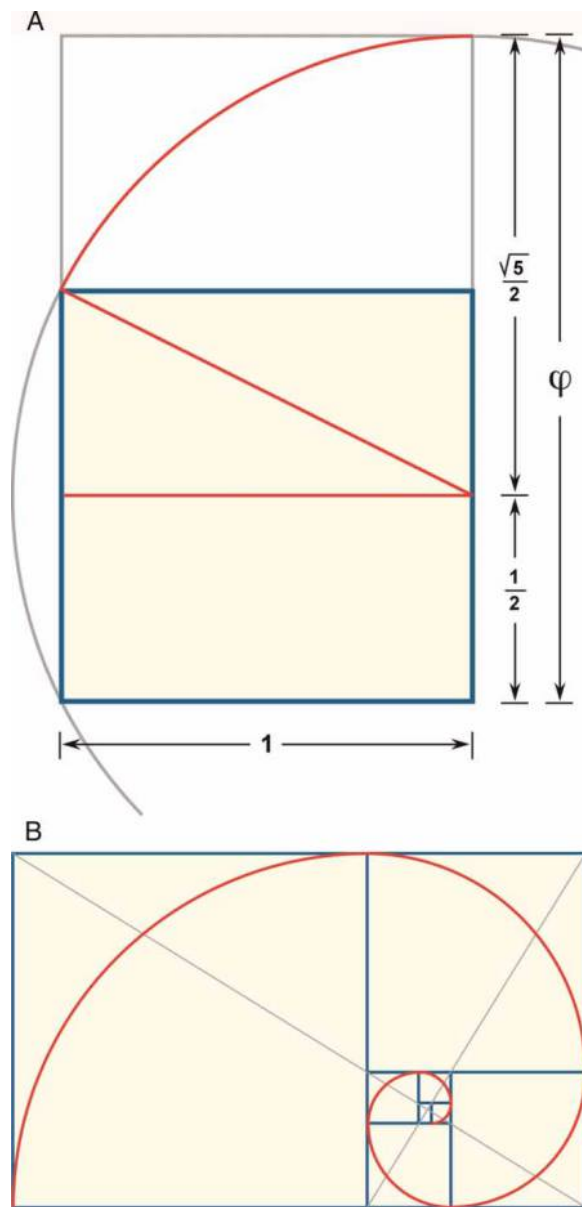


Figure 2: Constructing the golden rectangle (A) and drawing the golden spiral (B).

abstraction and a reduction to the essentials of form and colour, they were fascinated with exploring geometric alignments and asymmetric composition, had a predilection for sans-serif typefaces, made ample use of white space, and rejected ornaments.

The designers of the German *Bauhaus* began to discover that Gestalt theory offered a conceptual framework for explaining the aesthetics of their time. According to Gestalt theory, we perceive objects in their entirety before seeing their individual components. 'Das Ganze ist etwas anderes als die Summe seiner Teile' (The whole is other than the sum of its parts), gestaltist Kurt Koffka said. Fig. 5 illustrates what he meant. It depicts three blue circles, each with one wedge cut out. Another way of looking at the three circles is to see white corners placed

on top of each of them that imply the shape of a triangle. The whole, therefore, is not greater than, but different from, the individual parts it consists of.

Similarly, readers first perceive a page as a whole, taking in the colours and shapes, before they begin to zero in on, first, the graphics and images if available and, then, on the most intellectually challenging part, i.e. the text (Fig. 6).

Fundamentals of page layout

Many of today's designers draw on the principles of Gestalt theory to explain why some layouts work while others do not.^{6,7} A fundamental Gestalt principle is the *law of prägnanz*, which states that we strive to eliminate confusion and complexity and to introduce orderliness into what we see.

Figure-ground principle

Page design should create a clear visual logic.² According to the *figure-ground principle* of Gestalt theory, we perceive elements as either figures (i.e. the focus of attention) or ground (the background carrying these figures). Determining the figure-ground relationship is the first thing we do when we scan a page (Fig. 6). We cannot perceive figures unless they clearly stand out from their background. Therefore, rather than seeing a page as empty space needing to be filled, we should think of it as a shape that helps us organise the elements we place on it.

Similarity

Because our minds love patterns, a major hurdle to readability is inconsistency. Good design uses consistent typefaces, colours, graphics, and typography to help the reader effortlessly navigate the layout. Consistency makes a text more predictable and decreases the learning curve. The Gestalt *law of similarity* posits that when we perceive a collection of elements that resemble each other, we see them as belonging together. Also, similar appearance is perceived to represent similar function. Therefore, applying a consistent style for text and graphics guarantees unity across pages. Repetition here is not synonymous with boredom. Rather, it determines the personality of our document.

For example, because readers use headings as signposts to find the information they need, we should guide them through a document using consistently formatted headings that reflect the hierarchy in the text. Likewise, elements aligned along a shared axis appear more related to each other, whereas a lack of alignment makes a document look unorganised. The spacing between paragraphs should also be consistent, and there should be a

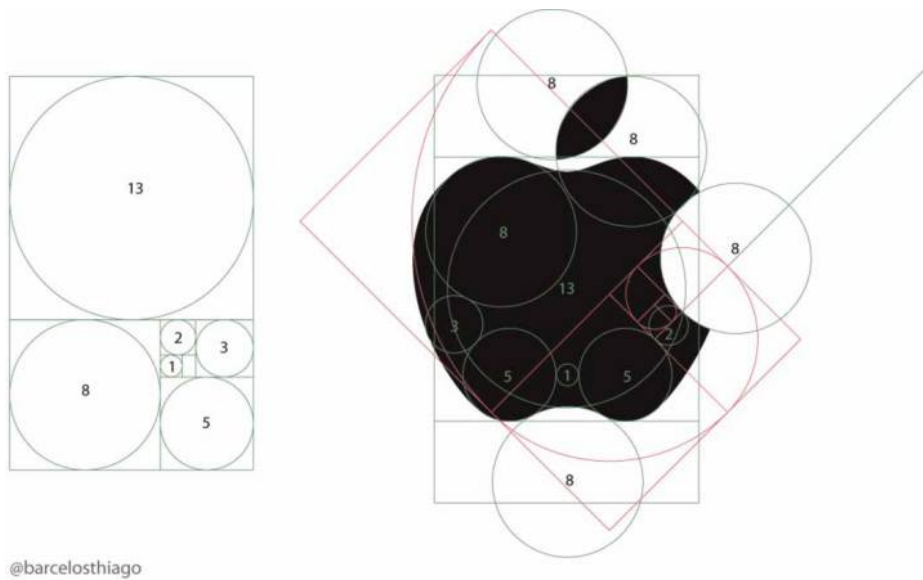


Figure 3: Apple logo based on the golden rectangle (courtesy of Thiago Barcelos).⁴

logic to why spaces are the width they are. The text in the left column of Fig. 7, consisting of running text and interspersed text samples, illustrates how illogical spacing can separate elements that actually belong together and group those that do not – an example of poor ‘closure.’ According to the Gestalt *law of closure*, we perceive objects as being whole even when they are not complete. A figure or page area with disrupted closure confuses us, because we will try to establish relationships that may not be intended. The reformatted text in the right column of Fig. 7 corrects this by using consistent and logical spacing between paragraphs.

Contrast

The flip side of similarity is contrast. Whereas consistency reinforces similarities, contrast highlights differences. The text in the left column of Fig. 7 has an additional problem – the reader has a hard

time differentiating between running text and text samples. Changing the typeface and indentation takes care of this problem by better emphasising content relationships (Fig. 7, right column).

The greater the difference, the greater the contrast should be. For example, headings should provide enough contrast to jump out of the grey body copy. To achieve contrast, we can enlarge the type, format headings in bold, or use a different typeface or colour. Varying tone is another effective means of producing contrast. A readable layout is generally one with a balanced interplay of dark and light areas.

Proximity

The Gestalt law of proximity states that we perceive objects that are close to each other as forming a group. It is a principle that is frequently violated, even with simple layouts. The table in Fig. 8A

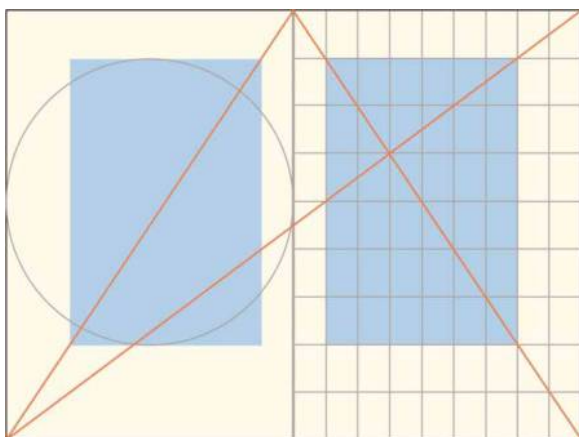


Figure 4: Tschichold (left panel) and Rosarivo (right panel) canons of page design.

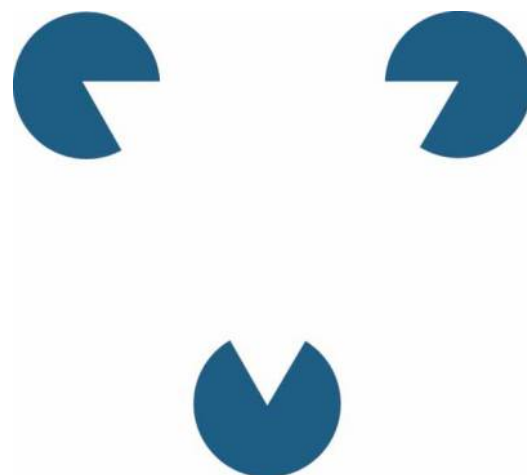


Figure 5: Kanizsa triangle.⁵

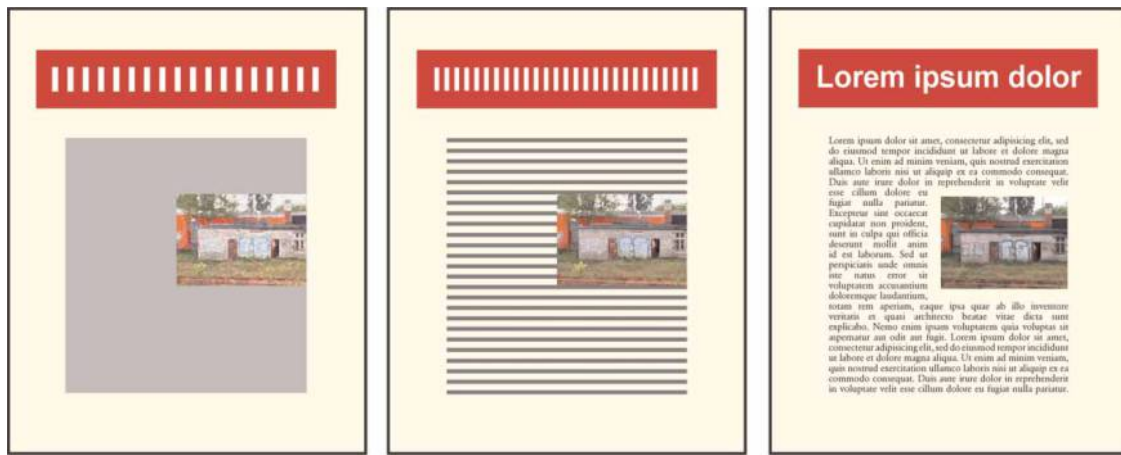


Figure 6: Reader’s scanning process: from contour and contrast to content (adapted from Lynch and Horton).²

groups columns that should not be grouped. In Fig. 8B, the error has been resolved.

Also, headings are frequently misplaced to the effect that they are equidistant to both the previous and the following paragraphs. With headings functioning as signposts, we should not leave the reader puzzled as to where a heading belongs. Do not just have the headings jump out of the grey

through contrast – stick them to the paragraph they introduce.

Balance

According to the Gestalt *law of balance*, or *symmetry*, we perceive objects as forming around a centre point. Balance refers to elements being distributed on a page so that the page does not topple over to one

<p>the text clinic</p> <hr/> <p>Revising or correcting translated texts that lack clarity and readability can range from simple to tedious. Some sections can be improved by simple editing, as the following sentence with an ambiguous referent shows:</p> <p>Treatment of infections with dermatophytes with terbinafine is a good option in transplant recipients.</p> <p>Turning ‘dermatophyte’ into an adjective improves the readability rather effortlessly:</p> <p>Treatment of dermatophyte infections with terbinafine is a good option in transplant recipients.</p> <p>In the next example, the rather long list of nominal groups may require a second reading:</p> <p>Patients were eligible for inclusion into the study if they required treatment with prothrombin for acute bleeding, overdose of coumarin or coumarin derivates or prophylaxis.</p> <p>With a comma of separation added before the last noun, one reading will suffice:</p> <p>Patients were eligible for inclusion into the study if they required treatment with prothrombin for acute bleeding, overdose of coumarin or coumarin derivates, or prophylaxis.</p>	<p>Page 1 of 1</p> <hr/> <p>Revising or correcting translated texts that lack clarity and readability can range from simple to tedious. Some sections can be improved by simple editing, as the following sentence with an ambiguous referent shows:</p> <p><i>Treatment of infections with dermatophytes with terbinafine is a good option in transplant recipients.</i></p> <p>Turning ‘dermatophyte’ into an adjective improves the readability rather effortlessly:</p> <p><i>Treatment of dermatophyte infections with terbinafine is a good option in transplant recipients.</i></p> <p>In the next example, the rather long list of nominal groups may require a second reading:</p> <p><i>Patients were eligible for inclusion into the study if they required treatment with prothrombin for acute bleeding, overdose of coumarin or coumarin derivates or prophylaxis.</i></p> <p>With a comma of separation added before the last noun, one reading will suffice:</p> <p><i>Patients were eligible for inclusion into the study if they required treatment with prothrombin for acute bleeding, overdose of coumarin or coumarin derivates, or prophylaxis.</i></p>
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Figure 7: Paragraph spacing gone wrong (left) – and corrected (right).

A Law of proximity violated...					
Day	Mean	Day	Mean	Day	Mean
0	640	6	530	12	526
1	600	7	529	13	510
2	580	8	527	14	530
3	585	9	520	15	520
4	550	10	523	16	525
5	540	11	525	17	510

B ...and corrected					
Day	Mean	Day	Mean	Day	Mean
0	640	6	530	12	526
1	600	7	529	13	510
2	580	8	527	14	530
3	585	9	520	15	520
4	550	10	523	16	525
5	540	11	525	17	510

Figure 8: Law of proximity violated (A) and corrected (B) (adapted from Moore and Fitz).⁷

side or slip towards the bottom. Balanced layouts will look good when viewed right side up and when viewed upside down.

We have two basic options to achieve balance. One is based on the style developed in the Renaissance – the symmetric layout. The feeling it conveys is one of stability. While balance in symmetric designs is fairly easy to achieve, it is important to lift the elements on the page to its optical centre, which is always above the physical centre. Therefore, the margin at the bottom of a page should generally be larger than the top margin.

The second option is asymmetric balance, which is achieved when the left and right sides of a page are unequal. Asymmetric designs are less predictable and therefore more exciting. With asymmetry, it is more of a challenge to achieve balance than with symmetric designs. Whitbread compares asymmetric balance with an adult and a child on a seesaw: to achieve it, the adult and the child must be placed in different positions.¹ Asymmetric modernist layouts often rely on a grid, whose modularity is perfectly in line with the needs of the information age. Grids help assign functional page areas and allow information to be organised into logical units.¹

A leading proponent of the asymmetric design was the printer and calligrapher Jan Tschichold. He used to work in the classical style until he came in touch, in the 1920s, with the paintings of El Lissitzky, who was later going to influence the Russian *Constructivists*, the Dutch *de Stijl* movement, and the German *Bauhaus*. Tschichold’s most

important work, *Die neue Typographie* (The New Typography), was a manifesto of modern design, and his philosophy is reflected in an announcement for his book (Fig. 9). After World War II, the modernist graphic design became a cohesive movement referred to as the International Typographic Style.⁸

Although Tschichold originally thought of asymmetric design as more effectively representing modern life, he abandoned his firm views in the early 1930s and returned to classical print design, analysing incunabula for the secret canon of page design described earlier (Fig. 4). Between 1947 and 1949, he lived in England, where he was responsible for the redesign of the Penguin paperback books.⁹ Overall, Tschichold initiated many of the typographic practices that are largely taken for granted today.

White space

Consistency, contrast, proximity, and balance are merely some of the principles that make page layout work and, as we have seen, they do not function in isolation but in concert with each other. Ultimately, they all do one thing: they manage white space. White space is ‘determined by placement of design elements within space’.¹ The less crowded a page, the less likely it is to overwhelm its readers. White space provides breathing room for the eye. For example, Google makes optimal



Figure 9: Book announcement flyer: Jan Tschichold’s *The New Typography* (1928).

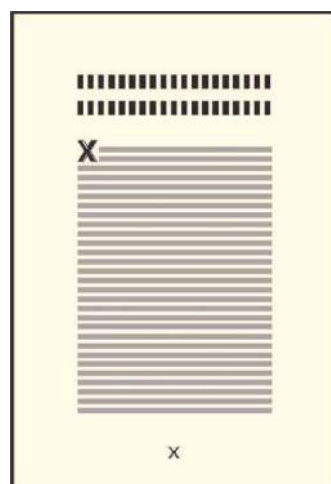
use of white space, ending up with one of today's most powerful and easy-to-use designs on the web.

If economy and conservation were your chief concern, then white space would be at a minimum; obviously you would use it all up. So white space is used for purely semiotic values; for values of presentation which transcend economic values by insisting that the image of what you present is more important than the paper you could be saving. . . . White space is a negative cost right down the production line—except for giving style.

– Keith Robertson¹⁰

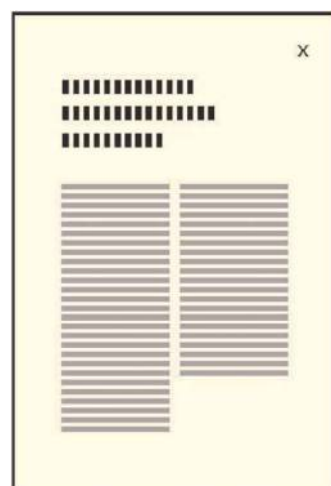
Classical versus modern page layouts

As one might guess from all of the above, page designs are generally of one of two basic types: classical or modern. The classical design is based on the Italian book design of the Renaissance and has been the dominant style used in books (Fig. 10).



- Generous margins that relate to each other
- One-column set-up
- Centred page number
- Strong serif typeface (e.g., Bembo, Garamond, Times, Baskerville, or Palatino)
- Paragraphs indented by about 5 mm, with no extra space between them
- Justified type with generous leading
- Centred heading
- Initial drop capitals at the beginning of a chapter and centred dingbats at the end
- Constant page depth, with the bottom line of the text block defined by the bottom margin

Figure 10: Classical page layout (adapted from Whitbread).¹



- Light margins, with top and side margins about the same; the bottom margin should be slightly larger
- Text block divided into 2 or 3 columns separated by a narrow gutter
- Right-aligned page number
- Sans-serif typeface with extensive font family (e.g., Helvetica, Univers, Frutiger, Gill Sans, or Futura)
- Flush left, unjustified, and with a generous leading to separate the sans-serif lines for easy reading
- Block paragraphs, not indented and separated with a half to one line space
- Headings formatted in different point sizes and weights; use of capitals to be avoided
- Varying page depth, with each column filled to a logical paragraph break, but not down to the bottom

Figure 11: Modern page layout (adapted from Whitbread).¹

so much so that their layout may be legally enforceable. Biomedical publications are institutionally enforced and have to conform to internationally agreed or journal-specific guidelines. Newspapers are rule-bound by convention, and advertisements are hardly rule-bound at all, yet form a unique genre through purpose and imitation. The more rule-bound a genre, Waller says,¹¹ the more specific the concept of error. In the case of medicines labels, a layout error may arise merely from not complying with the legal provisions. For the least rule-bound genres, the designer commits an error only if he fails to achieve his goal. For example, the layout of a medicine advertisement has failed if the physician never even gets to read the name of the product. Thus, while layout is the first thing we perceive when looking at a piece of print, there's more to it than first meets the eye.

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