READABILITY.

GUIDE TO A NEW DESIGN PRINCIPLE

TABLE OF CONTENTS

Introduction 3

Research 4

T.R.I. (Typographic Readability Index) 7

Principle of Design 8

Components of READABILITY 9

Who READABILITY is For 12

Why READABILITY is Important 13

READABILITY in Action 14

Guidelines 15

- Typography 16
  - Size
  - Weight
  - Proportion
  - Letter-spacing
- **Color** 17
  - Text Color & Background Color
  - Color Contrast Ratio

How to Teach Readability 18

- **Teaching** 19
- **Mobile App** 20
- **Color Wheels** 21

Credits ..... 22 & 23

INTRODUCTION

This guide is intended to inform and assist design professionals, educators, and anyone interested in practicing, teaching, or learning typography. Our research has found that over 90% of people, of all ages, and all types of visual acuity are affected by difficulties due to low color contrast and small type in design. Through research, testing, and data analysis, we created a new quantifiable measurement of readability – T.R.I. (Typographic Readability Index). With consideration of font size, font weight, font proportion, letter-spacing and color contrast ratio as its main factors, TRI can be calculated and used as a reliable predictor on how readable the text will be for the general population.

RESEARCH

Low color contrast and small type (LCCST) on print materials have the potentials to cause issues on readability, comprehension, and communication among consumers. Thus, we asked the following research questions:

- *Which population (age groups, with or without visual impairment) find challenging by LCCST materials?*
- *What emotional responses do consumers have toward these materials?*
- *What characteristics (types of LCCST) appear most challenging?*
- *Which industries are most responsible for creating these materials? For what reasons?*

RESEARCH

Twenty-five print materials were selected, categorized and recreated as testing stimuli, which have varying ranges of readability. We surveyed over 100 U.S.. consumers, and asked the participants rate the redability of the stimuli one at a time, in a scale of 1 to 5 (from “Very Easy to Read” to “Extremely Difficult or Impossible to Read”. Afterwards all scores for each specific stimulus were totaled and looked at against all the other stimuli to see at what number on our scale people are unable to read the text on the stimuli.

From our research we found that small font size and low color contrast present readability issues among over 90% of the population; **font size (FS)**, **color contrast ratio (CC)**, **font weight (FW)**, **font proportion (FP)**, and **letter-spacing (LS)** are the major factors affecting readability.

The **product of these five factors** which we termed as **Typographic Readability Index (TRI)** is highly corelated with redability rating (**$R^2 > .94$**). An ideal TRI (**≥ 50**) indicates a good readability.

1	2	3	4	5
Very Easy to Read	Normal (Readable)	A Little Difficult to Read	Very Difficult to Read	Extremely Difficult or Impossible to Read

READABILITY SCALE

FS	**Font Size**	**Point Size** (x-height measured in point system)				
FW	**Font Weight**	Ultra Light	Light	Regular	Bold	Extra Bold
		x 0.5	**x 0.75**	**x 1**	**x 1.25**	**x 0.75**
FP	**Font Proportion**	Ultra Condensed	Condensed	Regular	Extended	Ultra Extended
		x 0.5	**x 0.75**	**x 1**	**x 1.25**	**x 0.75**
LS	**Letter-Spacing**		Tight	Regular	Loose	
			x 0.75	**x 1**	**x 1.25**	
CC	**Color Contrast**	**Contrast Ratio** (between text color and background color)				
RECOMMENDATIONS		FS ≥ 7 + CC ≥ 3 + TRI ≥ 50				

TRI (Typographic Readability Index)

PRINCIPLE OF DESIGN

WHAT IS READABILITY?

Readability is the ease with which a reader can understand a written text. For this study, our focus is on the presentation and typographic aspects of body copy on print materials. Understanding the importance of readability and how to incorporate it into design can greatly improve design work in allowing materials to be communicated to a broader range of viewers.

COMPONENTS OF READABILITY

TYPOGRAPHY & COLOR

TYPOGRAPHY

The principle of Readability encompasses two main components — Typography and Color. Each component includes several subcategories. Typography includes font size, font weight, font proportion, and letter-spacing, while color includes text color, background color, and color contrast ratio.

When referring to the components of readability, it is important to understand the terminology in reference to the Readability. Font size refers to the X-height measured in point system, font weight refers to the thickness of a character outline, font proportion refers to the width of a character is relation to its height, and letter-spacing refers to the spacing between characters. Along with the contrast ratio between text color and background color, all these components work together to determine a text's Readability.

COLOR

The readability of text is depending upon both text color and background color. The color contrast ratio (ranges from 1 to 21) can be plugged into the TRI formula. A color contrast ratio of greater than 3:1 is recommended for body copy to make sure the text is readable.

WHO READABILITY IS FOR

Design professionals, educators, and anyone interested in practicing, teaching, or learning typography.

WHY READABILITY IS IMPORTANT

Small font size and low color contrast present readability issues among over 90% of the population. This problem exists in everyone's daily life, and most consumers felt negatively when they can not read the text. Graphic designers are responsible for making these design decisions and we should work together and solve this problem and make the world around us more visible.

READABILITY IN ACTION

Here you can find typographic guidelines and tips for how to teach the READABILITY principle. This section is to aid in teaching graphic design students and anyone else who is interested in typography and design.

READABILITY GUIDELINES

Rules on TYPOGRAPHY & COLOR

TYPOGRAPHY RULES

FONT SIZE

The point size determines the x-height of the characters, measured in point system. Any body copy smaller than 7 points becomes too difficult to read.

FONT WEIGHT

Font weight is the thickness of the character outlines relative to their height. When formatting text for readability, it is advised to avoid using exceptionally light or bold weights as thin stoke or the lack of white space makes the text more difficult to read.

Designers will generally want to choose a typeface with a weight between light to bold.

FONT PROPORTION

Font proportion refers to the width of a character in relation to its height. Exceptionally condensed or expanded proportions reduce the overall TRI.

Designers will generally want to choose a typeface with a proportion range from condensed to extended.

LETTER-SPACING

Letter-spacing (or tracking) is the spacing between characters in text. If the letterforms are too close together or too spaced out the type becomes unreadable.

TEXT COLOR
VS.
BACKGROUND COLOR

The text color is the color of the type where as the background color is the color that the design is on. These two colors are used to find out the color contrast ratio.

COLOR CONTRAST RATIO

Color Contrast is how readable the text is in relation to the background color. Any color contrast ratio lower than 3:1 will be considered too low for the body copy to be readable.

COLOR RULES

HOW TO TEACH READABILITY

This section introduces a few helpful tools that can aid in the teaching of the design principle of READABILITY to your classroom.

TEACHING

When using the Readability principle as a teaching tool, one must show the students WHY the designs they create can sometimes be unreadable.

It would be best to first demonstrate how to identify font size, font weight, font proportion, letter-spacing as well as color contrast ratio, and calculate Typographic Readability Index. When design students are creating their initial designs, let them measure how readable the text is by using the TRI formula and create a baseline data. TRI should also be used whenever they make a major adjustments to their text which may impact its readability.

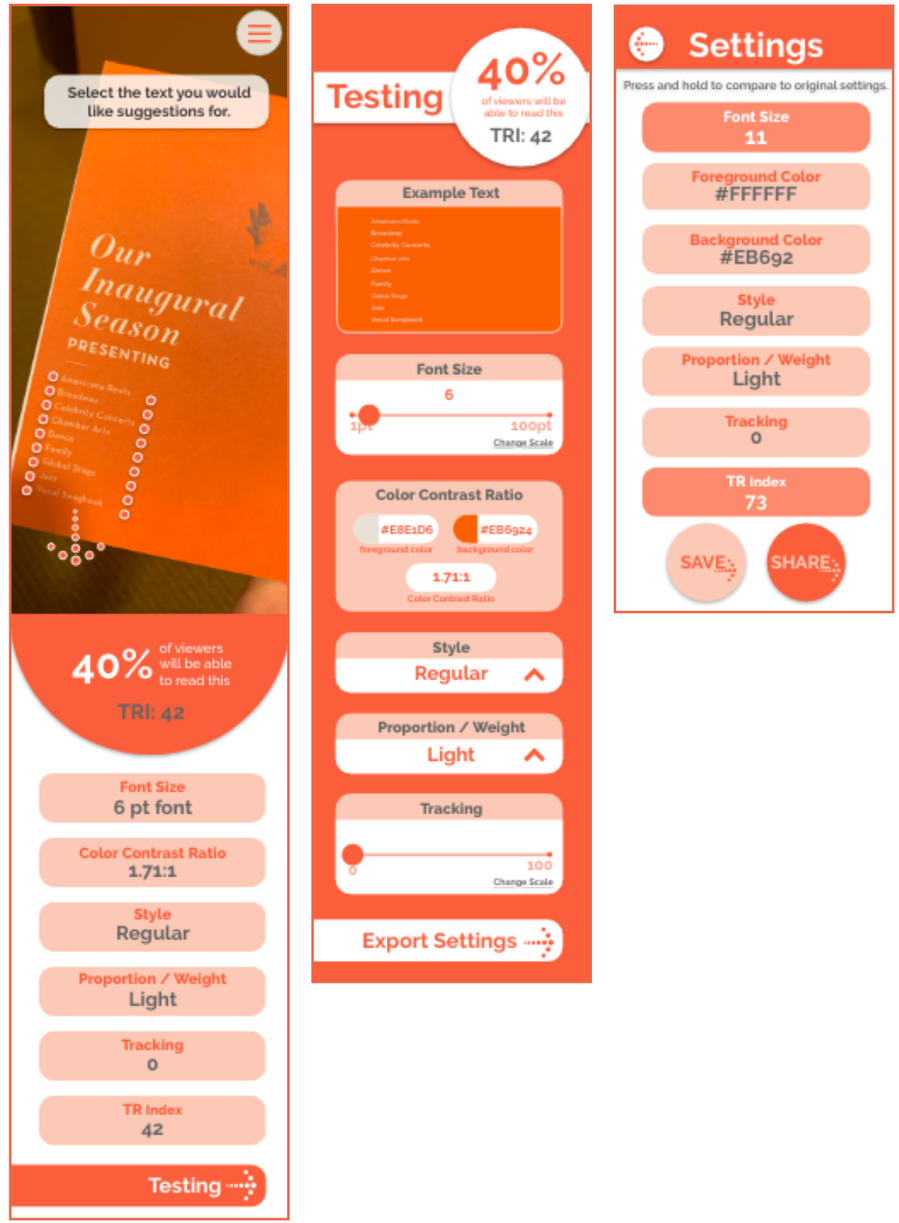
Magnifeye® color wheels can be used to measure color contrast ratios and give recommendation on alternative colors for improving text readability.

Readability® App is a handy tool to allow designers find out the TRI simply by taking a picture of their designs using a mobile phone. This app also provides a built-in TRI calculator which can be used to adjust any of the five factors for predicting readability.

Both can be found through the website: www.nowyouseeme.us

READABILITY APP

Readability® App is a very helpful tool in determining a text's TRI and how readable it is to viewers. The app works by holding up the in-app camera to capture any print material, it then scans the image and highlights any areas of text that has a low TRI (< 50). The user can select the text and view the percentage of viewers that would be able to read this text along with suggestions on how to make the text more readable. From there, the user can test different text and/or color settings in real-time and view the results as the percentage of readability updates. Once the optimal settings have been achieved, the user can save or share their settings to use as a guideline in their original design document.



COLOR WHEELS

Magnifeye® color wheels allow designers to be hands on when it comes to picking out a color scheme. We have a variety of wheels to cover different color palettes so that it can benefit any project.

The color wheels are made of three panels: one interior and two exterior. The interior panel is printed on front and back with the color contrast ratios that correspond with the matching exterior panel. Each of the two exterior panels features the percentages of the color presented on exterior panel along with a corresponding dye cut to reveal the ratio. Our wheels rotate to reveal six different color combinations and ratios with each turn and come in a variety of color combinations including pantone and CMYK.

We hope that this guide is a useful teaching tool that helps all future and current designers understand the Readability of their designs and how they affect the viewers. We hope through sharing our research findings, both professors and students can begin to use the TRI to measure text readability and change their designs for the better. Our new design principle is one that we hope will stand the test of time for decades to come and be expanded upon. Thanks for reading and happy designing.

— Readability Crew

CREDITS

Writers & Designers:	Myracle Dorsett
	Noel Shorts
	Shreyank Shivaprasad
	Mary Grace Stanley
	Ruoyu Tang
Professor:	Wei Wang
Class:	GDES 4240 Graphic Design I
	Fall 2019

Special thanks to **Mr. Jerry Link**, for giving us this exciting project topic to work on for this semester.