Comparing Serif and Sans Serif Typeface Pairings on Maps

by

Nathan Finden

A Thesis Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Science in Technology

Approved April 2018 by the
Graduate Supervisory Committee:

Laurie Ralston, Chair
Christina Carrasquilla
William Westover

ARIZONA STATE UNIVERSITY

May 2018

ABSTRACT

When cartographers and graphic designers create maps they choose typefaces. Often, serif and sans serif typefaces are paired together to represent different information on a map. Typefaces have a communicated tone and choosing the correct typeface combination to send the intended message can be challenging. The purpose of this study was to create an analysis of the aesthetic characteristics of typeface pairings to assist map creators when choosing typefaces. An online survey was utilized to collect responses from graphic designers who have been trained in at least one year or more in design from a higher education institution. There were 30 participants in the study and they scored 24 typeface pairings, 12 differentiating and 12 superfamily, on 48 maps. Scoring was done on eight aesthetic characteristics: friendly, whimsical, cheap, neutral, bland, corporate, serious and modern. The researcher conducted an analysis of each typeface's microaesthetics and then compared these to the survey's scored aesthetic characteristics. It was concluded that there are many factors that go into comparing the typeface pairings of serif and sans serif typeface combinations. However, a selection of a superfamily typeface pairing is better than selecting a differentiating pairing. Future research should focus on conducting studies with a varying amount of typeface styles. Also, to include less maps per survey and a survey completion status bar.

TABLE OF CONTENTS

CHAPTER Page

APPENDIX Page

LIST OF FIGURES

Figure Page

LIST OF TABLES

Table Page

CHAPTER 1: INTRODUCTION

When communicating language in the written form, type is utilized to combine letters together to form words (Cheng, 2005). As soon as the text is joined together with a typeface there becomes a harmony that needs to be conducted with precision and care (Bringhurst, 2008). Typefaces give off a certain aesthetic depending on their design and the decision on which typeface to choose should depend on the function (Crisp, 2012). The decision on typeface selection influences how one interacts with a printed piece or a physical environment (Harkins, 2013). A design, and even the entire impression of a company, may communicate a different message depending on the typeface chosen (Harkins, 2013).

The combining of typefaces is typically done to bring attention to selected text, or to apply contrast to different groupings of information (Marshall, 2012). Graphic designers with years of practice can have difficulty pairing typefaces together, and novice designers an even more difficult time (Carter, 2013). Cartographers, with no experience in design, or history in typography, will have an even more challenging time combining typefaces (Guidero, 2016).

A map's text is imperative to the end goal of the map, which is to communicate information to the viewer (Dent, 1999). Text on maps can be broken out into the different sections of a map: title, legend, data source, scale and mapped area (Slocum, McMaster, Kessler, and Howard, 2005). Text that has been placed on a map instantly becomes important as the typeface selection, location on the map and anything the text overlaps impacts the visual messaging (Robinson, Morrison, Muehrcke, Kimerling, and Guptill, 1995). When cartographers and graphic designers create maps they will often combine serif and sans serif typefaces, and this combination will effect the readability and overall messaging

of the map (Guidero, 2016). Man made and natural features on a map are routinely designed with different typefaces (Keates, 1973). Overall, the message being communicated should match the intended audience and the brand (Guidero, 2016).

By examining the aesthetics of typeface pairings on a city and topographic map, this thesis research will attempt to discover which serif and sans serif typeface combinations communicate a certain tone. Additionally, an examination of the microaesthetics of serif and sans serif typeface combinations will be conducted to compare the similarities and differences between them. Microaesthetics refers to the small differences in the shape and endings of a type's character. This could be the angle of the legs on the uppercase 'M', the roundness of the tail on the lowercase 'y' or the roundness of the lowercase 'c'. The goal is to assist the map creator in choosing typeface combinations that will communicate the intended message.

Need for the Project

Combining typefaces can be a challenging endeavor. Between all of the different sizes, weights and styles of type, creating a pleasing combination can get complicated. When designing maps, making these types of decisions is vital. If a map is detailed enough, two typefaces will often be selected for the different features to create contrast and increase readability. There has been much written on the combination of typefaces, along with the relationship between the letterforms, and what those typefaces communicate from authors such as: Robert Bringhurst, Erik Spiekermann and Lindsey Marshall. What has been found lacking is any information on studies between serif and sans serif combinations in regards to their communicated tones on maps. This study will build on the knowledge of previous studies on typeface communicated messaging and the microaesthetics of typefaces, while also

addressing the lack of information in regards to serif and sans serif typeface combinations on maps.

Research Question

This thesis research will examine different typeface combinations on two different maps to answer the following question: What is the preferred typeface combination for use on topographical and digital city maps by graphic designers to create a particular tone?

Research Objectives

In beginning to examine serif and sans serif typeface combinations on maps, one must understand the complexity and issues behind combining typefaces. An examination of the communicative nature of typography itself, regardless of the medium, needs to occur. The different aspects of letterforms, which are the foundation of what typography communicates, must first be examined. The objectives of this study are:

- Identify the different styles of typefaces
- Explore two categories of typeface pairings: superfamily and differentiating
- Identify the microaesthetics of the individual typefaces
- Compare and contrast the two typeface pairing categories
- Determine which typeface pairings have attributable aesthetics on two different types of maps: topographical and city

Limitations of the Project

Five super family typefaces identified during the research portion were not able to be used due the cost of purchasing them. Creating each of the maps took a considerable amount

of time. Due to the amount of time required to not only create the various maps, but also test them, only two maps were designed for the study.

Summary

Typefaces have an aesthetic and communicate a particular tone (Crisp, 2012). Typeface selection needs to be made with great care as it creates a harmony with the text (Bringhurst, 2008). Combining typefaces is a difficult task, one that experienced graphic designers struggle with along with beginner designers (Carter, 2003). Cartographers select typefaces by combining serif and sans serif typefaces on a single map to distinguish between different features (Guidero, 2016). The purpose of this study is to help cartographers make typeface combination selections to pair the tone of the typefaces along with the intended purpose of the map.

CHAPTER 2: LITERATURE REVIEW

Type Anatomy

In beginning to examine type, outlining definitions and categories can be useful (Harkin, 2013). Typography can be classified as fonts, families and typefaces. Typefaces are a group of types that have been created to appear similar. Families refer to the weight of the type such as bold or thin and fonts can be referred to as either family or the typeface (Harkins, 2013).

While there is no designated vocabulary for the different parts of a character, typographers do utilize designated terms (Cheng, 2005). Type anatomy can be examined by the different sections of the character including (Williams, 2012; Cheng, 2005):

- Arm – the horizontal sections of the uppercase 'E'
- Bowl – the curve section of the lowercase 'c' or 'p'
- Leg – the lower-right diagonal section of the uppercase 'R'
- Link – the small section connecting the two bowls on the lowercase 'g'
- Ear – section on the top-right of the lowercase 'g' that sticks out from the bowl
- Tail – the section of an uppercase 'Q' that ends below the baseline
- Stem – the vertical sections on an uppercase 'I' or 'H'

Type height sections can also be defined as (Harkins, 2013; Cheng, 2005):

- Ascender – the section that extends above the x-height to the capital height
- Capital height – the top line of a character
- x-height – the height of the lowercase 'x'
- Baseline – the bottom line that characters sit on

• Descender – the section of the letter below the baseline

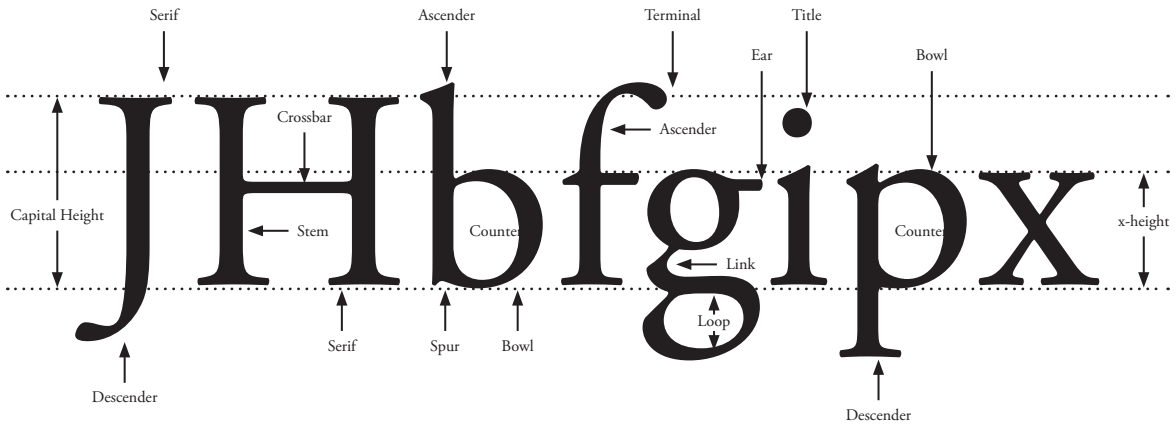
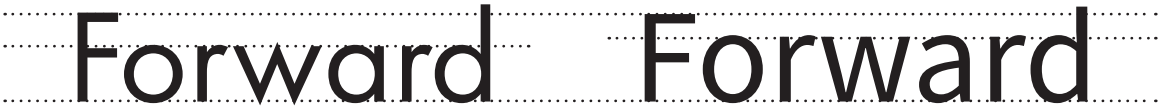


Figure 1: Type Anatomy
(Williams, 2012)

The x-height can be a different height depending on the typeface (Willen and Strals, 2009). Taller x-heights began to be designed in the twentieth century (Lupton, 2004). When the x-height is taller, the overall look of the letter appears larger as shown in Figure 2 below (Willen and Strals, 2009).



50-pt Futura 50-pt Source Sans Pro

Figure 2: x-height comparison

Typography Classifications

Classifying type is useful to understanding type and when doing typeface combination selections (Haley, n.d.). Historically speaking, type has been created for an intended purpose and the location and time of its creation is a factor (Cheng, 2005). The

design of typefaces is greatly influenced on the time period of its origin (Crisp, 2012). The classifications are a start in to understanding the styling of different typefaces, but doesn't necessarily define a typeface as many typefaces can be grouped in to more than one classification (Willen and Strals, 2009). "Any type classification system is subject to argument and exception" (White, 2005, p. 49).

The classifications of type have evolved over the course of the last century as more typefaces have been created. The list of categories depends on who is defining it, as in 1970, the British Monotype Corporation listed 34 categories, while in 2012 it listed almost 100 (Crisp 2012). In 1962, The Association Typographique Internationale (ATypl) adopted the Vox-ATypl system that divided the 11 classifications (Harkins 2013). As of the 2010 ATypl conference, which voted to add Gaelic as a category, the official list of typefaces consists of (Alessio, 2013, June 19; Alessio, 2013, April 17):

- Serif:
    - Humanist
    - Garalde
    - Transitional
    - Didone
    - Slab Serif
- Sans Serif:
    - Grotesque
    - Neo-grotesque
    - Geometric
    - Humanist

- Calligraphics:
    - Glyphic
    - Script
    - Graphic
    - Blackletter
    - Gaelic

Table 1: Vox-ATypl Typeface Classifications

Grouping	Classification	Example – 12 pt	Typeface
Serif	Humanist	Jackdaws love my big sphinx of quartz	Jenson
	Old face	Jackdaws love my big sphinx of quartz	Bembo
	Transitional	Jackdaws love my big sphinx of quartz	Baskerville
	Didone	Jackdaws love my big sphinx of quartz	Bodoni
	Slab Serif	Jackdaws love my big sphinx of quartz	Rockwell
Sans Serif	Grotesque	Jackdaws love my big sphinx of quartz	Franklin Gothic
	Neo-grotesque	Jackdaws love my big sphinx of quartz	Univers
	Geometric	Jackdaws love my big sphinx of quartz	Futura
	Humanist	Jackdaws love my big sphinx of quartz	Gill Sans
Calligraphic	Glyphic	JACKDAWS LOVE MY BIG SPHINX OF QUARTZ	Trajan
	Script	Jackdaws love my big sphinx of quartz	Mistral
	Graphic	JACKDAWS LOVE MY BIG SPHINX OF QUARTZ	Banco
	Blackletter	Jackdaws love my big sphinx of quartz	Fraktur
	Gaelic	Jackdaws love my big sphinx of quartz	Gaelige

Microaesthetics

By examining the mathematical sections of type and categorizing different shapes, a vocabulary begins to form on how to reference different typefaces. The reality is that graphic designers usually gravitate to and choose a particular typeface just because they like it (Spiekermann, 2014). However, type can be examined by looking at the differences in the weight, widths and angles (Kunz, 2000). "Microaesthetics encompass the form, size, weight, and relationship of secondary elements: typeface characteristics; letterforms and counterforms; and spacing between letters, words, lines, and other graphic elements" (Kunz, 2000, p. 98). Guidero (2016) breaks down the definition of microaesthetics further to be the individual parts, or sections, of a letterform. This could be the slant of the tail on the letter 'y', or the roundness of the bowl on the letter 'o'.

Pairing Typefaces

Currently, there are thousands of typefaces to choose from. "From 1985 to 2000, thousands of digital typefaces reached the market. Bona-fide type designers, alongside amateurs, created digitized typefaces based on traditional fonts, hybrid fonts, and completely new font types" (Crisp, 2012, p. 238). When starting a project, beginning designers can have a difficult time in making typeface decisions and the decision should not be conducted on one's personal opinion, but rather on what the aesthetics that the typeface communicates (Harkins 2013). "Brands have to speak their own authentic language. Type is visible language. Using a bland or overused typeface will make the brand and its products or media equally bland and even invisible" (Spiekermann, 2014, p. 77).

In discovering the typeface pairing that meets the intended message, there are an

infinite amount of possible combinations (Crisp 2012). There are many opinions when it comes to the selection of combining typefaces. When designers emphasize different types of information they routinely use contrasting typefaces (Marshall 2012). If one needs to use more than one typeface, then there needs to a definitive contrast between the two typefaces (Harkins, 2013). When viewing typeface families, there is a relationship between them due to their similar shapes. The relationship changes when serif and sans serifs are introduced, which creates a different visual effect, but keeps a harmonization between the typefaces (Crisp 2012). "If you've chosen a family that includes a matched sanserif, your problems may be solved. But many successful marriages between serifed and unserifed faces from different families are waiting to be made (Bringhurst, 2008, p. 105)."

Typeface superfamilies are typefaces that have been designed specifically to have similar visual elements between the serif and sans serif options (Strizver, n.d.). Sometimes the serif and sans serif options are created together, while other times one or the other will be added at a later date (Harkins, 2013). When combining serif and sans serif typefaces, superfamilies are the most straightforward way to go about achieving a good design (Ellison, 2015). The following are superfamily typeface combination recommendations that have been discovered during research.

- Carson (2017):
    - Meta Serif and Meta
    - Freight Sans and Freight Text
    - Calluna and Calluna Sans

- Crump (2008):
    - Aptifer Slab and Aptifer Sans
    - Legacy Sans and Serif
- Krygier and Wood (2016):
    - Stone Sans and Stone Serif
- Spiekermann (2014):
    - Lucida and Lucida Sans
    - ITC Stone Serif and Sans
    - ITC Officinia Serif and Sans
- Harkins (2013):
    - FF More and FF Good
    - FF Amman Sans and Serif
- Marshall (2012):
    - Stone Serif and Sans

The following are superfamily typeface combination recommendations that are personal selections:

- Compatil Fact and Letter
- Generis Sans and Serif
- Source Sans and Serif

Table 2: Superfamily Typeface Combinations

Typeface	Weight	Classification	Serif type	Year released	Designer/Foundry
Aptifer Sans	Regular	Grotesque	Sans	2006	Martin Thavenius/Linotype
Aptifer Slab	Regular	Slab Serif	Serif	2006	Martin Thavenius/Linotype
Calluna	Regular	Humanist	Serif	2009	Jos Buivenga/exljbris
Calluna Sans	Regular	Humanist	Sans	2009	Jos Buivenga/exljbris
Compatil Fact	Regular	Humanist	Sans	2000	Olaf Leu/Linotype
Compatil Letter	Regular	Humanist	Serif	2000	Olaf Leu/Linotype
FF Amman	Regular	Garalde	Serif	2011	Yanone/Font Font
FF Amman Sans	Regular	Grotesque	Sans	2011	Yanone/FontFont
FF Good	Medium	Grotesque	Sans	2007	Lukasz Dziedzic/FontFont
FF More	Book	Garalde	Serif	2010	Lukasz Dziedzic/FontFont
Freight	Book	Slab Serif	Serif	2009	Joshua Darden/GarageFonts
Freight Sans	Book	Neo-grotesque	Sans	2005	Joshua Darden/GarageFonts
Generis Sans	Book	Humanist	Sans	2006	Erik Faulhaber/Linotype
Generis Serif	Book	Humanist	Serif	2006	Erik Faulhaber/Linotype
ITC Officina Sans	Book	Grotesque	Sans	1990	Erik Spiekermann and Ole Schäfer/ITC
ITC Officina Serif	Book	Slab Serif	Serif	1990	Erik Spiekermann and Ole Schäfer/ITC
ITC Stone Sans	Medium	Geometric	Sans	1987	Sumner Stone/Adobe
ITC Stone Serif	Medium	Didone	Serif	1987	Sumner Stone/Adobe
Legacy Sans	Book	Humanist	Sans	2000	Ronald Arnholm/ITC
Legacy Serif	Book	Humanist	Serif	2000	Ronald Arnholm/ITC
Meta Serif	Regular	Humanist	Serif	2007	Erik Spiekermann and Akaki Razmadze/FontFont
Meta	Normal	Humanist	Sans	1991	Erik Spiekermann and Akaki Razmadze/FontFont
Source Sans	Regular	Neo-grotesque	Sans	2012	Paul Hunt/Adobe
Source Serif	Regular	Garalde	Serif	2012	Frank Griesshammer/Adobe

The following are differentiating typeface combination recommendations that have been discovered during research.

- Bringhurst (2008):
    - Frutiger and Meridien

    - Syntax and Minion
    - Futura and Bodoni
    - Helvetica and Clarendon
- Bonneville (2010):
    - Souvenir and Futura Bold
- Harkins (2013):
    - Garamond and Gill Sans
    - Garamond and Helvetica
    - Garamond and Akzidenz Grotesk
- Mills (2017), which only looks at combinations of Google fonts:
    - Roboto Slab and Open Sans
    - Roboto and Roboto Slab
- Carson (2017):
    - Helvetica Neue and Garamond
    - Caslon and Myriad
    - Bembo and Gill Sans
    - Bembo and Lucida Grande
    - Caslon and Gill Sans
    - Caslon and Lucida Grande
    - Garamond and Gill Sans
    - Garamond and Lucida Grande

- Spiekermann (2014):
    - Joanna and most of Frutiger's types
    - Gill Sans and most of Frutiger's types

Table 3: Differentiating Typeface Combinations

Typeface	Weight	Classification	Serif type	Year released	Designer/Foundry
Akzidenz Grotesk	Regular	Grotesque	Sans	1898	Berthold
Bembo	Regular	Garalde	Serif	1928	Monotype
Bodoni	Book	Didone	Serif	1798	Giambattista Bodoni
Caslon	Regular	Humanist	Serif	1990	Carol Twombly/Adobe
Clarendon	Regular	Slab Serif	Serif	1820	Hermann Eidenbenz/ Linotype
Frutiger	Roman	Humanist	Sans	1970	Adrian Frutiger/Linotype
Futura	Book	Geometric	Sans	1926	Paul Renner/Bauer
Futura Bold	Demi	Geometric	Sans	1926	Paul Renner/Bauer
Garamond	Roman	Garalde	Serif	1495	Claude Garamond
Gill Sans	Regular	Humanist	Sans	1928	Eric Gill/Monotype
Helvetica	Regular	Neo-grotesque	Sans	1957	Max Miedinger/Haas
Helvetica Neue	Regular	Neo-grotesque	Sans	1983	Max Miedinger and Edik Ghabuzyan/Linotype
Joanna	Regular	Garalde	Serif	1930	Eric Gill/Monotype
Lucida Grande	Regular	Humanist	Sans	2000	Charles Bigelow and Kris Holmes/Bigelow & Holmes
Meridien	Roman	Humanist	Serif	1957	Adrian Frutiger/Linotype
Minion	Regular	Humanist	Serif	1990	Robert Slimbach/Adobe
Myriad	Regular	Humanist	Sans	1992	Robert Slimbach and Carol Twombly/Adobe
Open Sans	Regular	Neo-grotesque	Sans	2010	Steve Matteson/Ascender Corporation
Roboto	Regular	Neo-grotesque	Sans	2011	Christian Robertson/Google
Roboto Slab	Regular	Neo-grotesque	Serif	2011	Christian Robertson/Google
Souvenir	Medium	Humanist	Serif	1914	Morris Fuller Benton/ American Type Founders
Syntax	Regular	Humanist	Sans	1968	Hans E. Meier/Linotype

Cartography and Graphic Design

There is a direct correlation between cartography and graphic design (Aronston, 2003, 2). In the design of information, cartography and graphic design both achieve the same results by communicating graphically (Slocum, McMaster, Kessler, and Howard, 2005). While cartographers are not typographers, they should be able to identify the characteristics that a typeface communicates and pick the appropriate one for the map design (Keates, 1973).

Typefaces on Maps

Choosing the typeface for a map offers one of the most creative decisions to be made in the design of the map (Robinson, Morrison, Muehrcke, Kimerling, and Guptill, 1995). The map designer needs to have a basic understanding of typography, as the typeface decision and location of the type will be the biggest factors in the design process (Dent, 1999). The most important aspect of the text is legibility and readability (Meszaros, 2004; Robinson et al., 1995). "Labels are one of the most important elements on the map as they can provide more information than other symbols can" (Deeb, Ooms, Vanopbroeke, and De Maeyer, 2014, p. 75) Other text that occurs on a map are primarily in the legend and title, although there may be some smaller descriptive text if necessary (Dent, 1999).

Type elements consist of visibility and recognition, with the measurement tool being the type's size, style, form and color (Robinson et al. 1995). The type's line weight should be bold enough to be read, which means the type height needs to not be too small, and the overall design not appearing to be cramped (Meszaros, 2004). Type designed correctly on a map can greatly enhance the visual aesthetics of the map, and the readability will increase

as well (Slocum et al., 2005). The viewer may never realize the well-designed type, but they will identify poorly designed type, and the map will suffer because of it (Keates, 1973). Typography not executed properly on a map will diminish legibility and the map's intended purpose will be impacted (Dent, 1999). Poor and well-designed map typography is exhibited in the following figure (Figure 3).

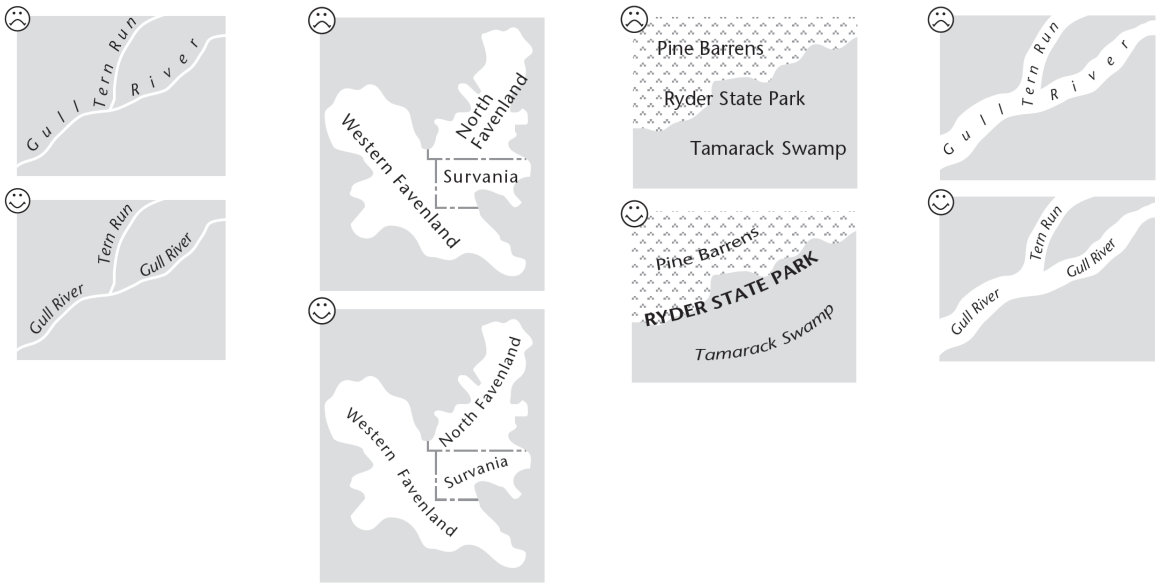


Figure 3: Poor and Well-designed Map Typography
(Krygier and Wood, 2011)

Type on a map is read differently than text in posters, books or magazines. This is because a single word is often left by itself, whereas text in a book is combined with other words to make a sentence (Dent, 1999). A word on a map could be overlapping other elements, such as colors, lines and icons (Keates, 1973). Oftentimes, the letter spacing is increased to cover a large area on the map (Kraak and Ormeling, 2003). With all of the different words on a map, similar elements should utilize the same typeface for consistency (Slocum et al., 2005).

In terms of communicating a visual tone, typefaces are an important aspect in the design process of a map (Tyner, 2010). Depending on the chosen typeface, the visual impact can be formed to the tone and mood of the map's purpose (Krygier & Wood, 2011). Map viewers instinctively interpret typefaces and assign a particular mood to it (Robinson et al., 1995). Creating a mood has to do with knowing the goal and viewers. A typeface communicates a particular visual language and should be chosen carefully to create the intended mood, while at the same time not drawing too much attention to themselves ("Labeling and text hierarchy," n.d.).

Map Typeface Selection

Typeface selection needs to be considered with the entire graphic of the map in mind. Adequate contrast needs to achieved through the different labeling of map elements and the icons (Keates, 1973). When selecting a typeface, one needs to not only choose from the many options available, but also examine the various font weights in the typeface family (Tyner, 2010). On a map, script typefaces can suffer from readability issues, and appear strange (Krygier & Wood, 2011). Decorative typefaces should not be used as legibility suffers. Additionally, limit the amount of bold and italic stylizing (Slocum et al., 2005). The map's design will have more unity if the typeface styles are limited, with natural features being an italic font and man-made structures being a regular font (Robinson et al., 1995). Water features are often represented in an italic font (Slocum et al., 2005).

Map Typeface Combinations

If one needs to use more than one typeface on a map, do not use more than two, and have the typefaces be completely different such as a serif and a sans serif (Slocum et al.,

2005). Cartographers typically utilize different styles in a typeface family to differentiate between map features, although this can become busy quickly (Robinson et al., 1995). The primary way to create contrast is to utilize serif and sans serif typefaces, as small differences in type will go unnoticed by the viewer (Keates 1973). When combining typefaces, either have them be a part of a superfamily or they need to be examined for visual harmony (Krygier & Wood, 2016). When combining typefaces for visual compatibility, utilize only one serif and one sans serif in bold and italic style variations (Tyner, 2010). Two sans serif or two serif typeface combinations should be avoided (Krygier & Wood, 2011; Tyner, 2010). "Maps often pair serif typefaces with sans serif typefaces; it is cartographic convention to use serif typefaces for physical features such as hydrography and mountain ranges, and sans serif typefaces for cultural or political features such as cities and structure names" (Guidero, 2016, p. 119). Serif or sans serif can be utilized in the text, with serif typefaces for constructive features and sans serif for environmental features (Slocum et al., 2005).

Summary

Research identified the need for a greater understanding of typeface combinations on maps. In examining type it is useful to understand the different sections of the letterform (Harkins, 2013). Text can have the same point size, but with a different x-height, and the text will appear larger or smaller depending on the x-height (Willen and Strals, 2009). Classifying typefaces is a start to understanding the overall characteristics of type and will assist when making typeface combination selections (Haley, n.d.). Type can be examined based on its microaesthetics, which are the small differences in the characteristics of a letterform (Kunz, 2000).

The number of typefaces to choose from has grown at a rapid rate since the personal computer was invented (Crisp, 2012). When needing to show contrasting information, serif and sans serif typefaces will be selected (Marshall 2012). The most straightforward way of combining typefaces is go with a superfamily typeface (Ellison, 2015). Map typeface selection is important as it will set the communicated tone (Krygier & Wood, 2011). In map design, natural features will normally be shown in a serif typeface, while physical features are shown in a sans serif typeface (Guidero, 2016).

CHAPTER 3: METHODOLOGY

Study Design

The data collected during this study was obtained using a cross-sectional survey, conducted online, with the option being an e-mail to the participants. The population for the study are those in the graphic design field, over the age of 18, who have completed at least one year of typography courses at an accredited four-year graphic design program. Data will be collected through an e-mailed SurveyMonkey survey. The setting will vary depending on the subject's location where they choose to complete the survey.

Methodology Process Map

The methodology for this study is shown in the following figure (Figure 4).

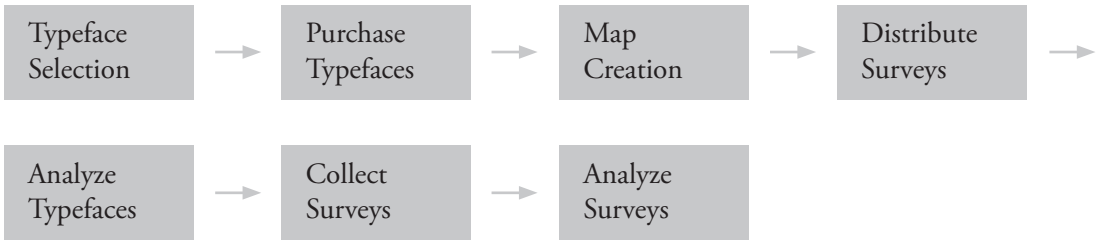


Figure 4: Methodology Process Map

Typeface Selection

To begin, a combination of 24 typeface pairings were selected from research conducted in typography books and online articles, which can be found in Tables 1 and 2 in chapter 2. As typeface pairings are subjective, utilizing established experts in the typography field discounts a novice's individual opinion. The 24 typeface pairings were divided up into two different categories: superfamilies (typefaces created that have serif and sans serif fonts),

and differentiating that were created separately, but may have similar size, stroke weight, font type, etc.

Twelve typeface pairings were found for the superfamily category, while 20 were found for the differentiating category. An analysis of the typeface pairings for the differentiating category was conducted and typefaces that appeared in multiple results, such as Garamond, were reduced from 4 to 2. The pairing of Garamond and Gill Sans was recommended from 2 different sources, which eliminated another result. The final step was to look at similar visual characteristics of typefaces, such as Helvetica and Akzidenz Grotesk, and make the reduction down to 12 typeface pairings for the differentiating category.

Purchase Typefaces

Typefaces were obtained through Adobe Typekit — available with an Adobe Creative Cloud subscription, a Monotype Library subscription and the author's personal collection.

Map Creation

A city and topographical map were created for the participant survey. The city map of Washington D.C. was obtained from the Open Vector Maps website at https://openvectormaps.com.The topographic map of Telluride, CO was downloaded from the United States Geological Survey (USGS) website at https://viewer.nationalmap.gov/basic/. Both map files were imported to Adobe Illustrator where they were visually altered and configured with the different typeface pairings. Each map was comprised of one of the 24 typeface pairings, for a total of 48 maps.

Creating and Distributing Survey

A cross-sectional survey was created in SurveyMonkey. Each map's typeface pairing was judged on eight aesthetics with a score of zero to six. The 48 maps were divided into three separate surveys A, B and C. Each participant viewed 16 maps, eight of each of the two map types. The three groups each viewed different sets of maps, ensuring that all of the 48 maps were viewed, but none overlapped.

The aesthetics used included: friendly, whimsical, cheap, neutral, bland, corporate, serious and modern. These semantics were taken from a previous study (Guidero 2016) of microaesthetics on typography in maps. Guidero had reduced the number to eight from previous studies (Rowe 1982; Tantillo, Di Lorenzo-Aiss, and Mathisen 1995; Brumberger 2003) where they had upwards of 20 aesthetics. The survey was emailed to undergraduate graphic design students at Arizona State University, the author's personal graphic designer contacts and posted on the Facebook group Phoenix Designers, shown in Figure 5. The survey participants were graphic designers who met the study design criteria: in the graphic design field, over the age of 18, and who have completed at least one year of design courses at an accredited four-year graphic design program. This group was a sample of the overall population of graphic designers.

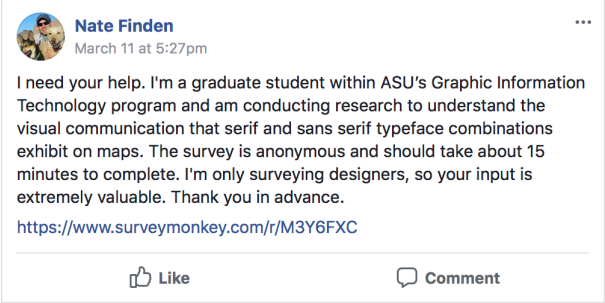
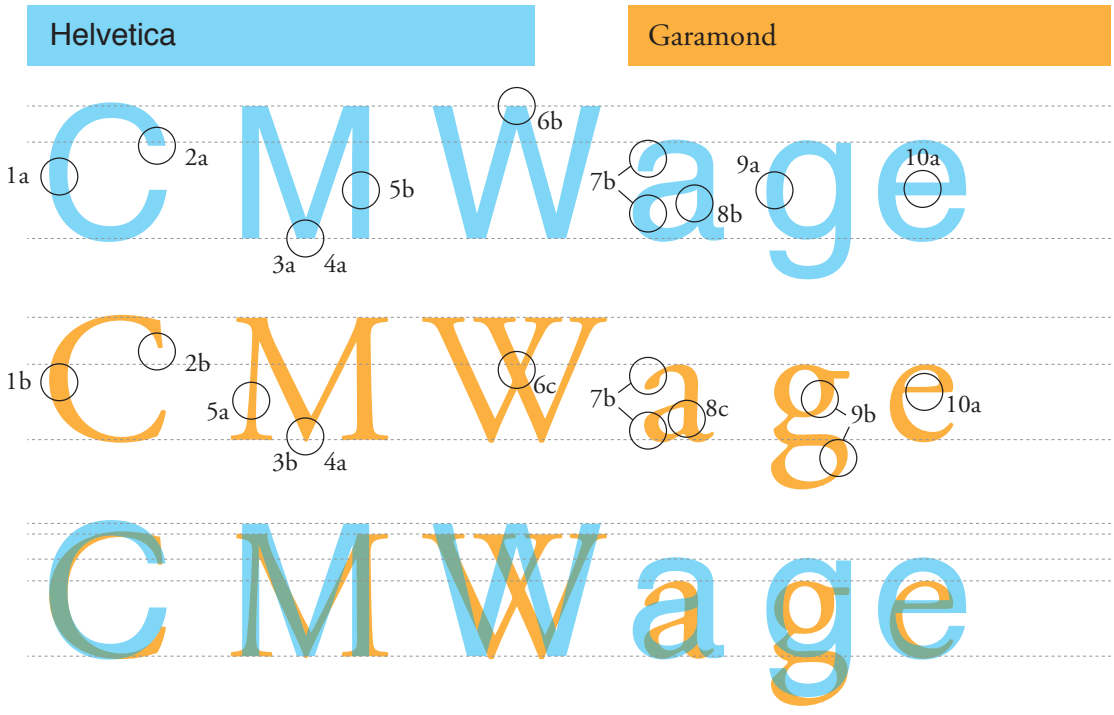


Figure 5: Facebook Phoenix Designers Group Post

Analyze Typefaces

While the survey was being completed by the participants, evaluation of the typeface's aesthetics in the survey were conducted by the author. This was done by examining a sampling of uppercase and lowercase letters. Previous studies that have looked at the aesthetics of letterforms (Perfect and Rookledge 1983; Mackiewicz 2005; Guidero 2016) also examined distinct letterforms. Perfect and Rookledge looked at the letters: Q, &, J, G, W, A, K, C, R, M, E, P, S, T, F, B, N, O, U, X, Y, D, H, Z, L, V and I for the uppercase letters (Guidero 2016). Lowercase letters were: g, a, j, y, k, t, f, r, q, w, e, b, s, c, d, p, m, u, x, o, v, h, n, i, l and z (Guidero 2016). Mackiewicz examined five letters: J, a, g, e and n. Guidero looked at: J, G, W, C, R, M, g, a, y, t, r, e, and o. In this study, the letters and cases that were used were based off of Perfect and Rookledge as well as Guidero's letters. An examination of the two maps created for this study was conducted to ensure that the letters chosen were prevalent on them. The chosen letters were: C, M, W, a, g and e. These letters were evaluated in a number of different categories to determine the microaesthetics of the individual letters.

Some of the microaesthetic categories examined included: aperture opening, angle of legs, height of vertex, shape of counter and the number of stories the letters a and g, the x-height and the cap height. The full list of microaesthetic categories examined is shown in Figure 6. All typeface pairings microaesthetic analysis can be found in Appendix A.



Letter	Letterform Element	Microaesthetic	Reference Code	Helvetica	Garamond
Uppercase C	Shape of bowl	Asymmetric	1a	X	
		Round	1b		X
	Aperture opening	Narrow	2a	X	
		Wide	2b		X
Uppercase M	Style of vertex ending	Flat	3a	X	
		Pointed	3b		X
	Height of vertex	Baseline	4a	X	X
		Midline	4b		
	Angle of legs	Angled	5a		X
		Vertical	5b	X	
Uppercase W	Style of apex	Cropped	6a		
		Joined	6b	X	
		Overlapped	6c		X
Lowercase a	Number of stories	One	7a		
		Two	7b	X	X
	Shape of counter	Round	8a		
		Teardrop	8b	X	
		Two-pointed	8c		X
Lowercase g	Number of stories	One	9a	X	
		Two	9b		X
Lowercase e	Angle of crossbar	Flat	10a	X	X
		Angled	10b		
x-height		Same height	11		
Cap height		Same height	12		

Figure 6: Typeface Pairings Microaesthetic Analysis

Collection and Analysis of Surveys

Thirty participant responses were completed through SurveyMonkey, 10 each for surveys A, B and C. Upon receiving the results, the data was converted from a scoring of 0 to 6 for the map aesthetic, to a scale of 3 to -3. Bar graphs were created for each typeface combination that showed the data results based on each of the eight aesthetic categories. Next, the scores were listed in a table format with the highest and lowest aesthetic categories. Finally, the typeface pairing microaesthetic analysis that was conducted by the author was compared to the survey results to discover which pairings communicated a particular aesthetic.

Summary

There were eight steps in the research methodology consisting of typeface selection, purchasing typefaces, designing two maps, distributing survey, analyzing the microaesthetics of selected typefaces, collecting surveys, analyzing results and writing report. The survey provided information on which typeface pairings communicate a particular tone on maps.

CHAPTER 4: RESULTS

Survey Results

There were 3 different surveys, A, B and C, each with 22 questions. Questions 1–16 had different maps depending on the survey. Questions 17 to 22 were the same on all three surveys. The survey can be found in Appendix D, and the maps in Appendix E.

Questions 1–16: Please rate the typeface combinations you see on map __ above on how well they exhibit the following aesthetics.

In Figure 8, bar graphs were made for each of the typeface pairings and the aesthetic score they obtained from the survey. Results are shown in what each typeface pairings received in the topographic map, the city map, and the two maps combined. The zero to six score was converted to a 3 to -3 scale. A positive number represents that the typeface pairing is more like the aesthetic, while a number means it is not like it at all. A zero represents that it is neither like or unlike the aesthetic. The bar graphs are shown on 30 to -30 scale. Figure 7 is a key for the aesthetic category bar graphs, the results of which are located in Figure 8.

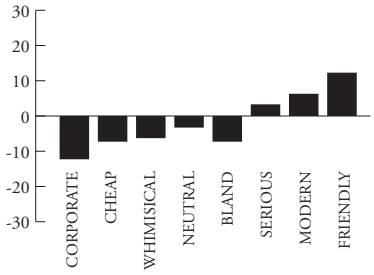


Figure 7: Aesthetic Categories Bar Chart Key

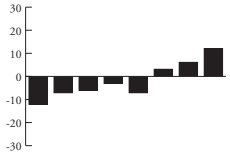
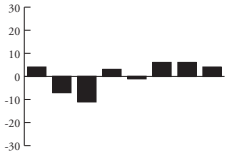
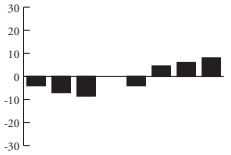
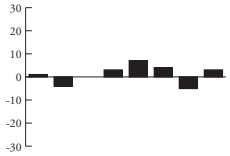
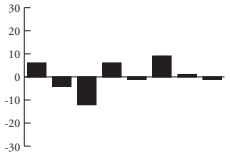
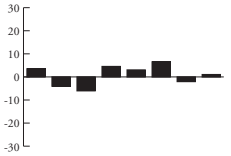
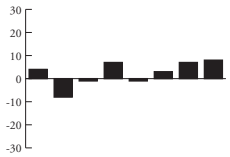
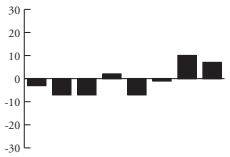
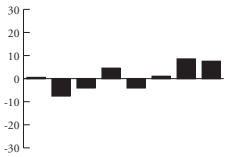
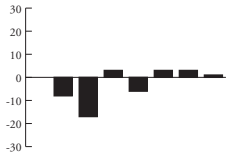
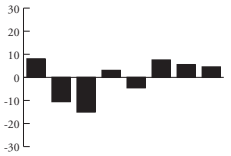
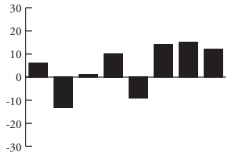
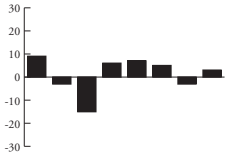
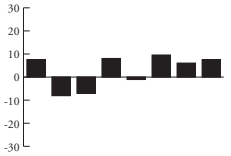
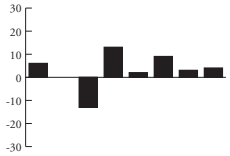
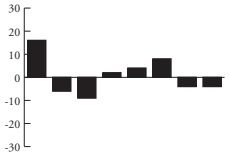
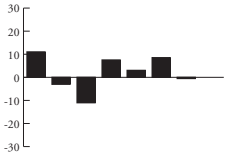
Typeface Pairings	Topographic	City	Combined
Bembo Gill Sans			
Bembo Lucidia Grande			
Bodoni Futura			
Caslon Myriad			
Clarendon Helvetica			
Frutiger Meridien			

Figure 8: Bar Graphs of Survey Results on Aesthetics

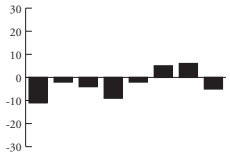
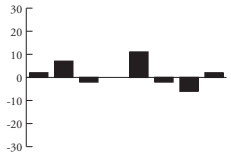
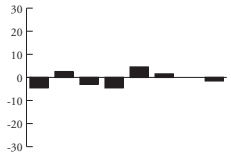
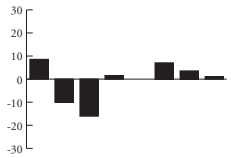
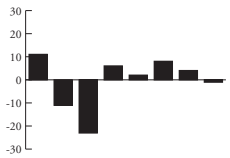
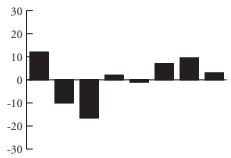
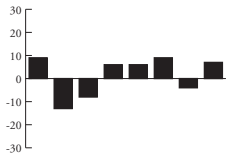
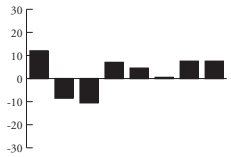
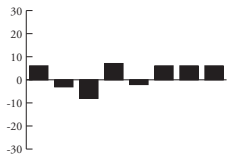
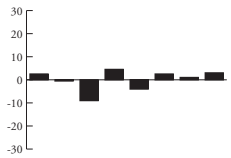
Typeface Pairings	Topographic	City	Combined
Frutiger Joanna			
Futura Bold **Souvenir**			
Garamond Gill Sans			
Garamond Helvetica			
Minion Syntax			
Open Sans Roboto Slab			

Figure 8: Bar Graphs of Survey Results on Aesthetics

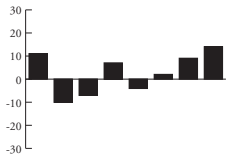
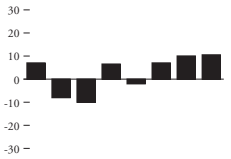
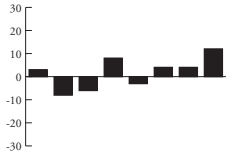
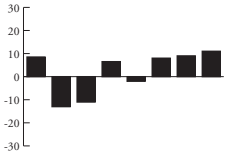
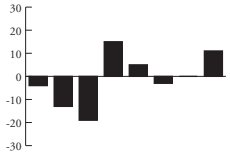
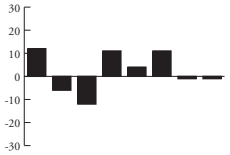
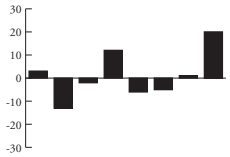
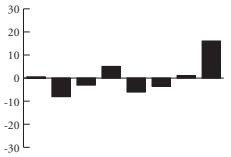
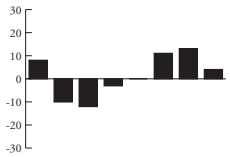
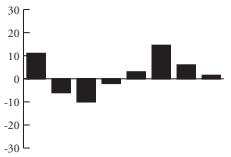
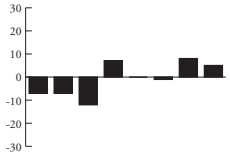
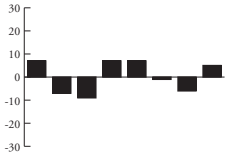
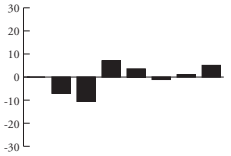
Typeface Pairings	Topographic	City	Combined
Aptifer Sans Aptifer Slab			
Calluna Calluna Sans			
Compatil Fact Compatil Letter			
FF Amman Sans FF Amman Serif			
FF Good FF More			
Freight Freight Sans			

Figure 8: Bar Graphs of Survey Results on Aesthetics

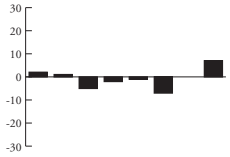
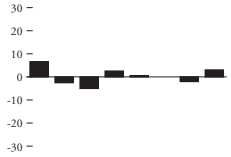
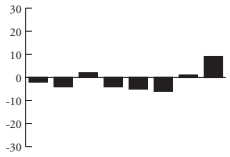
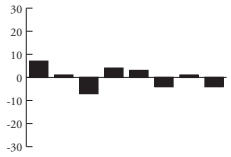
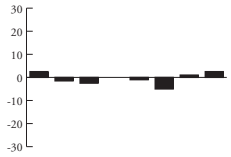
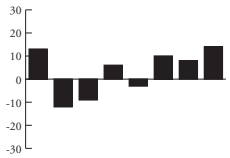
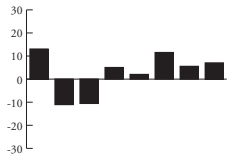
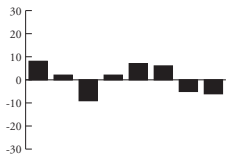
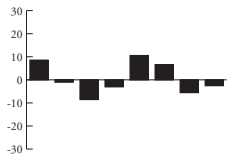
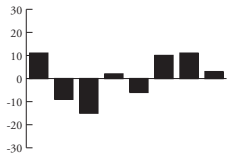
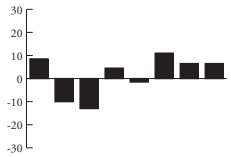
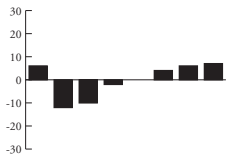
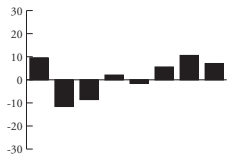
Typeface Pairings	Topographic	City	Combined
Generis Sans Generis Serif			
ITC Officinia Sans ITC Officinia Serif			
ITC Stone Sans ITC Stone Serif			
Legacy Sans Legacy Serif			
Meta Meta Serif			
Source Sans Source Serif			

Figure 8: Bar Graphs of Survey Results on Aesthetics

Question 17: What is your age?

Question 17 gathered data on the ages of the survey participants. The results are displayed in Figure 9. Six of the participants, or 20%, are between the ages of 18–20. Another six participants, or 20%, are between the ages of 18–20. Seven participants, or 23%, are between the ages of 26–30. Two participants, or 7%, are between the ages of 31–35. Four participants, or 13%, are between the ages of 36–40. Three participants, or 10%, are between the ages of 41–45. One participant, or 3%, is between the ages of 46–50. One participant, or 3%, is between the ages of 56–60. There were 0 participants in the following age categories: under 18, 51–55, 61–65, over 65.

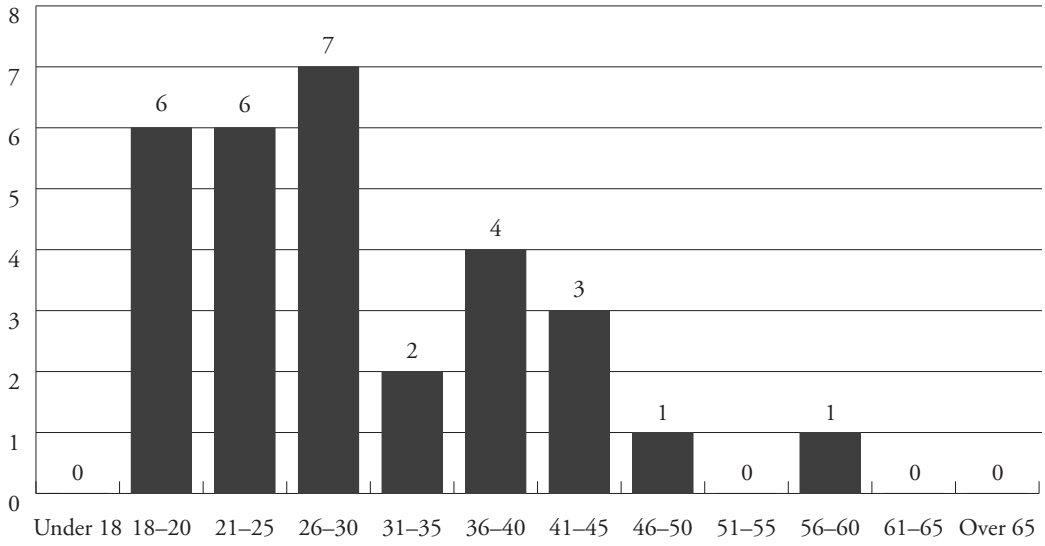


Figure 9: Survey Participants Ages

Question 18: How many years have you been practicing as a graphic designer?

Question 18 gathered data on the number of years that the survey participants have been practicing as a graphic designer. The results are displayed in Figure 10. Three of the participants, or 10%, had no years of experience. None of the participants had 1 year or less of experience. Ten participants, or 33%, had two to five years of experience. Nine participants, or 10% had six to 10 years of experience. One participant, or 3%, had 11–15 years of experience. Two participants, or 7%, had 16–20 years of experience. Five participants, or 17%, had 20 or more years of experience.

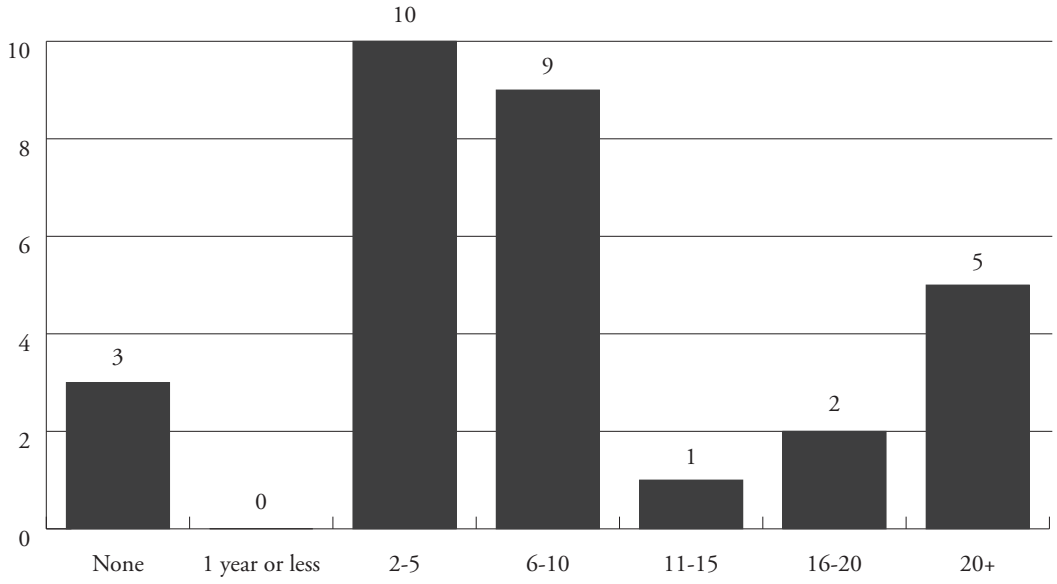


Figure 10: Survey Participants Years as a Practicing Graphic Designer

Question 19: How many years of design school have you completed at a higher education institution?

Question 19 gathered data on the number of years that the survey participants have completed in a design school at a higher education institution. The results are displayed in Figure 11. One participant, or 3%, had no years completed. Four participants, or 13%, had 1 year or less completed. Six participants, or 20%, had two years or less completed. Two participants, or 7%, had three years completed. Fourteen participants, or 47%, had four years completed. Three participants, or 10%, had five or more years completed.

The intention of this thesis research was to have only survey participants who had at least one year or more of design school experience at a higher education institution. This establishes a level of design experience and knowledge.

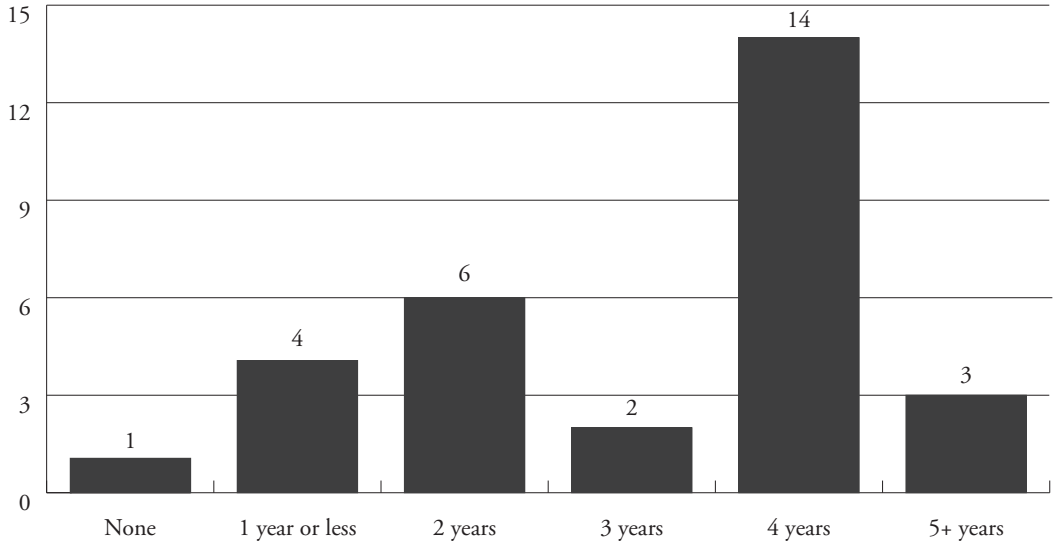


Figure 11: Survey Participants Completed Years of Design School at a Higher Education Institution

Question 20: What country do you primarily work or attend school in?

Question 20 gathered data on what country the survey participants primarily work or attend school. The results are displayed in Figure 12. Thirty participants, or 97%, primarily work or attend school in the United States. One participant responded twice for this question, choosing the United States button, and then choosing 'other' and typing in China.

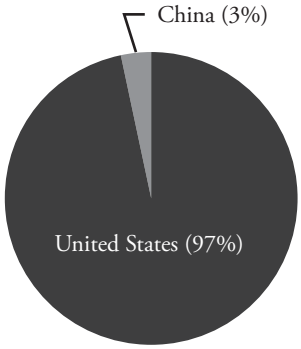


Figure 12: Survey Participants Country of Primary Work or School Attendance

Question 21: What is your primary language used in design work?

Question 21 gathered data on the survey participants primary language used in design work. The results are displayed in Figure 13. Thirty participants, or 100%, primarily use English. One participant responded twice for this question, choosing the English button, and then choosing 'other' and typing in the comment box Chinese.

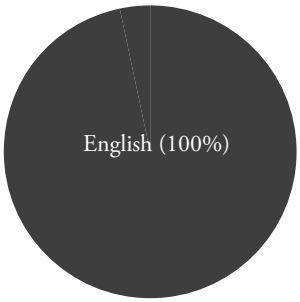


Figure 13: Survey Participants Primary Language Used in Design Work

Question 22: Do you have experience in designing maps? If yes, what typefaces do you use to make maps?

Question 22 gathered data on the survey participants experience in designing maps. The results are displayed in Figure 14. Eighteen participants, or 60%, have experience in designing maps. Twelve participants, or 40%, have no experience in designing maps.

If the participant answered yes, a comment box was provided asking what typefaces these use to make maps. Listed are the six participant answers:

- "Generally use very large x-height typefaces, one serif, one sans serif that match together with width and other formal characteristics."
- "Primarily sans serif because they were often reduced very small and I still needed the words to be readable."
- "Generally sans serif types, but only because those are usually the typefaces I design with."
- "Swiss, Arial, Helvetica, Folio, Adobe Caslon, Gothic."
- "Akzidenz Grotesk – bold, regular and condensed."
- "Often they are brand specific—Arial, Helvetica, Gotham, depending on who you are working with. For serif, National Park Service uses NPS Rawlinson Roadway, others use Clarendon. I've even seen Garamond and Bembo ... difficult to read without a heavy outline for contrast or other visual tricks."

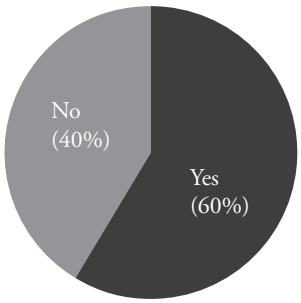


Figure 14: Survey Participants Experience in Designing Maps

Summary

In chapter 4, the data from the three surveys conducted through SurveyMonkey was presented. The survey was promoted through emails to Arizona State University undergraduate and graduate graphic design students, the Facebook group Phoenix Designers, and the authors personal contacts. Each of the three surveys had 10 participants, for a total of 30. Each survey was constructed of 16 maps that analyzed typeface pairings on two different maps, a city and topographic. Each map was then rated on eight different aesthetic characteristics. Questions 17 to 22 were related to demographics and experience as a graphic designer.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

The goal of this study was to research serif and sans serif typeface pairings on maps. This was conducted by examining the characteristics of typefaces and individual letterforms, and then grouping them together into two categories, differentiating and superfamily. An examination of the microaesthetics was conducted by the author. Next, an online survey was completed that resulted in respondents giving feedback on the aesthetic characteristics of serif and sans serif typeface pairing on two different maps. In chapter 5, Conclusions and Recommendations, the following research objectives of this study are addressed:

- Identify the different styles of typefaces
- Explore two categories of typeface pairings: super families and differentiating
- Identify the microaesthetics of the individual typefaces
- Compare and contrast the two typeface pairing categories
- Determine which typeface pairings have attributable aesthetics on two different types of maps: topographical and city

Survey Respondents Demographics and Experience

The online survey was anonymous and voluntary. There were 30 participants, 10 for each of the three surveys. Question 17 (what is your age?) identified that there were no respondents under the age of 18, establishing that we didn't need to get any parent or guardian approval to survey the participants. Question 18 (how many years have you been practicing as a graphic designer?) identified the experience level of the participants. Practicing graphic designers regularly work with typefaces and make decisions on which typeface to choose for a project. 90% of the survey participants had two or more years of practicing as

a graphic designer. Question 19 (how many years of design school have you completed at a higher education institution?) identified the experience of the survey participant in graphic design training. With 97% of the respondents being trained at a higher education institution, their level of design and typography knowledge would likely be greater than the average individual. Question 20 (what country do you primarily work or attend school in?) identified the geographical location of the survey participants. As the survey deals with visually communicated aesthetics, knowing the culture of the participants is valuable. Question 21 (what is your primary language used in design work?) identified if the participants used English as their primary language. As the maps in the survey used English, knowing if the participants were familiar with the language was important. 100% of the participants used English as their primary language in design work, while one participant also cited Chinese as a primary language they used in design work. Question 22 (do you have experience in designing maps? if yes, what typefaces do you use to make maps?) identified the experience level of the survey participants in designing maps. 60% of the participants had experience which is valuable to know given that they were evaluating typeface pairings on maps. Of those that chose yes, only six participants indicated which typefaces they used in designing maps. Out of the six comments, only one responded that they used serif and sans serif typeface pairings when designing maps.

Research Objectives

Objective 1: Identify the different styles of typefaces

Typefaces were identified by various classifications. First, type anatomy was examined by identifying different sections of letterforms including: leg, stem, bowl and spur. The

x-height was identified and it was demonstrated how a typeface with a taller x-height makes a letter appear visually larger, even while the point size is the same. Next, the official typeface classifications from Vox-ATypl were outlined, along with typeface examples. Microaesthetics were then introduced, giving an outline for an important section of the survey. Microaesthetics can refer to the overall characteristics of a letterform, such as the cap or x-height. It can also refer to the characteristics of an individual letter, such as the shape of the bowl, the joining together of stems and their location, or the angle of legs. The final step in identifying styles of typefaces was to categorize them in to two groups, superfamilies and differentiating. The differentiating category are serif and sans serif typefaces that were not designed to go together. Their microaesthetics may or may not have similar characteristics. The superfamily category is serif and sans serif typefaces that were designed to be paired together. The cap and x-height are almost always exactly the same. The overall shapes of the letterforms and microaesthetics are almost always exactly the same, varying only in the serif portion of the letterform.

Objective 2: Explore two categories of typeface pairings: superfamily and differentiating

The exploration of the two typeface pairings, superfamily and differentiating was conducted by researching expert opinions. It would have been easier to take the author's own opinions, or the opinion of peers, on which typeface pairing to conduct the survey from. By taking the opinions of published authors into account, it removed personal bias from the equation and added validity to the selection process.

After the literature review, more typeface pairings for the differentiating category had been identified. A selection of which pairings were going to be eliminated and which were

going to be kept was conducted by looking at typefaces that were repeated and those that had similar microaesthetic characteristics. Ultimately, a selection of 12 typeface pairings were selected for the superfamily and differentiating categories.

Objective 3: Identify the microaesthetics of the individual typefaces

Evaluations of letterform microaesthetics were conducted after a careful consideration of which letterforms should be reviewed. The writings of Perfect and Rookledge (1983) and the research of Mackiewicz (2005) and Guidero (2017) were examined to see which individual letters showed the greatest variance in shape characteristics. Next, an evaluation of the letters on the two maps utilized in this study was conducted. Letters that appeared in greatest frequency on both maps were chosen: C, M, W, a, g and e. The full visual list of microaesthetics can be found in Appendix A.

Objective 4: Compare and contrast the two typeface pairing categories

There were a range of similarities and differences found in the researched differentiating typeface pairings category. Some of the pairings had very similar letterforms to to certain letters, but very different in others. Figure 15 is an example of this. The uppercase C, lowercase a, lowercase g and lowercase e are similar in cap height, width, the lowercase a and lowercase g both had double stories, and the lowercase e both have a flat crossbar. The cap height is almost the same, but slightly off, while the x-height has slightly more of a difference. The shapes of the uppercase M and W vary greatly. The Gill Sans uppercase M ends at the midpoint, while the Garamond uppercase M extends to the baseline. The Gill Sans uppercase W joins at the cap height, while the Garamond version crosses over at the x-height.

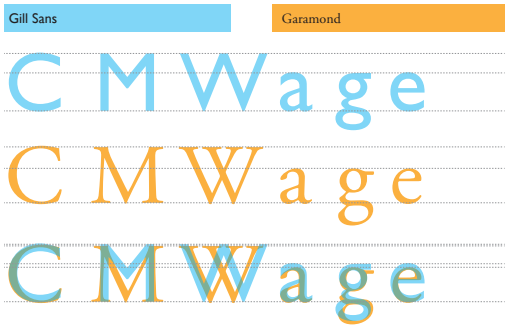


Figure 15: Differentiating Typeface Pairing Example One

While the differentiating typeface pairing in Figure 20 had many similar microaesthetics, the pairing in Figure 16 were almost completely different. The shape of the uppercase is different. The uppercase M has different leg angles, vertex ending and height. The lowercase a has a different counter and number of stories. The lowercase e has a different crossbar angle. The only microaesthetics that this pairing shares in common is the style of apex on the uppercase W, the aperture opening on the uppercase C, and the number of stories on the lowercase g.

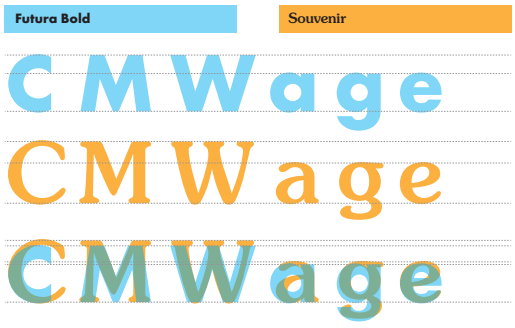


Figure 16: Differentiating Typeface Pairing Example Two

Figure 17 is an example of the superfamily category. The cap and x-heights are exactly the same. The curves on the uppercase C are the same. The uppercase M's style and height of the vertex, as well as the angle of the legs are the same. The uppercase W has the same style of apex. The lowercase a has the same shape of counter and number of stories. The lowercase g has the same number of stories. The lowercase e has the same angle of crossbar. The microaesthetics for Meta and Meta serif, shown in Figure 21, are common for typeface pairings in the superfamily category. They typically have all, or nearly all, microaesthetics the same.

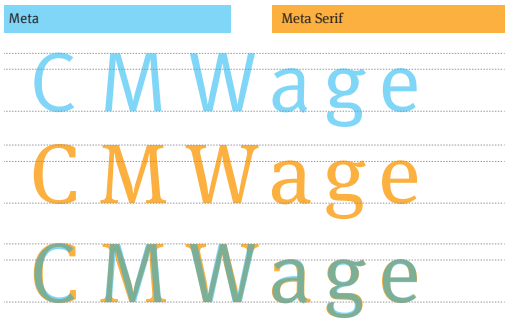


Figure 17: Superfamily Typeface Pairing

The difference between the two typeface pairings, differentiating and superfamily, can also be observed by comparing the microaesthetics that the serif and sans serif typeface pairings have in common. After analyzing the microaesthetics for all 24 typeface pairings, the number of microaesthetics that were the same was calculated. With 91.7% of the microaesthetics being the same, the superfamily category scored significantly higher than the 37.5% for the differentiating category. The results can be seen in Table 4, the full list in Appendix E.

Table 4: Number of Microaesthetics that are the Same by Category

Category	Number of Microaesthetics that are the Same	Percentage of Same Microaesthetics
Differentiating	54	37.5%
Superfamily	132	91.7%

Objective 5: Evaluate to determine which typeface pairings have attributable aesthetics on two different types of maps: topographical and city

The survey's aesthetic scores were added together and a mean number was determined for the different typeface combinations. Table 4 is a summary of the highest and lowest scored. The full aesthetic scores can be found in Appendix B. Overall, the categories that were most repeated were corporate for the highest aesthetic score, and whimsical for the lowest. In looking at the typeface pairings separately, the only difference from the overall scores was that the superfamilies scored friendly as the highest.

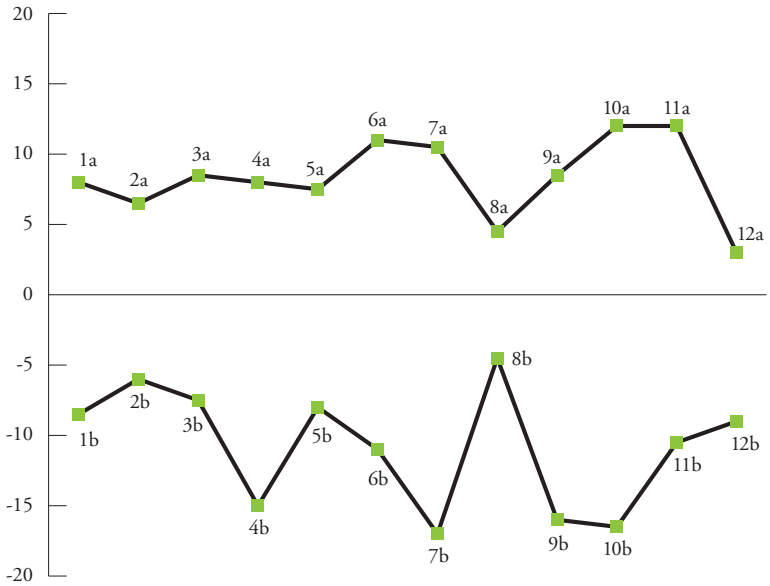
Table 5: Highest and Lowest Scored Aesthetics, by Mean Score

Differentiating	highest scoring aesthetic	highest scoring aesthetic value	lowest scoring aesthetic	lowest scoring aesthetic value
Bembo/Gill Sans	friendly	8	whimsical	-8.5
Bembo/Lucida Grande	serious	6.5	whimsical	-6
Bodoni/Futura	modern	8.5	cheap	-7.5
Caslon/Myriad	corporate	8	whimsical	-15
Clarendon/Helvetica	serious	7.5	cheap	-8
Frutiger/Meridien	corporate	11	whimsical	-11
Frutiger/Joanna	corporate	10.5	whimsical	-17
Futura Bold/Souvenir	bland	4.5	corporate, neutral	-4.5, -4.5
Garamond/Gill Sans	corporate	8.5	whimsical	-16
Garamond/Helvetica	corporate	12	whimsical	-16.5
Minion/Syntax	corporate	12	whimsical	-10.5
Open Sans/Roboto Slab	friendly	3	whimsical	-9
Total		**100**		**-134**

Superfamily	highest scoring aesthetic	highest scoring aesthetic value	lowest scoring aesthetic	lowest scoring aesthetic value
Aptifer Sans/Aptifer Slab	friendly	10.5	whimsical	-10
Calluna/Calluna Sans	friendly	11	cheap	-13
Compatil Fact/Compatil Letter	neutral	13	whimsical	-15.5
FF Amman/FF Amman Sans	friendly	16	cheap	-8
FF Good/FF More	serious	14.5	whimsical	-10
Freight/Freight Sans	neutral	7	whimsical	-10.5
Generis Sans/Generis Serif	corporate	6.5	whimsical	-5
ITC Officinia Sans/ITC Officinia Serif	corporate, friendly	2.5	serious	-5
ITC Stone Sans/ITC Stone Serif	corporate	13	cheap	-11
Legacy Sans/Legacy Serif	bland	10.5	whimsical	-8.5
Meta/Meta Serif	serious	11	whimsical	-13
Source Sans/Source Serif	modern	10.5	cheap	-11.5
Total		**126**		**-121**

When examined by category, superfamilies in the 'highest scoring aesthetic' scored a total of 126, compared to 100 in the differentiating category. Examined by 'lowest scoring aesthetic' the superfamily was -121 and differentiating was -134. This shows that overall, when choosing to design a map, a superfamily typeface pairing will be a better choice in communicating an intended tone. It also shows that out of these typeface pairings, 92% of the lowest scoring aesthetic was cheap or whimsical.

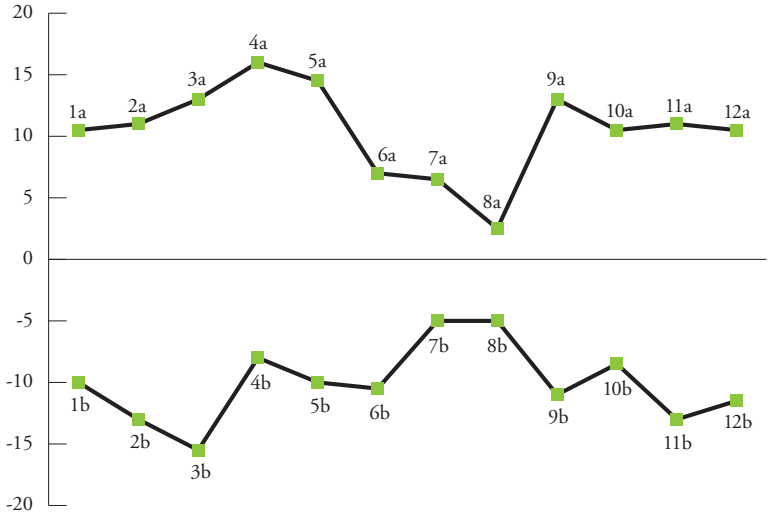
In examining the differentiating typefaces pairing highest and lowest aesthetic scores from the survey, a pattern emerges. Typeface pairings that have large positive 'highest aesthetic score' also have a large negative 'lowest aesthetic score'. Typeface pairings that have a lower 'highest aesthetic score' also have a lower 'lowest aesthetic score'. This can be observed in the Figure 18 line graph below. The values come from Table 5.



Differentiating typeface pairings	highest scoring aesthetic value reference code	lowest scoring aesthetic value reference code
Bembo/Gill Sans	1a	1b
Bembo/Lucida Grande	2a	2b
Bodoni/Futura	3a	3b
Caslon/Myriad	4a	4b
Clarendon/Helvetica	5a	5b
Frutiger/Meridien	6a	6b
Frutiger/Joanna	7a	7b
Futura Bold/Souvenir	8a	8b
Garamond/Gill Sans	9a	9b
Garamond/Helvetica	10a	10b
Minion/Syntax	11a	11b
Open Sans/Roboto Slab	12a	12b

Figure 18: Differentiating Typeface Pairing Highest and Lowest Survey Aesthetic Scores

The superfamily typeface pairings highest and lowest aesthetic scores exhibit a similar pattern. Typeface pairings that have large positive 'highest aesthetic score' also have a large negative 'lowest aesthetic score'. Typeface pairings that have a lower 'highest aesthetic score' also have a lower 'lowest aesthetic score'. The pattern for the superfamily category exhibits more of a mirror pattern between the highest and lowest aesthetic scores than the differentiating category. This can be observed in the Figure 19 line graph below. The values come from Table 5.



Superfamily typeface pairings	highest scoring aesthetic value reference code	lowest scoring aesthetic value reference code
Aptifer Sans/Aptifer Slab	1a	1b
Calluna/Calluna Sans	2a	2b
Compatil Fact/Compatil Letter	3a	3b
FF Amman/FF Amman Sans	4a	4b
FF Good/FF More	5a	5b
Freight/Freight Sans	6a	6b
Generis Sans/Generis Serif	7a	7b
ITC Officinia Sans/ITC Officinia Serif	8a	8b
ITC Stone Sans/ITC Stone Serif	9a	9b
Legacy Sans/Legacy Serif	10a	10b
Meta/Meta Serif	11a	11b
Source Sans/Source Serif	12a	12b

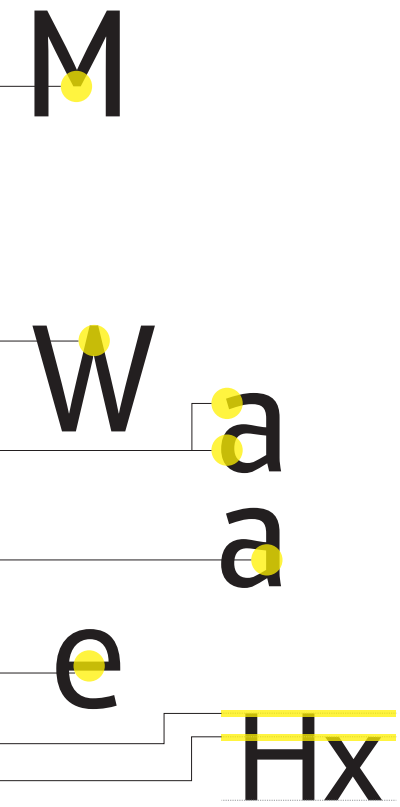
Figure 19: Superfamily Typeface Pairings Highest and Lowest Survey Aesthetic Score

Highest Scoring Aesthetics by Like-Scoring Microaesthetics

An examination of typeface pairings that scored the highest in the friendly aesthetic category from the survey is detailed below in Table 6. After examining the microaesthetics for each of the typeface pairing, which can be seen in Appendix A, the percentage alike was tabulated. The highest-scoring percentage alike above 70% is highlighted in yellow.

Table 6: Highest Scoring Microaesthetic Percentage Alike for Friendly Aesthetic

Friendly – 7 Typeface Pairings Bembo/Gill Sans Open Sans/Roboto Slab Aptifer Sans/Aptifer Slab Calluna/Calluna Sans FF Amman/FF Amman Sans ITC Officinia Sans/ITC Officinia Serif			
Letter	Letterform Element	Microaesthetic	Percentage Alike
Uppercase C	Shape of bowl	Asymmetric	43%
		Round	43%
	Aperture opening	Narrow	0%
		Wide	43%
Uppercase M	Style of vertex ending	Flat	71%
		Pointed	0%
	Height of vertex	Baseline	43%
		Midline	43%
	Angle of legs	Angled	43%
		Vertical	29%
Uppercase W	Style of apex	Cropped	0%
		Joined	86%
		Overlapped	14%
Lowercase a	Number of stories	One	14%
		Two	71%
	Shape of counter	Round	0%
		Teardrop	0%
		Two-pointed	86%
Lowercase g	Number of stories	One	29%
		Two	29%
Lowercase e	Angle of crossbar	Flat	71%
		Angled	14%
Cap height		Same height	71%
x-height		Same height	71%



An examination of typeface pairings that scored the highest in the serious aesthetic category from the survey is detailed below in Table 7. After examining the microaesthetics for each of the typeface pairings, which can be seen in Appendix A, the percentage alike was tabulated. The highest-scoring percentage alike above 70% is highlighted in yellow.

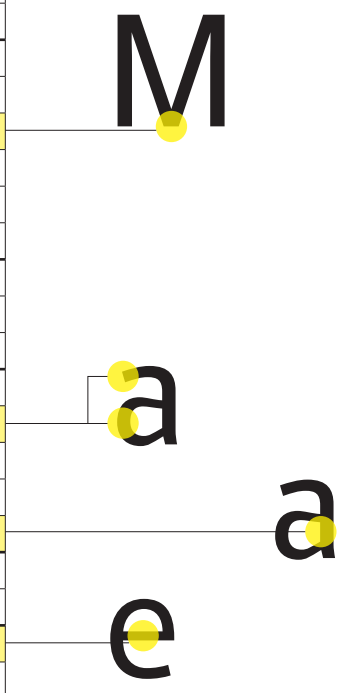
Table 7: Highest Scoring Microaesthetic Percentage Alike for Serious Aesthetic

Serious – 4 Typeface Pairings: Bembo/Lucidia Grande Clarendon/Helvetica FF Good/FF More Meta/Meta Serif			
Letter	Letterform Element	Microaesthetic	Percentage Alike
Uppercase C	Shape of bowl	Asymmetric	75%
		Round	0%
	Aperture opening	Narrow	25%
		Wide	50%
Uppercase M	Style of vertex ending	Flat	100%
		Pointed	0%
	Height of vertex	Baseline	50%
		Midline	0%
	Angle of legs	Angled	25%
		Vertical	50%
Uppercase W	Style of apex	Cropped	0%
		Joined	25%
		Overlapped	0%
Lowercase a	Number of stories	One	0%
		Two	75%
	Shape of counter	Round	0%
		Teardrop	0%
		Two-pointed	50%
Lowercase g	Number of stories	One	25%
		Two	50%
Lowercase e	Angle of crossbar	Flat	100%
		Angled	0%
Cap height		Same height	50%
x-height		Same height	75%

An examination of typeface pairings that scored the highest in the corporate aesthetic category from the survey is detailed below in Table 8. After examining the microaesthetics for each of the typeface, which that can be seen in Appendix A, the percentage alike was tabulated. The highest-scoring percentage alike above 70% is highlighted in yellow.

Table 8: Highest Scoring Microaesthetic Percentage Alike for Corporate Aesthetic

Corporate – 9 Typeface Pairings: Caslon/Myriad Frutiger/Meridien Frutiger/Joanna Garamond/Gill Sans Garamond/Helvetica Minion/Syntax Generis Sans/Generis Serif ITC Officinia Sans/ITC Officinia Serif ITC Stone Sans/ITC Stone Serif			
Letter	Letterform Element	Microaesthetic	Percentage Alike
Uppercase C	Shape of bowl	Asymmetric	22%
		Round	33%
	Aperture opening	Narrow	0%
		Wide	33%
Uppercase M	Style of vertex ending	Flat	22%
		Pointed	0%
	Height of vertex	Baseline	78%
		Midline	11%
	Angle of legs	Angled	11%
		Vertical	33%
Uppercase W	Style of apex	Cropped	0%
		Joined	67%
		Overlapped	0%
Lowercase a	Number of stories	One	0%
		Two	100%
	Shape of counter	Round	0%
		Teardrop	0%
		Two-pointed	78%
Lowercase g	Number of stories	One	11%
		Two	33%
Lowercase e	Angle of crossbar	Flat	100%
		Angled	0%
x-height		Same height	33%
Cap height		Same height	33%



An examination of typeface pairings that scored the highest in the modern aesthetic category from the survey is detailed below in Table 9. After examining the microaesthetics for each of the typeface pairings, which can be seen in Appendix A, the percentage alike was tabulated. The highest-scoring percentage alike above 70% is highlighted in yellow.

Table 9: Highest Scoring Microaesthetic Percentage Alike for Modern Aesthetic

Modern – 2 Typeface Pairings: Bodoni/Futura Source Sans/Source Serif			
Letter	Letterform Element	Microaesthetic	Percentage Alike
Uppercase C	Shape of bowl	Asymmetric	50%
		Round	0%
	Aperture opening	Narrow	0%
		Wide	0%
Uppercase M	Style of vertex ending	Flat	50%
		Pointed	50%
	Height of vertex	Baseline	50%
		Midline	0%
	Angle of legs	Angled	0%
		Vertical	50%
Uppercase W	Style of apex	Cropped	0%
		Joined	50%
		Overlapped	0%
Lowercase a	Number of stories	One	0%
		Two	50%
	Shape of counter	Round	0%
		Teardrop	0%
		Two-pointed	50%
Lowercase g	Number of stories	One	0%
		Two	50%
Lowercase e	Angle of crossbar	Flat	100%
		Angled	0%
x-height		Same height	50%
Cap height		Same height	0%

An examination of typeface pairings that scored the highest in the bland aesthetic category from the survey is detailed below in Table 10. After examining the microaesthetics for each of the typeface pairings, which can be seen in Appendix A, the percentage alike was tabulated. There were no percentage alike above 70% for the bland aesthetic.

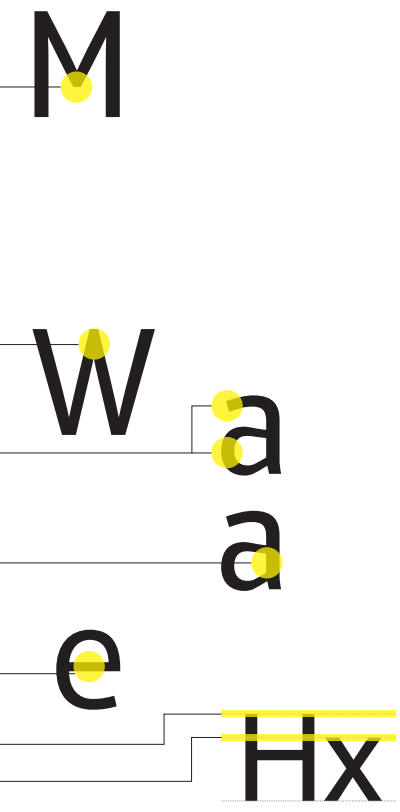
Table 10: Highest Scoring Microaesthetic Percentage Alike for Bland Aesthetic

Bland – 2 Typeface Pairings: Futura Bold/Souvenir Legacy Sans/Legacy Serif			
Letter	Letterform Element	Microaesthetic	Percentage Alike
Uppercase C	Shape of bowl	Asymmetric	0%
		Round	50%
	Aperture opening	Narrow	50%
		Wide	50%
Uppercase M	Style of vertex ending	Flat	0%
		Pointed	50%
	Height of vertex	Baseline	50%
		Midline	0%
	Angle of legs	Angled	0%
		Vertical	50%
Uppercase W	Style of apex	Cropped	0%
		Joined	50%
		Overlapped	0%
Lowercase a	Number of stories	One	0%
		Two	50%
	Shape of counter	Round	0%
		Teardrop	0%
		Two-pointed	50%
Lowercase g	Number of stories	One	50%
		Two	50%
Lowercase e	Angle of crossbar	Flat	0%
		Angled	50%
x-height		Same height	50%
Cap height		Same height	50%

An examination of typeface pairings that scored the highest in the neutral aesthetic category from the survey is detailed below in Table 11. After examining the microaesthetics for each of the typeface pairings, which can be seen in Appendix A, the percentage alike was tabulated. The highest-scoring percentage alike above 70% is highlighted in yellow.

Table 11: Highest Scoring Microaesthetic Percentage Alike for Neutral Aesthetic

Neutral – 2 Typeface Pairings Freight/Freight Sans Compatil Fact/Compatil Letter			
Letter	Letterform Element	Microaesthetic	Percentage Alike
Uppercase C	Shape of bowl	Asymmetric	50%
		Round	50%
	Aperture opening	Narrow	0%
		Wide	50%
Uppercase M	Style of vertex ending	Flat	100%
		Pointed	0%
	Height of vertex	Baseline	0%
		Midline	50%
	Angle of legs	Angled	50%
		Vertical	50%
Uppercase W	Style of apex	Cropped	0%
		Joined	100%
		Overlapped	0%
Lowercase a	Number of stories	One	0%
		Two	100%
	Shape of counter	Round	0%
		Teardrop	0%
		Two-pointed	100%
Lowercase g	Number of stories	One	50%
		Two	50%
Lowercase e	Angle of crossbar	Flat	100%
		Angled	0%
Cap height		Same height	100%
x-height		Same height	100%



Conclusions

Results show that there are many factors that go into comparing the typeface pairings of serif and sans serif typeface combinations. By splitting the pairings into two categories, differentiating and superfamily, a better understanding of how serif and sans serif typefaces relate to each other can be examined. Results that can be determined between these two categories are:

- Superfamily typeface pairings have a higher degree of microaesthetics similarity than differentiating typeface pairings.
- Superfamily typeface pairings communicate an aesthetic tone at a higher degree than differentiating typefaces pairings on maps.
- The degree that superfamily typeface pairings rate positively on the 'highest aesthetic score', they also score a similar negative rate on the 'lowest aesthetic score'. This can be observed in Figure 19.
- Out of the 24 typeface pairings that were examined for this study in maps, cheap and whimsical were the lowest scoring aesthetic categories, at 92% of the time. Corporate and friendly were the highest scoring aesthetic categories, at 64% of the time.

Aesthetic categories were determined from the survey results that identified the highest scoring aesthetic characteristics in the following groupings:

- Friendly:
    - Bembo/Gill Sans
    - Open Sans/Roboto Slab

    - Aptifer Sans/Aptifer Slab
    - Calluna/Calluna Sans
    - FF Amman/FF Amman Sans
    - ITC Officinia Sans/ITC Officinia Serif
- Serious:
    - Bembo/Lucidia Grande
    - Clarendon/Helvetica
    - FF Good/FF More
    - Meta/Meta Serif
- Corporate:
    - Caslon/Myriad
    - Frutiger/Meridien
    - Frutiger/Joanna
    - Garamond/Gill Sans
    - Garamond/Helvetica
    - Minion/Syntax
    - Generis Sans/Generis Serif
    - ITC Officinia Sans/ITC Officinia Serif
    - ITC Stone Sans/ITC Stone Serif
- Modern:
    - Bodoni/Futura
    - Source Sans/Source Serif

- Bland:
    - Futura Bold/Souvenir
    - Legacy Sans/Legacy Serif
- Neutral:
    - Freight/Freight Sans
    - Compatil Fact/Compatil Letter

Examination of the typeface pairings which had the same microaesthetics, compared by survey aesthetic categories, yielded the following determinations:

- Typeface pairings that have a highest aesthetic score in the friendly category have half of their microaesthetics similar, as well as similar cap and x-heights.
- Typeface pairings that have a highest aesthetic score in the serious category have less than half of their microaesthetics similar, but do have a similar cap x-height.
- Typeface pairings that have a highest aesthetic score in the bland category don't have similar microaesthetics, or similar cap and x-heights.
- Typeface pairings that have a highest aesthetic score in the neutral category have half of their microaesthetics similar, as well as the same cap and x-heights.

Recommendations

Overall, superfamily typeface pairings are preferable to differentiating typeface pairings. In terms of the individual aesthetic categories that was conducted in this study, the

recommended typeface pairings are displayed below in Table 12. The recommendations are based on the mean highest aesthetic scores from the survey. Aesthetic categories cheap and whimsical are the only categories that were a negative number. All recommendations are superfamily pairings, except in the cheap aesthetic, which are Open Sans and Roboto Slab.

Table 12: Recommended Typeface Pairings by Aeshetics

Aesthetic	Typeface
Friendly	FF Amman
	FF Amman
Serious	FF Good
	FF More
Corporate	ITC Stone Sans
	ITC Stone Serif
Modern	Source Sans
	Source Serif
Bland	Legacy Sans
	Legacy Serif
Netural	Compatil Fact
	Compatil Letter
Cheap	Open Sans
	Roboto Slab
Whimsical	ITC Officina Sans
	ITC Officina Serif

Typeface pairing selection for this study could have been more varied. After examining the letterform microaesthetics, many of the selected typefaces were similar. With the eight map survey aesthetic categories being varied, the typeface microaesthetics should have been more varied as well.

When the survey request was posted to the Facebook group Phoenix Designers, several comments indicated that there were too many maps to view, and would have liked

a status bar as to where they were at in the survey. Two survey participants commented that they abandoned the survey due to the number of maps.

Summary

There are different styles in typefaces, from letterform anatomy, to official typeface classifications. In examining typeface pairings, they can be divided into two different categories, differentiating and superfamily. The different sections of a letterform can be identified, known as microaesthetics. The microaesthetics can be compared and contrasted between the two different typeface pairing categories. Survey results show that there are attributable aesthetic characteristics in typeface pairings on maps. These characteristics can be identified by the microaesthetics in a letterform. Reviewing the microaesthetic results based on differentiating and superfamily typeface pairing categories allows for a better understanding of the data. The microaesthetic results, examined alongside with the survey results for aesthetic characteristics, allows for an understanding of the attributable aesthetics of typeface combinations on maps.

REFERENCES

Alessio, J. (2013, April 17). *Making Sense Of Type Classification (Part 1).* Retrieved from https://www.smashingmagazine.com/2013/04/making-sense-type-classification-part-1/

Alessio, J. (2013, June 19). *Making Sense Of Type Classification (Part 2).* Retrieved from https://www.smashingmagazine.com/2013/06/making-sense-of-type-classification-part-2/

Bonneville, D. (2010, November 4). *Best Practices Of Combining Typefaces.* Retrieved from https://www.smashingmagazine.com/2010/11/best-practices-of-combining-typefaces/

Bringhurst, R. (2008). *The Elements of Typographic Style.* Point Roberts, WA: Hartley & Marks.

Brown, T. (2013). *A Pocket Guide to Combining Typefaces.* Penarth, United Kingdom: Five Simple Steps.

Brumberger, Eva R. The rhetoric of typography: The awareness and impact of typeface appropriateness.Technical Communication, 2003 May, Vol.50(2), pp.224-231

Carson, N. (2017, August 24) *20 perfect font pairings.* Retrieved from http://www.creativebloq.com/typography/20-perfect-type-pairings-3132120

Cheng, K. (2005). *Designing Type.* New Haven, CT: Yale University Press.

Crisp, D. (2012). *Typography.* London: Printing International Ltd.

Crump, P. (2008). *Superfamily Font Roundup: 40+ Serif and Sans Font Pairings.* Retrieved from https://www.viget.com/articles/superfamily-font-roundup-40-plus-intentional-font-pairings/

Deeb, R., Ooms, K., Vanopbroeke, V., & De Maeyer, P. (2014). *Evaluating the efficiency of typographic design: gender and expertise variation.* Cartographic Journal, 51(1), 75–86.

Dent, B. D. (1999). *Cartography Thematic Map Deign.* Boston: Mc Graw-Hill.

Ellison, K. (2015). *3 principles you need to pair typefaces perfectly.* Retrieved from https://99designs.com/blog/tips/typeface-pairing-principles/.

Guidero, E. M. (2017). *Where Cartography Meets Typography: Choosing Typefaces and Semantic Effects For Maps Using Microaesthetics (Unpublished doctoral dissertation).* Pennsylvania State University, State College, PA.

Haley, A. (n.d.). *Type Classifications.* Retrieved from https://www.fonts.com/content/learning/fontology/level-1/type-anatomy/type-classifications

Harkins, M. (2013). *Understanding Type.* London: AVA Publishing.

Herasymenko, A., Philippov, Z., Novichikhina, D., Terekhov, A., & Demishvili, D. (2017). *Towards Combining Fonts.* School Ready Mag. Retrieved from http://school.readymag.com/fonts/about/

Keates, J.S. (1973). *Cartograhic Design and Production.* New York: Halsted Press.

Kraak, M., & Ormeling, F. (2003). *Cartography: Visualization of Geospatial Data.* Essex, London: Pearson Education Limited.

Krygier, J., & Wood, D. (2005). *Making Maps: A Visual Guide to Map Design for GIS.* New York: Guilford Press.

Krygier, J., & Wood, D. (2011). *Making Maps, Second Edition.* Guilford Press. Retrieved from http://www.myilibrary.com.ezproxy1.lib.asu.edu?ID=307762

Kunz, W. (2000). *Typography: Macro- and Microaesthetics.* Switzerland: Verlag Niggli AG.

Labeling and Text Hierarchy in Cartography. (n.d.). Retrieved from http://axismaps.github.io/thematic-cartography/articles/labeling.html

Lupton, E. (2004). *Thinking With Type: A Critical Guide for Designers, Writers, Editors and Students.* New York: Princeton Architectural Press.

Mackiewicz, J. O. (2005). How to Use Five Letterforms to Gauge a Typeface's Personality: A Research-Driven Method. *Journal of Technical Writing and Communication* 35 (3), 291–315.

Marshall, L., & Meachem, L. (2012). *How to Use Type.* London: Laurence King.

Mills, H. (2017) *Font Pair.* Retrieved from http://fontpair.co/

Perfect, C., & Rookledge, G. (1983). *Rookledge's International Type-Finder*. West Norwood, London: Sarema Press.

Robinson, A. H., Morrison, J. L., Muehrcke, P. C., Kimerling, A. J., & Guptill, S. C. (1995). *Elements of Cartography.* New York: John Wiley & Sons, Inc.

Rowe, C. (1982). Connotative Dimensions of Selected Display Typefaces. *Information Design Journal 3 (1)*, 30–37.

Spiekermann, E. (2014). *Stop Stealing Sheep & find out how type works.* San Jose, CA: AdobePress.

Slocum, T. A., McMaster, R. B., Kessler, F. C., & Howard, H. H. (2005). *Thematic Cartography and Geographic Visualization.* Upper Saddle River, NJ: Pearson Education Inc.

Strizver, I. (n.d.) *Super Families.* Retrieved from https://www.fonts.com/content/learning/fyti/typefaces/super-families.

Tantillo, J., Di Lorenzo-Aiss, J. & Mathisen, R. (1995). Quantifying Perceived Differences in Type Styles: An Exploratory Study. Psychology & Marketing 12 (5), 447–57.

Tyner, J. A. (2010). *Principles of Map Design.* The Guilford Press. Retrieved from http://www.myilibrary.com.ezproxy1.lib.asu.edu?ID=249999

White, A. W. (2005). *Thinking in Type: The Practical Philosophy of Typography.* New York: Allworth Press.

Willen, B., & Strals, N. (2009). *Lettering and Type: Creating Letters and Designing Typefaces.* New York: Princeton Architectural Press.

Williams, J. (2012). *Type Matters.* London: Merrell.

APPENDIX A

VISUAL COMPARISON OF TYPEFACE COMBINATIONS

Gill Sans

Bembo

Letter	Letterform Element	Microaesthetic	Gill Sans	Bembo
Uppercase C	Shape of bowl	Asymmetric		
		Round	X	X
	Aperture opening	Narrow		X
		Wide	X	
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline		X
		Midline	X	
	Angle of legs	Angled		X
		Vertical	X	
Uppercase W	Style of apex	Cropped		
		Joined	X	
		Overlapped		X
Lowercase a	Number of stories	One		X
		Two	X	
	Shape of counter	Round		X
		Teardrop		
		Two-pointed	X	
Lowercase g	Number of stories	One		X
		Two	X	
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height		
Cap height		Same height		

Lucida Grande

Bembo

Letter	Letterform Element	Microaesthetic	Lucida Grande	Bembo
Uppercase C	Shape of bowl	Asymmetric	X	
		Round		X
	Aperture opening	Narrow		X
		Wide	X	
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline		X
		Midline	X	
	Angle of legs	Angled		X
		Vertical	X	
Uppercase W	Style of apex	Cropped		
		Joined	X	
		Overlapped		X
Lowercase a	Number of stories	One		X
		Two	X	
	Shape of counter	Round		X
		Teardrop	X	
		Two-pointed		
Lowercase g	Number of stories	One	X	X
		Two		
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height		
Cap height		Same height		

Futura

Bodoni

Letter	Letterform Element	Microaesthetic	Futura	Bodoni
Uppercase C	Shape of bowl	Asymmetric		X
		Round	X	
	Aperture opening	Narrow		X
		Wide	X	
Uppercase M	Style of vertex ending	Flat		
		Pointed	X	X
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled	X	
		Vertical		X
Uppercase W	Style of apex	Cropped		
		Joined	X	
		Overlapped		X
Lowercase a	Number of stories	One	X	
		Two		X
	Shape of counter	Round	X	
		Teardrop		
		Two-pointed		X
Lowercase g	Number of stories	One	X	
		Two		X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height		
Cap height		Same height		

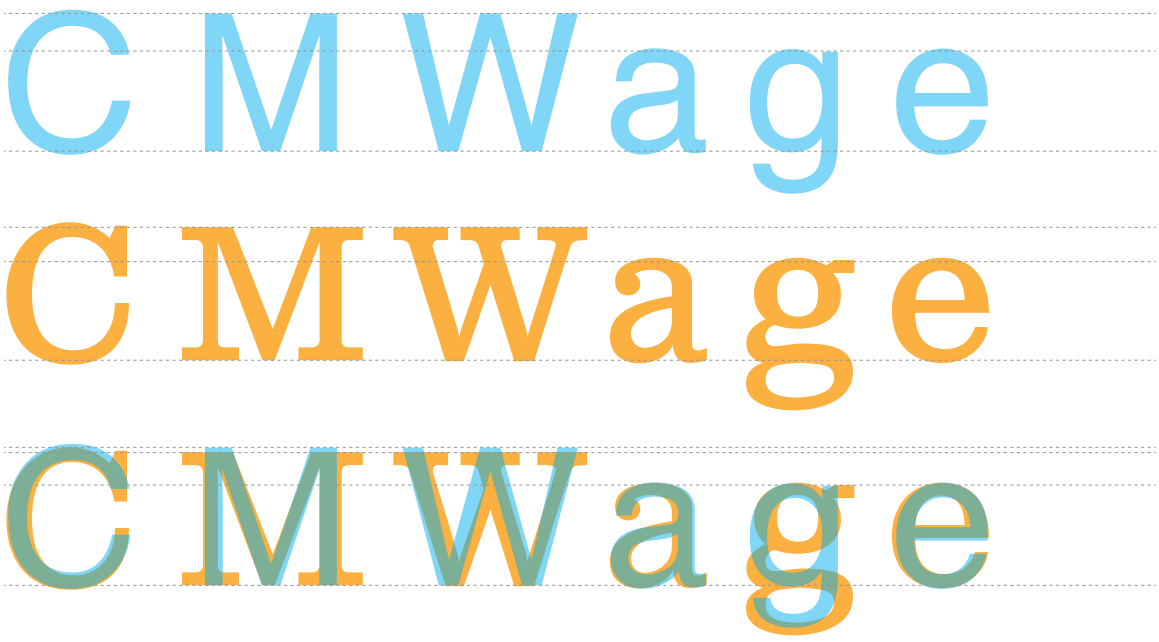
Myriad

Caslon

Letter	Letterform Element	Microaesthetic	Myriad	Caslon
Uppercase C	Shape of bowl	Asymmetric	X	
		Round		X
	Aperture opening	Narrow		X
		Wide	X	
Uppercase M	Style of vertex ending	Flat	X	
		Pointed		X
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled	X	
		Vertical		X
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		X
		Two-pointed	X	
Lowercase g	Number of stories	One	X	
		Two		X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height		
Cap height		Same height		

Helvetica

Clarendon



Letter	Letterform Element	Microaesthetic	Helvetica	Clarendon
Uppercase C	Shape of bowl	Asymmetric	X	X
		Round		
	Aperture opening	Narrow	X	X
		Wide		
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled		
		Vertical	X	X
Uppercase W	Style of apex	Cropped		X
		Joined	X	
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop	X	
		Two-pointed		X
Lowercase g	Number of stories	One	X	
		Two		X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height	X	
Cap height		Same height		

Frutiger

Meridien

Letter	Letterform Element	Microaesthetic	Frutiger	Meridien
Uppercase C	Shape of bowl	Asymmetric		X
		Round	X	
	Aperture opening	Narrow		X
		Wide	X	
Uppercase M	Style of vertex ending	Flat	X	
		Pointed		X
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled		X
		Vertical	X	
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One	X	
		Two		X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height		
Cap height		Same height		

Frutiger

Joanna

Letter	Letterform Element	Microaesthetic	Frutiger	Joanna
Uppercase C	Shape of bowl	Asymmetric		
		Round	X	X
	Aperture opening	Narrow		
		Wide	X	
Uppercase M	Style of vertex ending	Flat	X	
		Pointed		X
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled		
		Vertical	X	X
Uppercase W	Style of apex	Cropped		X
		Joined	X	
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One	X	
		Two		X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height		
Cap height		Same height		

Futura Bold **Souvenir**

Letter	Letterform Element	Microaesthetic	Futura Bold	Souvenir
Uppercase C	Shape of bowl	Asymmetric		X
		Round	X	
	Aperture opening	Narrow	X	X
		Wide		
Uppercase M	Style of vertex ending	Flat	X	
		Pointed		X
	Height of vertex	Baseline	X	
		Midline		X
	Angle of legs	Angled	X	
		Vertical		X
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One	X	
		Two		X
	Shape of counter	Round	X	
		Teardrop		
		Two-pointed		X
Lowercase g	Number of stories	One	X	X
		Two		
Lowercase e	Angle of crossbar	Flat	X	
		Angled		X
x-height		Same height		
Cap height		Same height		

Gill Sans

Garamond

Letter	Letterform Element	Microaesthetic	Gill Sans	Garamond
Uppercase C	Shape of bowl	Asymmetric		
		Round	X	X
	Aperture opening	Narrow		
		Wide	X	X
Uppercase M	Style of vertex ending	Flat	X	
		Pointed		X
	Height of vertex	Baseline		X
		Midline	X	
	Angle of legs	Angled		X
		Vertical	X	
Uppercase W	Style of apex	Cropped		
		Joined	X	
		Overlapped		X
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		
		Two	X	X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height		
Cap height		Same height		

Helvetica

Garamond

Letter	Letterform Element	Microaesthetic	Helvetica	Garamond
Uppercase C	Shape of bowl	Asymmetric	X	
		Round		X
	Aperture opening	Narrow	X	
		Wide		X
Uppercase M	Style of vertex ending	Flat	X	
		Pointed		X
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled		X
		Vertical	X	
Uppercase W	Style of apex	Cropped		
		Joined	X	
		Overlapped		X
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop	X	
		Two-pointed		X
Lowercase g	Number of stories	One	X	
		Two		X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height		
Cap height		Same height		

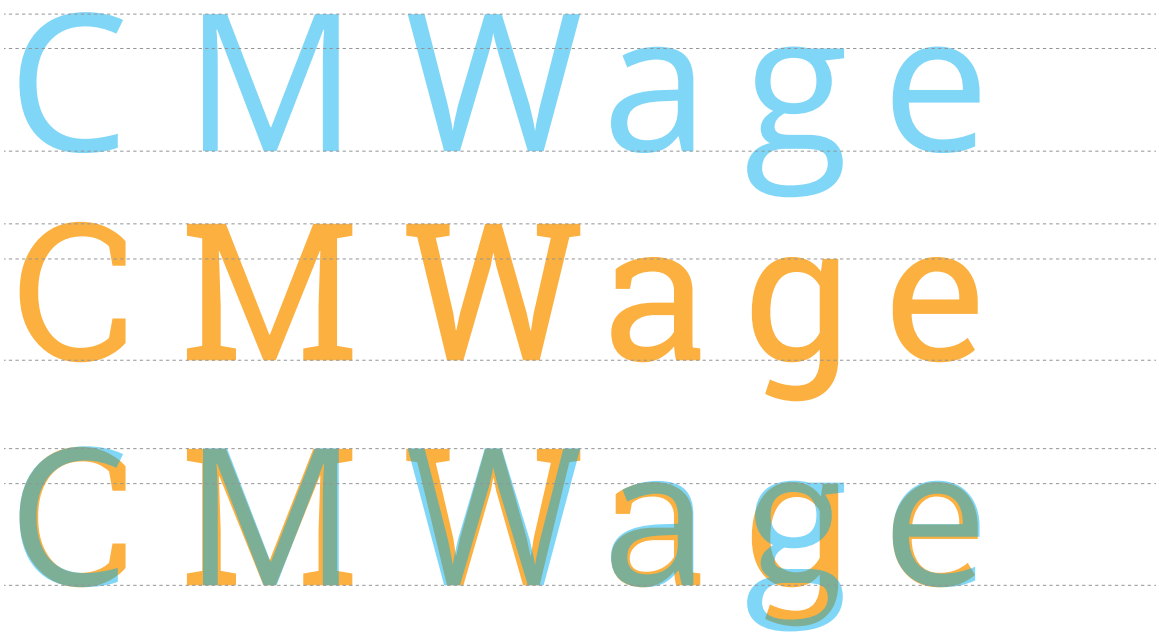
Syntax

Minion

Letter	Letterform Element	Microaesthetic	Syntax	Minion
Uppercase C	Shape of bowl	Asymmetric	X	
		Round		X
	Aperture opening	Narrow		X
		Wide	X	
Uppercase M	Style of vertex ending	Flat	X	
		Pointed		X
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled	X	X
		Vertical		
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		
		Two	X	X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height		
Cap height		Same height		

Open Sans

Roboto Slab



Letter	Letterform Element	Microaesthetic	Open Sans	Roboto Slab
Uppercase C	Shape of bowl	Asymmetric	X	
		Round		X
	Aperture opening	Narrow		X
		Wide	X	
Uppercase M	Style of vertex ending	Flat	X	
		Pointed		X
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled	X	X
		Vertical		
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		X
		Two	X	X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height		
Cap height		Same height		

Aptifer Sans

Aptifer Slab

Letter	Letterform Element	Microaesthetic	Aptifer Sans	Aptifer Slab
Uppercase C	Shape of bowl	Asymmetric	X	X
		Round		
	Aperture opening	Narrow		
		Wide	X	X
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline		
		Midline	X	X
	Angle of legs	Angled		
		Vertical	X	X
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		
		Two	X	X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height	X	
Cap height		Same height	X	

Calluna Sans

Calluna

Letter	Letterform Element	Microaesthetic	Calluna Sans	Calluna
Uppercase C	Shape of bowl	Asymmetric		
		Round	X	X
	Aperture opening	Narrow		
		Wide		
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled	X	X
		Vertical		
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		
		Two	X	X
Lowercase e	Angle of crossbar	Flat		
		Angled	X	X
x-height		Same height	X	
Cap height		Same height	X	

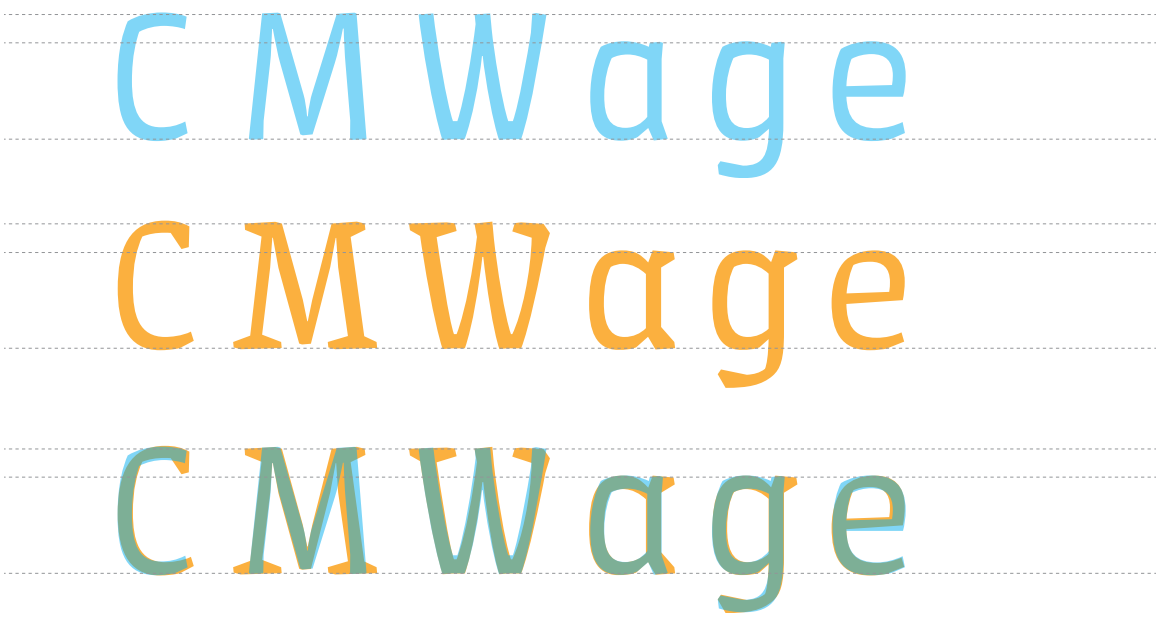
Compatil Fact

Compatil Letter

Letter	Letterform Element	Microaesthetic	Compatil Fact	Compatil Letter
Uppercase C	Shape of bowl	Asymmetric	X	X
		Round		
	Aperture opening	Narrow		
		Wide	X	X
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline		
		Midline	X	X
	Angle of legs	Angled	X	X
		Vertical		
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One	X	X
		Two		
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height	X	
Cap height		Same height	X	

FF Amman Sans

FF Amman



Letter	Letterform Element	Microaesthetic	FF Amman Sans	FF Amman
Uppercase C	Shape of bowl	Asymmetric	X	X
		Round		
	Aperture opening	Narrow		
		Wide	X	X
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline		
		Midline	X	X
	Angle of legs	Angled	X	X
		Vertical		
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One	X	X
		Two		
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One	X	X
		Two		
Lowercase e	Angle of crossbar	Flat	X	
		Angled		X
x-height		Same height	X	
Cap height		Same height	X	

FF Good | **FF More**

Letter	Letterform Element	Microaesthetic	FF Good	FF More
Uppercase C	Shape of bowl	Asymmetric	X	X
		Round		
	Aperture opening	Narrow		
		Wide	X	X
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline		X
		Midline	X	
	Angle of legs	Angled		
		Vertical	X	X
Uppercase W	Style of apex	Cropped		X
		Joined	X	
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		
		Two	X	X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height	X	
Cap height		Same height	X	

Freight Sans

Freight

Letter	Letterform Element	Microaesthetic	Freight Sans	Freight
Uppercase C	Shape of bowl	Asymmetric		
		Round	X	X
	Aperture opening	Narrow		
		Wide		
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline	X	
		Midline		X
	Angle of legs	Angled		
		Vertical	X	X
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		
		Two	X	X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height	X	
Cap height		Same height	X	

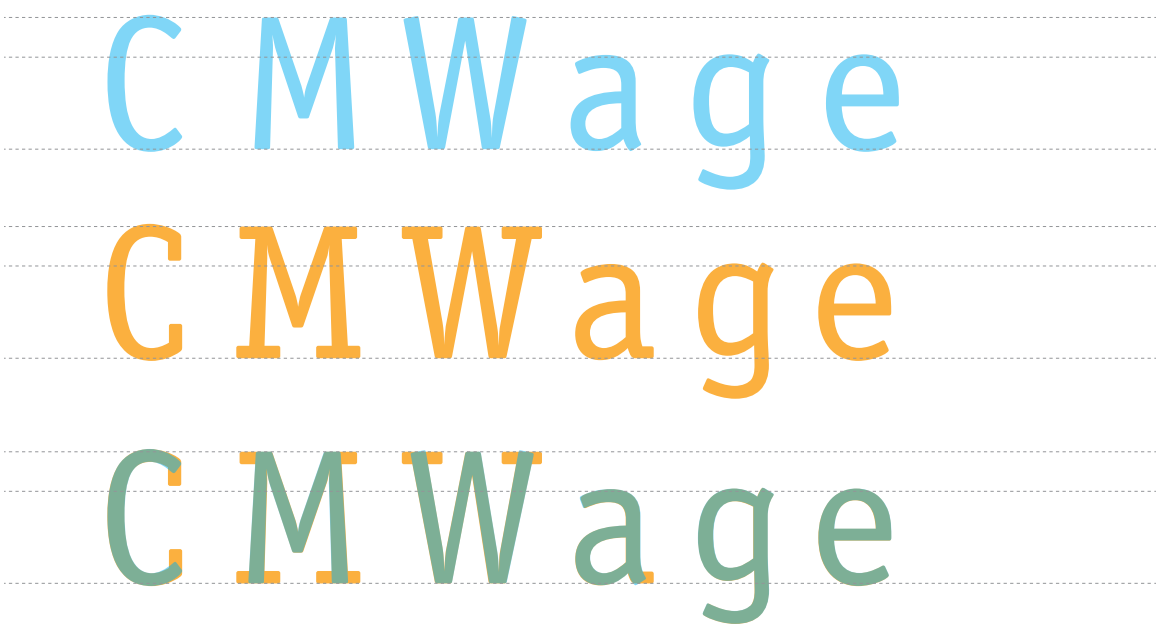
Generis Sans

Generis Serif

Letter	Letterform Element	Microaesthetic	Generis Sans	Generis Serif
Uppercase C	Shape of bowl	Asymmetric	X	X
		Round		
	Aperture opening	Narrow		
		Wide	X	X
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled		
		Vertical	X	X
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		
		Two	X	X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height	X	
Cap height		Same height	X	

ITC Officinia Sans

ITC Officinia Serif



Letter	Letterform Element	Microaesthetic	ITC Officinia Sans	ITC Officinia Serif
Uppercase C	Shape of bowl	Asymmetric	X	X
		Round		
	Aperture opening	Narrow		
		Wide	X	X
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline		
		Midline	X	X
	Angle of legs	Angled	X	X
		Vertical		
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One	X	X
		Two		
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height	X	
Cap height		Same height	X	

ITC Stone Sans

ITC Stone Serif

Letter	Letterform Element	Microaesthetic	ITC Stone Sans	ITC Stone Serif
Uppercase C	Shape of bowl	Asymmetric		
		Round	X	X
	Aperture opening	Narrow		
		Wide		
Uppercase M	Style of vertex ending	Flat	X	
		Pointed		X
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled		
		Vertical	X	X
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One	X	
		Two		X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height	X	
Cap height		Same height	X	

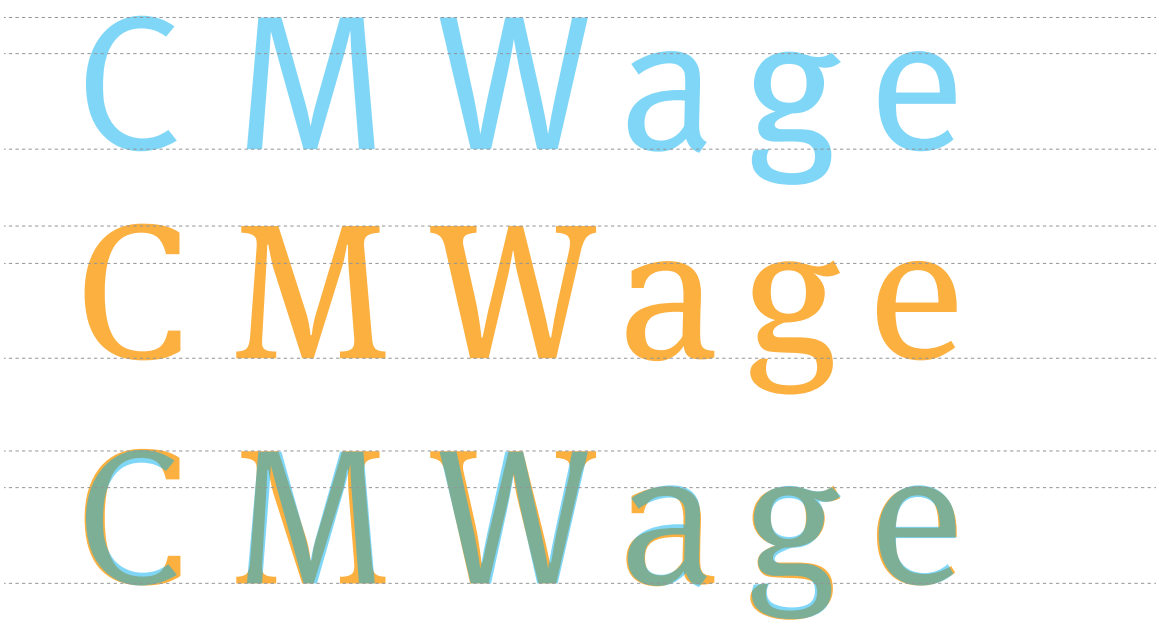
Legacy Sans

Legacy Serif

Letter	Letterform Element	Microaesthetic	Legacy Sans	Legacy Serif
Uppercase C	Shape of bowl	Asymmetric		
		Round	X	X
	Aperture opening	Narrow		
		Wide	X	X
Uppercase M	Style of vertex ending	Flat		
		Pointed	X	X
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled		
		Vertical	X	X
Uppercase W	Style of apex	Cropped		
		Joined	X	
		Overlapped		X
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		
		Two	X	X
Lowercase e	Angle of crossbar	Flat		
		Angled	X	X
x-height		Same height	X	
Cap height		Same height	X	

Meta

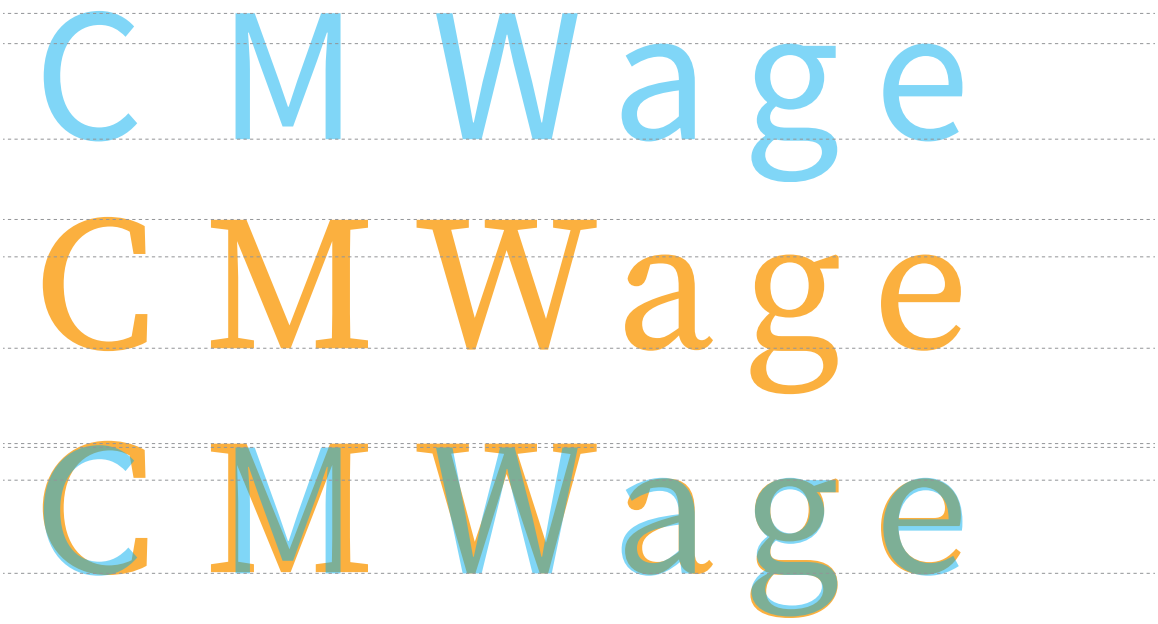
Meta Serif



Letter	Letterform Element	Microaesthetic	Meta	Meta Serif
Uppercase C	Shape of bowl	Asymmetric	X	X
		Round		
	Aperture opening	Narrow		
		Wide	X	X
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline	X	X
		Midline		
	Angle of legs	Angled	X	X
		Vertical		
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		
		Two	X	X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height	X	
Cap height		Same height	X	

Source

Source Serif



Letter	Letterform Element	Microaesthetic	Source	Source Serif
Uppercase C	Shape of bowl	Asymmetric	X	X
		Round		
	Aperture opening	Narrow		X
		Wide	X	
Uppercase M	Style of vertex ending	Flat	X	X
		Pointed		
	Height of vertex	Baseline		X
		Midline	X	
	Angle of legs	Angled		
		Vertical	X	X
Uppercase W	Style of apex	Cropped		
		Joined	X	X
		Overlapped		
Lowercase a	Number of stories	One		
		Two	X	X
	Shape of counter	Round		
		Teardrop		
		Two-pointed	X	X
Lowercase g	Number of stories	One		
		Two	X	X
Lowercase e	Angle of crossbar	Flat	X	X
		Angled		
x-height		Same height	X	
Cap height		Same height		

APPENDIX B

SUMMARY STATISTICS OF SURVEY DATA

1. Mean scores for typefaces and aesthetics

Contrasting	corporate	cheap	whimsical	neutral	bland	serious	modern	friendly
Bembo/Gill Sans	-4	-7	-8.5	0	-4	4,5	6	8
Bembo/Lucidia Grande	3.5	-4	-6	4.5	3	6.5	-2	1
Bodoni/Futura	0.5	-7.5	-4	4.5	-4	1	8.5	7.5
Caslon/Myriad	8	-10.5	-15	3	-4.5	7.5	5.5	4.5
Clarendon/Helvetica	7.5	-8	-7	8	-1	9.5	6	7.5
Frutiger/Meridien	11	-3	-11	7.5	3	8.5	-0.5	0
Frutiger/Joanna	10.5	-7.5	-17	4	1	9	1	1.5
Futura Bold/ Souvenir	-4.5	2.5	-3	-4.5	4.5	1.5	0	-1.5
Garamond/Gill Sans	8.5	-10	-16	1.5	0	7	3.5	1
Garamond/ Helvetica	12	-10	-16.5	2	-1	7	9.5	3
Minion/Syntax	12	-8.5	-10.5	7	4.5	0.5	7.5	7.5
Open Sans/Roboto Slab	2.5	-0.5	-9	4.5	-4	2.5	1	3

Super Families	corporate	cheap	whimsical	neutral	bland	serious	modern	friendly
Aptifer Sans/Aptifer Slab	7	-8	-10	6.5	-2	7	10	10.5
Calluna/Calluna Sans	8.5	-13	-11	6.5	-2	8	9	11
Compatil Fact/ Compatil Letter	4	-9.5	-15.5	13	4.5	4	-0.5	5
FF Amman/FF Amman Sans	0.5	-8	-3	5	-6	-3.5	1	16
FF Good/FF More	11	-6	-10	-2	3	14.5	6	1.5
Freight/Freight Sans	0	-7	-10.5	7	3.5	-1	1	5
Generis Sans/ Generis Serif	6.5	-2.5	-5	2.5	0.5	0	-2	3
ITC Officinia Sans/ ITC Officinia Serif	2.5	-1.5	-2.5	0	-1	-5	1	2.5
ITC Stone Sans/ ITC Stone Serif	13	-11	-10.5	5	2	11.5	5.5	7
Legacy Sans/ Legacy Serif	8.5	-1	-8.5	-3	10.5	6.5	-5.5	-2.5
Meta/Meta Serif	8.5	-10	-13	4.5	-1.5	11	6.5	6.5
Source Sans/ Source Serif	9.5	-11.5	-8.5	2	-1.5	5.5	10.5	7

2. Highest and lowest scored aesthetics, by median score

Contrasting	highest scoring aesthetic	highest scoring aesthetic value	lowest scoring aesthetic	lowest scoring aesthetic value
Bembo/Gill Sans	friendly	8	whimsical	-8.5
Bembo/Lucidia Grande	serious	6.5	whimsical	-6
Bodoni/Futura	modern	8.5	cheap	-7.5
Caslon/Myriad	corporate	8	whimsical	-15
Clarendon/Helvetica	serious	7.5	cheap	-8
Frutiger/Meridien	corporate	11	whimsical	-11
Frutiger/Joanna	corporate	10.5	whimsical	-17
Futura Bold/Souvenir	bland	4.5	corporate, neutral	-4.5, -4.5
Garamond/Gill Sans	corporate	8.5	whimsical	-16
Garamond/Helvetica	corporate	12	whimsical	-16.5
Minion/Syntax	corporate	12	whimsical	-10.5
Open Sans/Roboto Slab	friendly	3	whimsical	-9
Total		**100**		**-134**

Super Families	highest scoring aesthetic	highest scoring aesthetic value	lowest scoring aesthetic	lowest scoring aesthetic value
Aptifer Sans/Aptifer Slab	friendly	10.5	whimsical	-10
Calluna/Calluna Sans	friendly	11	cheap	-13
Compatil Fact/Compatil Letter	neutral	13	whimsical	-15.5
FF Amman/FF Amman Sans	friendly	16	cheap	-8
FF Good/FF More	serious	14.5	whimsical	-10
Freight/Freight Sans	neutral	7	whimsical	-10.5
Generis Sans/Generis Serif	corporate	6.5	whimsical	-5
ITC Officinia Sans/ITC Officinia Serif	corporate, friendly	2.5	serious	-5
ITC Stone Sans/ITC Stone Serif	corporate	13	cheap	-11
Legacy Sans/Legacy Serif	bland	10.5	whimsical	-8.5
Meta/Meta Serif	serious	11	whimsical	-13
Source Sans/Source Serif	modern	10.5	cheap	-11.5
Total		**126**		**-121**

APPENDIX C

TYPEFACE DATA

1. All text on the two maps used in the study

Topographic Sans Serif	Topographic Serif	City Sans Serif	City Serif
Telluride	Uncompahgre National Forest	Washington D.C.	National Mall
San Miguel	Epees Park	7th St NW	The Ellipse
Pandora	Liberty Bell Flats	14th St NW	Potomac River
Telluride Valley Floor Trail	Owl Gulch	15th St NW	Tidal Basin
Telluride Trail	Liberty Bell	17th St NW	Constitution Gardens Pond
Village Trail	Royer Gulch	23rd St NW	The Reflecting Pool
Ridge Trail	Camels Garden	Constitution Ave NW	Vietnam Veterans Memorial
Lone Tree Cemes	Coonskin Mtn	Independence Ave NW	Lincoln Memorial
Sheridan Crosscut Trail	Cornet Cr	Independence Ave NW	National Museum of African American History and Culture
145	San Miguel River	Arlington Memorial Bridge	World War II Memorial
648	San Miguel River	I-66	Washington Monument
	Butcher Cr	I-66; US 50	National Museum of American History
	Cornel Falls		National Museum of Natural History
	Marshall Cr		Smithsonian Castle
	Bear Creek		Korean War Veterans Memorial

APPENDIX D

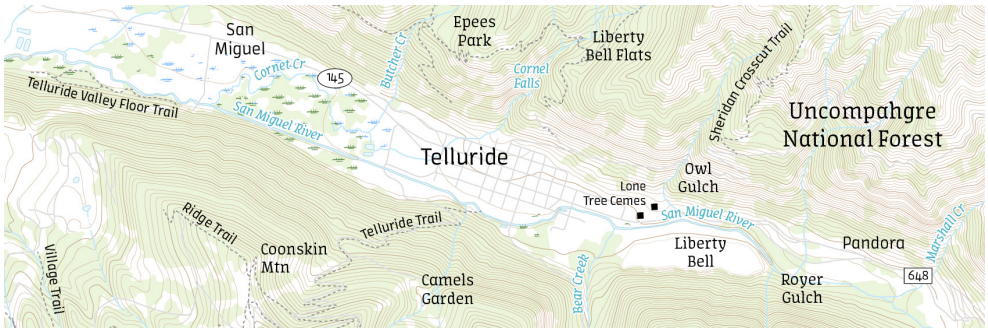
TYPEFACE COMBINATIONS ON MAPS SURVEY

Introduction

Hello, my name is Nathan Finden and I am a graduate student within the Arizona State University's Graphic Information Technology program under the supervision of Laurie Ralston (laurie.ralston@asu.edu). I am conducting research to understand the visual communication that serif and sans serif typeface combinations exhibit on maps.

There are 2 alternating maps containing 2 typefaces each, and a total of 16 maps. Please rate the typeface combinations in each of the 8 aesthetic categories. The survey is anonymous and voluntary. Your answers are vital to the success of my thesis and I thank you for your time.

Please direct any questions to nathan.finden@asu.edu.

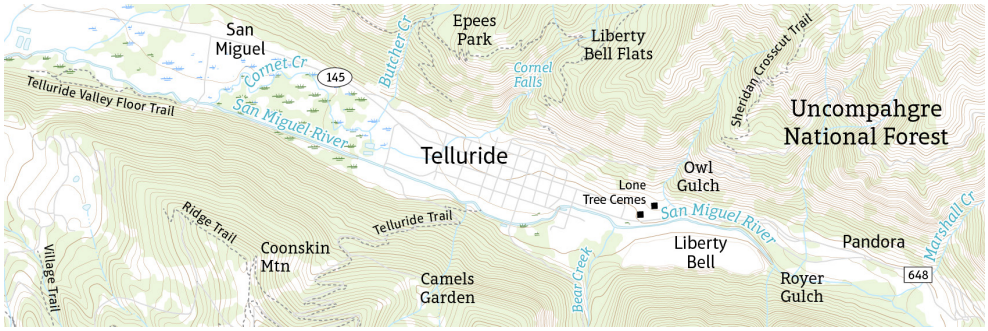


1. Please rate the typeface combinations you see on map 1 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

2. Please rate the typeface combinations you see on map 2 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

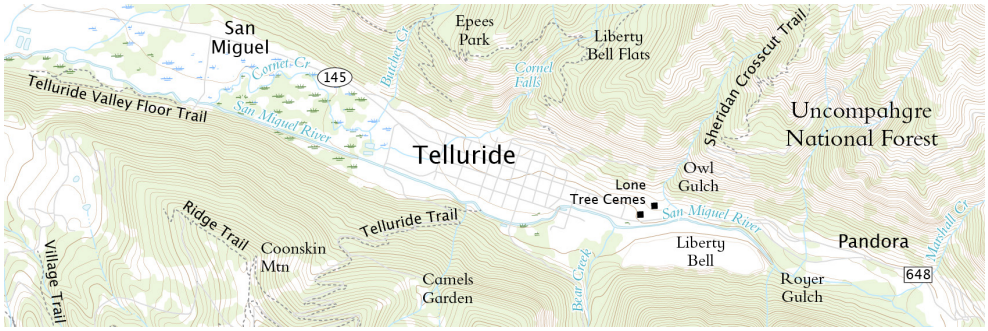


3. Please rate the typeface combinations you see on map 3 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

4. Please rate the typeface combinations you see on map 4 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

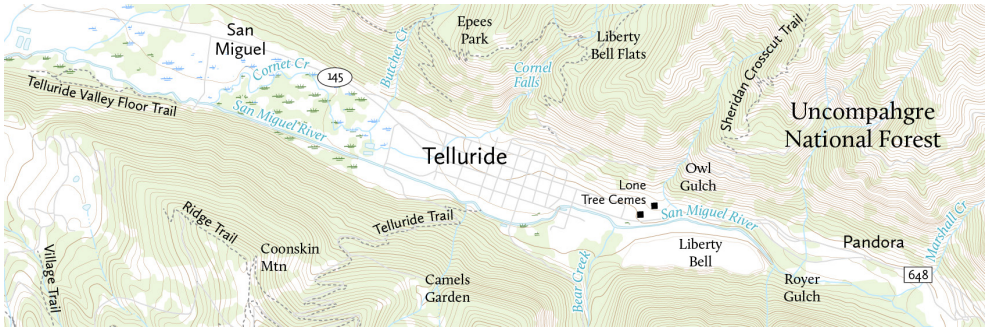


5. Please rate the typeface combinations you see on map 5 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

6. Please rate the typeface combinations you see on map 6 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

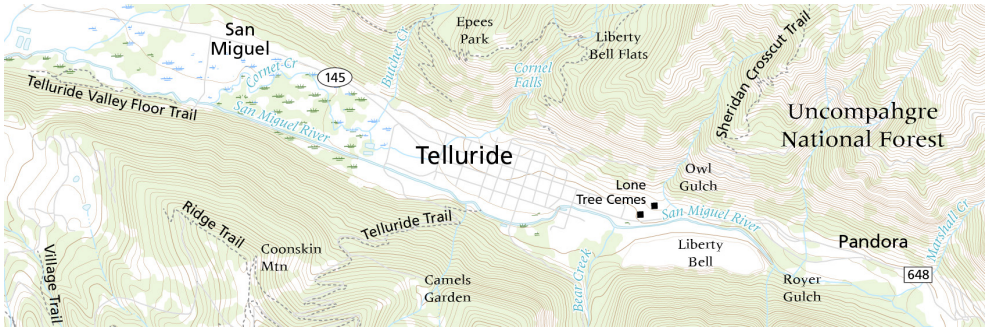


7. Please rate the typeface combinations you see on map 7 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

8. Please rate the typeface combinations you see on map 8 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

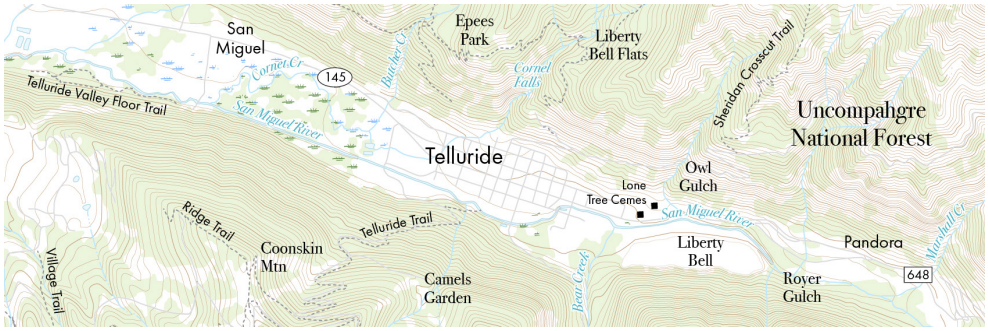


9. Please rate the typeface combinations you see on map 9 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

10. Please rate the typeface combinations you see on map 10 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

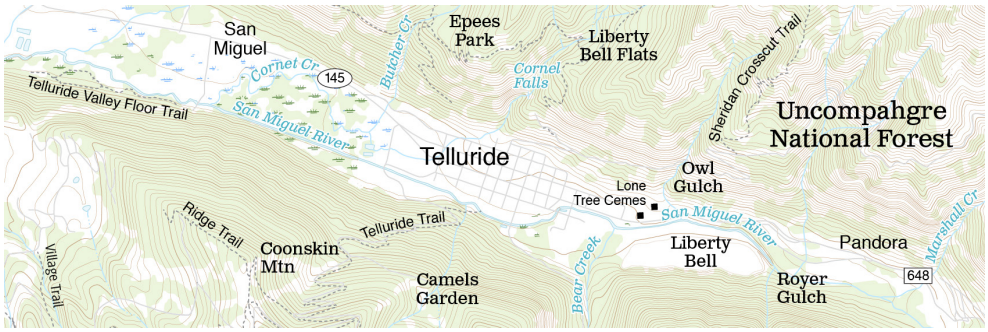


11. Please rate the typeface combinations you see on map 11 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

12. Please rate the typeface combinations you see on map 12 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

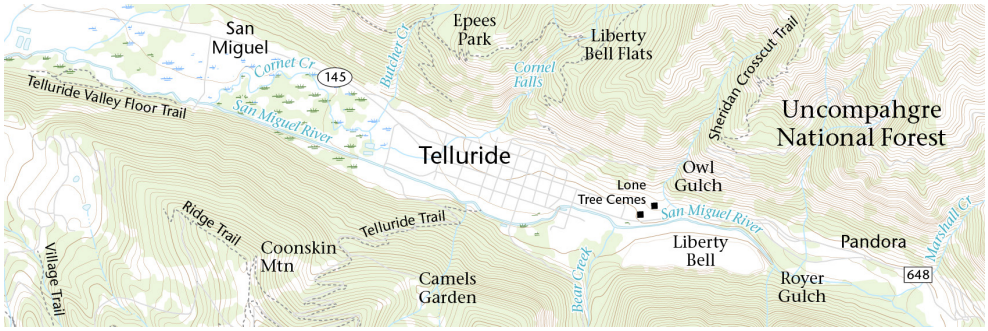


13. Please rate the typeface combinations you see on map 13 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

14. Please rate the typeface combinations you see on map 14 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○



15. Please rate the typeface combinations you see on map 15 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

16. Please rate the typeface combinations you see on map 16 above on how well they exhibit the following aesthetics.

	Completely like this term 6	5	4	Neither like or unlike this term 3	2	1	Not at all like this term 0
corporate	○	○	○	○	○	○	○
cheap	○	○	○	○	○	○	○
whimsical	○	○	○	○	○	○	○
neutral	○	○	○	○	○	○	○
bland	○	○	○	○	○	○	○
serious	○	○	○	○	○	○	○
modern	○	○	○	○	○	○	○
friendly	○	○	○	○	○	○	○

17. What is your age?

- ☐ Under 18
- ☐ 18–20
- ☐ 21–25
- ☐ 26–30
- ☐ 31–35
- ☐ 36–40
- ☐ 41–45
- ☐ 46–50
- ☐ 51–55
- ☐ 56–60
- ☐ 61–65
- ☐ Over 65

18. How many years have you been practicing as a graphic designer?

- ○ None
- ○ 1 year or less
- ○ 2-5
- ○ 6-10
- ○ 11-15
- ○ 16-20
- ○ 20+

19. How many years of design school have you completed at a higher education institution?

- ○ None
- ○ 1 year or less
- ○ 2
- ○ 3
- ○ 4
- ○ 5+

20. What country do you primarily work or attend school in?

- [ ] United States
- [ ] Mexico
- [ ] Canada
- [ ] Other (please specify)

21. What is your primary language used in design work?

- [ ] English
- [ ] Spanish
- [ ] Other (please specify)

22. Do you have experience in designing maps?

- [ ] Yes
- [ ] No
- [ ] If yes, what typefaces do you use to make maps?

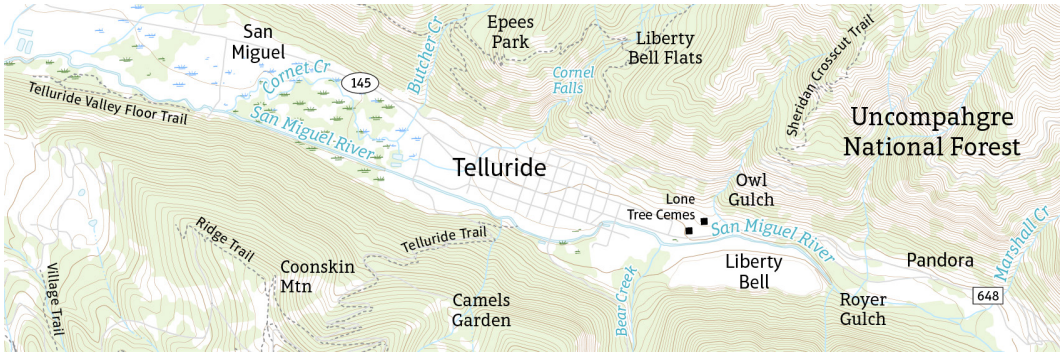
APPENDIX E

SURVEY MAPS ORGANIZED BY TYPEFACE COMBINATIONS

Super Family Typefaces

1. Aptifer Sans and Aptifer Slab

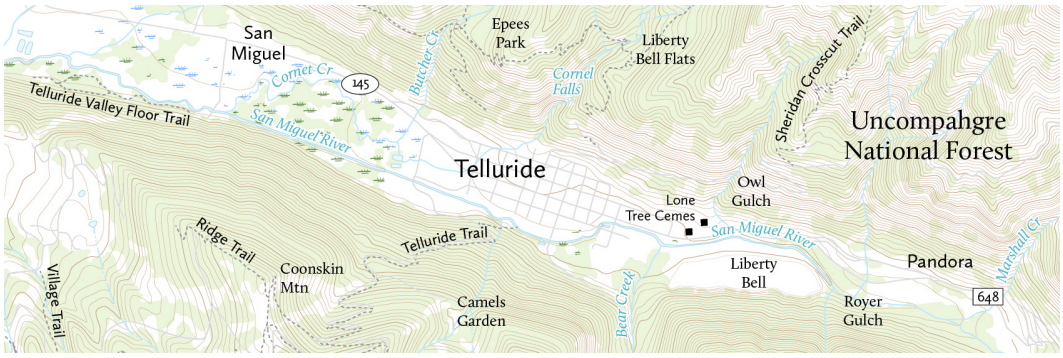
Survey C



Survey B

2. Calluna and Calluna Sans

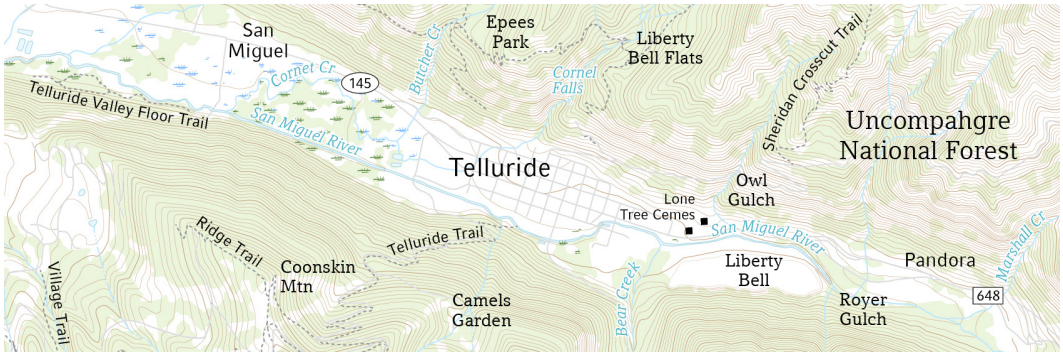
Survey C



Survey B

3. Compatil Fact and Compatil Letter

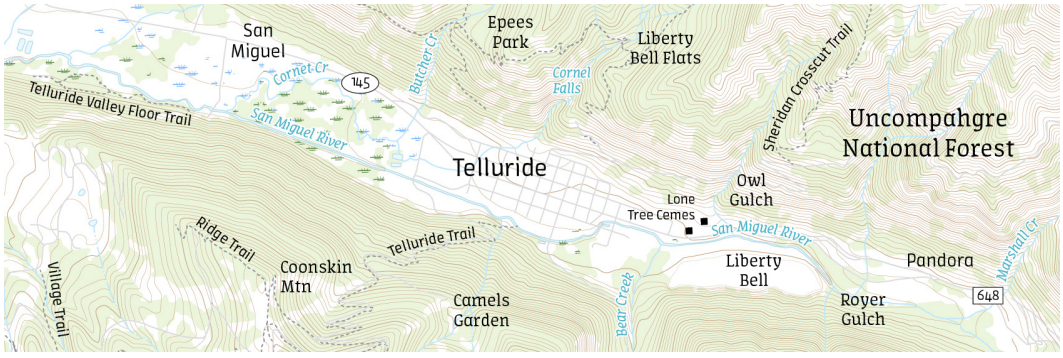
Survey B



Survey A

4. FF Amman and FF Amman Sans

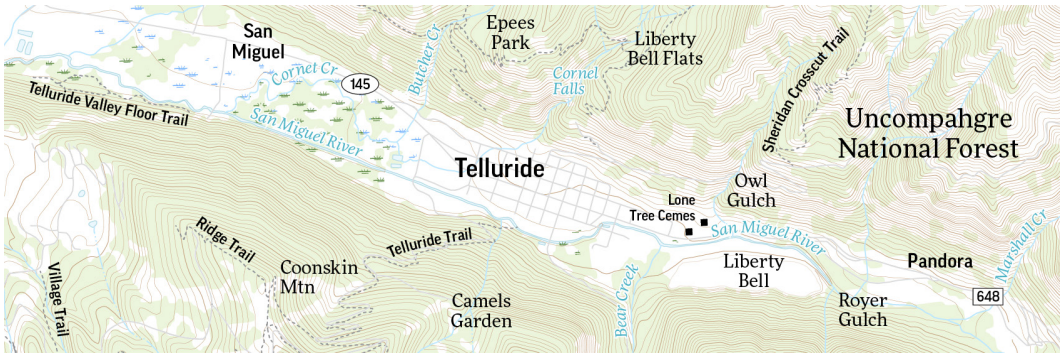
Survey C



Survey B

5. FF Good and FF More

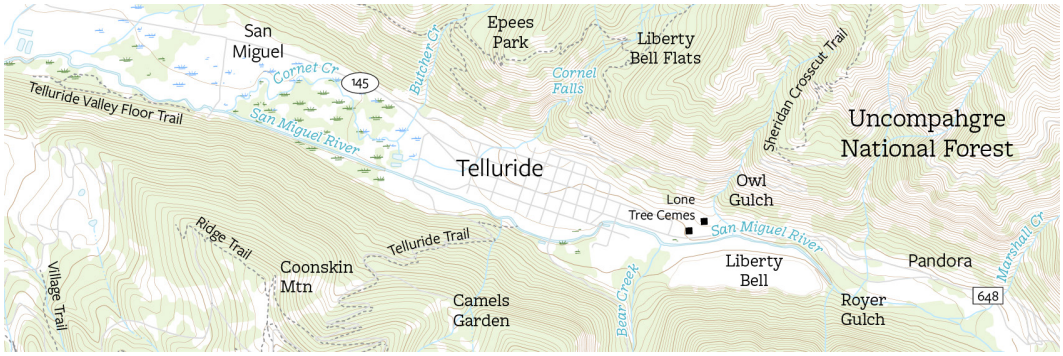
Survey A



Survey C

6. Freight and Freight Sans

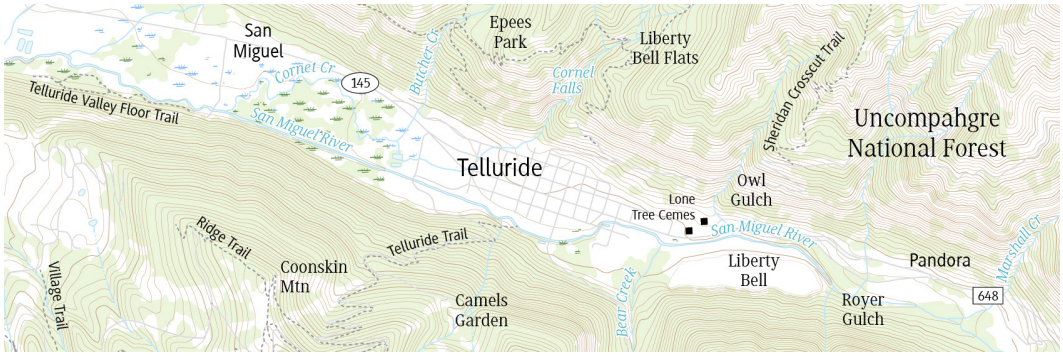
Survey A



Survey C

7. Generis Sans and Generis Serif

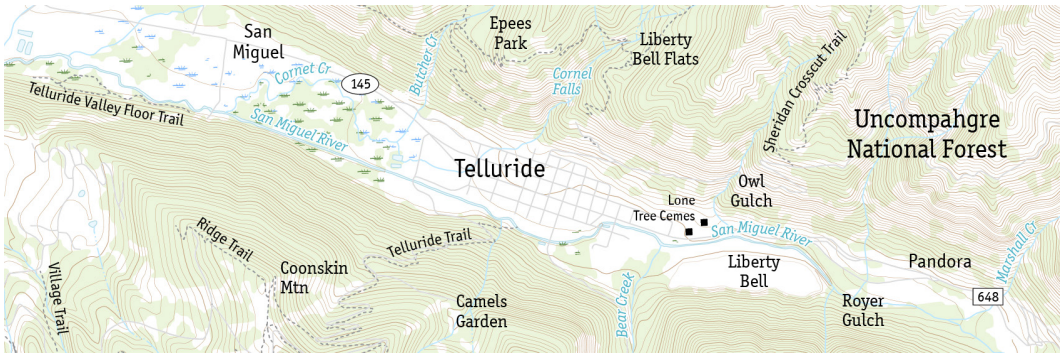
Survey B



Survey C

8. ITC Officinia Sans and ITC Officinia Serif

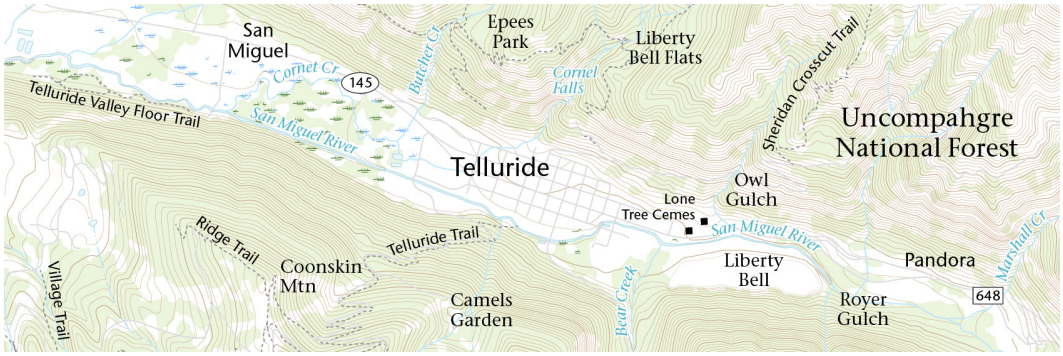
Survey B



Survey A

9. ITC Stone Sans and ITC Stone Serif

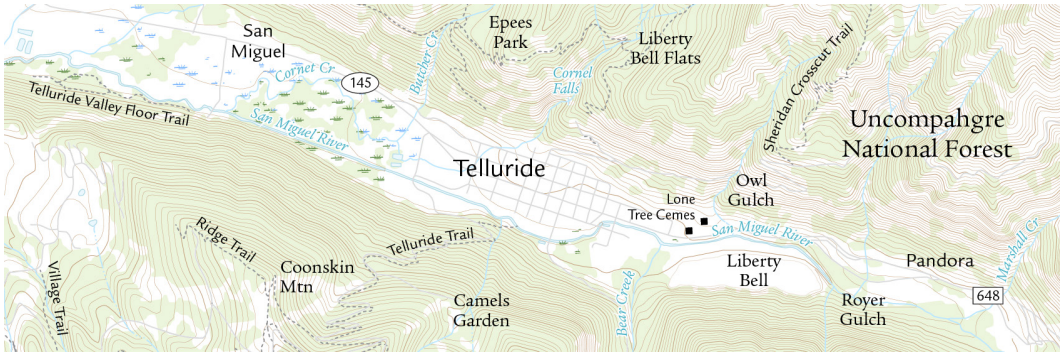
Survey C



Survey A

10. Legacy Sans and Legacy Serif

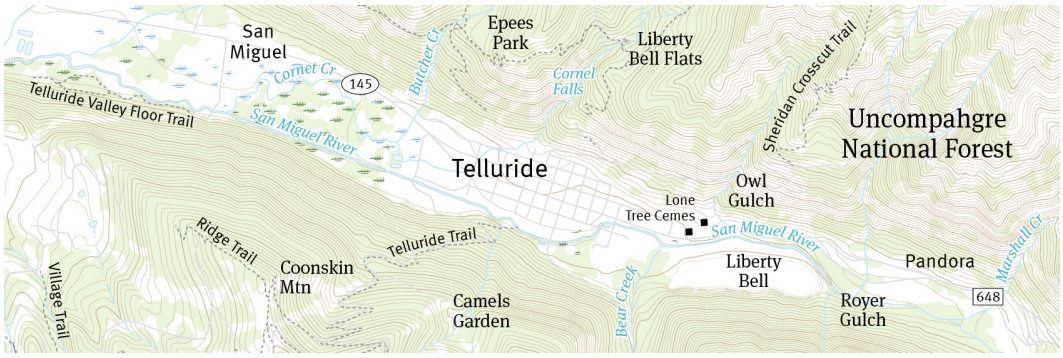
Survey B



Survey C

11. Meta and Meta Serif

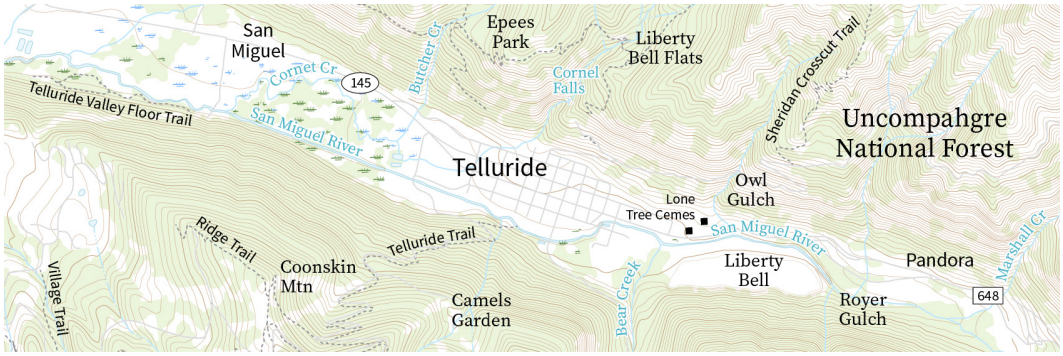
Survey A



Survey B

12. Source Sans and Source Serif

Survey A

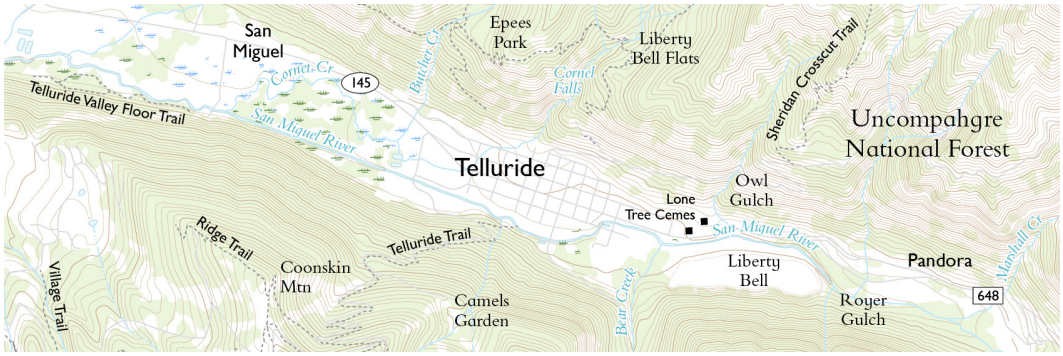


Survey B

Differing Typefaces

1. Bembo and Gill Sans

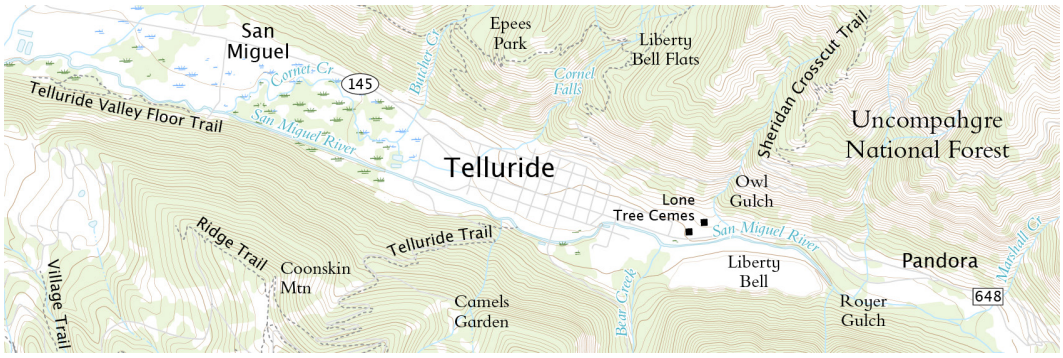
Survey A



Survey B

2. Bembo and Lucida Grande

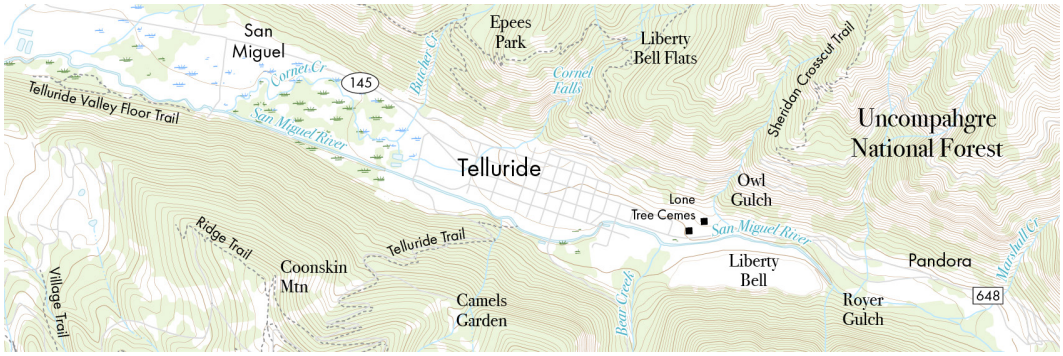
Survey C



Survey A

3. Bodoni and Futura

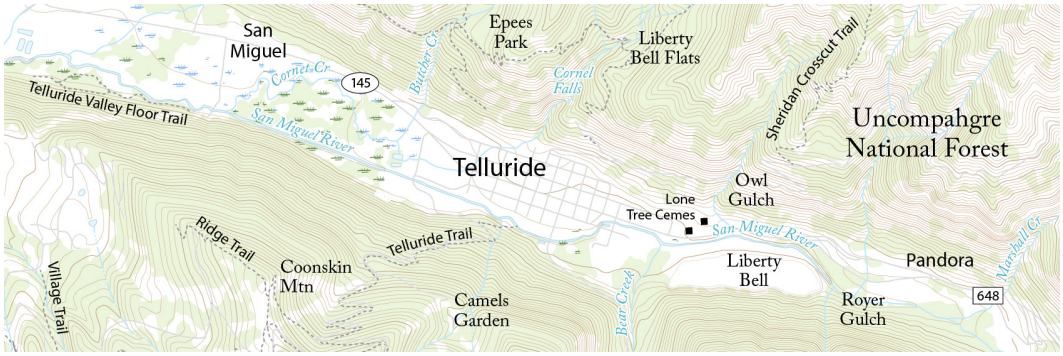
Survey C



Survey B

4. Caslon and Myriad

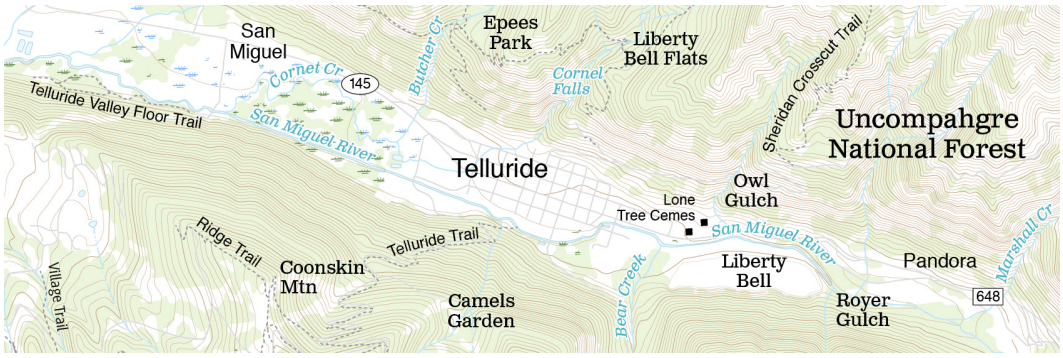
Survey A



Survey B

5. Clarendon and Helvetica

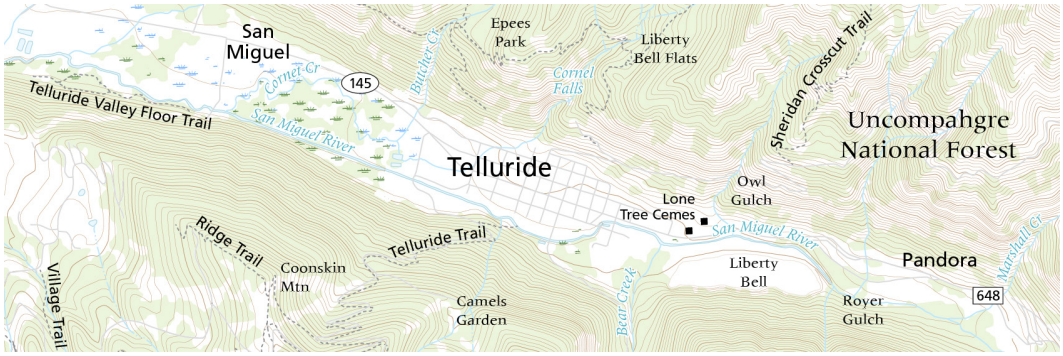
Survey C



Survey A

6. Frutiger and Meridien

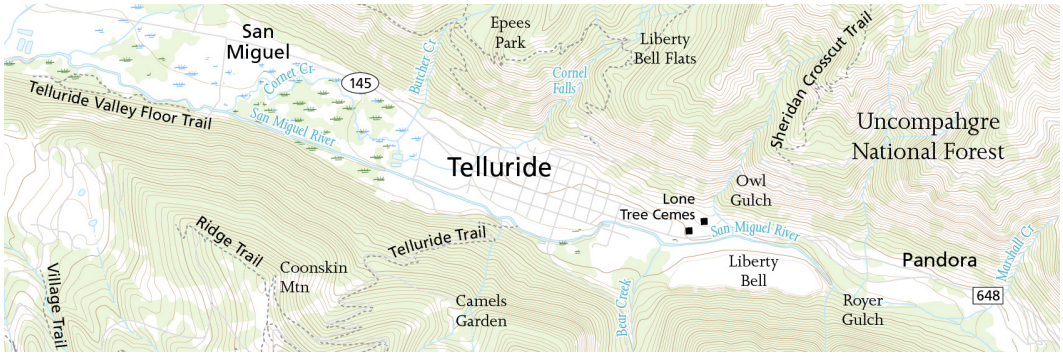
Survey C



Survey A

7. Frutiger and Joanna

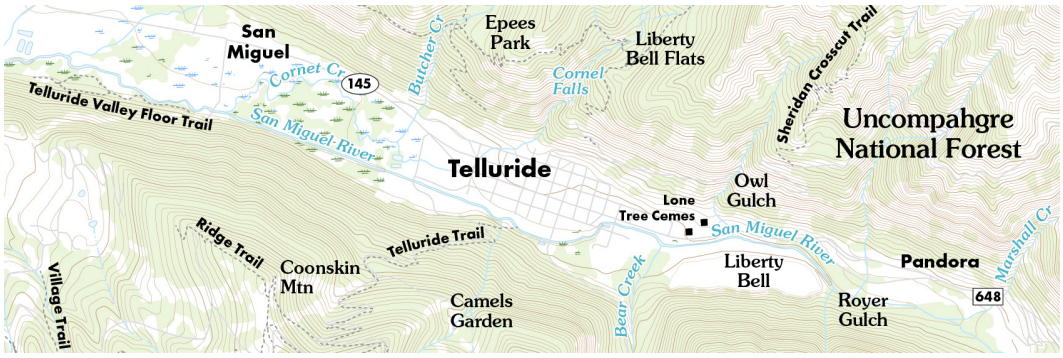
Survey B



Survey C

8. Futura Bold and Souvenir

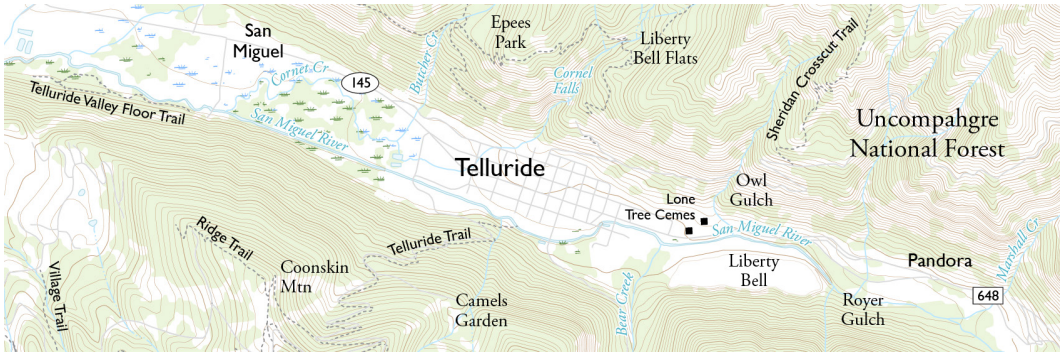
Survey A



Survey C

9. Garamond and Gill Sans

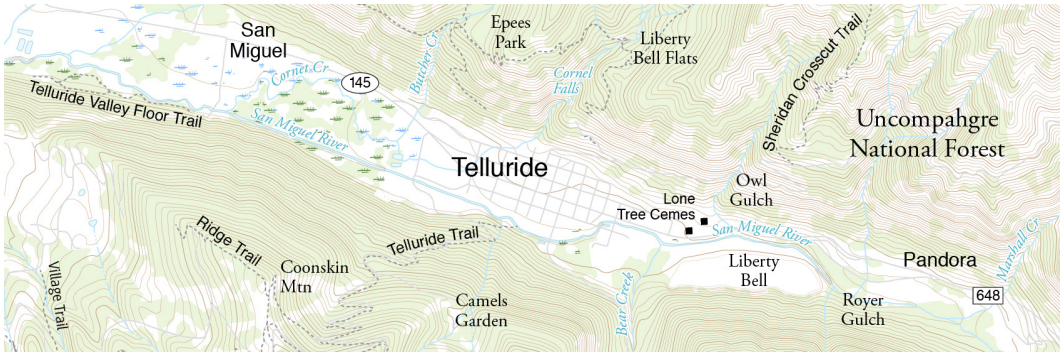
Survey B



Survey A

10. Garamond and Helvetica

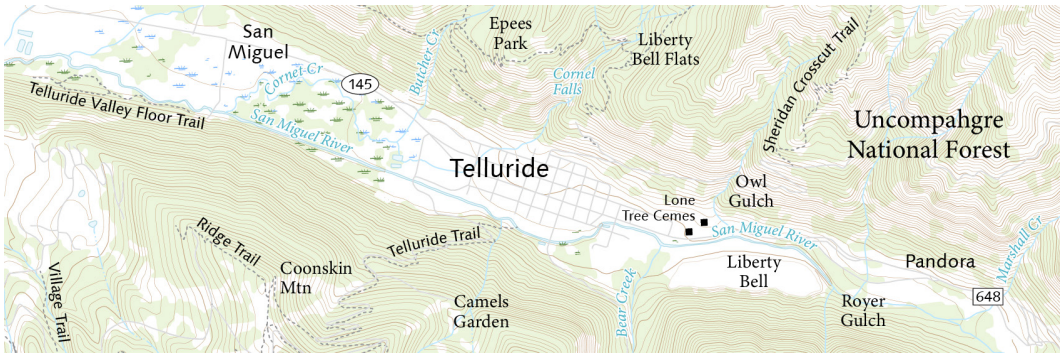
Survey B



Survey B

11. Minion and Syntax

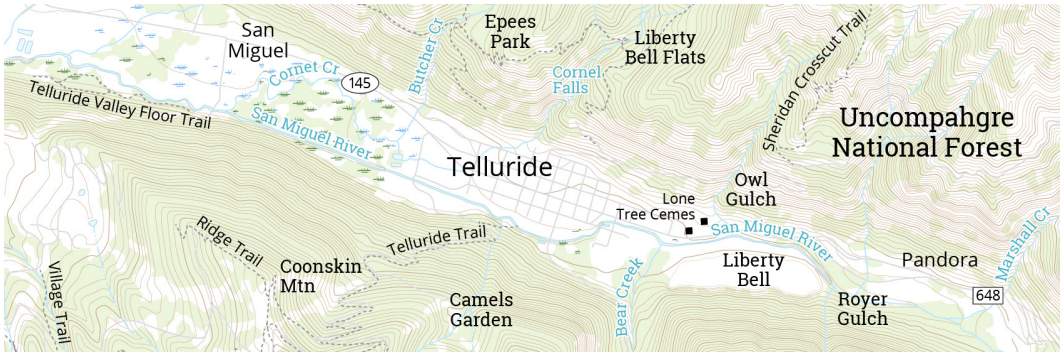
Survey A



Survey C

12. Open Sans and Roboto Slab

Survey B



Survey C


I-66
I-66; US 50
23rd St NW
Virginia Ave NW
17th St NW
The Ellipse
15th St NW
14th St NW
Pennsylvania Ave NW
7th St NW
Washington D.C.
Constitution Ave NW
Vietnam Veterans Memorial
Constitution Gardens Pond
National Museum of African American History and Culture
National Museum of American History
National Museum of Natural History
Potomac River
Lincoln Memorial
The Reflecting Pool
World War II Memorial
Washington Monument
National Mall
Smithsonian Castle
Arlington Memorial Bridge
Korean War Veterans Memorial
Tidal Basin
Independence Ave NW
Independence Ave NW