

LEGIBILITY

Legibility is concerned with perception:

the degree to which individual characters or letters (glyphs) in text are understandable or recognizable as distinct from each other based on appearance.

Legibility requires that each individual character or glyph is unambiguous and distinguishable from all other characters in the font. Legibility is affected by factors such as:

- x-height
- character shapes
- stroke contrast
- size of its counters
- serifs or lack thereof
- weight.

Legibility is usually measured through speed of reading, with comprehension scores used to check for effectiveness (that is, not a rushed or careless read). Other concerns are design of typefaces for people with dyslexia, visual impairment, for highway signs, or for other conditions where legibility may make a key difference.

Some common findings of legibility research include:

- Text set in **lower case** is more legible than text set all in upper case (capitals), presumably because lower case letter structures and word shapes are more distinctive.
- **Extenders** (ascenders, descenders and other projecting parts) increase salience (prominence).

- Regular **upright type** (roman type) is found to be more legible than italic type.
- **Contrast** - without dazzling brightness. Black on yellow/cream is most effective.
- **Positive images** (e.g. black on white) are easier to read than negative or reversed (e.g. white on black). However there are exceptions in some cases of disability.
- The **upper portions of letters** play a stronger part than the lower portions in the recognition process.
- In general typefaces that are **true to the basic letterforms** are more legible than typefaces that have been condensed, expanded, embellished, or abstracted.
- Whether serifed or sans serif fonts provide the most legibility continues to be an area of contention.

In practical application some attributes of readability and legibility cross over and affect each other. Even a legible typeface can become unreadable through poor setting and placement, just as a less legible typeface can be made more readable through good design.

Sometimes legibility is simply a matter of type size. However the relationship between point size and legibility varies widely between typefaces. Type size is measured in terms of the bounding box to each letter. In digital type the size of the bounding box is largely arbitrary and parts of the letter may overhang the bounds of the box, or there may be very large spaces.

Individual letterforms can also be significantly distorted and still remain legible - a factor exploited particularly in display type and type used as graphic elements in layout.

Brush Script, contains a number of illegible letters since many of the characters can be easily misread especially if seen out of textual context.

Palatino is an example of a typeface with long extenders and open characters. It is very legible at 12pt with auto-leading (14.4pt).

Palatino is an example of a legible typeface with long extenders and open characters. Even at 8pt auto-leading it is possible to read.

Franklin Gothic is an example of a condensed typeface with proportionately short extenders and narrow characters. It is not very legible at 12pt with auto-leading (14.4pt).

Franklin Gothic is an example of a condensed typeface with proportionately short extenders and narrow characters. It needs to be at 18pt to be easily legible.

Franklin Gothic is an example of a condensed typeface with proportionately short extenders and narrow characters. It is not very legible at 12pt with auto-leading (14.4pt). This is made even worse with white on a black background

READABILITY

Readability is concerned with comprehension:

the ease in which text can be read and understood.

It refers to entire words, sentences, and paragraphs.

Each typeface has a distinct rhythm of strokes and spaces. The relationship between form and counterform defines the optimal spacing of that particular typeface and, therefore, of the overall spacing between words and lines of type, and among paragraphs. (Samara p26)

Various factors to measure readability have been used, such as "speed of perception," "perceptibility at a distance," "perceptibility in peripheral vision," "visibility," "the reflex blink technique," "rate of work" (e.g., speed of reading), "eye movements," and "fatigue in reading."

Readability is influenced by:

- **choice of legible typeface and font:** typestyle, point size, weight. Poorly designed fonts and those that are too tightly or loosely fitted can seriously impair readability. Appropriate kerning can also increase readability.
- **linespacing:** is leading too tight or too loose? Readability can be improved when generous vertical space separates lines of text, making it easier for the eye to distinguish one line from the next, or previous line.
- **line length:** research has found that the physiognomy of the eye means that the eye tires if a line requires more than 3 or 4 saccadic eye movements. Each movement is able to take in and recognise the meaning of around 3 words at once. More than this is found to introduce strain and errors in reading (e.g. Doubling).

- **column spacing** for clear separation of columns
- **justification and alignment** (design of righthand edge) and hyphenation and its appropriate use in lines of different lengths
- **tracking or letter and word spacing**
- **colour contrast**

Readability is also concerned with comprehension and communication, and the willingness of the reader to be sufficiently interested to continue to read.

A 2010 Princeton University study found that students consistently retained more information from material displayed in so-called 'ugly' fonts (Monotype Corsiva, Haettenc[s]chweiler, Comic Sans italicised) than in a simple more legible font like Arial (Wikipedia entry on Arial).

Readability also requires **well-designed hierarchy** that guides the reader through the text. Particularly where readers are likely to skim-read, clear hierarchy helps them sort the most key information and decide which details they need to look at more carefully. Hierarchy can be achieved through for example:

- combining contrasting typefaces or font styles
- using font size, colour or weight contrast
- using background colour, boxes or paragraph and column rules
- using different linelengths, tracking and alignment

HORIZONTAL SPACING: LETTERSPACING - TRACKING

Letter-spacing, usually called tracking, refers to a **consistent and uniform degree of increase (or sometimes decrease) of space between letters to affect overall density and texture in a line or block of text.**

Until the advent of phototypesetting, the term "letter-spacing" referred strictly to the adding of space between the individual letters of words set in metal type. The amount of added spacing always had to be the same between each character in increments of a minimum of 1/2 point. Fixed spaces include:

- hair space
- thin space
- en-space (half the current point size)
- em-space (same width as the current point size)

Letterspacing was expensive, involving the hand insertion of copper (1/2 pt.), brass (1 pt.), and printer's "lead" (2 pt.) spaces between individual pieces of type or between matrices on linecasting machines such as the Ludlow Typograph and the Linotype. Because of this it was avoided if possible - the only exceptions were in advertising type or, in book work, in very short phrases in capitals or small capitals, to keep the phrases from being too visually black compared to the rest of the typographic composition.

With digital software variations in letterspacing, and also word-spacing, is easy and most applications allow differing, non-standard systems of adding or subtracting letter- and word-spacing. The default setting of

letter-spacing or tracking is zero, using the widths (and kerning information) built into the font itself. Digital type sets tighter on average than metal type because of design decisions in the fonts, and the more ready availability of kerning.

Tracking adjustments are frequently used for practical reasons to fix typographical anomalies, particularly in news design. The speed with which pages must be built on deadline does not usually leave time to rewrite paragraphs that end in split words or that create orphans or widows. Tracking is increased or decreased by modest (usually unnoticeable) amounts to fix these unattractive situations.

The amount of letter-spacing in text can affect legibility and readability.

The amount of letter-spacing can also affect how text is perceived.

Added whitespace around the characters allows the individual characters to emerge and be recognized more quickly. But addition of space to the point that individual letters become isolated rather than simply easily identifiable destroys legibility and readability.

- As reading with phonetic writing systems is based in part on context, and with unfamiliar words, on phonetic pronunciation, recognition of individual characters can be aided by slightly increased letter-spacing (here +25 on 9pt text).
- Tight letter-spacing, particularly in small text sizes, can diminish legibility (here -100 at 8pt Text)

• Tight letter-spacing particularly in small text sizes can diminish legibility (here -100 at 8pt text)

- Tight default letter-spacing, or negative letter-spacing can trigger a cultural association that tight letter-spacing is associated with advertising and therefore more subjective - the equivalent of a fast-talking car salesman. Here -100 on 12pt text.
- The increase of letter-spacing in text has a cultural association of a more objective typographic voice. Here +50 on 12pt text.

HORIZONTAL SPACING: KERNING OR MORTISING

Kerning (less commonly mortising) is the **process of adjusting the spacing between individual characters in a proportional font**, usually to achieve a visually pleasing result in display type, logos and type-based graphics.

The source of the word kern is from the French word *carne*, meaning “projecting angle, quill of a pen”. The French term originated from the Latin *cardo*, *cardinis*, meaning “hinge”. In metal typesetting, kerning was labour-intensive and expensive because the matrices had to be physically modified. It was therefore only employed on letter combinations which needed it the most, such as VA or AV. A corner was notched to a consistent height on one or both sides of a letter-piece. Such notched pieces were only set against one another, not against unnotched ones, which had straight sides. The corner allowed for a character’s features to reach into the area normally taken up by the next character. For example, the top bar of a T or the right diagonal stroke of the V could hang over the bottom left corner of an A. Having a consistently shaped corner cut out allowed for using fewer pieces of type to make up all possible kerning pairs. For example, a T and V piece with kerning on the right would match the same A piece with a matching kerning indentation on the left. A kern in that sense could only bring letters closer together (negative spacing), though of course it was possible to add space between letters.

With the arrival of digital fonts, it became much easier to kern many glyph combinations. Digital kerning can go in either direction - closer or further apart.

In a well-kerned font, the two-dimensional blank spaces between each pair of characters all have similar area. Which letters need to be kerned depends on which languages the font is to be used with. Since some combinations of letters are not used in normal words in any language, kerning these is not necessary.

Non-proportional (monospaced) fonts do not use kerning, since their characters always have the same spacing.

Kerning is usually applied to letter pairs as a number by which the default character spacing should be increased or decreased.

Reducing the default character spacing is widely used:

- to fit capital letters such as T, V, W, and Y closer to some other capital letters on either side, especially A,
- and to some lower case letters on the right side, such as the combinations Ta, Te, and To.
- to fit a period (full stop) or a comma closer to these and to F and P, as well as to the lower case letters r, v, w, and y.
- Other combinations are FA, LT, and LY.

An alternative is to have ligatures for common glyph combinations, such as the French L', or the combinations ff, fi and ffi.

Increased character width is used mainly in conjunction with punctuation symbols (for example, the lower case letter f followed by right parenthesis or quotation mark) and accented letters.

Group-based kerning: The OpenType format permits group-based kerning, which facilitates kerning for fonts that have a large number of glyphs. Instead of specifying the kerning for 'Va' and 'Vá' separately, all diacritics with the base letter 'a' are placed into a group and the kerning between V and this group is specified. At the same time it is possible to add exceptions, e.g. for 'Vä', to the group. Group-based kerning is supported in nearly all modern office and desktop publishing applications.

Some typographic programs provide an autokerning feature.

Metrics: uses kern pairs, which are included with most fonts. Kern pairs contain information about the spacing of specific pairs of letters. Some of these are: LA, P., To, Tr, Ta, Tu, Te, Ty, Wa, WA, We, Wo, Ya, and Yo. InDesign uses metrics kerning by default - to disable metrics select “0”.

Optical: adjusts the spacing between adjacent characters based on their shapes. Use this when a font includes only minimal built-in kerning or none at all, or if you use two different typefaces or sizes in one or more words on a line.

However autokerning is rarely a sufficient alternative for manual kerning, as some characters may appear to an algorithmic comparison to be spaced very closely together, but to a human reader might appear to be spaced too far apart, especially when the only part of a glyph that is 'too close' is a diacritic sign.

ALIGNMENT

Alignment or range, is the

setting of text flow or image placement relative to a page, column (measure), table cell or tab.

The type alignment setting is sometimes referred to as text alignment, text justification or type justification.

Note that alignment does not change the direction in which text is read; however text direction may determine the most commonly used alignment for that script.

There are four basic typographic alignments:

Flush left. Flush left. Flush left.

Flush right. Flush right. Flush right.

Centered text. Centered text

J u s t i f i e d

Flush left

Text is aligned along the left margin or gutter, also known as **left-aligned or ragged right;**

In English and most European languages words are read left-to-right, so text is usually aligned “flush left”, meaning that the text of a paragraph is aligned on the left-hand side with the right-hand side ragged. This is the default style of text alignment on the World Wide Web for left-to-right text. Quotations are often indented.

Flush right

Text is aligned along the right margin or gutter, also known as right-aligned or ragged left;

In languages that read text right-to-left, such as Arabic and Hebrew, text is commonly aligned “flush right”. Additionally, flush-right alignment is used to set off special text in English, such as attributions to authors of quotes printed in books and magazines, and is often used when formatting tables of data.

Centered

Text can also be “centered”, or symmetrically aligned along an axis in the middle of a column. Text is aligned to neither the left nor right margin; there is an even gap on each side of each line. This is often used for the title of a work, and for poems and songs. As with flush-right alignment, centered text is often used to present data in tables. Centered text is considered less readable for a body of text made up of multiple lines because the ragged starting edges make it difficult for the reader to track from one line to the next.

People with dyslexia (particularly Scotopic Sensitivity Syndrome) find that justification helps with cognitive understanding. Judicious hyphenation is also reported to be beneficial for dyslexics.

JUSTIFICATION

Text is aligned along the left margin, and letter- and word-spacing is adjusted so that the text falls flush with both margins, also known as fully justified or full justification. The spaces between words, and, to a lesser extent, between glyphs or letters, are stretched or compressed to align both the left and right ends of each line of text.

Lines in which the spaces have been stretched beyond their normal width are called **loose lines**, while those whose spaces have been compressed are called tight lines. Patterns of vertical space between words are called **'rivers'** - these should be avoided as they detract attention from the horizontal flow of text and meaning.

It is customary to treat the last line of a justified paragraph separately by left or right aligning it, depending on the language direction. Some modern typesetting programs offer four justification options:

- left justify,
- right justify,
- center justify
- full justify.

These variants specify whether the last line is flushed left, flushed right, centered or fully justified (spread over the whole column width). In programs that do not offer this extra functionality, justify is equal to left justify.

Historical context

Justification has been the preferred setting of type in many Western languages. The classic Western manuscript book page was built of one column or two columns, considered to look "best" if it is even-margined on the left and right. When using movable type it was much easier to handle and

make amendments to large amounts of type that had words or syllables at the ends of lines than it was to respace the ends of lines. Both scribal and typesetting traditions took advantage of abbreviations (sigla), ligatures, and swash to help maintain the rhythm and colour of a justified line.

Later developments

Use of justification decreased since the middle of the 20th century following Jan Tschichold's book *Asymmetric Typography* and the freer typographic treatment of the Bauhaus, Dada, and Russian constructivist movements. Continuous casting typesetting systems such as the Linotype were able to reduce the jaggedness of the right-hand sides of adjacent lines of flush left composition by inserting self-adjusting space bands between words to evenly distribute white space, taking excessive space that would have occurred at the end of the line and redistributing it between words.

With digital desktop publishing systems graphic designers and typesetters can adjust word and letter spacing, or "tracking", on a manual line-by-line basis to achieve the same effect. Adobe InDesign evaluates the effects of all the different possible line-break choices on the entire paragraph, to choose the one that creates the least variance from the ideal spacing while justifying the lines (so as to reduce rivers), and gives the least uneven edge when set with a ragged margin. Modern word processing packages also significantly reduce the rivers effect through adjusting the spacing between characters as well as using more advanced digital typography techniques such as glyph scaling or microtypography - automatically choosing among different glyphs for the same character and slightly stretching or shrinking the character in order to better fill the line.

Hyphenation

Justification can lead to typographic anomalies.

| | | |
|--|---|--|
| w h e n justification i s used in n a r r o w c o l u m n s , exceptionally large spaces appear between only two or three words (creating what is called a loose line). | when the spaces between words line up approximately above one another in several loose lines, a distracting river of white space may appear. Rivers appear in right- aligned, left-aligned and centered settings too, but are more likely to flow in justified | text due to extra word spacing. Since there is no added white space built into a typical full stop (period), other than that above the full stop itself, full stops only marginally contribute to the river effect. |
|--|---|--|

These problems are reduced by the addition of hyphenation. With older typesetting systems and WYSIWYG word processors, this was at one time done manually, where the compositor or author added hyphenation on a case-by-case basis.

Currently, most typesetting systems (also called layout programs) and modern word processors hyphenate automatically by using a hyphenation algorithm. Professional typesetting programs almost always provide for the further use of an exception dictionary, in part because no algorithm hyphenates all words correctly, and in part because different publishers will follow different dictionaries. Different publishers may also have different rules about permissible hyphenation. Most publishers follow a basic system such as the Chicago Manual of Style or Oxford style, but will overlay their own "house style," which further restrict permissible hyphenation.