

Design Fundamentals

by Steven Bradley

**Elements,
Attributes,
Principles &**

*A Beginner's Guide to
Graphic Communication*



Design Fundamentals—Elements,
Attributes, & Principles
A Beginner's Guide to Graphic Communication

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Introduction

When I made the decision to become a freelance web designer I had skills with HTML and CSS. I knew a smattering of Javascript and I quickly learned enough about PHP and MySQL to get by. What I was missing was an understanding of how to communicate visually. I didn't have a means to visually express the story my clients wanted to tell.

Like many who enter the field of web design, I didn't study graphic design in school. I've picked up some things through experience, such as red usually means stop and green usually means go. Life has taught me that sharp edges can cut and tend to be more dangerous than softer, smoother, curves. I've observed that larger objects in a composition are often more important than smaller objects in the same composition.

But none of that made me a graphic designer or gave me the ability to communicate ideas visually.

It didn't seem important at first. My original web design business was a partnership with a friend. She would design the sites and I would write the code to turn her designs into working websites. I might make a suggestion about how a design looked here and there, but she was in charge of the design and I was in charge of writing the code.

Unfortunately neither of us was all that good at the business. She eventually decided to pursue other things, while I decided to try again on my own.

I still didn't know much about designing websites. I could develop what others designed, but now I was going to have to design the site as well. I felt confident that I could design something that would be usable, but I wasn't sure I'd be able to design something anyone would want to look at. If I was going to be successful on my own, I knew I needed to learn something about graphic design.

I was fortunate in two ways. First I was aware of my limitations and immediately set out to learn. In fact, I knew the previous business was coming to an end a few months before it did and had already started reading beginner books on graphic design.

Second was the time I was getting started. It was 2005 and the majority of sites on the web were eyesores. No one wanted to look at them. I figured if I could get even a few things right, I would already be ahead of the majority.

My early goal was to not be awful. I admit, I wasn't exactly shooting for the stars with it, but it was a start and not too difficult a goal to meet. After reading two or three books I learned enough to make my designs something that wasn't too bad. They were far from beautiful, but they weren't awful. Visitors could find their way around the site and not flee in horror at the aesthetics.

Here's the first site I designed for myself and completely by myself.



Figure 0.1: The very first site I designed entirely on my own

Hardly great design, but I'm happy to see I got a few things right. The information is organized well. There's a reasonable amount of space between the groupings of text. For the most part, the elements are aligned to other elements, and I think you can tell

what goes with what.

I was able to show that some elements are different from others and I used both borders and space to achieve this separation. There's something of a hierarchy on the page and I even managed to include what for me was a bit of eye candy in the background illustration. It's from a drawing I made from Vincent van Gogh's own drawing of his Yellow House in Arles.



Figure 0.2: My drawing of Vincent van Gogh's Yellow House

Of course, I did get a number of things wrong with the design of the site too. Everything I mentioned above as being done well, I could have done far better.

- A few things are still out of alignment

- The space should be more purposeful.
- Elements were grouped in the most obvious way.
- The hierarchy could be clearer and stronger.

And there's plenty I didn't do well at all.

The colors are dull and the design generally lacks interest. I don't know what I was thinking when I designed the logo other than my lack of ability to design something better.

That was more than a dozen years ago and I'd like to think I've come a long way since then. At the very least I know all those design terms and what they mean. I spent years reading books and looking at websites and magazine advertisements and posters. I thought about the design of menus and business cards and any other visual composition that caught my eye and made it linger.

What I've learned is that designing a website involves making lots and lots of decisions. Should this be larger than that? What colors should you use? Is a rectangular shape appropriate or would a circle be a better choice?

Designing a website, designing anything, is about solving problems. The graphic part of designing a website is about solving problems of visual communication. It's difficult to know with absolute certainty if a decision you make in isolation is a good one, but each decision informs the next one and the one after that,

making each subsequent decision a little easier.

My goal with this book is to provide you with information to help you make these decisions. I want to help you understand how you can attract someone's eye to one part of your design and then lead them to the next thing you want them to see. I want to give you tools so when a client asks for an elegant or enthusiastic or comforting design, you'll have an idea how you might do that without using the words. You'll be able to decide between circle and square and red and blue.

About This Book

This book is divided into 4 parts, each building on the parts that come before.

1. **Visual perception**—This section offers a quick look at how the eye takes in visual information and processes it. The more I learn about graphic design, the more I'm convinced all the guidelines stem from how our eyes work.
2. **Elements**—Elements are the visual objects you add to a composition as well as the space between them. This section considers a number of basic design elements such as lines, shapes, and space.
3. **Attributes**—Attributes are how you modify elements. They let

you distinguish one square from another square and they provide ways to emphasize similarities and differences between elements. They describe elements as large or small, red or blue, textured or patterned, and so on.

4. Principles—These are the guidelines for how to work with elements and their attributes. The principles of composition in this section will help you decide when to use a circle or a line and when to make one red and the other blue. It will also help you decide how to arrange all your elements in your composition.

As you read through this book don't think of everything here as an absolute rule you must follow. Think of it all as guidelines, though guidelines with a lot of history and success behind them.

If I say that larger elements are typically seen before smaller elements, don't take that to mean you have to make everything larger to make it stand out. Instead, think of the information as a tool. If you need to call attention to something, know that making it larger is one way you can do that, but there are also other options. Use what's here to understand your options and why you might choose one over another to solve a particular visual problem.

Chapter One

Visual Perception

A lot happens when you take in your visual world. Your eyes dart about before fixating on a small area. You process visual information storing some for later retrieval. Previously held information, your interest of the moment, something in your visual world that calls attention, all potentially direct your eye where to move next and the process begins again.

This all happens so quickly that you don't notice or think much about it, but so many principles of design arise out of the way we all perceive our visual surroundings; the way our eyes take in information and process it.

You could make an argument that everything visual in the design of a website involves working with or against the human process of visual perception. I think that makes the topic a good place to start a study of the fundamentals of composition and graphic design.

Visual Perception is a Two-Way Process

It seems so easy and natural, but how do we take in visual information? How does raw data about the shape and color and size of an object become something meaningful to us? How does it attract our attention? How does it become something we act on or store for later?

Visual perception is a two-way process in which internal and external information moves back and forth to determine where you'll look, what you'll process, and how you'll store information for later retrieval. The two directions of the process are typically referred to as bottom-up and top-down.

- **Bottom-Up Process**—Your senses take in visual data from your visual environment, process some, and store some of what's processed for long-term use. This is also called early vision
- **Top-Down Process**—Your long-term memory works back to the senses to interpret the information being processed, to influence how information is stored long-term, and to direct the eye where to look next. This is also called later vision.

The bottom-up process is driven by external stimuli. It's pre-attentive processing in that it occurs without your conscious attention or rather before your conscious attention.

Your eyes move about, landing here or there momentarily to take information in. Your brain quickly distinguishes background and

foreground. It groups and organizes elements and patterns. It determines where the next landing spot will be and what information gets stored in long-term memory.

Early vision works with parallel processing, that is lots of neurons are firing at once taking in as much as they can and spending less than 10 milliseconds on each object. The goal is to organize the visual information and give it structure.

At this stage of vision you generate an overall impression or a rough sketch of what you see. Because this occurs so quickly, it's driven by the attributes of the objects in your field of vision as opposed to a conscious choice of where to look next. You can recognize general shapes, their size, and their color in early vision, but you don't take in enough information to see the objects in detail or identify what they are.

The top-down process works in reverse. It's driven by internal stimuli and demands on your attention. Your memories, expectations, intentions, and desires all push back down the stack directing your eyes to look for what's meaningful or useful in the moment.

Later vision works with serial processing. It makes use of the early vision sketch to help determine where to focus your attention. It's guided by pre-existing knowledge and attitude and your general worldview. During later vision your attention is more focused and you can use information held in memory to identify an object as a car, a balloon, or a person.

Because later vision involves serial processing it happens slower,

though bear in mind slower is a relative term and how much time is actually involved depends on what you're looking for and the difficulty in finding it. Finding Waldo would likely take more time than finding the number 7 in a string containing less than a dozen numbers.

Together, both the top-down and bottom-up processes lead to the complex interactions that make up visual perception as new information from our visual world enters our brain and information previously stored helps direct our senses and shape what it all means.

Much (though not all) of what's in this book is going to focus on early vision and it's pre-attentive parallel process. Let's talk about the process in a little more detail starting with how our eyes work and how some of what they take in ends up in long term memory.

Bottom-Up Visual Perception

Bottom-up perception begins with the senses, specifically the eye in the case of visual processing. The process describes how our eyes take in information and move some of the information into memory.

The Fovea and Saccadic Eye Movements

Visual perception starts when light reaches your retina, which is a light sensitive membrane covering the back of your eye. Your retina converts the light energy it receives into electrical impulses that it sends to your brain to interpret.

At the center of your retina is a small depression that contains a concentrated amount of retinal cones. This area is your fovea and it's where your vision is sharpest. The center of your visual field is located in this area.

Your fovea can distinguish size, color, shape, and a variety of other primitive characteristics. It also gives sharpness to vision. Anything inside the fovea's range is seen clearly. Anything outside it's range is far less than clear. You might distinguish a shape of sorts outside the range of your fovea, but the detail necessary to recognize what you see isn't there. You might see an amorphous blob out of the corner of your eye, but not be able to distinguish it as a circle or square.

Unfortunately, the fovea is small. It can take in about 15 degrees of vision so only a small part of your visual world is seen clearly at any given moment. Most of the visual information available to you exists in your periphery.

To increase the overall clarity of our visual environment, our eyes must continuously, frequently, and rapidly move about. These rapid eye movements are called saccades and they allow us to choose what to pay attention to visually.

Saccades are straight, but jagged, darts of the eye, which occur about 3-5 times every second. In between saccades, we allow our eyes to briefly fixate on one location and we extract visual data before starting the next saccade. As our eyes move and fixate, we become active participants in what we see around us.

Saccades are among the fastest movements produced by our bodies. They happen so quickly we aren't consciously aware they're occurring and once a saccade has started it can't be altered.

When we encounter a new visual environment, our eyes move around to locate the most interesting parts. At the same time we build a mental map based on what we see. We don't take in all the information we need for a complete and detailed map all at once. We alternate saccades and fixations over the scene in front of us and we move our unconscious attention from one location to the next, picking up new data and processing it at each stop.

Strategies for Seeing Clearly

To compensate for our limited visual fields, our eyes have evolved and they employ strategies to find what we want as quickly as possible. We get our eyes near what we want to see and then we look for the details.

We begin with an initial overview of our surroundings and make big movements. We seek context and to get us close to what we want. Once in the right area, our eyes make finer movements to examine the details. Our entire visual search process runs through three loops.

- Move and scan loop
- Eye movement control loop
- Pattern-testing loop

Assuming we already know what we're looking for the **move and scan loop** looks something like the following.

- Move to a general area
- Initiate fixation
- Move to a new area
- Initiate fixation
- Continue until desired object/information is found

To determine where to move next after moments of fixation we use the **eye movement control loop**, which determines targets to move to based on their elementary properties of form (size, color, shape, etc.).

The final loop, the **pattern testing loop**, comes into play while we fixate on an object. We check the pattern we see with patterns we've previously stored in memory. We make several pattern checks during each fixation to help us identify known objects and make connections between unknown objects and known information.

Primitive Features (Pop Outs)

Throughout early vision our eyes alternate between moving and fixating. We take in visual information, process it, and move our eyes again to fixate on another object.

Some things grab our attention quicker and we recognize them more easily, even in the periphery of our visual field. A blinking light for example doesn't need to be directly in front of you to recognize it as blinking.

The part of the brain that processes visual information is the primary visual cortex. Features or characteristics that are processed by the visual cortex are generally easier to retrieve. Hardwired features like color, size, orientation, shape, motion, and stereoscopic depth can therefore be used to attract the eye.

When a feature of an object stands apart from the same feature in those that surround it, the object becomes visually distinct. Make the feature different enough (a red shape in a sea of black shapes, for example) and it becomes quick and easy to find (**Figure 1.1**). This is called the pop out effect.

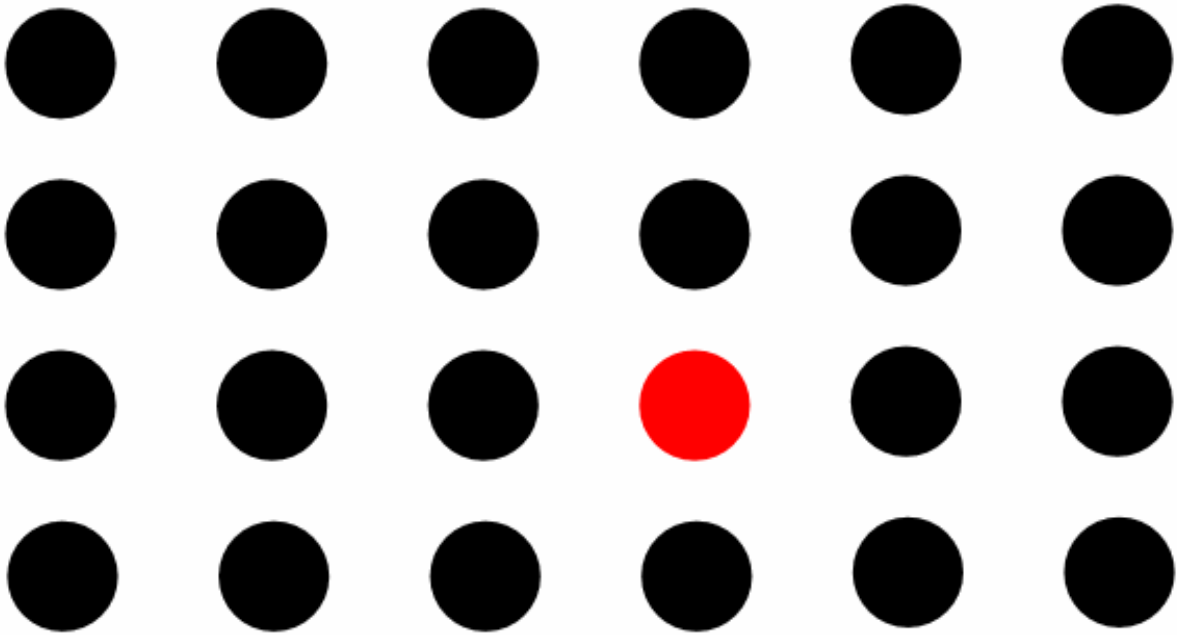


Figure 1.1: The red circle pops out from the sea of black circles.

It only takes a single fixation (less than 1ms or 1/10th of a second) to observe a pop out. Items that don't pop out might take several fixations (between one and a few seconds) to be discovered.

The key to making primitive features pop out is how different they are from the same primitive feature of surrounding elements. The difference has to be enough to quickly distinguish between them.

Note that this isn't limited to a single primitive feature. You can vary multiple features to create more or less pop out effect (**Figure 1.2**).

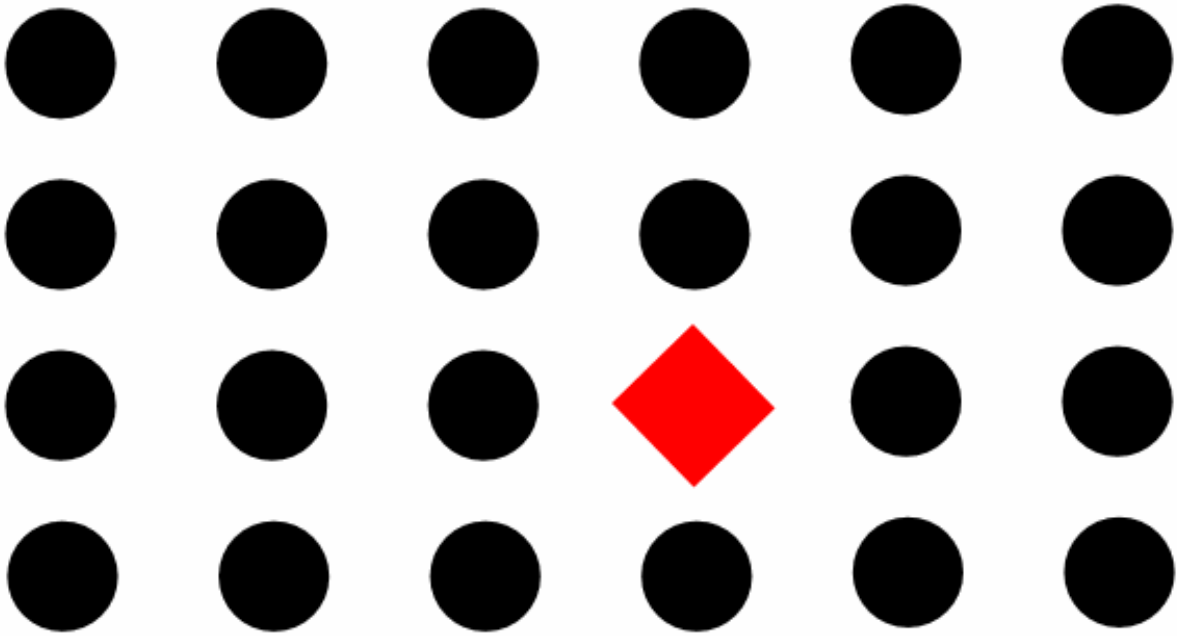


Figure 1.2: The pop out effect is increased by varying both color and shape.

You might be familiar with the idea of using contrast to make something in a design stand out. This is why it works. If you're not familiar with contrast, don't worry I'll cover it later in the book.

Other Types of Eye Movements

Saccadic movements aren't the only type of eye movements. There are four ways in which the eye might move.

1. **Saccadic movements**—are rapid movements and moments of fixation.

2. **Smooth pursuit movements**—are slower tracking movements to keep an object on the fovea at all times while it's in motion.

3. Vengeance movements—align the fovea of each eye with targets located at different distances from the observer.

4. Vestibulo-ocular movements—stabilize the eyes. They compensate for head movements and keep our eyes stable to the visual world.

Hopefully you can see how saccadic eye movements are the ones we're most concerned with, given our designs don't need their movement tracked (outside of any animations we add where objects are moving across the screen) and our head probably isn't moving around too much when viewing a website on a two-dimensional screen where everything is the same distance away.

A few times I've mentioned that we process the information that our eyes take in. Your fovea and saccadic eye movement generally cover the taking in part. For the processing part we need to consider memory and its role in visual perception. We need to think about the top-down process of visual perception.

Top-Down Visual Perception

Information gathered during saccadic eye movement is quickly passed on to your brain for processing, where the information influences where your eyes look and focus next. This influence is the top-down process in which everything you know and have previously seen or experienced or thought, influences your attention in the moment. It helps you identify what you're looking for sooner and it helps you disregard information that isn't meaningful to you at the time.

The Role of Memory in Visual Perception

To understand how the information we hold in memory influences where we look next, we need to consider how information gets into memory in the first place. We can consciously hold a very limited amount of information at any one time so anything you want to retain longer needs to be processed right way so it can be stored for later use.

We use three different kinds of memory in this process.

- Sensory memory
- Working memory
- Long-term memory

Sensory Memory

As the name implies, sensory memory is where we process the sensory data we receive during saccades. At best this data is a momentary impression that fades away after a few hundred milliseconds, or less than a second. The information is held just long enough for some of it to be further processed.

There are at least two components to sensory memory.

- Iconic memory for visual information
- Echoic memory for auditory information

I said some of the information is held long enough for further processing. Which part is held, influences our conscious attention and the primitive features recorded in the visual impression. This suggests that primitive features not only attract attention, but also help start the process of placing information into memory.

Once sensory information is ready for further processing, it's passed on to working memory.

Working Memory

Working memory is a mental workspace that helps us make sense of our visual world. It's kind of like RAM in a computer. It serves as a bridge between sensory memory and long-term memory. All the work of integrating the two is done here.

New data is analyzed and synthesized with previously stored information. We do conscious mental work to decide how to integrate new information with old and we use both to better understand what we see and determine where to focus our attention next as well as returning the combined information back to long-term memory.

Working memory is where we map our surroundings. It's where we separate figure from ground. It's where we identify shapes by searching long-term memory for anything similar to the ones we see.

If you find a match between what you see in your visual surroundings and what you find in your search of long-term memory, you'll be able to identify what you see. If you don't find a match, you'll instead have to make inferences about it.

Like sensory memory, working memory has two components and it probably won't surprise you what they are and what each does.

- Visual working memory processes visual information
- Verbal working memory processes verbal information

To understand and make sense of new information we compare it to what we already know (or think we know). As your eyes move about, your working memory performs ongoing searches of long-term memory looking for information related to the data your eyes are taking in.

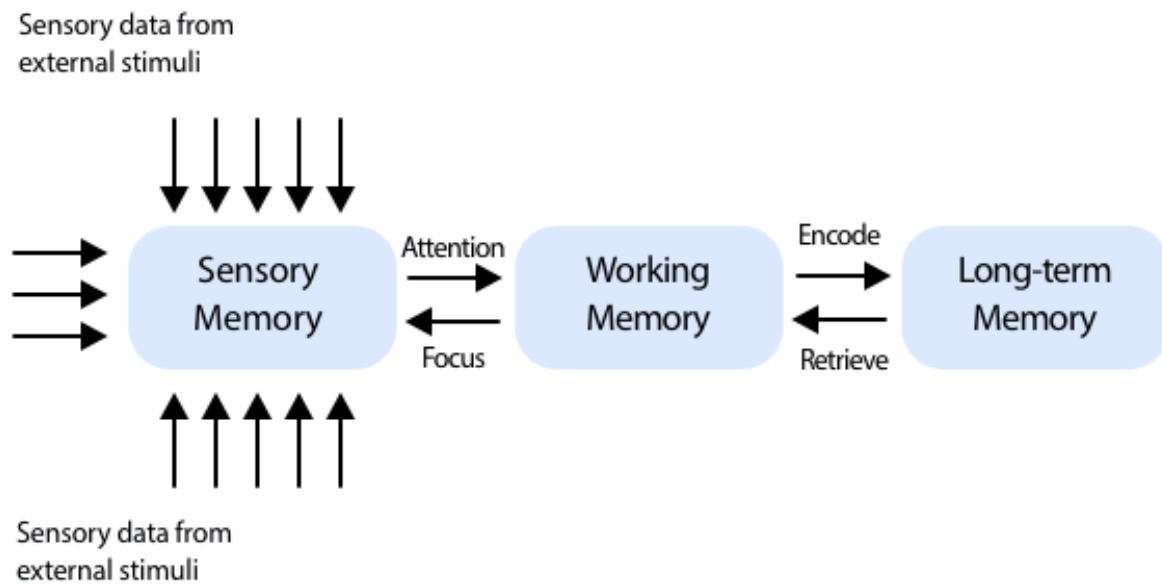


Figure 1.3: The two-way process of memory.

Though the systems are independent they communicate and interact, which explains why information is more likely to be retrieved from memory when it's stored in both visual and verbal form.

Also like sensory memory, working memory has a limited capacity to hold information. On average a person can hold three to five chunks of information consciously at a given time, though different people can hold more or less based on their genetics and focus among other things. The information held will rapidly fade unless it's further manipulated or repeated.

That turns out to be a good thing since it allows us to change cognitive directions, to change what we're thinking about at the moment. It allows us to shift our focus, attention, and processing.

Cognitive Load

Cognitive tasks like counting don't require a lot of working memory, but more complex tasks that involve solving problems and even conscious recall does place demands on cognition and on working memory. Together these demands are known as cognitive load.

The higher the cognitive load, the more difficult it will be to process information and the more likely any information you do process will be misunderstood or misinterpreted or overlooked entirely.

You might have heard of the book *Don't Make Me Think* by Steve Krug. The whole concept of the book is to reduce cognitive load so that site visitors have less to process in working memory.

Long-Term Memory

The information you process and integrate in working memory is likely, though not definitely, moved into long-term memory.

It might surprise you to know that long-term memory is capable of storing unlimited information in a flexible and dynamic structure. Surprising, because who can really access everything they've ever seen or experienced. Not me, that's for certain. However, the reason isn't because the information doesn't exist in memory. It's because our long-term memory doesn't have an easy way to retrieve what it stores.

Not all memories are the same. We remember concepts in a different way than we remember events in our lives or how to cook dinner. Like sensory and working memory, long-term memory is of more than one type. There are three types of long-term memory.

- **Semantic memory**—is interpretation. It stores meaning, facts and concepts, and information extracted from pictures. Semantic memory is where we store general knowledge.

- **Episodic memory**—is autobiographical. It stores events and the associated emotions related to the experience. Episodic memory is where we store autobiographical and narrative information.

- **Procedural memory**—is task oriented. It stores skills and procedures and other “how to” information, Procedural memory is where we store information about how to do things.

Some of the information we process in working memory is automatically passed into long-term memory, but this encoding generally requires more conscious effort from simply repeating the information until it's retained to analyzing the meaning of the new information so it can be related with information already held in long-term memory.

The more ways you can connect new and old information, the more likely you'll be able to recall it later, especially when you connect and combine visual and verbal information.

How deeply you process information significantly affects how likely it can be recalled later. Something you process only as deep

as its visual characteristics isn't going to be stored as deeply as something you process semantically with attached meaning.

The more meaning you give to information, the more you include both visual and verbal information, the more you connect images to words, the greater the depth of processing for that information. The greater that depth, the more likely the information will be stored deeper in long-term memory.

Schemas

Meaning is really the key to storing long-term information. We don't store literal copies of the information we take in through our senses. Instead we interpret new information in terms of what we already know. The known provides a context for the new and this context is used to interpret and incorporate new information with old.

In order to do this we organize long-term memory into structures called schemas. Together our schemes form a network of impressions and associations that make up how we understand the world.

For example, your schema for a car might include information about its general shape and knowledge that a car has four tires, an engine, and a steering wheel. It might include information that cars are used to transport people from one location to another.

When you see something with four tires and an engine that's in the general shape of a car your schema helps you determine if the

thing you see is or isn't a car. Your car schema probably includes something about how the size of a car differs from a truck or a bus. You probably hold a more general schema for vehicle that includes cars, trucks, buses, and more. And you probably hold more specific schemas for sports car, family car, economy car, and so on.

Schemas are abstract and generalized representations of what we know (or think we know) and we rapidly activate them during cognition. They can represent objects, scenes, concepts, and the relationships between them.

Our schemas are dynamic. They're constantly changing as new information is integrated. We refine schemas each and every time we assimilate new information into them.

The reason we encode information into schemas is to help us recall it later. Unfortunately, recalling information is error-prone and unpredictable. It can be highly dependent on what's known as retrieval cues.

Retrieval cues are bits of information that activate associated knowledge for easier recall. They're kind of like meta information for the memories we store long-term. They're the brain's way of tagging information to find it later. A retrieval cue could be a smell, a feeling, an idea, or some other stimulus from the environment.

The cue, a song for example, activates an associated schema, which itself then activates other schemas. If the right schemas are retrieved, the memory is recalled. Usually when you can't

remember something it's because you're using a poor (or no) retrieval cue to recall it. On the other hand, multiple cues activating multiple schemas increases recall. It's why combining text and graphics can make a concept easier to remember. Visual and verbal cues combine to activate more schemas.

Many schemas become automatic with practice and repetition. You don't need to search your long-term memory to remember how to read for example. You aren't searching your memory to recognize letters and words. You likely did when you first learned to read though.

Another type of structure in long-term memory are mental models, which are more general and wide ranging than schemas. Mental models help you explain cause and effect and how changes to one thing can affect another. They're also how two people can view the same events and walk away with such a completely different interpretation of those events. Each had a different mental model for how cause and effect worked in the particular situation.

Cognitive Characteristics of Your Audience

One last thing to consider with visual perception is the audience. Different people have different cognitive characteristics that can alter where their eyes look and what they make of the visual information in front of them.

Characteristics to think about include:

- **Developmental**—What experience, skill, and understanding of the subject will the audience have?
- **Distractibility**—What is their ability to focus?
- **Visual literacy**—How much knowledge and understanding of graphic symbols and techniques do they have?
- **Motivation**—How interested will the visitor be? Does the information present match his or her goals?
- **Culture**—How does the culture of the viewer provide context for visual input in your design?

Each of the above requires knowing your audience as best you can and aligning content and visuals with their interest, culture, and experience.

Closing Thoughts

My guess is before reading this section you already knew that a lot more happens when you notice an element in a design than merely noticing it. Hopefully now you understand a little more about the complex two-way process in play that directs your eye where to look, what to take in and process, and what to incorporate into the existing structures of your long-term memory.

Every part of this process has implications for graphic design from understanding whatever you can about the schemas and mental models of your audience to making something pop out so it gets noticed more quickly.

The majority of this book will focus on the latter, on early vision and the bottom-up process. It will focus more on the perceptual, the sensory impressions the eye takes in, though some topics such as the meaning of color has a lot to do with the schemas of your audience.

You might be surprised to discover how much advice about graphic design originates with how our eyes work as they take in visual information about our environment, but I think as you read through the rest of the book, you'll agree with me that it all starts here.

Chapter Two

Elements

Design elements are the marks we make on the canvas as well as the canvas itself. They're objects your eye lands on during fixations and some elements also direct your eye where to move next. Keep this idea of alternating fixations and movements in mind as you read through this chapter and the rest of the book.

In this chapter I want to talk about five different types of elements, what they communicate, and how to use them in your designs.

- Space
- Points and Dots
- Lines
- Planes and Shapes
- Volumes and Mass

You might notice that each type of element adds one more dimension than the element that came before in the list. Space is the absence of elements. Points are coordinates in space and have zero dimensions. Lines have a single dimension, Forms have two dimensions, and volumes have three.

Let's walk through each type of element and consider their different functions within a composition. We'll start with what's often the most overlooked element, the empty canvas itself. Let's begin our talk of elements by looking at space.

Negative Space

If I asked you to describe what you do to create a composition, you might tell me about a line you drew here and a shape you placed there. You might talk about a pattern you added and how you gave an object a sense of depth through shading. You'd be describing all the marks you placed on the page and how you organized them into some kind of cohesive whole.

That's not the full story, though. You'd be neglecting to talk about the space of the canvas and how you shaped that space in your composition.

Space provides contrast for the elements that fill it. A positive form only exists in comparison to the negative space it fills. They exist together like day and night or yin and yang. You can't change one without changing the other.

Design is as much about shaping and organizing space as it is about what fills the space. It's your first and perhaps most important design element. It's the element you have by default and with the first mark you add to your canvas, you begin to manipulate space.

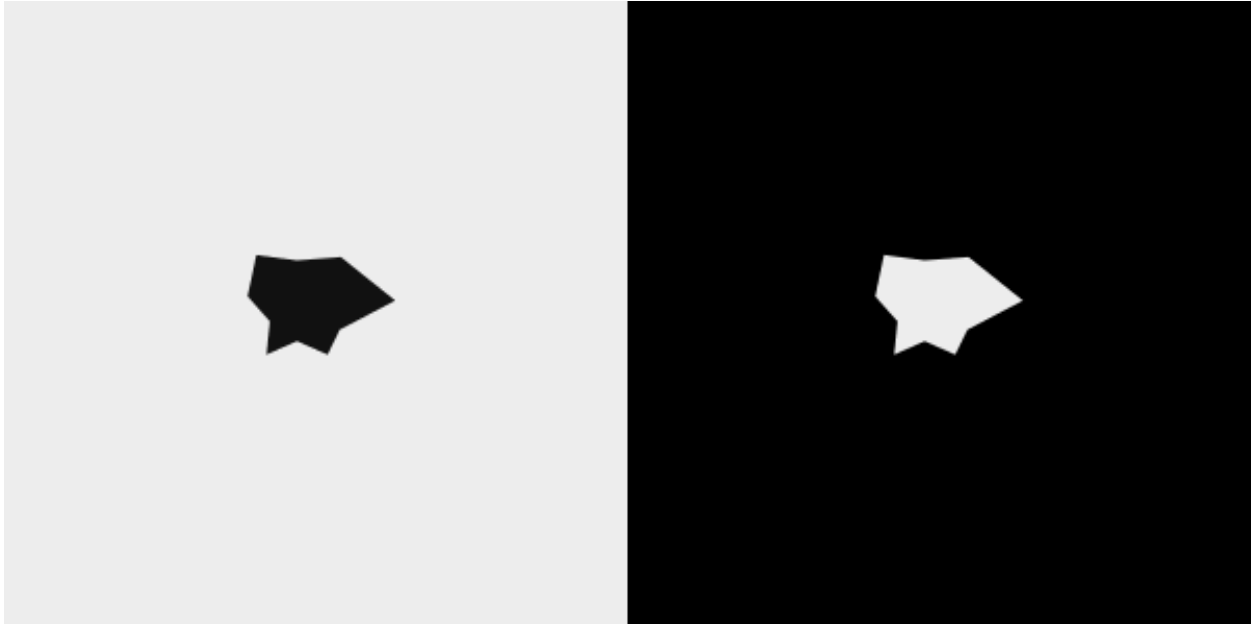


Figure 2.1: A dark positive form on a light negative background (left) and the reverse (right).

One of the first things a viewer does to understand a composition is to identify what in the composition are the positive elements and what is the negative space. This happens in working memory when we separate figure and ground.

This observation will set the context for everything else we see. Don't allow space to be the leftover result of where your positive elements aren't located. Learn to shape the space in your designs.

You've likely heard negative space referred to as empty space or whitespace. It's empty because it's the area of the canvas that doesn't contain any positive elements. I assume it's also called whitespace because paper is generally white and so the empty space looks white, but know that it doesn't literally have to be white. Also know that negative is used with space in contrast to

the positive of elements. It's not a judgment about good and bad.

Space doesn't literally have to be empty either. Think of a photograph where a person in the foreground is in focus and everything in the background is blurry. The background despite not being empty would still be considered negative space. Similarly, if the background of a composition consists of a pattern. It can still be seen as negative space in the composition.

The main thing is that negative space isn't the focus. It's there to help the positive elements communicate, but despite it not being where you want someone to look, it's vital in helping you direct them to where you want them to look.

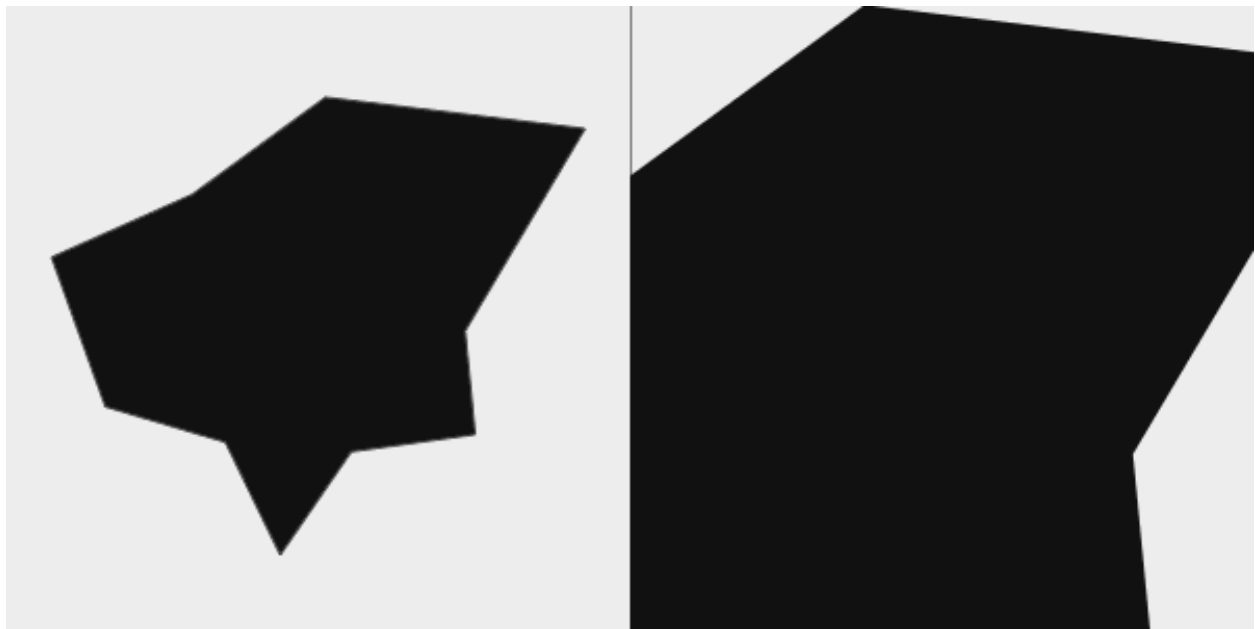


Figure 2.2: As the form grows larger, the space is reduced until the form becomes larger than the space and begins to appear as the positive element while the form appears to be the negative space.

The Function of Space

First and foremost, space provides contrast to non-space. Think for a moment about music. Music doesn't exist if you only have sound. Music is created through a contrast of sound against silence. Different sounds occur at different intervals and through the variety of both sound and interval, patterns are formed that create rhythm and melody.

Music is ultimately a patterned contrast between sound and silence.

Visually, space acts like the silence in music. Space is the interval between your positive elements. It can connect elements by being sparse and it can separate elements by being vast.

When you learn to control the interval of space between elements you can control aspects of your design such as:

- Rhythm
- Direction
- Flow
- Motion
- Balance

I'll talk about each of the above in greater detail later in this book.

Micro and Macro Space

Micro space is the space between and within elements. It's the space between letters and lines of text. It's the space between paragraphs or between an image and its caption. It's the space between elements clearly defined as part of the same group.

Macro space is the space between major elements or groupings of elements in a design. It separates both by appearing in abundance. It connects elements by being scarce. This idea of connection and separation is one we'll come back to several times in this book. Space is only one way to show both separation and connection, but it's an important way.

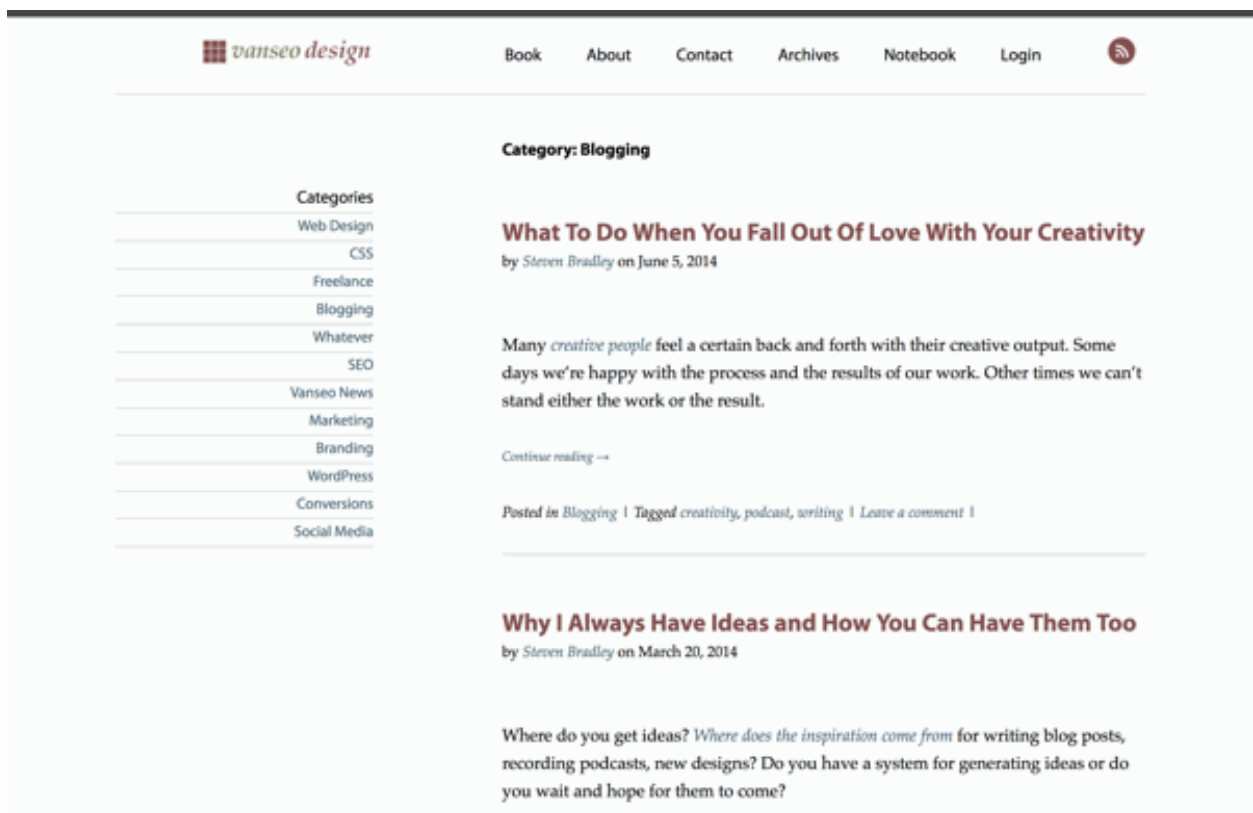


Figure 2.3: Micro space is the space between letters and lines of text. It's the

space between navigation items. Macro space is the space between larger groupings of elements. It's the space between the header and main content, between category navigation and articles.

Both micro and macro space are important. While the individual shapes of micro space are small, there will be more examples of micro space in a typical design. If you increase the space between lines of text by even a small amount, it creates a lot more overall space in the composition, making your design feel lighter and more open.

An element placed inside a large area of macro space gains in importance and attracts our attention. Think of it as a local area of luxury and wealth. Why is the element allowed to exist in so much space when no other element is permitted to exist there? It must be important.

**A generous
amount of space
calls attention to
what's inside the
space**

Figure 2.4: A positive element inside a large area of negative space calls attention to itself.

When an element, such as a paragraph of text (**figure 2.4**), is located in an area of generous negative space, it creates contrast leading to the pop out effect. That's one reason it attracts your eye and brings attention to the element.

The Relationship of Space to Positive Elements—Active and Passive Space

When space is a leftover byproduct of your design, it's passive. It's there, but it doesn't contribute meaningfully to the whole. It exists

not because it exerts itself in any way, but because the positive elements decided not to use that part of the canvas.

Consider **figure 2.5**, a bird centered in the canvas. The ample space helps the bird stand out, but what's the point of the space? It's there passively in the composition, contributing little to the whole.

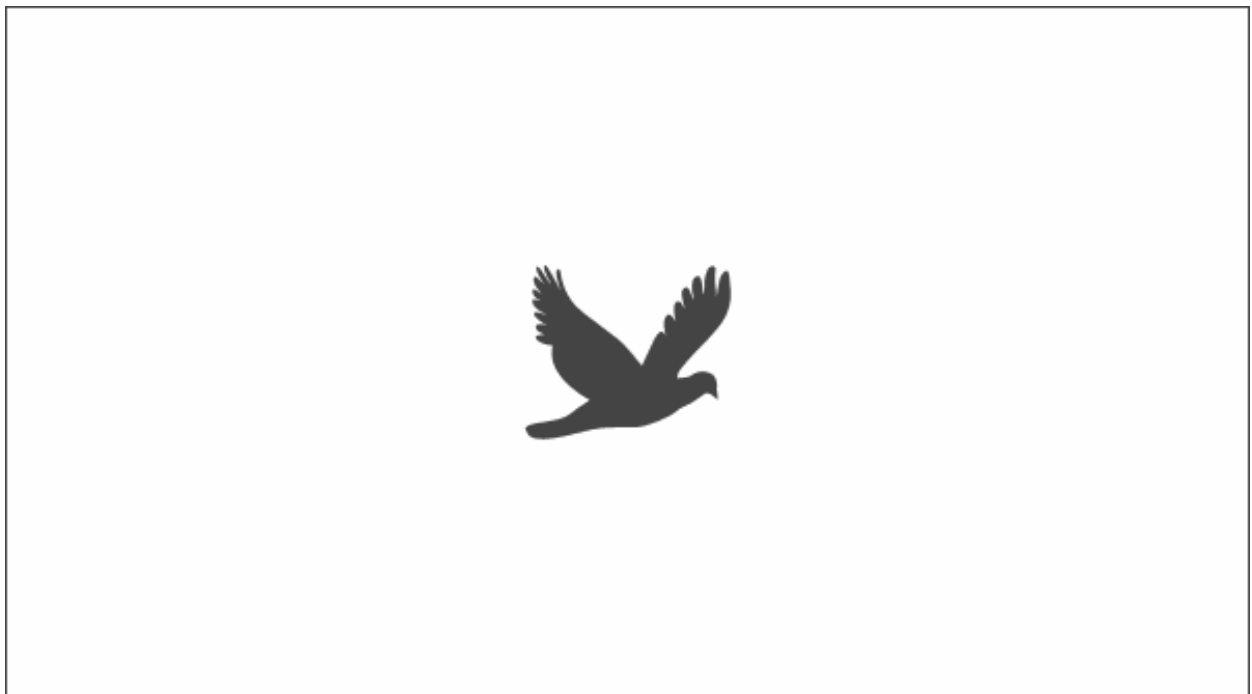


Figure 2.5: A bird centered in the canvas leads to symmetrical and passive space.

Passive space is typically symmetrical. It's static, formal, and more often than not, boring. Passive space is not always a result of being leftover. Sometimes it is planned. Static and formal make sense when designing a wedding invitation, for example, so you might very well plan a symmetrical design.

Active space is never leftover. It exists through its own will. No elements fill it, because the space won't allow itself to be filled. It actively contributes to the composition and without it an entirely different message can be communicated.

Active space is typically asymmetrical. It's dynamic, modern, and it tends to be more interesting. It leads the viewer from one part of the design to another. It's an active part of the composition.

Consider **figure 2.6**, with the same bird, but located at the left edge of the canvas. Now the space is telling part of the story. This bird has just flown into the space and has a way to go to reach the other side. Where did it come from? How long was its journey to get here? What's outside the canvas gains in importance.

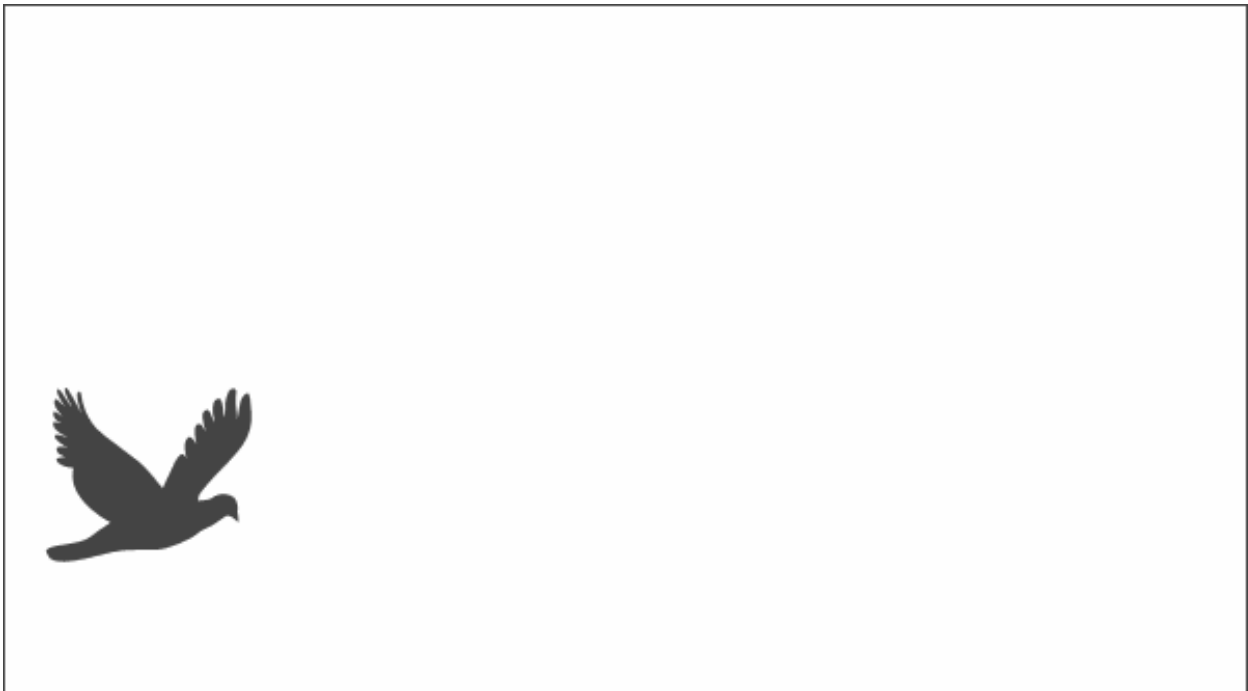


Figure 2.6: Placed off center, the bird creates asymmetrical space. The composition becomes active.

Now consider **figure 2.7** with the bird about to leave the frame on the right for parts unknown. Where is it going? How long will it take to get there? Again, what's outside the canvas adds to the story.

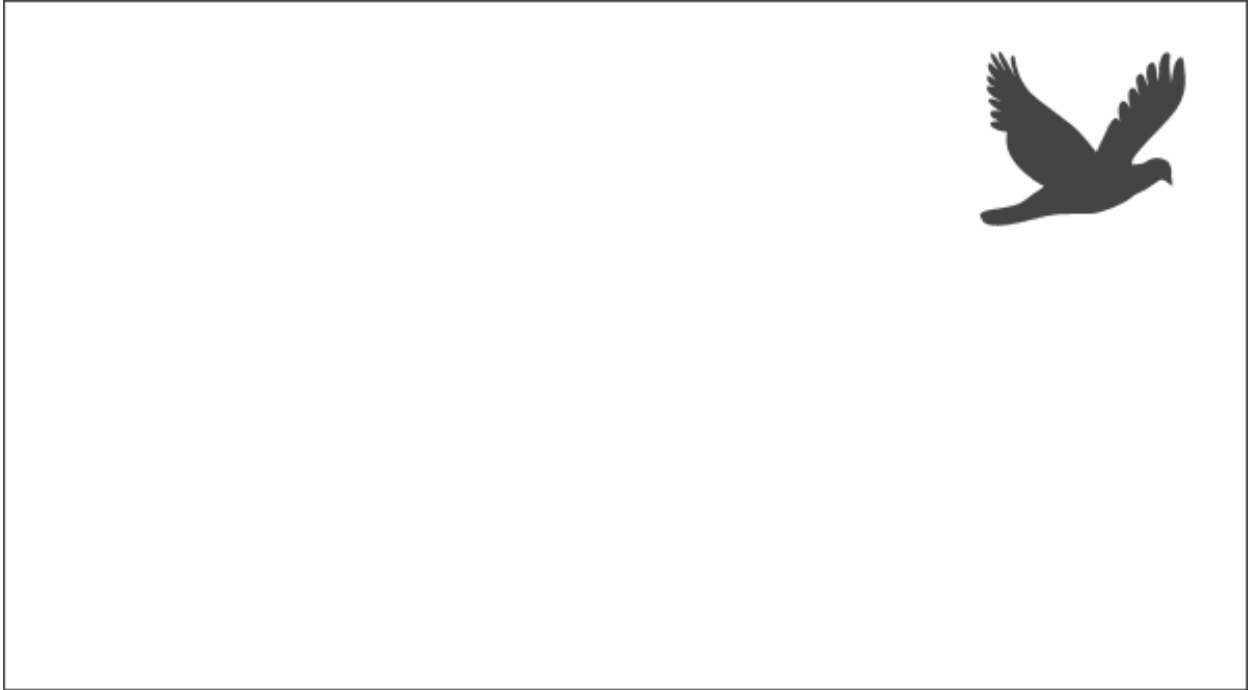


Figure 2.7: The bird leaving the frame raises questions about where it's going.

Sure, you could ask all these questions about the bird in any of the three compositions, including the one where it's in the center, but can you see how the the two that make use of active space help raise specific questions for you? One leads you to think about what came before and one leads you to think about what comes after.

The composition with passive space doesn't raise the questions so

obviously. It makes you notice the bird, but asking the questions requires a little more work on your part.

What Does Space Communicate?

Empty space can communicate different things depending on how much of it there is and what shape it takes.

Think about the clothing stores Old Navy and Banana Republic. Both are owned by the same company. The latter is the high end brand. It has a lot of open space and the clothing can feel sparse because there's so much more space. The former is the lower end brand. It has more clothing packed tighter together and less open space overall. The use of physical space in each store communicates what the two brands are about.

Of course, space can communicate more than which brand is high end.

Figure 2.8 contains a single lone shape tucked away in the corner. The composition is nearly all space. What does it communicate? Some possibilities include isolation, solitude, and emptiness. Perhaps it suggests loneliness, abandonment, and sadness. All from simply having the amount of space dominate a single element placed inside it.

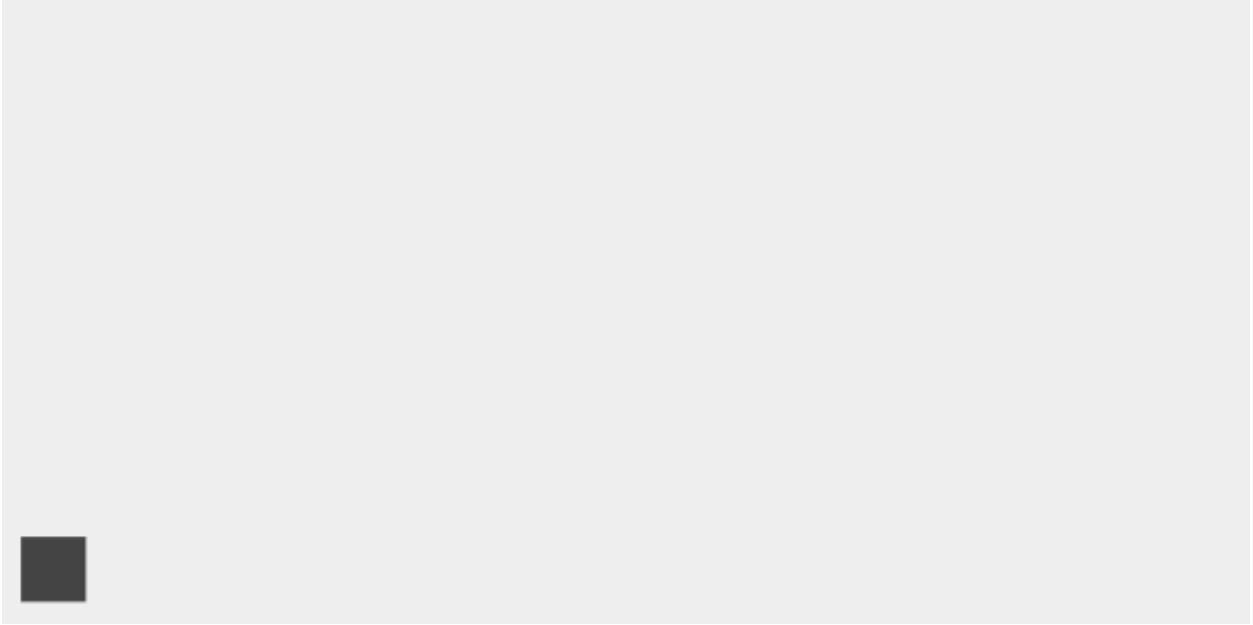


Figure 2.8: A small element placed in space suggesting isolation, loneliness, abandonment, and sadness.

There are other ideas we might also attribute to a generous amount of space.

- Purity
- Spirituality
- Openness
- Calmness
- Inaction
- Luxury
- Elegance
- Sophistication
- Distance
- The infinite
- Cleanliness

A lack of space, on the other hand, might lead one to feel cramped and claustrophobic. It might make a composition feel crowded, full, and even overwhelming. It might suggest the what's sold within is inexpensive. On a more positive note, it suggests a closeness between elements and the ideas they carry.



Figure 2.9: A lack of space makes elements feel cramped and packed together.

Space is far more than an area to place other things. It contributes as much to the communication in your design as anything you place inside it. Look back at **figures 2.5 through 2.7** and then **figure 2.8** and think about all that might be communicated

mostly through the space of a near empty canvas.

Shaping Space—How to Use Space in a Composition

The first thing you need to do in order to shape the space in your designs is to see it. Pay attention to how space is used in the designs of others. Think about what it communicates. Think about how it leads your eye from one part of a composition to another.

Be conscious of space and see it as an element at least the equal of all the other elements we're going to talk about in this book.

The goal of design isn't to fill every available inch or pixel of space in the canvas. Negative space is necessary to provide a contrast for the positive elements you want people to notice. It helps provide clarity for those elements by removing distractions in the immediate area.

Space can be used both to connect and to separate elements and groups of elements. A generous amount of space usually calls attention to whatever is inside the space and give it emphasis.

Remember how your eyes work. They move and then fixate on something before moving again. Space helps facilitate the movement. It's free flowing and it helps direct the eye by allowing free movement through it.

Space is not wasted. It's an element as much as any line or square

or splash of color you add to a composition and it should be planned just as much. First and foremost, start to pay attention to it in the designs you see and think about whether or not the designer was conscious of the space you notice. Once you start seeing how space is shaped in a composition you won't be able to ignore it in your own work.

Points and Dots

Now that we've considered space and understand it's importance we can start thinking about the marks we make inside it. The first positive element we'll talk about is the abstract point and its concrete counterpart, the dot.

You can't actually draw a point since by definition it has zero dimensions. Points are coordinates in space without any form. What you can draw is a dot, which is technically a shape, but we consider it a dot as long as it exhibits point-like or dot-like characteristics. In fact the size of the dot is less important than whether or not the element performs the function of a dot, which I'll get to in a moment.

Points and dots are the building blocks for all the other positive elements. They do not have to be round. It's probably how you immediately picture dots, but the specific contours aren't important.

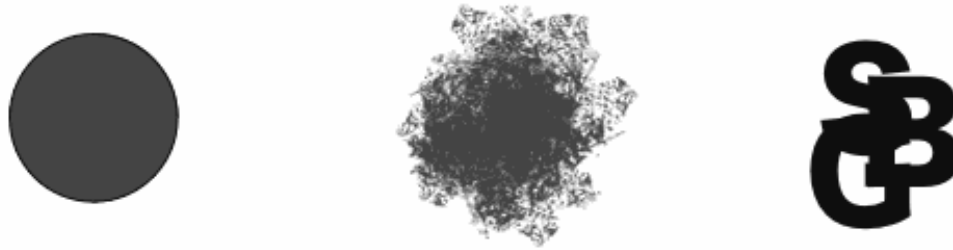


Figure 2.10: Three different kinds of dots.

Any blob in a composition that has a recognizable center and doesn't have one side significantly longer than the other is effectively a dot. Dots can be squares, circles, triangles, trapezoids, and similarly shaped elements. As the size of a dot increases, its contours do become more important and they interact differently with the space around them, but again anything is a dot as long as it exhibits the function of a dot.

The Function of Points and Dots

The defining characteristic of a dot is it creates a point of focused attention. Dots are focal points.

They're the objects our eye fixate on during saccades. Our fovea moves and then momentarily rests. The thing it rests on is probably dot-like. In fact, every positive element you add to the canvas will either mimic the qualities of a dot or a line and if dot-like elements are the objects on which your eye fixates, can you

guess what line-like objects tend to do? Hang on to that thought for the next section about lines.

Points and dots anchor themselves in space and provide reference to other elements and the space itself. They help viewers orient themselves inside a composition. They call attention and give viewers something to focus on. That's their fundamental characteristic and function.

The Relationships Between Dots and Space and Between Multiple Dots

Dots establish relationships with the space around them. The two most important of these are proportion and position.

- **Proportion** — As dots increase in size we begin to see them as shapes, though they still retain their fundamental dot-like qualities as their size increases. A square placed in space is still a dot if it attracts visual attention to itself and gives the eye a place to momentarily rest.

- **Position** — Once they've been placed on a page, dots create either symmetry or asymmetry. They have some kind of position on the screen and they immediately start to form a composition.

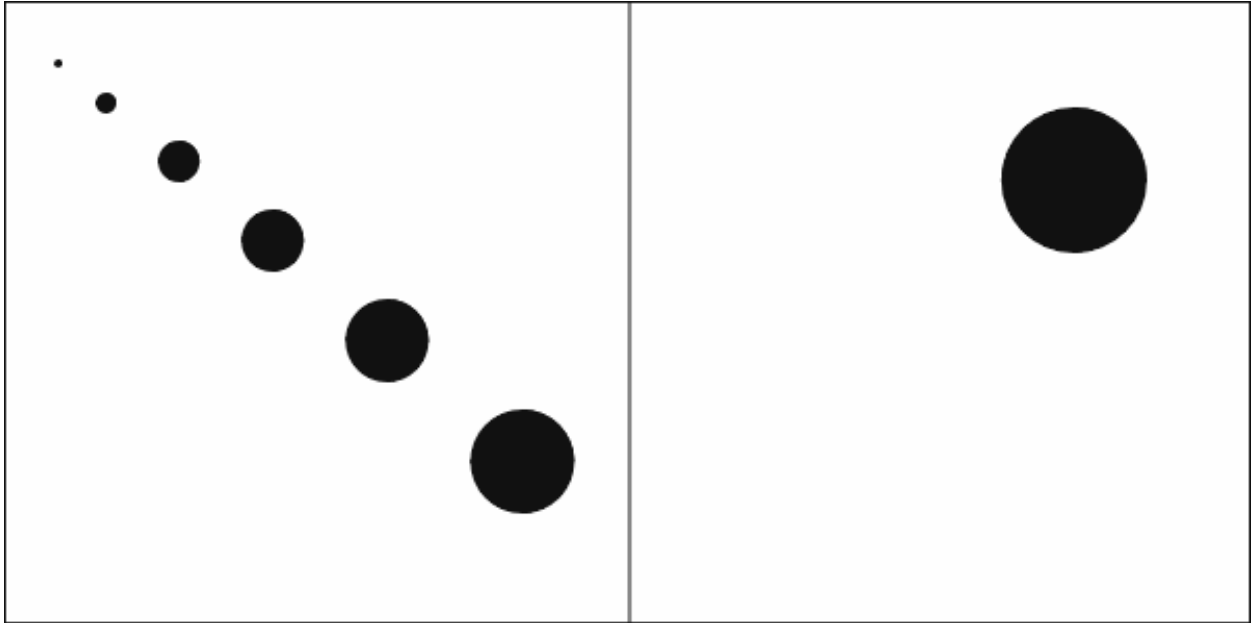


Figure 2.11: Dots in scale (left) and a single dot creating an asymmetric composition through its position.

Dots are more interesting when more than one is present. When two dots are placed near each other, the emphasis is shifted from their relationship to space to their relationship to each other. A second dot implies a structure.

As the space between the dots decreases, the tension between them increases. As the space approaches zero the tiny bit of it that's still present between the dots becomes much more important than either dot. All the tension is contained in that very small space.

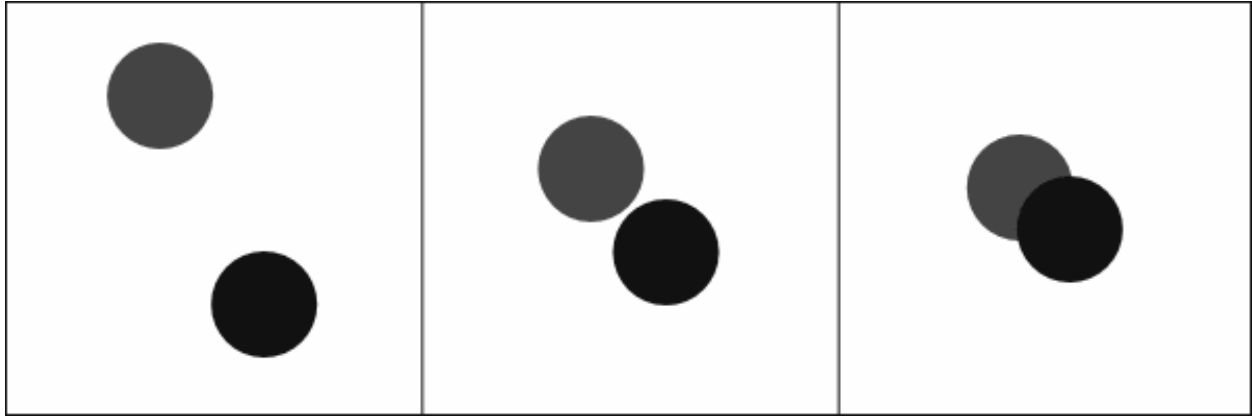


Figure 2.12: Tension in space created and relieved by moving the tension to a third dimension.

Eventually as the dots move together and touch they start to be seen as a single object. Two individual dots become a single dot with a different shape. Once the dots overlap and become this new single dot, the tension that was held in the space between them is released and decreases until it's replaced by a new tension based on the appearance of depth.

This assumes the two original dots can still be seen as distinct objects and the space that existed between them in two dimensions has now been moved to the unseen third dimension. This dimension is implied because it's the only way we can make sense of the overlapping dots.



Figure 2.13: Two distinct overlapping dots (left) and a combined single dot with a new shape right.

Overlapping dots create a new figure/ground relationship. One dot is seen as the figure (foreground) and the other is seen as the ground (background) in their specific relationship. The overlapping dots form a more complex shape than either does individually. This resulting group of dots is now a single complex dot with a different form.

When a number of dots are far apart and the space between them is greater than the intrinsic area of any, the emphasis is placed on the structure between them instead of the identify of the individual dots. Additional dots in close proximity to each other further emphasizes the structure of all dots instead of any single dot or pair of dots.

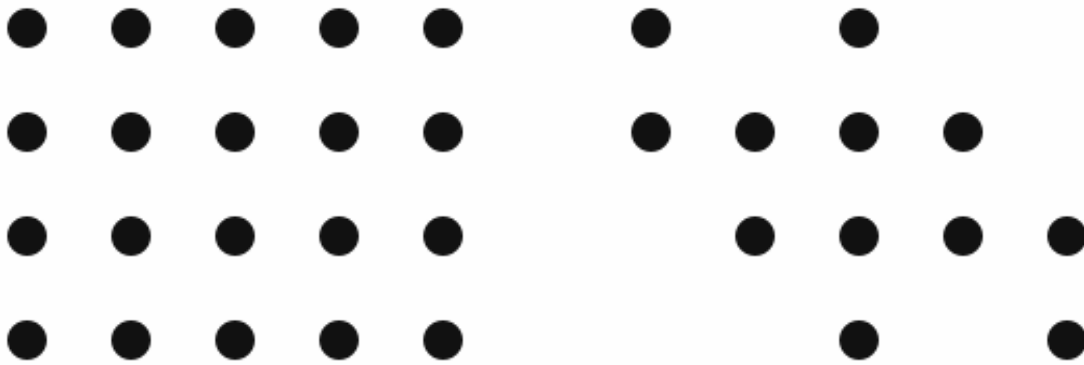


Figure 2.14: Invisible structures formed by dots are emphasized over any individual dot.

What do Dots Communicate?

A certain amount of what a dot communicates is solely about its function to attract the eye and orient the viewer in the space. A single dot on the canvas communicates a focal point, a place to rest the eye.

Where a dot is located can communicate different things. A single dot in the center of the canvas creates passive space and the space tends to exert its influence on the dot. Move the same dot off center and the dot starts to take charge of its surroundings. It creates active space where the centered dot creates passive space.

As the size of a dot increases its contours and attributes will communicate more, but we'll need to cover attributes before we can really see how. I think a simple example (**figure 2.15**) will

give you an idea until we get there.

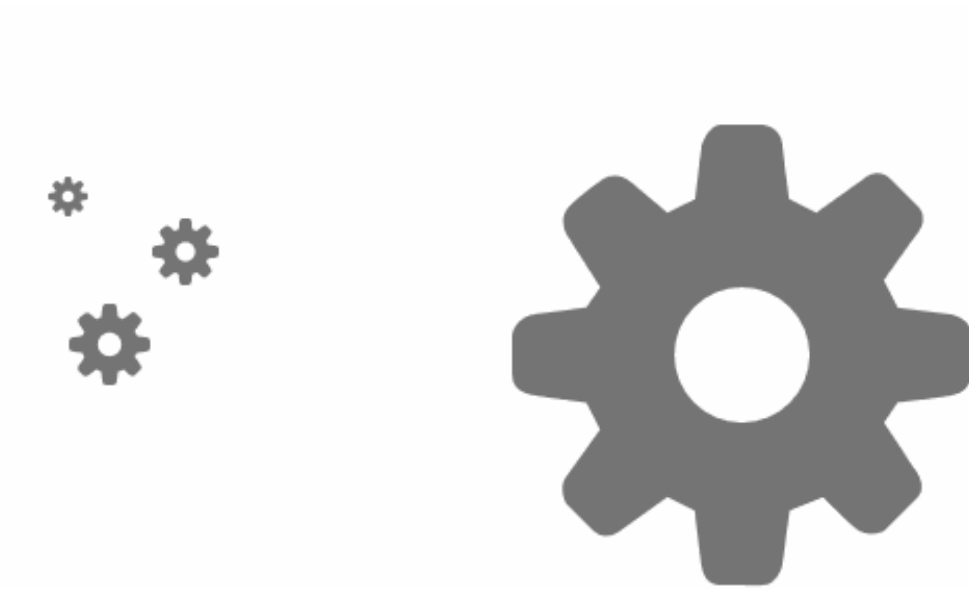


Figure 2.15: As dots with complex contours grow larger their contours influence their surroundings and they become less dot-like.

When multiple dots are in the composition they form patterns and textures. They form structures as the relationships between the dots dominate those of any dot to the surrounding space.

I already showed you how you can create and release tension by moving dots closer together and further apart. Adding more dots leads to more complex structures, which can communicate any number of things.

If you begin to add dots with different attributes, in this case size, you can communicate all sorts of things.

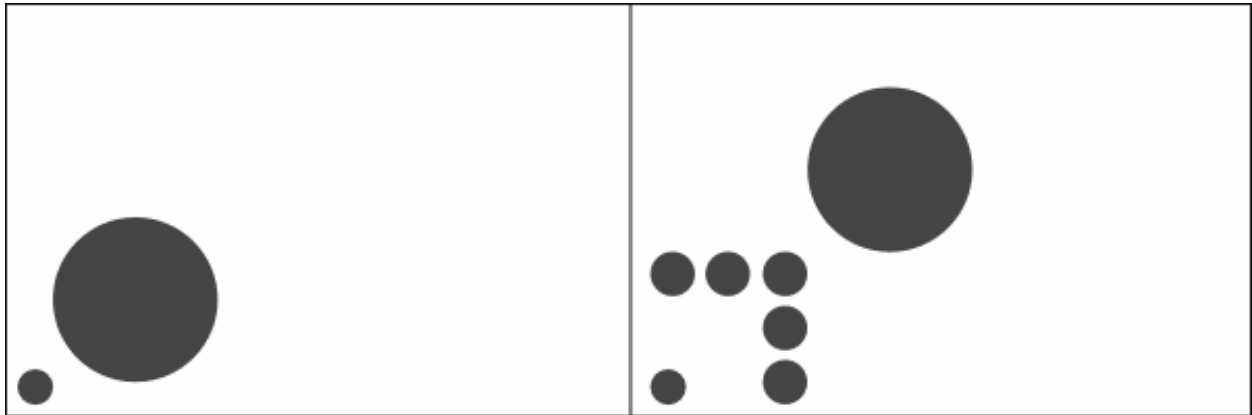


Figure 2.16: One dot intimidating another (left) and several dots protecting against intimidation (right).

The main thing to remember is that dots attract the eye and orient us in space. The rest will depend more on the attributes of the individual dots and the patterns they form in the composition and I'll talk about both in the next chapter about attributes.

When to Use Dots in a Composition

When and why to use dots is based on their fundamental characteristic of focusing attention. Wherever you want a viewer to look, place a dot or rather a dot-like element. When you want to emphasize important information, a dot stands at the ready.

- Use dots to call attention to a specific area in your design.
- Use dots to provide objects on which the eye can fixate.
- Use dots to break up space and begin shaping it.
- Use dots to build structures and patterns.
- Use dots to build other elements.

In combination dots can form an endless variety of structure and complexity. They can become lines or curves when adjacent to each other or they can become patterns and structures when some space is left between them. In fact they can form any structure imaginable and in combination can imply both movement and direction. All the other elements can be built up from dots.

Let's continue with the easiest element to build from dots, the line.

Lines

A line is a series of adjacent points. Like points, lines are abstract objects. They have only a single dimension and we need them to have two dimensions before we can see them. The concrete version of the abstract line is really a line-like shape and we'll consider anything a line as long as one of its dimensions is significantly larger than the other.

Just as we were more concerned with a dot's ability to be dot-like, we're more concerned with line's ability to be line-like. It's the ratio of length to thickness of the element that determines how line-like something is.



Figure 2.17: A series of dots forming a line, several lines of varying thickness, and a pair of thicker line-like shapes.

A line connects two points in space. It might also be the path made by a single moving point. Lines can be thick or thin, long or short, vertical, horizontal, or diagonal. They can be solid, dotted, or dashed. They can be curved, straight, or a combination of both.

There's a lot more variety to lines than what first pops to mind as a line.

I'm unaware of any formula that distinctly defines when something is line-like and when it isn't, but I trust you to use your judgment to make a determination. Think of it as seeing some elements as more or less line-like than others instead of looking for a specific point of demarcation between lines and not lines.

The Functions of Lines

Where the fundamental characteristics of a dot are to attract attention and orient the viewer in space, the fundamental characteristics of lines are to separate, connect, and impart direction and movement.

Lines can connect and unite. The connection can be visible or invisible. Place two dots on a page and we automatically see a connection. We can see a line between them regardless of whether or not one is actually present. The connection is the line. The dots will attract or repel each other along that invisible line.

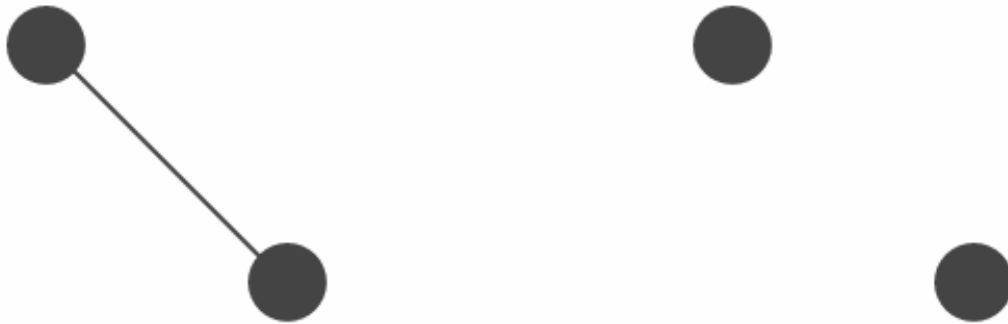


Figure 2.18: A line connecting two dots (left) and seeing the connective property of a line that isn't there (right).

Lines can separate as well as connect. When a line is perpendicular to the invisible line connecting objects, the line emphasizes the separation of the objects. The line provides a barrier. That barrier can protect and it can also support.

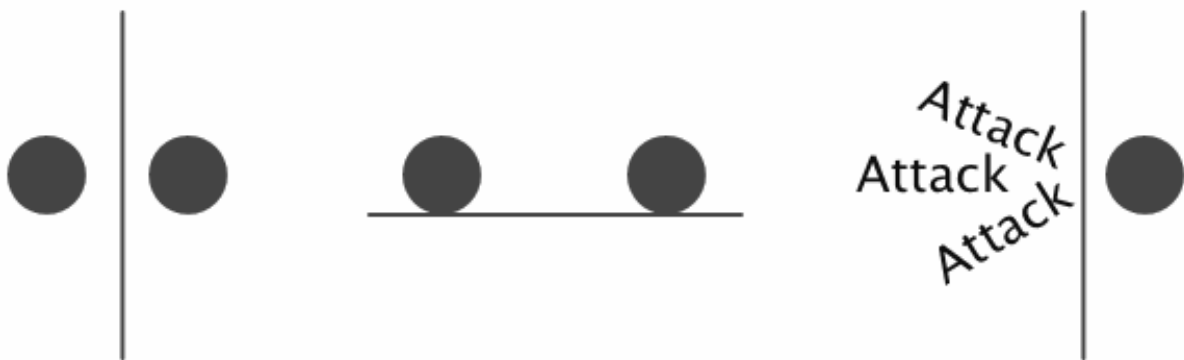


Figure 2.19: Lines separating, supporting and protecting.

Points are static. They are positioned in space at some coordinate. Lines on the other hand are dynamic. They don't exist at a single point, but over multiple points. Lines are also about movement

and direction. Lines lead somewhere. Their movement and direction allows us to use them to control how the eye flows through a composition. The eye will naturally seek the endpoints of a line even if the endpoints are located outside the canvas. Lines don't attract you to a point in space. They direct you toward and away from points in space.

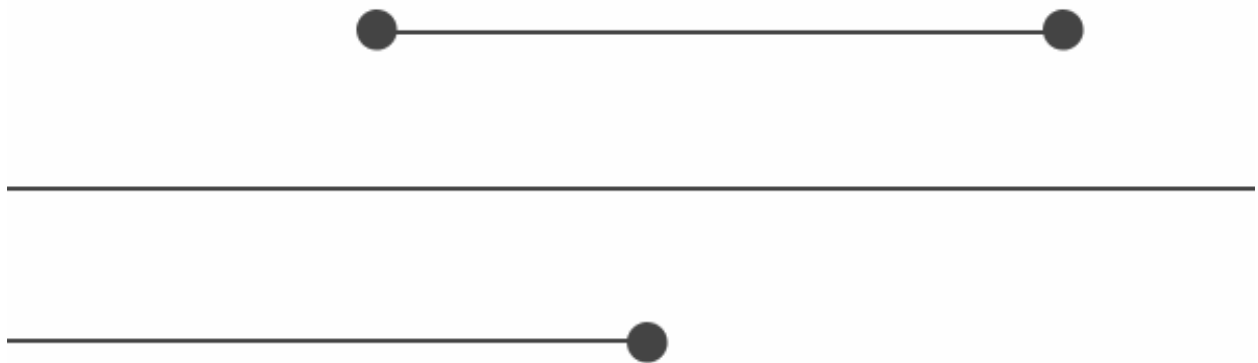


Figure 2.20: Lines emphasizing direction and movement.

Lines can enter and leave the canvas. Their endpoints could be inside the canvas or they could appear to be located at infinity. If endpoints are located outside the canvas, the sense of movement in the line is increased. When one endpoint is located inside the canvas, the direction is no longer infinite. It becomes specific to that point and the tension between the endpoint and the surrounding space increases.

The thinner the line, the more the emphasis is placed on its direction. As a line grows thicker without also growing longer, it

begins to lose its line-like characteristics and becomes more dot-like. At some point emphasis shifts from its direction to the mass of the form.



Figure 2.21: Lines becoming less line-like (left) and curved lines (right).

Lines aren't limited to being straight. They can be curved or angled. A single line that travels in a curve around a fixed point eventually connects its starting and ending points and becomes a circle. A circle is really a line until that line grows thick enough to fill the negative space within. The negative space while still present becomes a dot, distinct from either line or circle. If the distance from the center changes as a line moves around a point in space, it forms a spiral instead of a circle.

Types of Lines

There are several distinct types of lines defined by their use

- **Contour lines** are used to define edges. They create boundaries around or inside an object. Most lines are contour lines.
- **Dividing lines** can also define edges, but their distinguishing characteristic is they divide space. Think about lines between columns of text or lines that separate items in a menu or navigation bar.
- **Decoration lines** are used to embellish an object. Cross hatching to add shading and form are examples of decoration lines. The line beneath a link is another. Lines used to create a floral background are yet another example.
- **Gesture lines** are quick and rough continuous lines that are used to capture movement. They're generally used when studying shape and motion in the human form. You likely won't use gesture lines in a design, though you could create patterns of lines to imply motion or build up form.

The Relationship Between Lines

When two lines join they form a joint with some angle. The joint becomes a starting point to move in either of two directions along two different lines. Multiple joints create a sense of altered direction as in a zig zag pattern.

When the angle between lines is acute (less than 90 degrees) the movement through the joint it is perceived as quick and rapid. By contrast, when the angle between lines is obtuse (greater than 90

degrees and less than 180 degrees), movement is perceived as slow and gradual.



Figure 2.22: Acute angle (left) and obtuse angle (right).

Separating lines focus attention on the identity of each line and the interval between them. Rhythm is created by varying the interval or varying the size of the line. Other characteristics of the line such as color or value can provide additional complexity to the rhythm. Lines working together in rhythm can form patterns and textures.

We can create a sense of depth in the canvas by varying the thickness or weight of lines or changing the interval between them. Lines closer together have more tension (much like dots placed close together) and tend to appear to advance into the foreground and gain in attention. Lines further apart carry less tension and tend to recede into the background.



Figure 2.23: Thick lines creating thin lines between (left) and lines creating rhythm (right).

Thick lines placed close together create a thin line of space between them (**Figure 2.23**). This can sometimes reverse the figure/ground relationship where the space is seen as figure and the thick lines seen as ground.

When two lines converge the effect of their direction increases. The eye can't resist following converging lines to the point at which they converge. Converging lines create perspective and add depth to a composition.

What Do Lines Communicate?

Lines can communicate different things based on their dominant characteristics, though keep in mind much of what's communicated will depend on the top-down visual process of the viewer.

Thin lines are fragile and seem easy to break or knock over. They suggest frailty, but can also convey a quality of elegance. They're delicate and ephemeral. Thick lines are the opposite. They're strong and appear difficult to break or knock over. They suggest strength and rigidity. They're bold and lend emphasis to nearby elements.

The thicker the line, the more dot-like it becomes, and the more the line attracts attention to it as opposed to directing the eye to its endpoints.



Figure 2.24: Thick and thin vertical, horizontal, and diagonal lines.

Horizontal lines are parallel to the horizon (hence the name) and tend to be associated with earthbound things and ideas. They appear to be laying down, at rest, or even asleep. They can't fall over so they suggest stability and security. They're absent of

conflict and are in a state of restful peace.

Vertical lines are perpendicular to the horizon. They're filled with potential energy which might get released if they fall over. They appear more rigid in order to support their standing up appearance. They can suggest stability when thick enough and can sometimes suggest a lack of movement as though they're fixed to the ground. Vertical lines accentuate height as they stretch away from the earth and toward the heavens.

The idea of reaching for the heavens sometimes connects vertical lines with spiritual concepts. (Think cathedrals with tall vertical columns) Their tall, formal, and strong nature may give the impression of dignity. Vertical lines can act as borders to horizontal movement and they're good at blocking access to whatever is on their other side.



Figure 2.25: (Left) Frank Lloyd Wright's prairie houses were meant to invoke the open landscape and be connected to the earth. Thus the dominant horizontal lines. (Right) St Patrick's Cathedral uses vertical lines to reach for the heavens and be spiritually connected with them.

Diagonal lines are unbalanced. They're filled with restless and uncontrollable energy. They can be seen as either rising (energy being added) or falling (energy being released). Their kinetic energy creates tension and excitement. They suggest action and motion, though they can seem solid and unmoving when they appear to be holding up another element or coming to rest against one. Diagonal lines are dynamic and more dramatic than either horizontal or vertical lines.

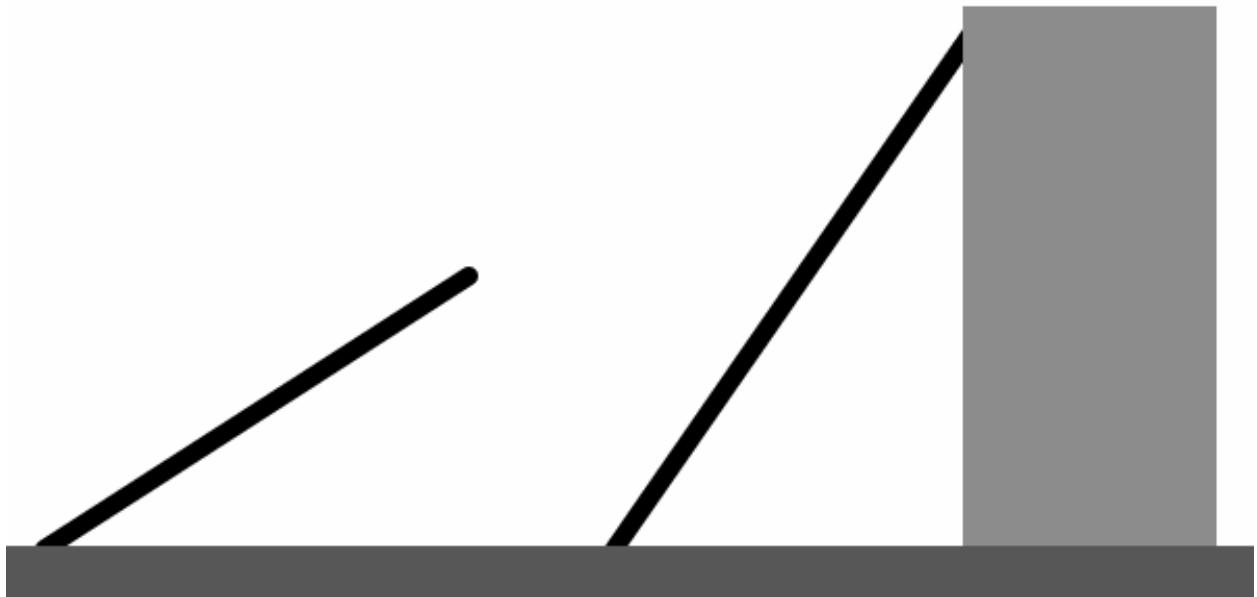


Figure 2.26: The line on the left is falling and releases energy. The line on the right is resting against the rectangle and contains only potential energy.

Curved lines are softer than straight lines. They're sensual,

elegant, and appear more beautiful. They sweep and turn gradually between endpoints. The eye follows a curved line at a slower and more relaxed pace than it does a straight or jagged line.

Curved lines are less definite and predictable than straight lines as they bend and change direction. They express fluidity and flexibility and can be calm or dynamic depending on how much they curve. The less sharp the curve, the calmer it appears.

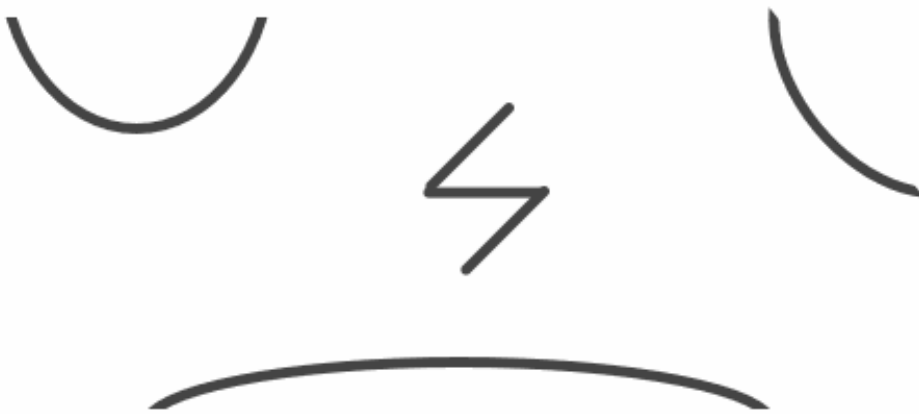


Figure 2.27: Curved and zigzag lines.

Zigzag lines are diagonal lines joined at various points. They have the same dynamic and high energy characteristics as diagonals, though they create even more excitement and tension. They convey a sense of intense movement changing direction suddenly. They can convey nervousness or confusion due to the changing direction and can imply danger or destruction. The more quickly and frequently and the more acute the angles in the

zigzag, the greater the confusion and danger. All the reasons above are why you commonly see lightning represented as a zigzag line.

Long perfectly even lines feel artificial. Nature is not perfectly straight. The more variation a line has, the more natural it feels.

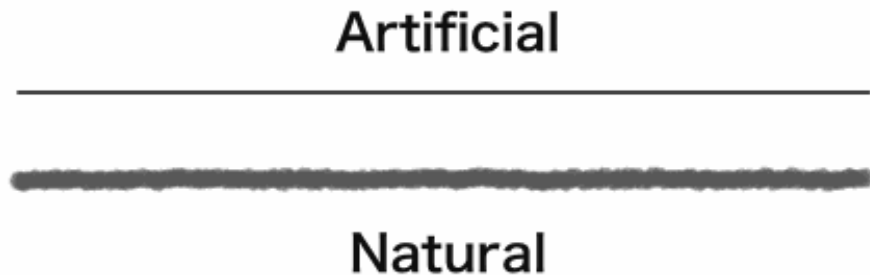


Figure 2.28: A perfectly straight artificial line and a more varied natural line.

Dashed and dotted lines are implied lines. They're incomplete and allow objects to pass through them. They have less ability to separate as the space between dashes or dots increases. A thick, vertical, dashed line can still be seen as strong, though not as strong as a solid line with the same characteristics.



Figure 2.29: A dashed line and a dotted line.

A series of lines form a pattern. When the lines are parallel and of uniform width and interval, they create a static and orderly effect. It doesn't matter what the other characteristics are as long as they're seen as parallel with uniform width and interval. Even repeating curved lines convey this sense of order, though a more dynamic order based on the curve.

Varying the interval between lines leads to a sense of movement (right side of **figure 2.23**). The more random the interval, the more dynamic and chaotic the motion. Less randomness in interval and changing line characteristics leads to pattern.

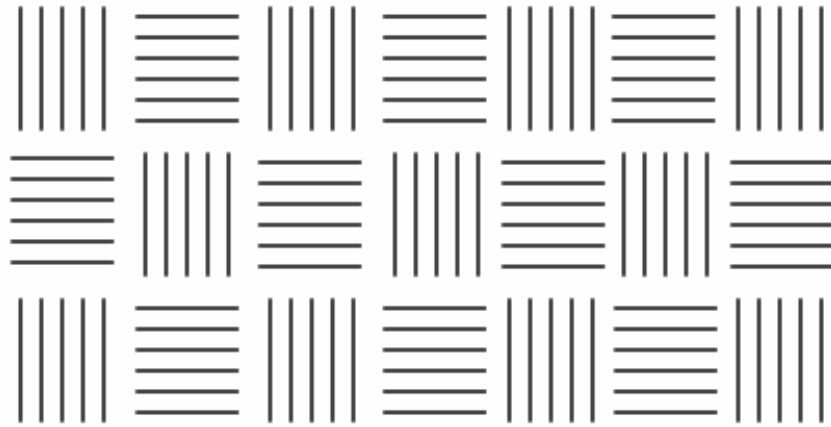


Figure 2.30: A simple pattern formed from the repetition of lines.

Patterns of lines can be built up to create texture or mimic the play of light over an object. Lines can combine to form different shapes and shapes can be placed in sequence to imply lines.

Using Lines in Design

Lines are used in design when we need to make use of their fundamental characteristics of connection, separation, direction, and movement. These characteristics help us organize information and elements.

The implied lines of a grid can impose order on a design and become the structural glue holding a design together. Borders around an element or group of elements separate and protect them from other elements and groups. Lines can divide one

section of content from another.

We can use lines to communicate movement or to provide emphasis to what lies at their endpoints. If you want someone to look at a particular element, draw a line leading to it.

- Use lines whenever you want to define space in some way.
- Use lines to separate elements or areas on the canvas
- Use lines to direct the eye through your design
- Use a line to connect two or more elements
- Use lines to lead to focal points
- Use a line to provide a barrier

Figure 2.31 is a screenshot from one of the category pages on my site, Vanseo Design. Many pages of the site, including the one in this screenshot make use of lines. The thin line between the main navigation and the content below separates each from the other. The same line and the thick dark line at the top of the page connect the left and right side of the header, leading your eye from the logo, through the navigation, to the rss button, and back.

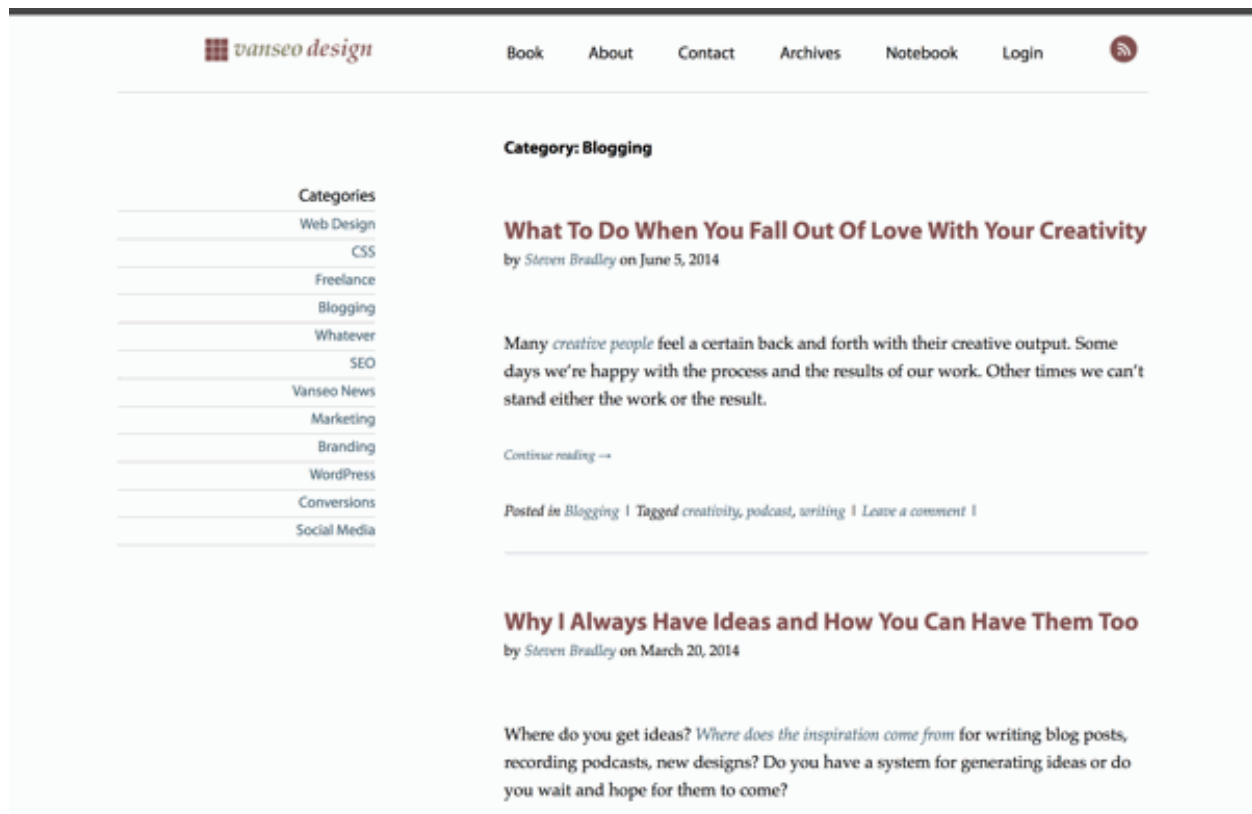


Figure 2.31: A screenshot from a category page on my Vanseo Design site that makes use of lines and implied lines.

Each of the links in the category navigation on the left is separated by a line. The pattern of lines that's formed helps connect the entire menu. Because the lines extend to the left, it creates a sense of movement in the links as though they're moving toward the right, leading your eye back to the main content, which is where I want you to look.

If points technically have zero dimensions and lines have a single dimension, guess how many dimensions we're going to talk about next, when we talk about forms and shapes?

Planes and Shapes

As a dot grows larger and the attributes of its contour gain in importance and impact its surroundings, it becomes a plane or shape. Its dot-like characteristics become secondary to the characteristics of its outer contour and their influence.

Shapes are two-dimensional objects with recognizable boundaries. They can be open or closed, round or angular, big or small, and any other combination of attributes.



Figure 2.32: A variety of shapes.

If a line can be seen as a series of adjacent points or dots, then a plane can similarly be seen as a series of adjacent lines. It could also be seen as a single line in motion perpendicular to the direction of the line. Planes and shapes generally act more like dots than lines, but depending on their specific contours can be dot-like or line-like. They differ from dots in that they've grown large enough so their size and contour are now more important characteristics that have greater influence on its visual

surroundings..

The Function of Planes and Shapes

Because shapes can be either dot-like or line-like, their fundamental characteristic and function will depend on which of the two the shape is more like.

The larger the shape, the more its dot-like (or line-like) characteristics become secondary to its size and contour. Larger shapes can still function solely as dots if the space around them is large enough and other elements in the space small enough. At some point, a shape grows large enough that its size and contour affect the space and other elements around it.



Figure 2.33: As a dot grows larger its size and contour dominate and it becomes a shape.

The contour of a shape also determines how dot-like it is. The more active the contour, the more dynamic the shape, the more

emphasis is placed on the contour and the less the shape appears to be a dot. Notice how the contour of the shape on the right in **figure 2.34** demands more attention than the simple circular contour of the shape on the left.



Figure 2.34: Shapes of simple contour (left) and complex (right).

Depending on their specific contours and whether they're more dot-like or line-like, shapes can:

- Organize information through connection and separation
- Symbolize different ideas
- Create movement, texture, and depth
- Convey mood and emotion
- Emphasize and create entry points and areas of interest
- Lead the eye from one design element to the next

Types of Shapes

We can group shapes under three main types, geometric, organic, or abstract.

- **Geometric shapes**—have regular contours and mathematically similar internal and external measurements. Circles, polygons, squares, and triangles are all examples of geometric shapes.
- **Organic shapes**—have irregular, complex, or highly differential contours. Soft and textured forms also appear to be organic. The greater variation of organic objects makes them appear more like objects found in nature, which are not as regular as geometric shapes.
- **Abstract shapes**—are simplified or stylized versions of organic shapes. Icons are an example of abstract shapes. Typographic glyphs are an example of abstract shapes that represent letters.



Figure 2.35: Examples of a geometric shape (left), an organic shape (middle), and an abstract shape (right).

While geometry does exist in nature, we tend to notice the irregularity of nature first. For example some leaves appear symmetric and similar in shape to triangles, but we see their irregular contours before we see their triangularity and symmetry.

You can mix geometric and organic by arranging geometric shapes organically or organic shapes geometrically. The juxtaposition can lead to interesting effects.



Figure 2.36: An organic shape arranged in a geometric structure.

What Do Shapes Communicate?

Whenever we see a shape's contour we attempt to establish some meaning with both the contour and the shape. As was true when talking about what dots and lines communicate, the top-down process of the viewer plays a large role in the communication.

Like dots and lines, shapes can carry meaning based on their attributes or based on cultural schemas and mental models. For example, a red octagon is probably seen as a message to stop

despite nothing about red or octagon inherently meaning stop. We've learned this meaning over time and after seeing many, many, stop signs.

Our prior knowledge about stop signs allows us to understand the meaning of the next one we see, even if the word stop isn't present. The visual and verbal connection is so strong, most of us don't need the verbal part to be there to stop.

The characteristics and attributes of a shape will also play a role in what the shape communicates, including the type of shape it is.

- **Geometric shapes**—have regular patterns that suggest structure. They convey a sense of order, organization, and efficiency. Their tendency toward symmetry further suggests order.

- **Organic and natural shapes**—have irregular patterns that suggest spontaneity. They tend to have more curves and uneven contours suggesting nature and they convey pleasing and comforting feelings.

- **Abstract shapes**—have recognizable contours, but not contours found in reality. They tend to be stylized and simplified versions of organic forms such as stick figures. They abstract forms to represent ideas and concepts and some have near universal recognition.

Let's consider some common geometric shapes and think about what they communicate. Once again, keep in mind much of this

comes from a top-down process we can't predict. Don't take what's here as gospel. Take it more as possible things that different shapes can communicate, with the understanding that different viewers might have different interpretations.

Circles—have no beginning or end and often represent an eternal whole, well roundedness, or completeness. They can symbolize the sun, the earth, the moon, the universe, and other celestial objects. They can also represent other familiar objects such as wheels, balls, or fruit.

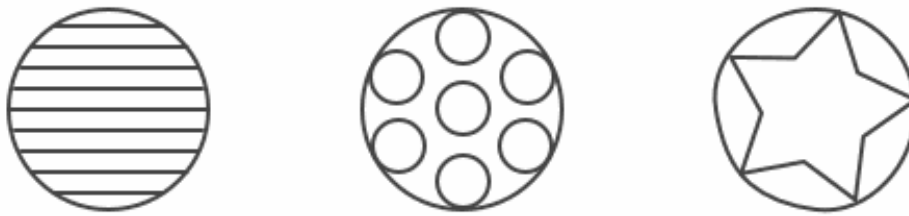


Figure 2.37: A circle with lines indicating motion, protecting smaller circles, and confining a star.

Circles are graceful, feminine, warm and comforting. Like curved lines they convey a sense of sensuality and love.

Circles have free movement. They can roll. Shading or lines can enhance their sense of movement. The movement of circles suggests energy and power.

Their completeness suggests the infinite, unity, and harmony. Circles can protect whatever is inside them. They endure. They can also restrict and confine. They offer both safety and connection and suggest community, integrity, and perfection.

Circles can also represent nothing given their likeness to the number zero.

They are usually less common when compared to the shape of the canvas in which they reside. A circle sitting inside the rectangle of the screen, a block of content, or the angular lines of a sidebar can offer contrast and attract attention.

Squares and Rectangles—are familiar and trusted shapes and as such they suggest honesty. Their right angles represent order and formality. They are the shapes of mathematics and rational thought.

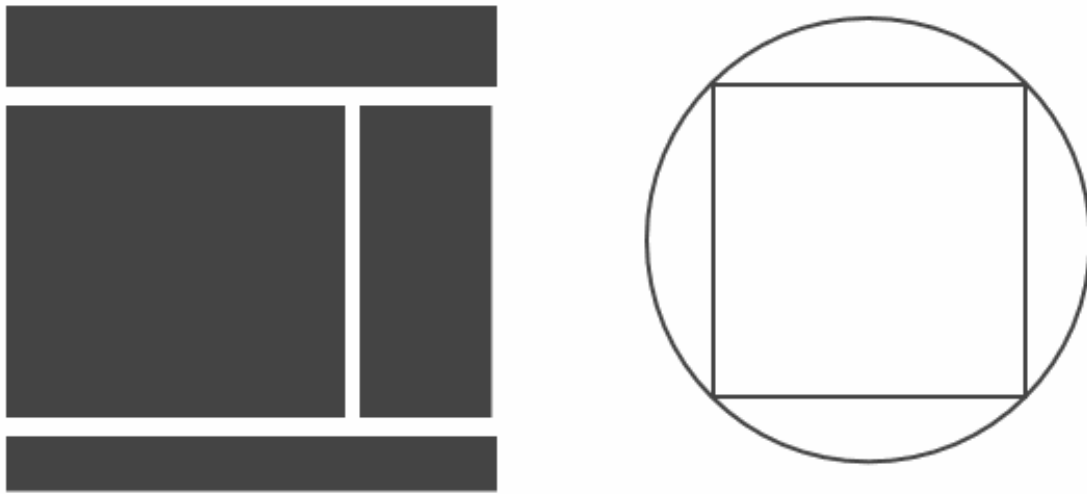


Figure 2.38: Rectangles arranged in a familiar web design pattern (left) and a square contained in a circle, a Buddhist symbol representing the relationship between the human and the divine (right).

Rectangles are the most common geometric shape we encounter. They are seen as earthbound when horizontal. They convey feelings of peacefulness, security, stability, and equality. They also suggest conformity. Their familiarity, while trusted, can be seen as boring.

They are generally not attention getters, though they can attract more attention when tilted on their side and presented as diagonal.

In Buddhist symbolism a square (which is earthbound) inside a circle (which represents the eternal whole) represents the

relationship between the human and the divine.

Triangles—can be either stable or unstable depending on whether or not they're sitting on their base. This stable/unstable dynamic fills them with energy and power. They contain both conflict and steady strength. Triangles represent dynamic tension, action, and aggression.



Figure 2.39: A stable triangle, an unstable triangle, and a triangle attached to a rectangle creating an pointing left.

Triangles are balanced and can be seen as a symbol for law, science, and religion. Three is a dramatic number. It carries more tension than other numbers and it's often used in storytelling to increase drama and conflict. Three can also represent the trinity and so triangles can sometime suggest self-discovery and religion.

The points of triangles can direct the eye like an arrow. Triangles appear as familiar objects such as pyramids and pennants. The strength of triangles suggests the masculine to some and they can

convey feelings of progression, direction, and purpose. Their dynamic nature makes them better to represent a high tech startup as opposed to a stable financial institution.

Spirals—are found in the natural growth pattern of many organisms and so suggest growth and evolution. They're expressions of creativity and they convey ideas of fertility and birth. They also convey feelings of death. They represent expansion, contraction, and transformation. Spirals are the cycle of time, life, and the seasons. They're a common shape in religious and mystical symbolism.



Figure 2.40: Some spirals commonly found in nature, clockwise from top/left: seashell, hurricane, galaxy, sunflower.

Spirals can move in either direction. They represent returning to the same point with a new understanding. They suggest trust during change, the release of energy, and maintaining flexibility through transformation. They communicate the journey taken or to be taken.

A clockwise spiral is said to be a projection of intention while a counterclockwise spiral is said to be the fulfillment of an intention. Double spirals suggest opposing forces.

Crosses—The four points of a cross represent self, nature, wisdom, and a higher power or being. Crosses represent spirituality and healing. They are the meeting of divine energies.

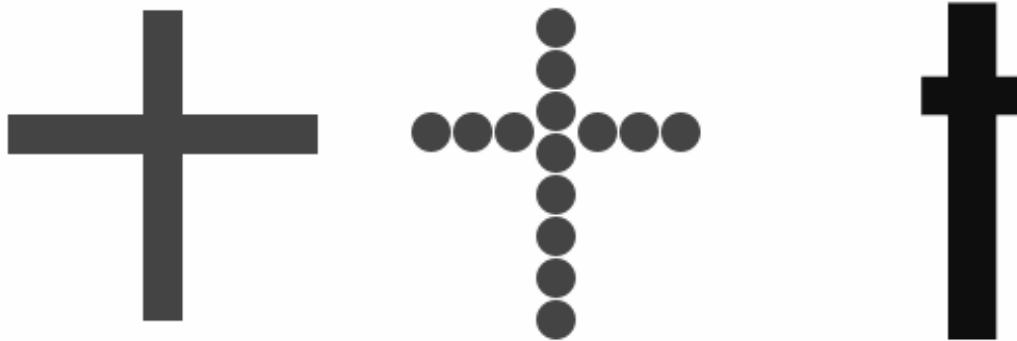


Figure 2.41: A cross made from two thin rectangles (left), a series of dots (center), the letter “t” in Futura typeface.

Crosses can suggest transition, balance, faith, unity, temperance, hope, and life. They can represent relationships, synthesis, and a need for connection to something. This connection can be to a group, an individual, the self, or a project. The key is the need for connection.

Crosses can also communicate honor and choice.

Vertical and Horizontal Shapes

When shapes become more line-like they tend to communicate much the same thing as lines do.

Vertical shapes are seen as strong. Horizontal shapes are seen as peaceful. Curved shapes offer rhythm and movement, happiness, pleasure, and generosity. Sharp shapes are filled with energy, violence, and anger. They can also be seen as lively and youthful.

Shapes that lean toward a protagonist appear to be blocking or stopping progress. Shapes leaning away from a protagonist appear to be aiding progress by opening up space.



Figure 2.42: Rectangle blocking a square (left) and rectangle opening up space for a square (right).

When background shapes are kept large and simple they can attract more attention. Both their larger size and simple contour gives them more weight and helps them push back toward the foreground.

Using Shapes in a Design

The way you use shapes in a design depends on the specifics of the shape. You'll use dot-like shapes similar to how you would use a dot, to attract the eye and hold it. You'll use line-like shapes similar to how you would use lines, to connect, separate, and direct.

The main difference between shapes and either dots or lines is that a shape's contours and size influence its surrounds more than either a dot or a line does.

Think about the three different types of shapes and what each generally communicates and then think further how the specific audience for your design might interpret the meaning of different shapes. Shapes communicate through both their characteristics and through any cultural meaning we assign them. Keep in mind this meaning will most often be cultural and your culture may be different from that of the audience.

I think the best way to understand what shapes communicate is to observe them and see what they make you feel. Scribble and doodle various shapes. Observe them in nature. Notice how each affects you and think about what that suggests about what the shape communicates to you and might also communicate to someone else.

Volume and Mass

Volumes are three-dimensional objects. A volume is filled with empty space and is defined by planes, lines, points and dots. A mass becomes present when the interior space of a volume is filled or appears to be filled.

We design for a two-dimensional canvas, yet we live in a 3-dimensional world where objects have depth in addition to width and height. Because of the two-dimensional canvas we can only represent 3-dimensional objects on the screen.

Technically any volume or mass we create on the screen is really a shape with the illusion of another dimension being present. While we can only offer the perception of volume and mass we can take advantage of the fact that we do live in three dimensions and our brains would prefer to interpret a composition as existing in 3-dimensional space rather than 2-dimensional space.

The Function of Volume and Mass

Like two-dimensional planes, volumes will exhibit either dot-like or line-like characteristics depending on the specific form they take. Because volumes make us think we're seeing three dimensions, they add a sense of realism to a design.

They also add weight to visual objects. We assume three-dimensional objects have a physical weight associated with them, but they also have a visual weight in that our eye, wanting to understand the space of the canvas, is attracted to volumes.

Volumes advance into the foreground when compared to two-dimensional planes. Objects with a greater visual mass have a greater push and pull on the objects around them. Volumes and masses exert a greater force than their two-dimensional counterparts. In this way they act more dot-like because of their greater attractive visual force.



Figure 2.43: The 3-dimensional sphere on the right advances into the foreground compared to the 2-dimensional circle on the left.

To perceive a volume we need to perceive it existing in all three dimensions so placing a volume on the canvas adds depth to the space of a composition and imparts direction into and out of the screen. Combined with other depth cues, volumes can add a line-like function in getting your eye to follow lines that run toward

and away from you.

Open and Closed Forms

Forms can be open or closed. A closed form is one where the object appears to be completely filled, while an open form allows you to see inside and through the object.

When the form of the object is closed we perceive it as more dense, we perceive it to carry more mass or rather implied mass as we can't actually pick up the object and feel how heavy it is.

When the form of an object is open it appears lighter. We can see some space through and around parts of the object. We'll perceive the object as having more volume, but less mass, because all the extra space makes it appear less dense.

What do Volumes and Mass Communicate?

Volume and mass mainly communicate a sense realism and depth into and out of the picture frame. Naturally they communicate physical weight in an element.

As far as the specifics, it will depend on the specific form the volume or mass takes. They'll generally communicate the same

things as their two-dimensional counterparts.

- A sphere communicates much of what a circle communicates. It's free to roll and it reminds us of celestial objects like the sun, moon, and planets.
- A cube communicates the same kind of stability that a rectangle communicates.

It's similar for the other shapes I talked about in the last section.

The main thing that volume and mass communicate is three-dimensional space and a sense of realism to a compositions.

How to Represent Volumes and Masses on a 2-Dimensional Canvas

In order to convey the perception of three-dimensionality to elements on a two-dimensional canvas, we need to rely on a handful of attributes. We can add patterns, such as gradients, that mimic that play of light over an element.

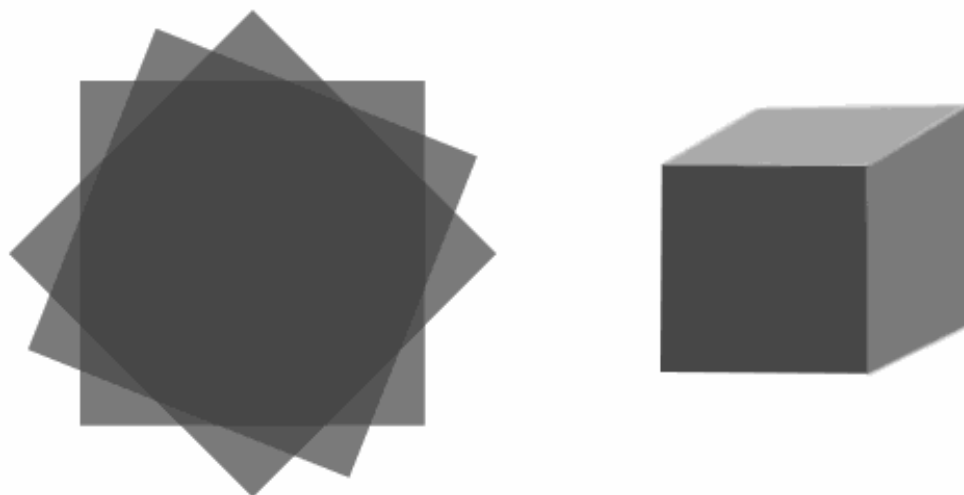


Figure 2.44: Mass is created by rotating a plane (left) and by adding the illusion of a third dimension (right).

A consistent pattern on a plane can lead to the perception of less mass being present as it appears parts have been removed from a solid object. An object with a consistent pattern appears flatter when compared to a solid plane of the same general shape. This changes if the pattern appears to mimic the play of light, in which case the object appears 3-dimensional.

Since the next chapter is all about attributes, I'll hold off going into too much detail about them here and instead offer some tips for how to add depth to a composition and create the illusion of the three-dimensional space. I'll go into more details about attributes in the next chapter.

How to Add Depth to a 2-Dimensional

Object

Our ability to perceive depth in three-dimensional space is based on how we interpret a variety of different depth cues. There are two types of depth cues with rather obvious and not so helpful definitions

- **Pictorial**—can be reproduced in a photograph or realistic painting
- **Non-pictorial**—can not be reproduced in a photograph or realistic painting

The main non-pictorial depth cues are: stereopsis, which results from having two eyes instead of one, and structure from motion. Other non-pictorial cues include focusing and refocusing our eyes and how what our eyes see converge as they fixate on an object.

Since non-pictorial depth cues require that we're physically in 3-dimensional space, I'll focus on the pictorial cues.

Pictorial Depth Cues

Pictorial depth cues do not need to be applied singularly to an entire design. They can be applied independently to different elements. Each cue will have its own properties and will communicate different visual information. People will look for and find depth in some way no matter what you do so the choice is

really which depth cues to use and not whether or not to use them.

Occlusion (overlapping objects)—This is the strongest depth cue and it overrides all other cues when there is a conflict. In order for one object to obscure (occlude) another there must be a depth of space between them.

The nearer object occludes or covers the object further away. The partially occluded object in the background must be recognizable for its complete shape or the objects might be seen as sitting side by side. When occlusion does occur the viewer will fill in the missing details of the hidden object.



Figure 2.45: Occlusion (left) is the strongest depth cue. Transparency (right) is similar, though it can sometimes make it difficult to determine which element is in front and which is behind.

Transparency is a form of occlusion where you can see through and behind the nearer object. Parallax is a technique to show moving objects occluding one another.

Size and scale—Larger objects appear closer than smaller objects, which appear further away. You can place objects near each other in a way that the difference in size appears to occur due to a difference in depth. By varying scale in a pattern you can create perspective.

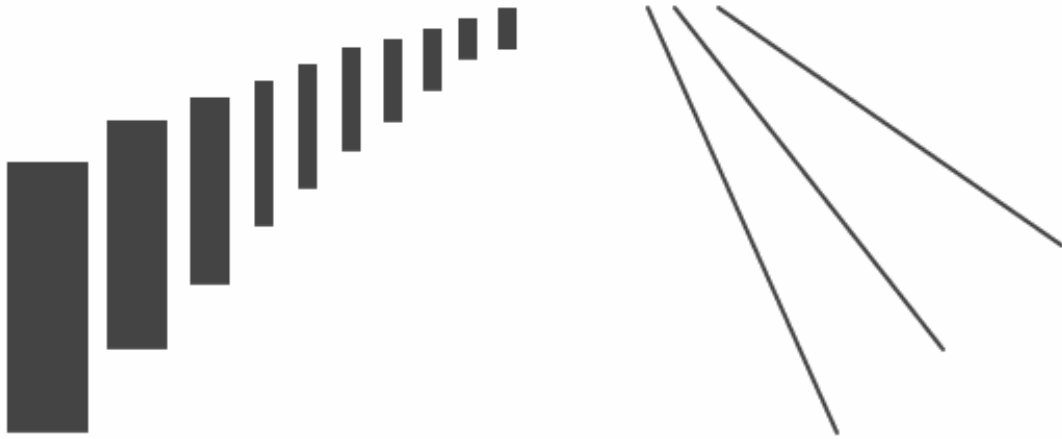


Figure 2.46: Depth indicated through scale (left) and perspective (right).

Linear perspective—A series of lines that converge at one or more points create perspective, which implies the depth of three-dimensional space. Perspective lines don't need to be visible. They can be implied by objects in the composition.

Texture—Texture implies depth by definition. The goal of a texture is to make you feel the surface of an element, which requires there be some depth on the surface. Textured elements appear smaller and more densely packed as they move further away. A texture that mimics something in real life can be used as a

reference for the size of other objects.



Figure 2.47: The stones in the background are smaller and more densely packed than those in the foreground.

Cast shadows—The shadow one element casts on another gives cues about the relative distance between them. Drop shadows are the most common way to use cast shadows to add depth.

Reflections can also be used in a similar way, since they too appear on a different surface than the element which throws the reflection.



Figure 2.48: The circle on the right appears further off the ground because its shadow is larger, lighter, and blurrier.

A smaller shadow looks darker and crisper and also nearer to the object casting it. Making the shadow larger and lighter and placing it further away from the object, increases the perception of the distance between them. Blurring the edges of a shadow also increases this illusion.

Location on the picture plane—Objects located higher up on the picture plane are usually perceived as being further away. Consider the horizon. What’s above it (sun, sky, clouds, stars) is further away from you and what’s below it (earth, grass, pavement) is nearer to you.



Figure 2.49: The object to the left appears nearer because it's located lower in the picture plane.

Lighting and shading—The play of light over a surface indicates the depth of that surface. It offers clues about the 3-dimensionality of the object. Examples of the play of light on a surface are gradients, bevels, and embosses. Each shows how light is absorbed and reflected off a surface.

The surface of an object can show more or less light depending on its orientation from the light source. Closer to the light source will show brighter with more reflected light.

Depth of Field—When the eye focuses on one object it remains sharp while other objects around it become somewhat blurry. This difference in the amount of sharpness and blurriness is called the

depth of field. The closer an object is to the one in focus the less depth is perceived between them. Objects that are further away will appear blurrier.

This is true regardless of whether or not the object in focus is nearer or further away from the viewer. It's the amount of distance from the object in focus that matters to the objects out of focus.



Figure 2.50: The difference in focus between the clear subject in the foreground and the blurry background creates a sense of depth in the photograph.

Reference to nearby or known objects—Once we perceive

the size of one object it provides a reference for other objects in the composition. The known object can be known because it represents a real life object such as a person or a house. The known object can also be known because its size is defined somewhere in the composition itself.

The known object adds context for the unknown object. It ties it to the physical world and it adds scale to the composition.



Figure 2.51: We know a butterfly and a building aren't the same size. In order for us to make sense of this seeming contradiction we perceive a depth between them with the building further into the background.

Degree of contrast—The contrast between an object and its background is reduced as the distance between them increases. It's why a darker shadow appears closer to the object casting it. This also accounts for how depth of field works. Greater contrast

in focus/blurriness leads to the perception of greater distance between objects.



Figure 2.52: The left side of this image appears to have more depth due to the greater contrast between the values of the foreground shape and the background.

Color—Cooler and darker colors tend to recede into the background, while warmer and brighter colors advance into the foreground. Perhaps it has to do with the cool sky being further away and the warm earth being nearer. Mixing warm and cool colors can add to the sense of depth in a composition by having some objects recede and others advance.



Figure 2.53: Edward Hopper uses warm and cool colors to help create a sense of depth in his painting *Lighthouse at Two Lights*.

Every composition will divide itself into figure and ground so it's not a matter of whether or not depth cues are present, but which ones you use and how much depth you create with them. You can use any of the above cues, though you likely wouldn't use all.

Most of these cues are based on the characteristics or attributes of the elements in the composition so it's probably time to talk specifically about those attributes in greater detail.

Chapter Three

Attributes

The elements in the previous section all have certain fundamental characteristics in that their behavior is either dot-like (attracting attention) or line-like (directing attention).

But not all dots are alike. Neither are all lines, squares, spheres, triangles, or spirals. We need ways to describe all these elements so we can distinguish one dot from another and one triangle from another. Some lines are long. Some lines are short. They might also be thick or thin, light or dark, red, green, or blue.

All of the elements we've talked about can have a variety of characteristics or attributes that can distinguish elements of the same type. The same way different elements communicate different things and serve different functions, different attributes applied to the same type of element communicate different things and serve different functions.

In the Visual Perception chapter, I mentioned the use of primitive features as a way to create the pop out effect and attract the eye. Most primitive features are the attributes I'll talk about in this chapter.

One additional thing to note while you're reading through this chapter is how, like the elements, attributes are mainly used to attract the eye or to direct the eye to another part of your composition. Fixate and move. Fixate and move. Keep that in mind as you read, not only this book, but anything else you read

about graphic design.

Structures—Patterns and Textures

Whenever two or more objects in a composition are located in relation to each other they appear connected in some way and they form a structure.

The spaces between objects in a structure are called structure units. The something that connects objects in a structure is known as a structure line. These are lines along the axis in which the objects are arranged and they can be classified in four types.

- **Visible**—You can see the structure lines
- **Invisible**—You can't see the structure lines
- **Active**—The structure lines influence the objects
- **Inactive**—The structure lines don't influence the objects

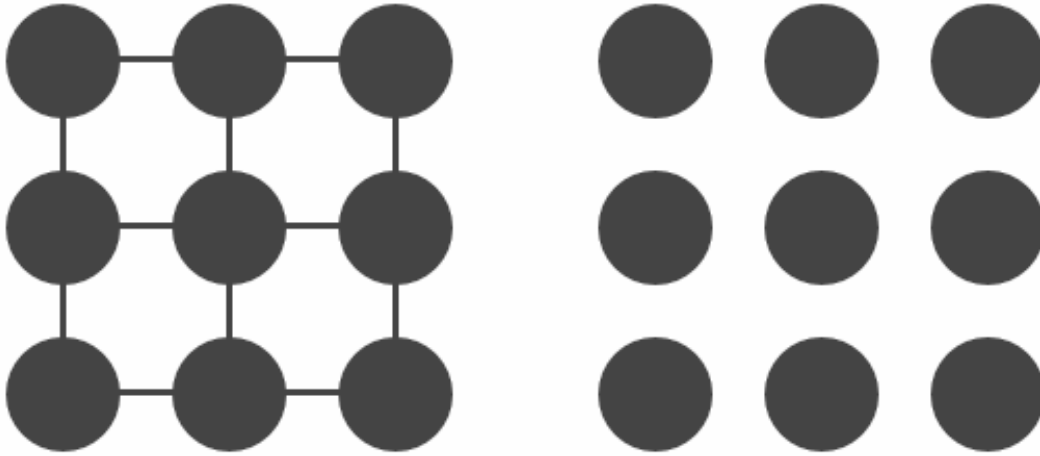


Figure 3.1: Structures with visible (left) and invisible (right) structure lines. Structure lines are inactive in both cases because they don't exert any influence on the objects.

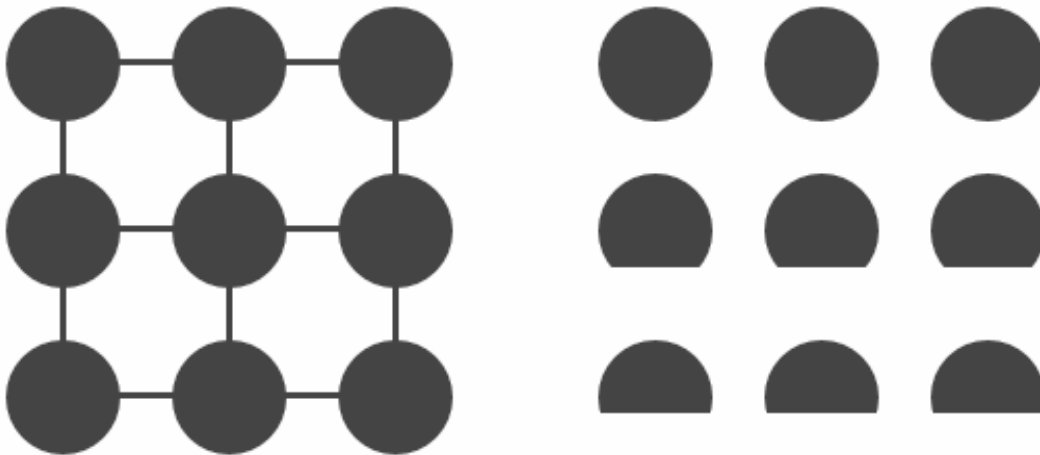


Figure 3.2: Structures with visible and inactive structure lines (left) and invisible and active structure lines (right).

Notice that structures are created by combining dots and/or lines. Once again, the idea of fixation and movement is present. The dot

part of a structure attracts the eye and the line part of the structure, whether present or implied, directs the eye to move to another dot in the structure.

Abstract Structures

When the structure lines in a structure are **both invisible and inactive**, as they are in the right hand structure in **Figure 3.1**, we say the structure is abstract. The objects are clearly arranged in some way, which suggests a structure is in place, but we can't see the structure lines or their influence.

There are several types of abstract structures.

- **Formal structures**—Have an even distribution of objects and spacing between them so the structure units are equal. The structure on the right in **Figure 3.1** is a formal structure.
- **Informal structures**—Lack a regular arrangement of objects. Even when a pattern is observed, the structure is informal if the objects do not follow straight structural lines (Left side **figure 3.3**).
- **Gradation structures**—Have structure units (spacing) that change in form or size, but at a regular or even rate (Right side **figure 3.3**).
- **Radiation structures**—Have structure units that radiate from a common center (Both sides **figure 3.4**).
- **Spiral structures**—Have an uneven distribution of

structure units radiating from a common center (**figure 3.5**).

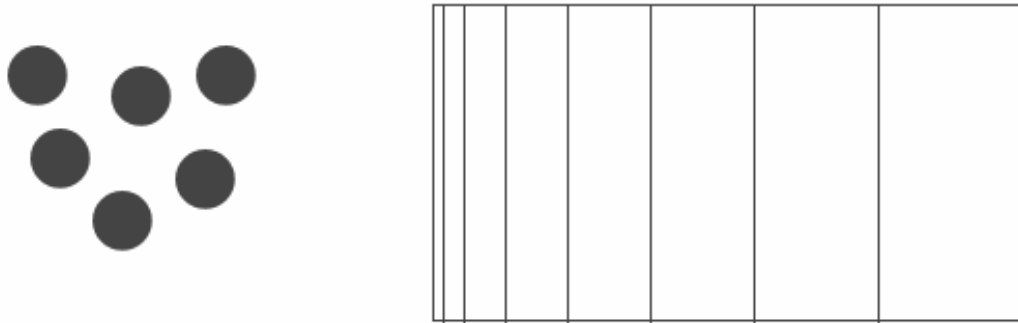


Figure 3.3: Examples of informal and gradation structures.



Figure 3.4: Two types of radiation structures.

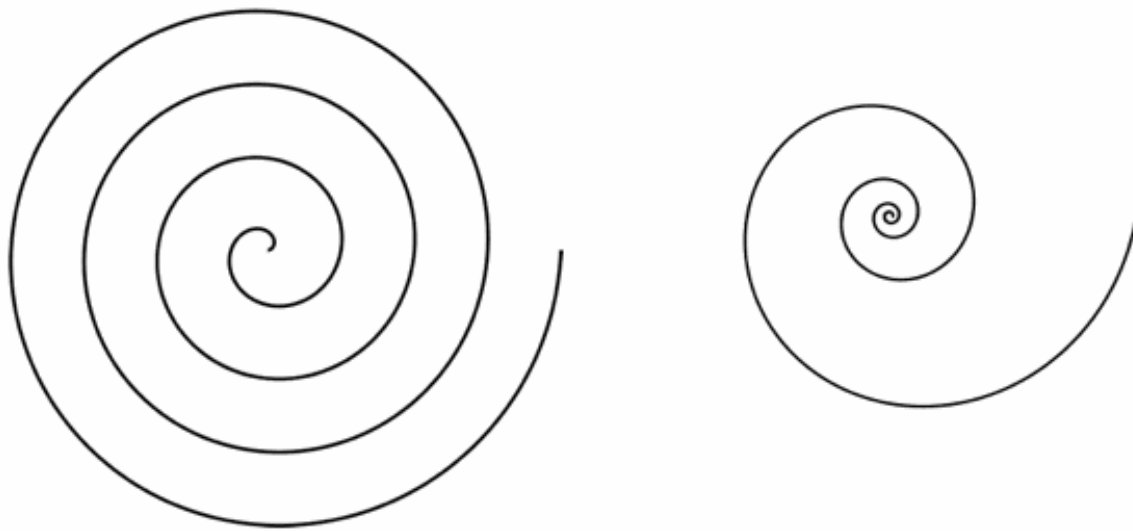


Figure 3.5: Two spiral structures. Archimedean spiral (left) and logarithmic spiral (right).

Concrete Structures

Where abstract structures imply their structure from the location of the objects, concrete structures directly show themselves, either by being visibly present or by actively showing their influence. For a structure to be concrete its structure lines must be either **visible or active**. They can be both, but they only need to be one or the other for the structure to be concrete.

Visible structures do not have to include objects. As long as the structure lines are visible the structure is present as seen in the right side of **Figure 3-6**.

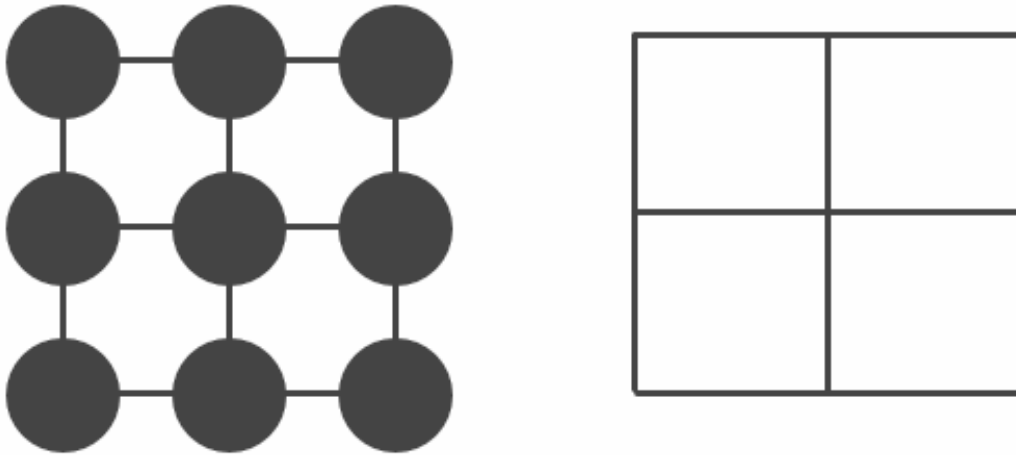


Figure 3.6: Concrete structures seen through visible structure lines. Note the objects don't need to be visible if the structure lines are visible.

Active structures are those where the structure influences the form of the objects in some way. The objects naturally need to be present in order for the influence to be seen, but active structure lines can be visible or invisible (**Figure 3-7**). It's their influence that makes them active.

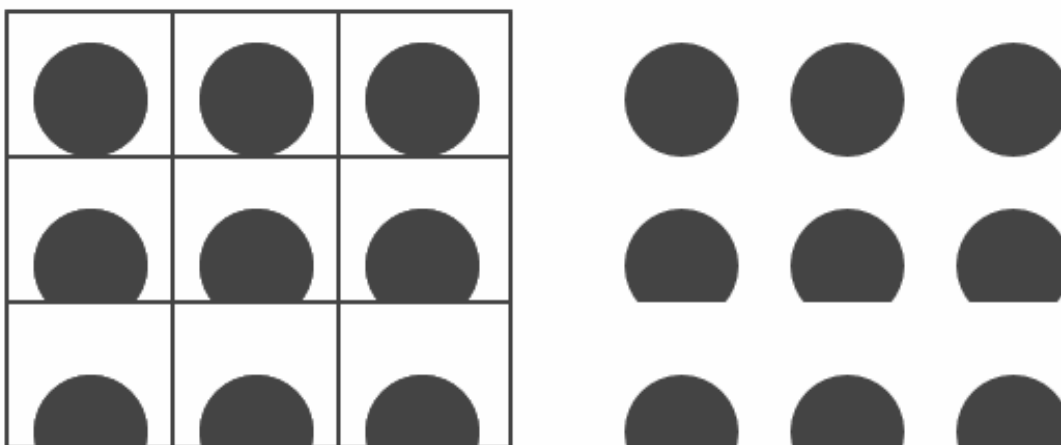


Figure 3.7: Concrete structures seen through active structure lines. Note the

structure lines don't need to be visible to be active.

Surface Activity

When a structure is present on the surface of an element, the surface becomes more active. There are two types of surface activity.

- **Patterns**—Structures with a geometric quality. The objects of the structure are arranged in a recognizable and repeatable way
- **Textures**—Structures with irregular surface activity. The objects of the structure are arranged in a random or varying way

You can see how each type of surface activity can affect a composition by comparing two versions of the painting *Bedroom at Arles* (**Figures 3-8 and 3-9**). Roy Lichtenstein's version uses patterns, where Vincent van Gogh's original makes use of textures.



Figure 3.8: Roy Lichtenstein's version of Vincent van Gogh's Bedroom at Arles uses patterns.



Figure 3.9: Vincent van Gogh makes use of texture throughout his painting Bedroom at Arles.

I think you'd agree these are two different approaches to a painting of the same subject and the main difference is that one uses geometric patterns and the other uses irregular textures to give different impressions of the same room.

Patterns

Structures that are formed from consistent and repeated relationships are patterns. Patterns are geometric and

mathematical. They're synthetic and mechanical and they can easily be mass produced.

Like all structures, patterns:

- Add visual interest
- Attract attention
- Can create a sense of depth
- Create contrast with elements that don't use the pattern
- Create a sense of movement

Patterns are typically less complex than textures given their geometric nature and more easily identifiable organization.

Patterns also have their own characteristics based on structure units and the qualities of the the elements used to create the pattern.

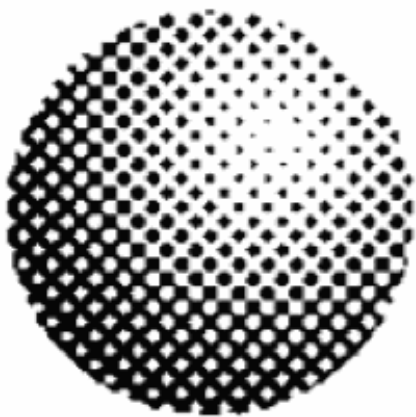


Figure 3.10: A pattern formed from consistent and repeated structural relationships.

It's important to understand that patterns (like textures) are supporting elements. The content, style, and message of a pattern should enhance the content, style, and message the element is trying to convey. If a pattern contradicts the element it produces a new message.

Of course, your overall message might be one of contradiction in which case a pattern that contradicts the element it rests on might be entirely appropriate.

Single shapes and objects can be used to create complex geometric patterns through repetition and rotation, which can help make another object more complex and interesting.



**Using a pattern to
mimic the play of light
over a surface leads
to a stylized look**

Figure 3.11: A pattern mimicking the play of light over a surface in a stylized manner.

Increasing the density of objects in a pattern leads to a darker pattern with a darker value. If you change the density of a pattern over the surface of an element you can create a transition from light to dark, which can mimic the play of light over a volume or mass. Patterns used this way tend to create a more stylized volume than when textures are used in a similar way, because patterns appear less organic and natural than textures.

Too much pattern can be a bad thing. Remember, they take a supporting role and not a lead role. When too much pattern is present it becomes decoration instead of design. It becomes excessive. Patterns support the message, but they aren't the message.

In his book, *Patterns in Nature*, Peter S. Stevens suggested there are a limited number of ways patterns can be structured.

- **Flowing patterns**—are based on the repetition of an undulating line, and reflect a natural meandering through a composition.
- **Branching patterns**—(patterns of deviation) are a repetition of forking lines. These kinds of patterns can be found in almost all plants, and in many other places in the natural world.
- **Spiraling patterns**—are a circular pattern, or a pattern that winds in and around itself.
- **Packing and Cracking patterns**—are those which refer to the way the shape of one object defines the next object in the pattern.



Figure 3.12: Clockwise from top left, flowing pattern, spiral pattern, packing/cracking pattern, and branching pattern.

The most memorable patterns occur when you see the structure before the individual objects. It's how the objects are arranged, and not the objects themselves, that's most important when it comes to patterns.

Two techniques you can apply to patterns in your design are to emphasize the pattern or to break it.

- **Emphasize**—You can emphasize a pattern by zooming in on it and accentuating its size.
- **Break**—You can break a pattern by adding an object that breaks the flow of the pattern. Breaking a pattern will draw attention to the location of the break as it contrasts with the rest of the pattern.



Figure 3.13: A pattern broken (left) and one emphasized (right).

Textures

Structures that are formed from irregular or random relationships create textures, which are more organic and natural than patterns.

The key to a texture is variety. The size and shape of objects and/or structure lines in a texture may vary. The intervals between the objects may vary. The density of objects at any point may vary. This variety is what leads to the perception of the structures being organic, natural, or random.



Figure 3.14: Stone texture (left) and cloth texture (right).

Textures are physical. We can touch and feel them (tactile textures). On the screen we can only create the perception of this physical quality of textures. We design implied textures (visual textures) as opposed to real ones. Ideally, you want to make your audience imagine how the textures you create feel. In this way, textures help us appeal to a sense not usually experienced in two-dimensional visual only picture planes.

- **Tactile texture**—The actual feel of a surface.
- **Visual texture**—The illusion of the surface's texture.



Figure 3.15: Visual textures of common objects that almost make you feel the texture.

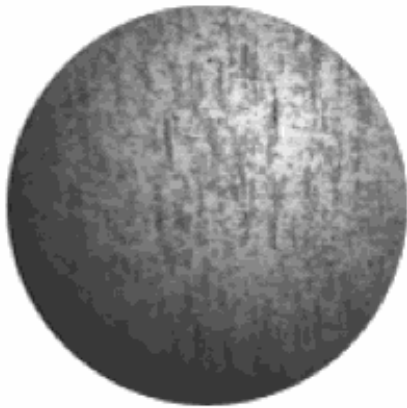
The physical quality of a texture is what gives it a sense of realism and depth and through this realism they can give your design a connection to the physical world.

The more consistent the textural irregularity and the less contrast in density across the surface, the flatter the texture appears. More contrast and more irregularity leads to a greater perception of depth and feeling.



Figure 3.16: A flatter stone texture (left) and a stone texture with greater depth (right).

As with patterns, transitioning the density of a texture over a surface creates a gradation from light to dark mimicking the play of light. A texture that mimics light in this way will appear more realistic than a pattern that does the same.



**Using a texture to
mimic the play of light
over a surface leads
to a realistic look**

Figure 3.17: A gradient texture mimicking the play of light over a surface leads to a more realistic look than a pattern doing the same.

Textures can be created from dots, lines, shapes, and volumes, as well as other textures or patterns. They can be added within the contours of an element to add interest to the element or they can be added to the space outside the contours to add interest to the space surrounding an element.

As with patterns, textures are supporting elements. They communicate additional information and can enhance the

message of an element or contradict it through juxtaposition.

Type has a visual structure that's varied through value, density, and spacing. This creates typographic texture, which can suggest fabric. In fact, the word text comes from the Latin textus, a word used to describe the texture of woven fabric.



Figure 3.18: Different textures of type.

Texture can also be used in a composition in much the same way as pattern. They can be used to:

- Add visual interest
- Attract attention
- Create a sense of depth
- Create contrast with elements that don't use the texture
- Create a sense of movement

The main difference is that structures appear more realistic than patterns, but they generally function the same way.

Size, Scale, and Proportion

While scale and proportion aren't limited to the size of an element, all three tend to get talked about together. Keep that in mind throughout this discussion. Let's start with a short definition of each (in terms of size) and then I'll talk about all three in more detail.

- **Size**—The physical dimensions of an element.
- **Scale**—The relative difference in size between elements or between a single element and a common standard.
- **Proportion**—A harmony of scale.

Size

Size refers to the physical dimensions of an object. It's ultimately an absolute measurement, though we can set size using either absolute or relative values.

Absolute values—Size is set with a unit that doesn't change regardless of context. The absolute value most commonly used online is the pixel (px).

Relative values—Size is set with a unit relative to some other measurement. When the first measurement changes, the second changes with it. Some common relative units online are em, rem, and percent.

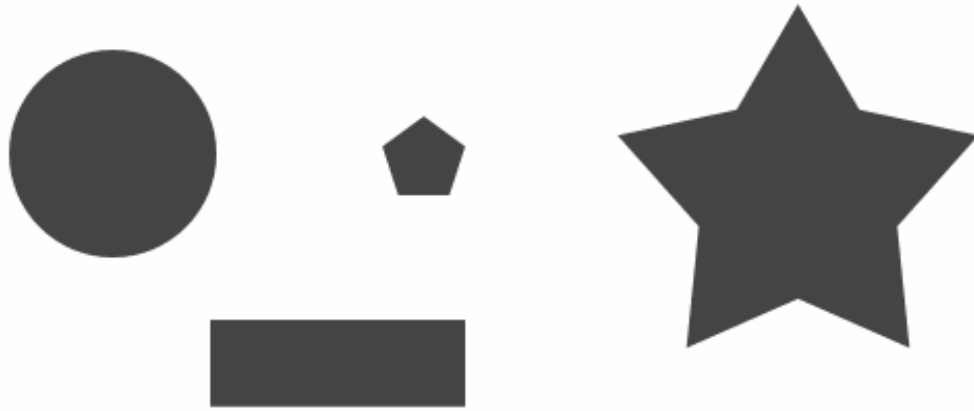


Figure 3.19: Shapes of various sizes.

At any given moment and under any given condition the size of an element is fixed and can be measured absolutely, but when set using relative values, the size of the element can change with the context.

For example, an image set to have a width of 300px will always be 300px regardless of where it's viewed. An image set to have a width of 80% of the screen width will have a different measured width depending on the width of the screen it's viewed in at the moment the image is measured.

An element in your design will exist with absolute dimensions at a given time and under a given set of conditions. That doesn't mean you have to use absolute measurements like px to set sizes on everything. It simply means that for any context, the element can be measured with absolute dimensions.

At a different point in time the conditions might change. A browser might be resized or the size of the base font could be increased. If you used relative measurements like em or % to describe an element's dimensions it can change with a change in font-size. It could still be measured absolutely from the perspective of the viewer at any given point in time, though.

Size isn't especially interesting on its own. It doesn't mean much to say something is 400px or 25em wide. It's not until we compare one dimension to another that something is communicated.

For example, saying something is 400px wide and 600px tall gives a sense of the shape of the object. Saying one line is 400px long while another is only 40px long communicates something about their relationship.

Size becomes more interesting when we talk about scale.

Scale

Scale is a relative measurement of something. It's a level or degree, a progressive classification of some quality. Scale is an amount and it's also a measure of importance or rank. Again, it isn't limited to size, but it often gets talked about in combination with size. However, any quality, and characteristic, any attribute, you can apply to an element exists on some scale.

To say someone is 6 feet 5 inches is a matter of size. To say that person is tall is a matter of scale. If you say something is big, it's immediately seen on a scale in comparison to small and probably medium.

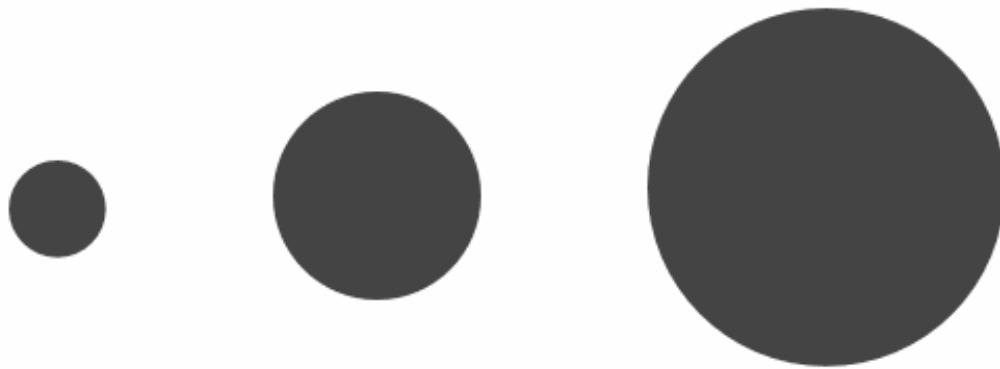


Figure 3.20: Small, medium, and large dots.

Anytime you compare two objects in any way, you've set up a scale. A single element has no scale. It needs the context of another element for scale to exist. The moment a second object is present to compare to the first, scale is also present.

Figure 3.20 shows a small, medium, and large dot. The figure can only show all three because the others are present. Remove any two of the dots and you can no longer say the remaining dot is small, medium, or large. It's easy to imagine two more dots smaller than the smallest dot shown in the figure, which might then make the small dot the large one.

Scale communicates relationships between elements and groups of elements. Two elements of the same dimensions exist at the same point on a scale of size, which communicates they're similar in some way. Two elements with different dimensions exist at different points on the same scale communicating that they aren't the same in some way.

Typographic Scale

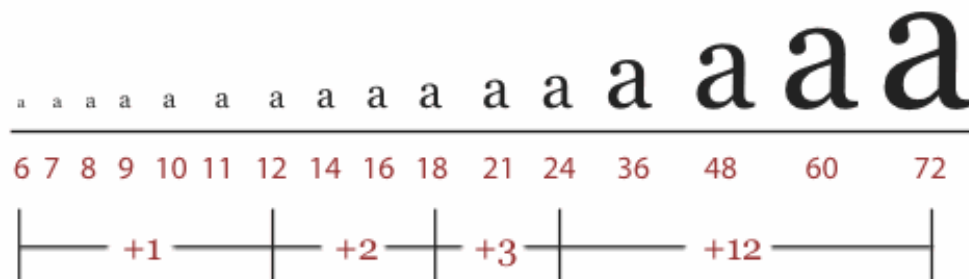


Figure 3.21: Choosing types sizes with a typographic scale helps create rhythm and hierarchy.

When designing a website you can compare the size of one element to another element, to the browser, to the usable portion of the screen, to the space around the element, or to a common standard like the size of a person or of the earth.

Scale is always about relative measurements. When I mentioned relative measurements earlier as a way to set size, I was really

talking scale in that one element is 50% of another or the size of a font is 1.5 time the default height of the capital ‘M’ of a particular typeface.

Scale is an important part of many design principles, some of which we’ll encounter later in the book. Hierarchy, contrast, and similarity are all based on scale. Scale leads to concepts like dominance and it’s how elements appear to have different visual weights.

In the last section about structures I mentioned how varying the density of objects in a pattern or texture can mimic the play of light over a surface leading to depth. That all relies on scale, particularly a scale of density across the surface of the element (Right side of **figure 3.22**).

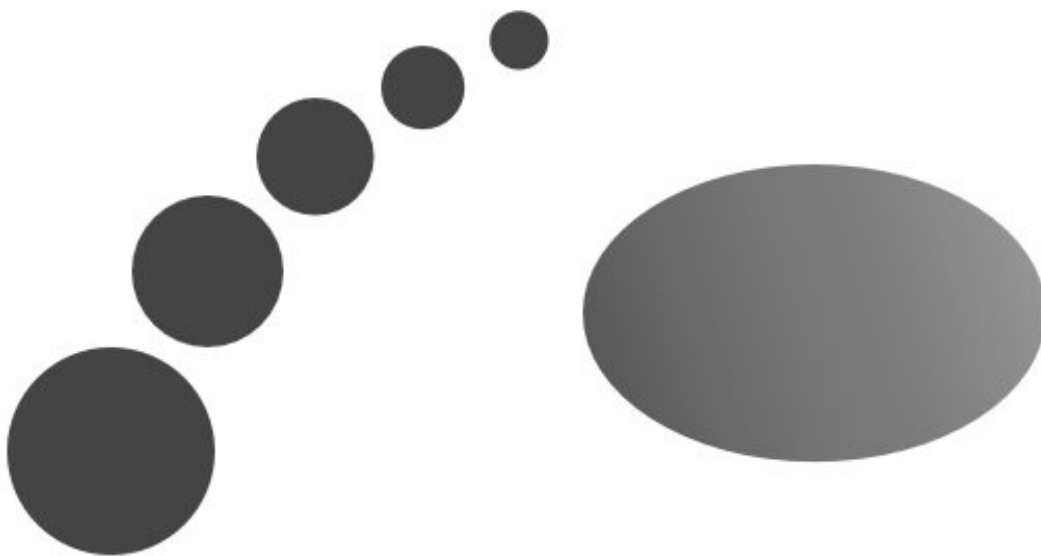


Figure 3.22: Scale of size creating depth in the canvas (left) and scale of value

creating depth over an element (right).

When talking about depth, I mentioned that larger elements appear to be closer and smaller elements appear to be further away, creating perspective. Once again scale is behind this illusion (Left side of **Figure 3.22**).

Scale can imply meaning to a composition. For example, a larger shape might confront a smaller one and corner it. That could communicate intimidation or pressure. The smaller shape might be communicating fear or a feeling of being trapped. The larger shape imposes its will and exerts influence and force over the smaller shape. The smaller shape is timid, cowers in fear, and hopes for escape. All communicated through a scale of size.

Confrontation
Intimidation
Pressure
Threat
Fear

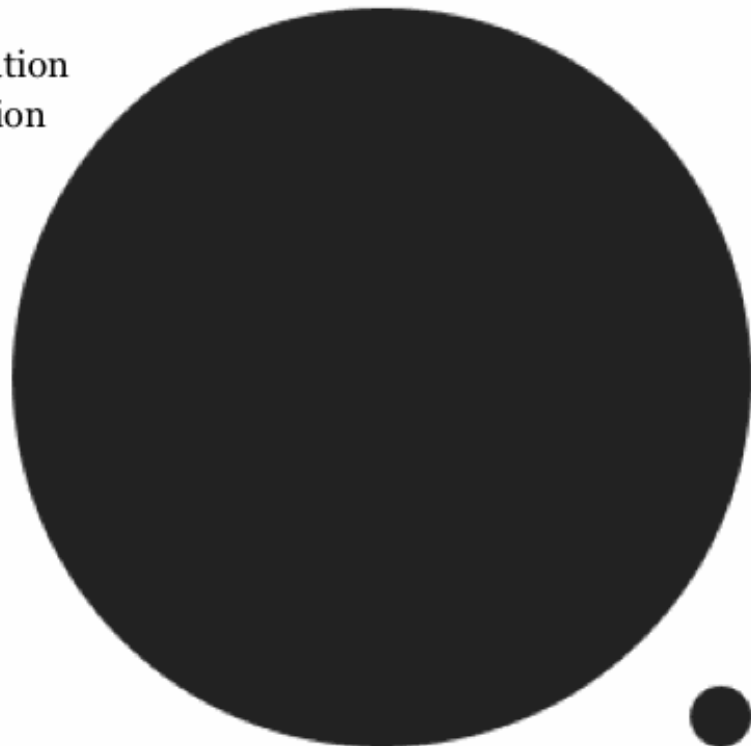


Figure 3.23: A large object intimidating a small object.

A composition without scale in which everything is the same (size or otherwise) is boring. It's the differences between elements that makes things more interesting. When making things different through a contrast of attributes, it's better to go big. Reach for points far apart on the scale. Small changes in scale are difficult to discern and they generally have little impact. If anything, they'll appear to be mistakes. Bigger changes resonate more and look more purposeful.



Figure 3.24: A small change in scale looks accidental (left) while a large change is clearly purposeful.

While contrast is more interesting, similarity of scale is still important. When everything contrasts with everything else it's hard to determine the scale. A mixture of similar and contrasting elements works best. How much of each to use is, of course, a matter of scale.

The Scaling Fallacy

The scaling fallacy is the mistaken assumption that something that works at one scale also works at another larger or smaller scale. A different scale brings different challenges with it.

For example, the effect of the wind on a small building is often negligible. No matter how much wind is blowing the building will likely survive. However, if you increase the size of the building, its surface area also increases. The same wind then exerts a much greater overall force on any of the walls of the building. The top of the building is also further from the ground in which the building is anchored, requiring less force to tip it over. The building might need stronger materials or a different shape as the scale increases.

Type is another good example. Some typefaces look great large, but not so great small. Some are the opposite. Good typography is usually based on a scale of size between the font, line-height, and the measure of a line of text.

The image displays the 'Impact' typeface. The top line features the words 'Impact Font' in a very large, bold, black sans-serif font. Below this, a second line of text reads 'Impact is difficult to read at text sizes though easy to read at display sizes' in a smaller, bold, black sans-serif font. This visual comparison demonstrates how the font's design, which is optimized for high contrast and readability at large sizes, becomes less legible when scaled down to a smaller size.

Impact Font

Impact is difficult to read at text sizes though easy to read at display sizes

Figure 3.25: Impact font shown at display size and text size.

Proportion

Proportion is the relationship between elements on a scale. Certain scalar relationships are pleasing, while others can be off putting. If the different sizes of elements are in proportion, they are likely in balance and harmony.

Proportion is the ratio between parts of a larger whole and to the whole itself. Maintaining proportion is very important. When one element changes, the others should change with it and they should probably remain in the same proportion. I say probably because like most things, it depends.

Think of a web page where increasing the text size has no effect on the size of other elements. The text grows, while its container remains the same size. Everything quickly begins to look out of proportion and the design breaks down. If the size of all the elements was allowed to change in the same proportion as the text, the design would still function well and look good as the base size of the text changed.

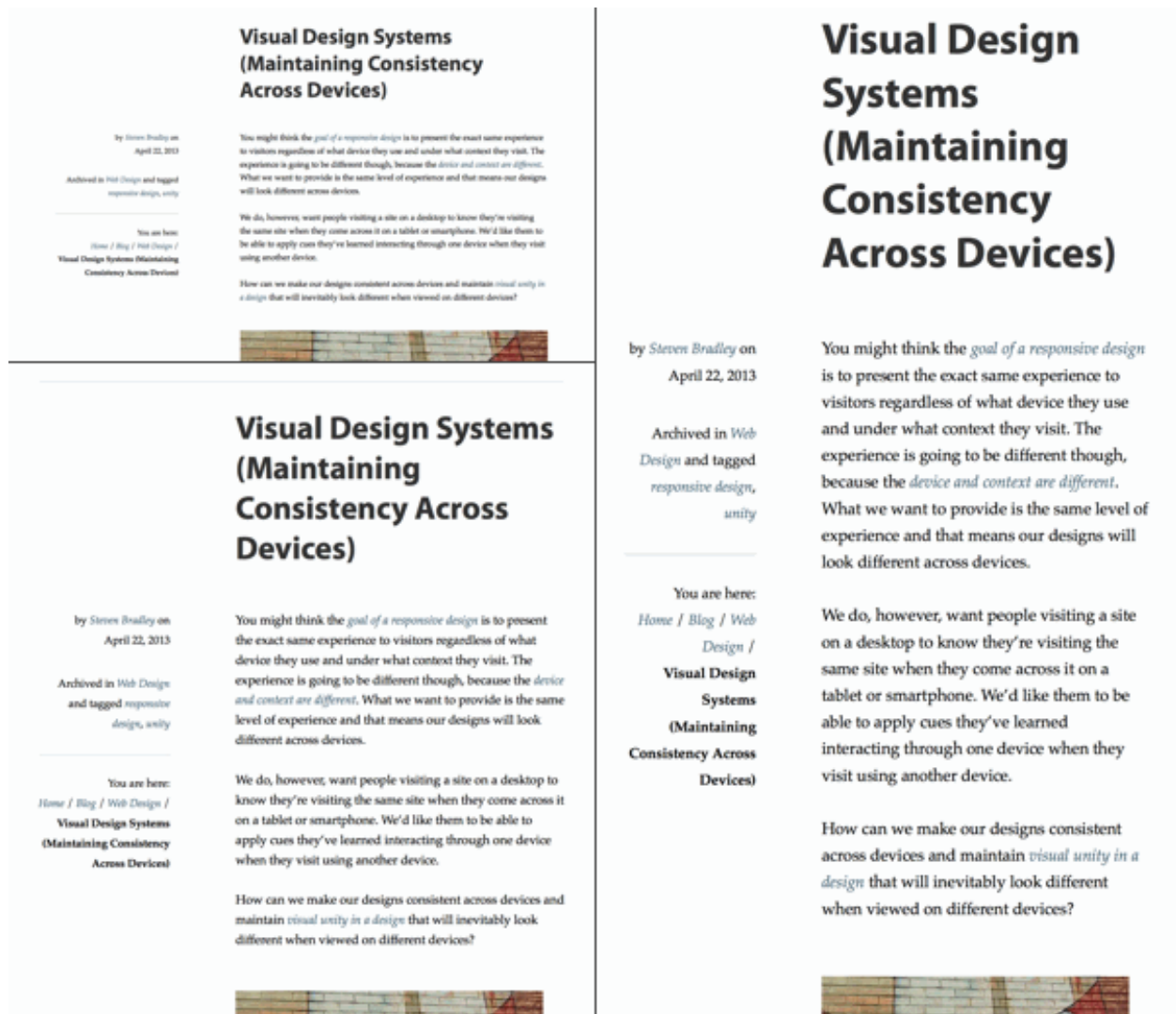


Figure 3.26: A page from my site with text set at 16px (top left) 24px (bottom left) and 32px (right). Column widths maintain their size in each and the type remains in proportion.

Proportion leads to rhythm and harmony. It can help lead to unity in a composition or design. We naturally tend to judge the size of objects based on ourselves and so the human body is often a universal standard used for proportion.

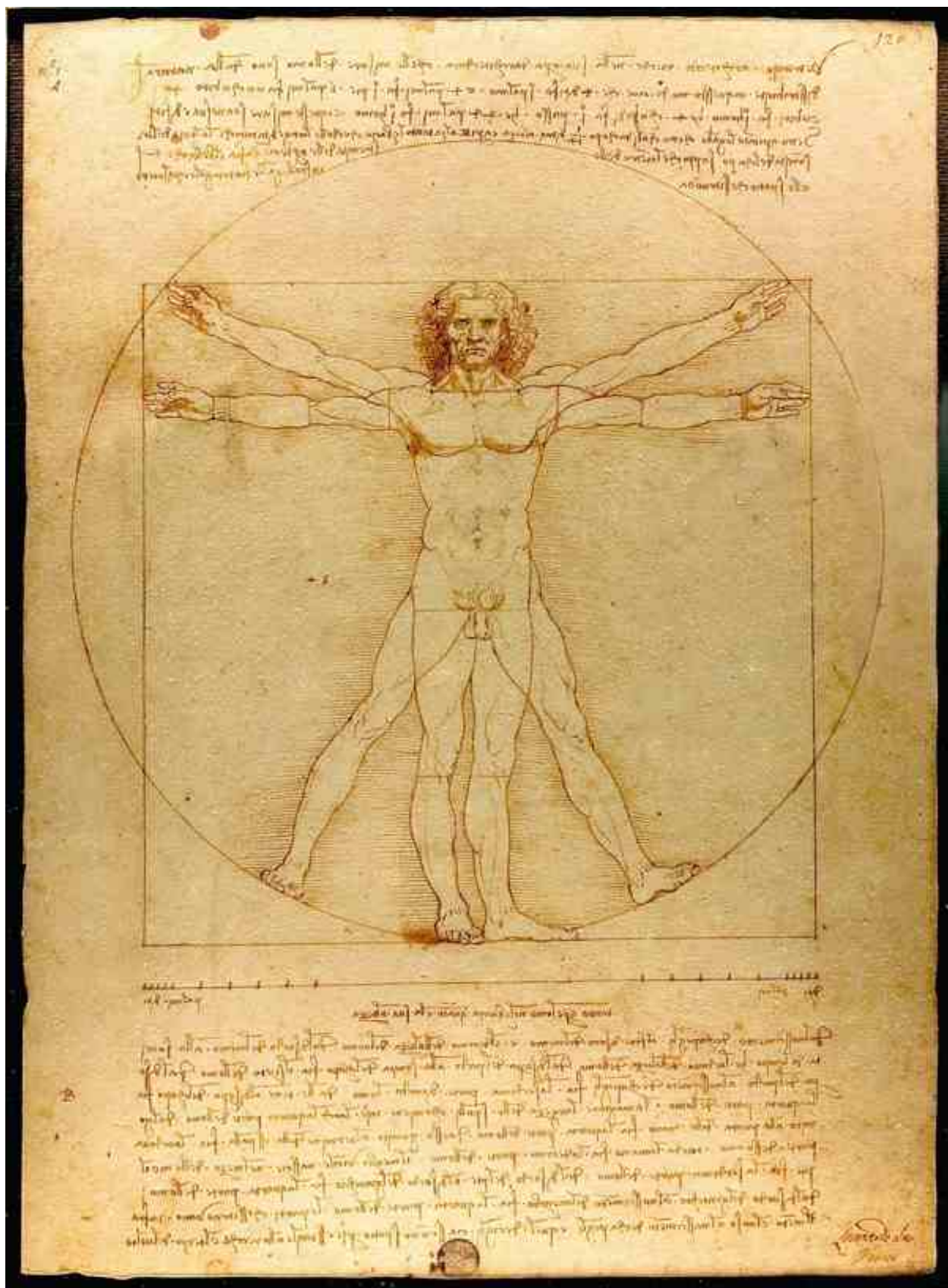


Figure 3.27: Leonardo's Vitruvian Man, showing human proportions.

Proportion tends to be noticed most when something is out of proportion. When an element isn't in the correct proportion it seems out of place and causes us to feel tension or generally negative feelings. At times this might be the desired effect, but much of the time it won't be.



Figure 3.28: The out of proportion object attracts attention.

On the other hand, when objects are in proportion it just feels right.

Choosing Proportions

Some proportions are commonly found in nature. Others, like the golden section, have been thought to be aesthetically pleasing. Some proportions are based on mathematics or music. Many are

based on the human body.

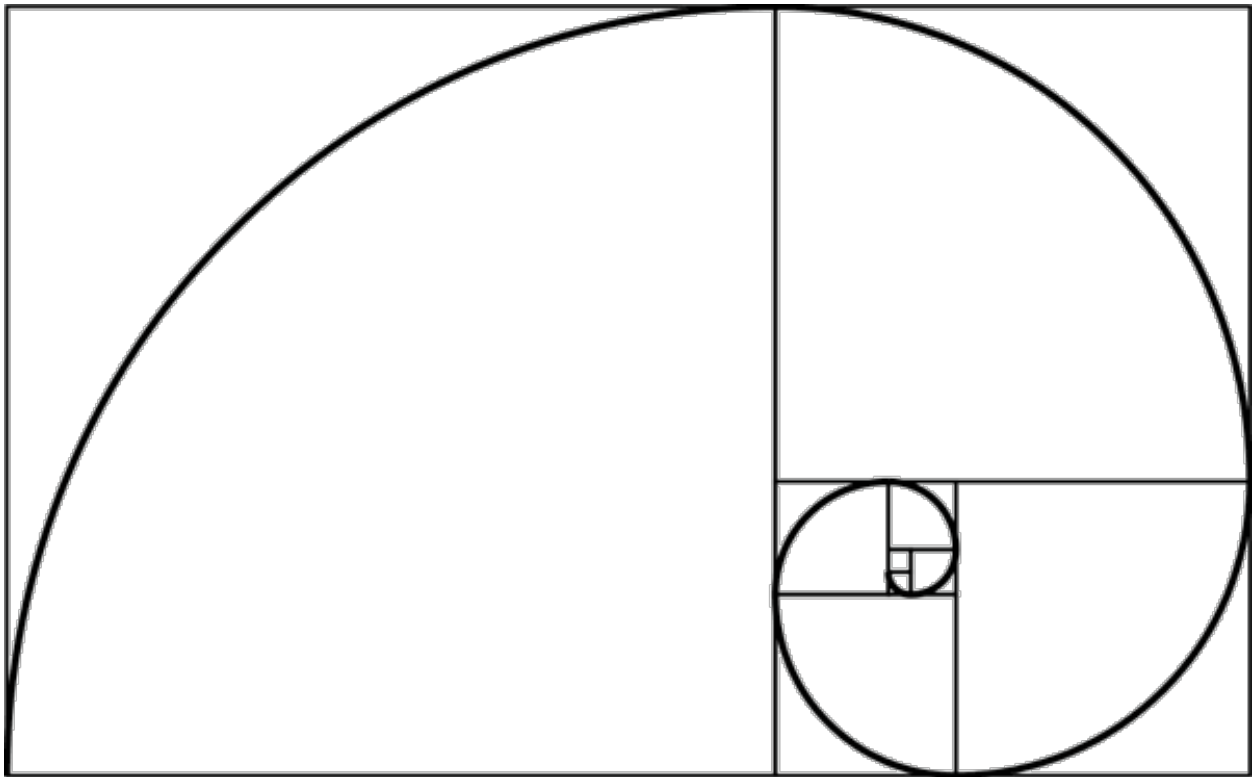


Figure 3.29: The golden section.

Typography and the typographic grid are probably the most common parts of a design where you'll be concerned with proportion. Good type is in many ways about the proportion of several different type characteristics.

- Font size
- Line height or leading
- The length of a line of text

Changing any one of these requires a change in the others in order to maintain the same proportion. It's the proportion of these different

characteristics of type that lead us to think of the type as well or poorly done.

Tim Brown set up a site to choose proportions for type. The site (<http://modularscale.com/>) generates a proportion of scales based on different musical intervals or on the golden section. The golden section itself is based on the mathematical Fibonacci sequence. Do visit the links on the modular scale page, especially the video where Tim first presents the idea.

There is no right or wrong proportion on which to choose sizes along a scale, though ideally the proportion chosen will have a connection with the design's concept. In my current design I was trying to incorporate something of a Renaissance concept and so chose to use golden section proportions in the type.

If your concept called for a Zen-like aesthetic you might choose to use proportions from a musical scale used prominently in Japan, China, Vietnam, or Korea. Maybe you'd choose a scale based on the characteristic scale of a type of music in order to convey a similar message.

Regardless of which you choose, using proportions of some kind will create a harmony, a unity, in whatever elements you apply the proportion to.

Color Theory

“If one says ‘Red’ (the name of a color)
and there are 50 people listening,
it can be expected that there will be 50 reds in their minds
and one can be sure that all these reds will be very different.”
— Josef Albers from *Interaction of Color*

Color is among the strongest visual stimuli, which makes it a very useful communication tool for designers. Color evokes emotions and meaning. It’s helpful in showing that things are alike and not alike. Color can attract the eye and communicate direction. It’s used to create hierarchy and it helps organize the information in your design.

Color is also very subjective. While the mechanics of color perception are the same for all human beings, color is rarely, if ever, seen exactly as it physically is. There’s no way to know if when you and I see red, we’re seeing the same thing. We both call it red, but we possibly see a slightly different red. And while color communicates meaning, it mostly does so based on cultural interpretation.

These facts make color a mix of art and science and places it as the most relative medium in art and graphic design. In fact color theory itself shouldn’t be seen as absolute rules, but guidelines for how to use color, especially given how we all perceive the same colors differently.

Color is also a subject that goes far beyond what I can cover in this book. It deserves many books all to itself and if you truly want to learn how best to use color I suggest reading multiple books on the subject to begin what will be a lifelong practice and experimentation. The best way to learn how to use color is to use it and make your own judgments about what different colors and color combinations communicate.

My goal here is to present you with an overview of color fundamentals and talk a little about the cultural meaning of color. I'll leave you with some thoughts about how to explore color on your own as it's the only real way to gain a sense of how colors work together and influence each other.

Color Fundamentals—How We Describe Color

When light hits the surface of an object, some of the light is absorbed and some is reflected. What we see as color in the physical world comes from the reflected wavelengths of light. A blue surface is blue because it reflects wavelengths of light in the part of the visible spectrum that appear blue.

Our eyes perceive light and dark as well as color information through rods and cones, which each have a different function.

Rods are responsible for seeing in low light (scotopic vision) and

so are more sensitive to information about light and dark (luminance information). They also have low visual acuity, which makes them less useful for determining spatial relationships.

Fortunately, our cones are good at spatial acuity. Cones are more active when light is present (photopic vision) and they're responsible for sensing color information (chromatic information), particularly hue and saturation. The central fovea of your eye is mostly cones.

There are three types of cones, S-cones (blue), M-cones (green), and L-cones (red) for short, medium, and long wavelength. If you ever wondered why we see three primary colors, now you know it's because we have three types of cones.

Rods are more plentiful than cones. Overall the eye has close to twenty times as many rods as cones, which means our eyes are much more sensitive to the luminance component of color than the chromatic component. We're better at seeing light and dark than we are seeing specific colors.

We also have a tendency to disregard some chromatic information and, in fact, the details we see are mostly communicated through what we perceive about light and dark.

There are three primary ways in which we describe color.

- **Hue**—the quality of a color (red, blue, green, etc.).
- **Saturation**—the intensity or purity of a hue in relation to gray. More gray desaturates colors.
- **Luminance/Lightness**—a measure of how light or dark a

hue is.

Any wonder why this color model is referred to as HSL?

Hue is the quality of a color (red, blue, green, etc.) What hue we see is dependent on the wavelength of light being reflected from a surface or produced by a light source.

Saturation is the intensity or purity of a given hue in relation to gray. 100% saturation means there's no addition of gray to the hue and 0% saturation appears as a medium gray. The more saturated a color, the closer to 100%, the more vivid or bright it appears, while desaturated colors, closer to 0%, appear duller.

Luminance or lightness is a measure of how light or dark a hue is. 0% lightness results in black and 100% lightness results in white. In some color systems brightness or value is used instead of luminance or lightness. They aren't exactly the same, but all are some measure of how light or dark a hue is.

There are three additional terms used to describe color that I want to briefly mention, tint, tone, and shade.

- **Tint**—adding white to a color to make it appear lighter.
- **Shade**—adding black to a color to make it appear darker.
- **Tone**—adding gray to a color to desaturate it.

A true tint lightens a color by adding only white to it. A tint doesn't literally make a color brighter or lighter as far as light intensity is concerned, but the addition of white makes the color

appear lighter or rather paler. Tinted colors are also called pastels and they range from slightly lighter (in appearance) than the original color all the way to white

A shade is similar to a tint, except that black is added as opposed to white and a true shade is the addition of only black to a color. Again, it's not the light intensity that has changed, but the color's appearance. Where tints appears to lighten colors, shades appear to darken them and a shade can range from slightly darker in appearance than the original color all the way to black.

A tone sits in between and is the addition of gray and a true tone adds only gray. It has to be a pure gray, in other words only a mixture of black and white and no other color. Adding gray tones down the intensity (saturation) of a color, which in limited amounts can be more pleasing to the eye as it's more subtle and sophisticated than pure colors, which are often associated with children and childlike things. Tones range from appearing slightly desaturated as compared to the original color all the way to gray.

That all sounds scientific, but let me remind you again of the subjectivity of color. Because of a predominance of rods in our eyes, I mentioned we're more sensitive to luminance than either hue or saturation. Few people can even distinguish the difference in luminance across different hues. We're good at distinguishing light and dark in a single hue, but we're not good at comparing the luminance of one hue to another.

We also perceive the lightness of colors differently depending on how much light there is in general. During the day there's too much light for our rods so we make more use of cones.

Information from all three cone types is combined with limited information from our rods and the perceived luminance or lightness is dependent on both light specific information as well as information about the specific wavelength of the light we see.

At night, we become more dependent on our rods than our cones and the information we receive about colors has a greater component from luminance than hue or saturation.

In either case, the combination of the intensity of the light and the wavelength of the light leads to us seeing some wavelengths of light as brighter or darker than others and we perceive luminance differently depending on how much light there is in the overall environment.

The hue and saturation of an object also affects its luminance. If you keep the saturation of different hues constant and then convert the hues to grayscale, you'll discover that each shows a different amount of luminance. In other words each hue has a sort of intrinsic luminance level. Blue is the least luminant hue and yellow is the most luminant.

If you reduce the saturation of a pure color to 0%, the result is a medium gray or a 50% gray with 50% luminance. If a hue has a natural luminance above 50%, decreasing the saturation also decreases the luminance. On the other hand, if a hue has a natural luminance below 50%, the opposite happens and decreasing its saturation increases its luminance.

How saturated a hue appears also depends to a degree on what colors it's next to or near. A 50% saturated hue placed next to a

25% saturated hue will appear more vivid than when placed next to a 75% saturated hue.

When colors are side by side they interact with each other and the interaction changes our perception of them. This effect is called simultaneous contrast. Objects of a given color cast shadows with their complementary color. Red, for example, casts a somewhat green shadow. When a red object is placed against an object of another color, the second object will appear to have more green in it than it actually does.

Don't feel the need to memorize any of this. You aren't going to take measurements of the amount of saturation present or how much light is in the environment. You should, however, understand that colors are affected by their environment.

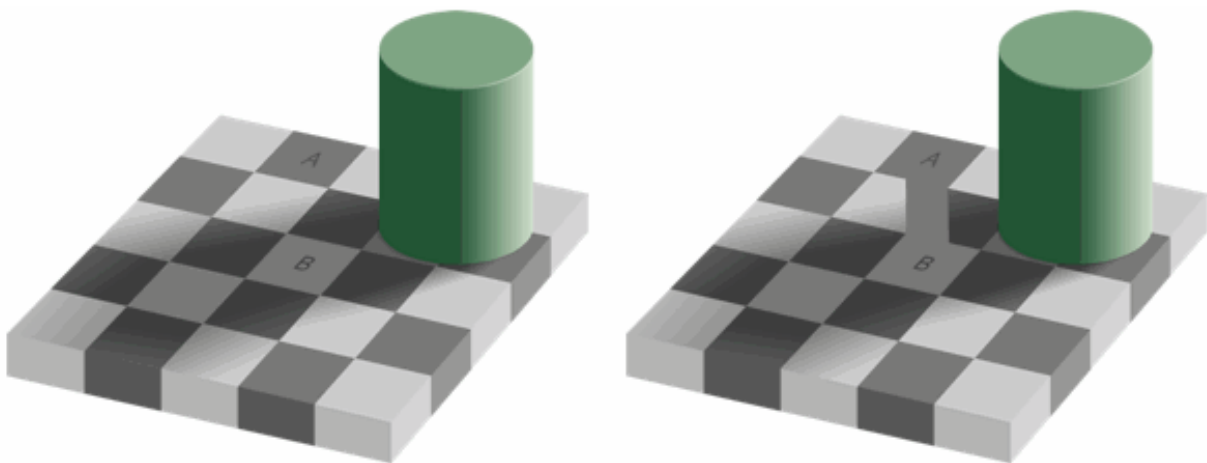


Figure 3.30: Squares A and B appear to be a different shade of gray (left), but are really the same exact shade (right).

Color Models

A color model is a mathematical framework to describe color, typically with three or four color components that are combined in various amounts to produce all other colors. The resulting set of colors from a given color model is its color space. It represents the full gamut of colors that can be produced by the specific model.

The term color system gets used interchangeably with both color model and color space, at least I've seen it used to mean either of the other two terms and have used it that way myself. Don't get too hung up on any of the terms though. Just know there's a term for the theory and one for the practical application of the theory.

At the start of this chapter I said the color we see comes from the reflected light off an object. That's one color model, but there are actually two dominant types of color models, additive color and subtractive color.

- **Additive color**—When we see color directly from something that produces its own light (computer monitor, tablet screen). In an additive model you start with complete darkness and add wavelengths of light.
- **Subtractive color**—When we see color reflected off a surface (physical world). In a subtractive model you generally start with white light in the environment and subtract wavelengths as they get absorbed by the object.

RGB (red, green, blue) is an additive color model, which is why we use it when designing for a screen from a device that produces its own light source. To create any other color in the model, we mix varying amounts of red, green, and blue.

Red—rgb(255,0,0)—#ff0000

Green—rgb(0,255,0)—#00ff00

Blue—rgb(0,0,255)—#0000ff

Both the rgb and hex notations for colors are composed of three components, each representing one of the primary colors of the model.

CMYK (cyan, magenta, yellow, black) is a subtractive system and it's used in print where we see reflected colors. Its colors are close to the primary blue, red, and yellow we learned about as kids. In theory mixing all three should lead to black, but due to the way ink works in the real world they don't and so a true black is added.

The gamut of colors, the color space, produced by the CMYK model is a little smaller than that produced by the RGB model and CMYK can't represent the brightness of RGB colors. Every device also has its own unique gamut based on the actual colors it can reproduce, which will be less than the gamut of human vision.

RGB and CMYK are the models, but we work with color spaces, the actual colors something can produce based on the model and there have been quite a few color spaces created over the years. Odds are whatever image or graphic editor you use, is set to use either the Adobe RGB or sRGB color spaces.

Both are based on the additive RGB model, but neither comes close to producing 100% of colors in the visible spectrum. The sRGB space can reproduce about 35% of all RGB colors and Adobe RGB can produce about 50%.

I won't try to talk about all the different color spaces that exist, but I will mention a couple.

The Munsell Color System

Albert Henry Munsell was a 19th century American artist and professor of art and he wanted to find a way to organize color in a meaningful and practical way. His system divides color into three dimensions, which may look familiar.

- **Hue**—the quality of the color
- **Chroma**—the purity of the color
- **Value**—the lightness of the color

You might recognize these as hue, saturation, and luminance or lightness. Munsell didn't quite measure them the same way as I described above though. For example, he used five principle hues (red, yellow, green, blue, and purple) instead of three.

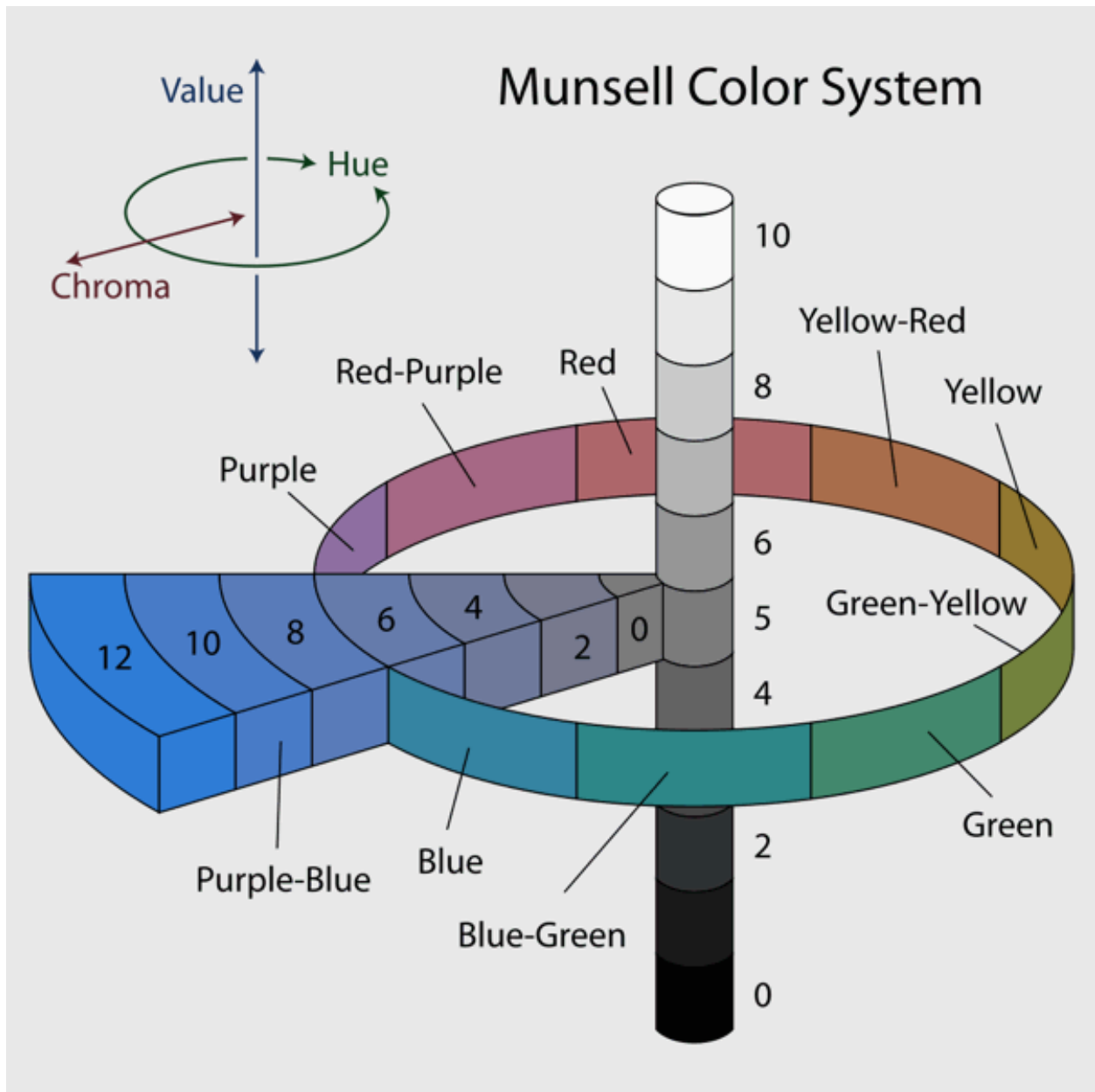


Figure 3.31: The Munsell Color System (image: Jacob Rus https://en.wikipedia.org/wiki/Munsell_color_system).

1931 CIE Color Space

In 1931, the International Commission on Illumination (CIE) developed a color space that came to be known as the 1931 CIE color space. The space has been revised since 1931 and it's still in

use. The idea behind the space was to map all the different colors that an average person can perceive.

To give you an idea how different color spaces can be, take a look at **figure 3.32**, which shows the CIE color space (the outer contours), and what parts of it the Adobe RGB and sRB color spaces can each reproduce.

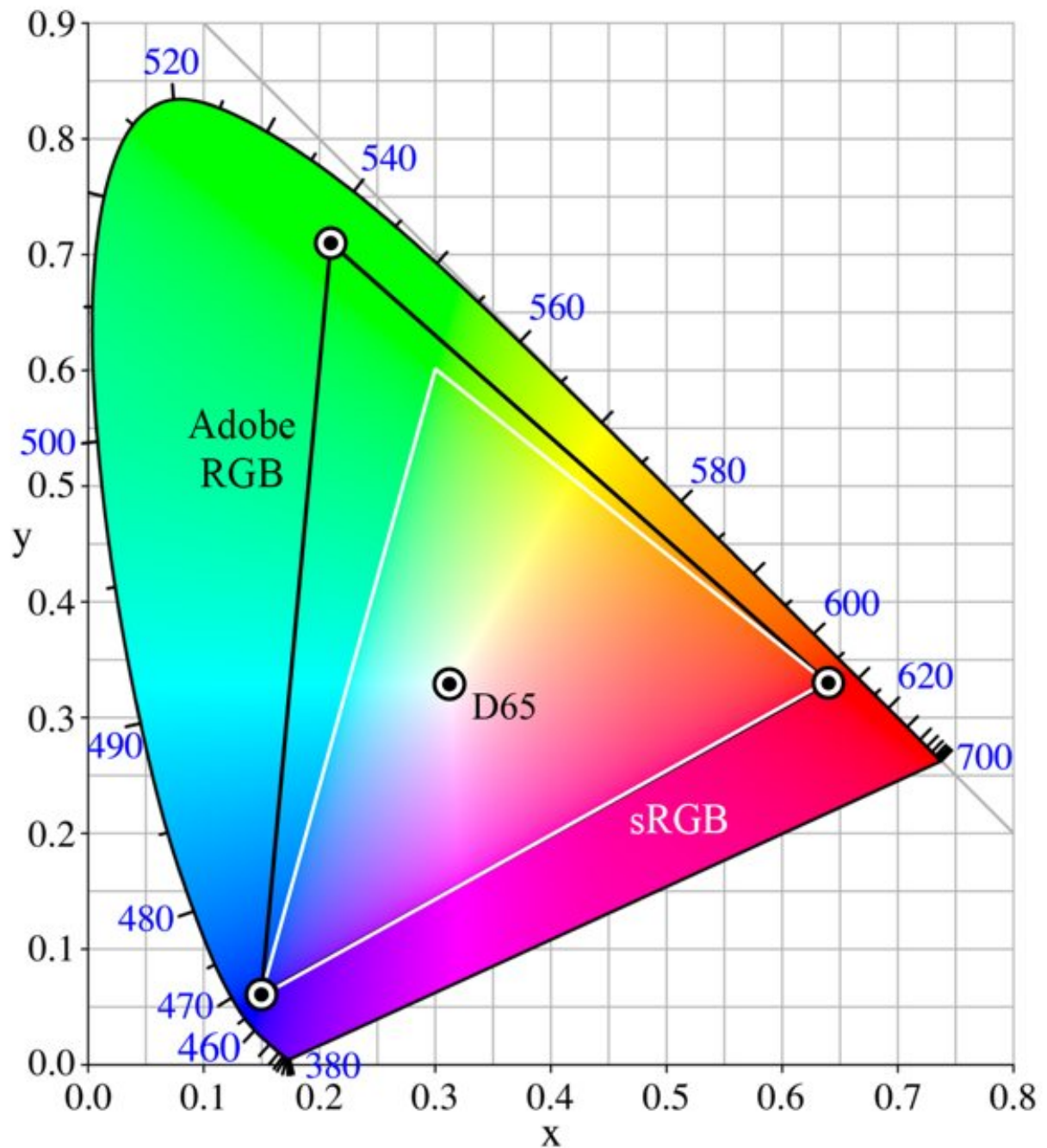


Figure 3.32: The 1931 CIE color space with Adobe RGB and sRGB color gamuts contained inside (image: M. Bearnstein https://en.wikipedia.org/wiki/File:CIExy1931_AdobeRGB_vs_sRGB.png).

In 1960, the CIE attempted to correct for some deficiencies in the 1931 color space, which ultimately led to the CIE L^*A^*B (CIELAB)

color space in 1976. CIELAB is device independent and it uses one channel for luminance and two additional channels for color. One channel extends from green to red and the other from blue to yellow. I won't say any more, but I thought I'd mention LAB, since it's possibly an option in your image editor of choice.

HSL, HSB, and HSV

In addition to HSL, you might have seen HSB and HSV and wondered what differences, if any, existed between them. Both are similar to HSL as I described it earlier, but they aren't exactly the same.

In the HSB model, hue is the quality of the color. Saturation measures the intensity of a color from 0% (neutral gray) to 100% (completely saturated hue). Brightness is the amount of illumination, from 0% (no light) to 100% (full light.). That probably makes it sound exactly like HSL, but there's an important difference.

The B in HSB is a measure of how much light there is in the color. The L in HSL is a measure of how much white there is in the color. The saturation in each is scaled to fit the definition of brightness or lightness.

HSV is the same as HSB, The V (value) has the same meaning as the B (brightness) in HSB.

They all represent the same basic thing, but do understand that HSB and HSL will give you different values for the same color,

based on the different definitions of brightness and lightness.

The Cultural Meaning of Colors

An individual color can communicate meaning, however you have to take all talk of color meaning with a grain of salt. There's no substantial evidence to indicate a universal meaning for different colors. Most of the meaning we get from color is culturally learned. In other words, the meaning one color communicates isn't necessarily the same for all people.

For example, in western cultures white is a color used to symbolize purity and it's commonly used in weddings. In some Asian cultures white is a symbol for death and it's commonly used in funerals. Two very different messages depending on where someone lives. The point is to understand your audience and their culture to truly understand what the colors you use might say to them and not to seek a universal meaning for individual colors.

With that said let's talk about the meaning of color, though be aware this will come from a mostly western point of view and may or may not apply to the specifics of any given design or audience.



Figure 3.33: Red, green, and blue squares, the primary colors in the RGB system.

Red—is the color of fire and blood. It carries the most visual weight of all colors and advances the most into the foreground of a composition. Red is often used to attract attention and is commonly used to highlight elements. Red’s ability to attract attention isn’t culturally learned. This is universal and it comes from the way our eyes work.

Words we might associated with red include: energy, war, danger, strength, power, determination, confidence, courage, vitality, passion, desire, and love. Red can enhance metabolism, increase respiration, raise blood pressure, and increase the odds of taking impulsive action.

Green—is the color associated with nature and it symbolizes growth, hope, and fertility. It can evoke feelings of financial wealth in countries with green money like the United States.

Words we might associate with green include: healing, stability, endurance, harmony, safety, life, and well being. It can sometimes

signify a lack of experience and is sometimes used to indicate the safety of drugs and medical products in advertising. It's often associated with environmental concerns, given its connection to nature.

Blue—is the color of the sky and sea which we see as ever present. Blue has the opposite effect of red. It slows metabolism, breathing, and heart rate. It creates a calming effect and is seen as masculine. It's often overused for corporate identity due to an association with trust.

Words we might associate with blue include: trust, loyalty, wisdom, intelligence, expertise, confidence, stability, and calm. Blue can suppress appetite and is considered beneficial to the health of both body and mind.



Figure 3.34: Yellow, orange, and purple, the secondary colors in the RGB system.

Yellow—is the color of the sun. Bright yellow attracts attention, but it can do so in a distracting way. Yellow produces a warming effect and evokes pleasant feelings. Be careful with yellow as

shades of it can become dingy and less pleasing to the eye.

Words we might associate with yellow include: joy, happiness, cheerfulness, wisdom, intellectual energy. Yellow stimulates mental energy and helps generate muscle energy.

Orange—combines the energy of red and the happiness of yellow. It's not as aggressive as red. It can lead to thoughts of healthy food. Think citrus and tropical. Orange can increase appetite.

Words we might associate with orange include: joy, sunshine, enthusiasm, happiness, fascination, creativity, determination, attraction, success, encouragement, stimulation, and strength. Orange can evoke thoughts of the fall and harvest.

Purple—combines the stability of blue and the energy of red. It can evoke feelings of wealth and extravagance and is the color of royalty. Purple can symbolize power, nobility, luxury, and ambition.

Words we might associate with purple include: wisdom, dignity, independence, creativity, mystery, and magic. Purple tends to be seen as feminine and is a popular color with children. It occurs less frequently in nature than other colors and can be seen as artificial. In Catholic cultures it represents death and in Islamic cultures it's associated with prostitution.



Figure 3.35: Neutrals, black, gray, and brown.

White—is associated with light, goodness, innocence, purity, virginity, cleanliness, and safety. Keep in mind these are associations for western cultures. They might have opposite associations in eastern cultures.

Black—is the color of night. It's seen as formal and elegant and brings feelings of fear and the unknown. Power, death, evil, and mystery might also be associated with black. Again, these are all culturally learned and can change in the future as society changes.

Gray—is somewhere between white and black. It's a neutral color that evokes non-invasive feelings, however it can make one think of sorrow, detachment, and isolation. Gray is responsible, conservative, and practical. It's secure, mature, and dependable.

Gray can be used to reduce the intensity of other colors and to emphasize a willingness to comply. People who prefer gray are sometimes thought to be narrow-minded or lone wolf types.

Brown—is the color of the earth and tends to blend into the background. Brown symbolizes material things, order, and convention. It's connection to the earth gives it stability and it can convey solid and wholesome feelings.

Once again take much of the above with a grain of salt. It's likely many people will associate blue with the sky and ocean since we're all familiar with both, however not all countries use green money and so the association of wealth may not be there.

One way you can better understand what colors might communicate is to think of examples in the real world where a color is common. Think about the associations you have with the object and apply them to the color where reasonable. You also want to know what you can about the expected audience for a design in order to understand how that audience might interpret color.

Aspects of Color

Just because much of the meaning communicated by color is cultural, not all of it will be. I mentioned in the previous section that red carries the most visual weight. I'll talk more about visual weight later in this chapter. For now, know that it's a measure of how much something attracts the eye. Red attracts the eye more than other colors and this attraction isn't cultural. Red is simply more attention getting than another color like green.

People are physically, psychologically, and socially influenced by color. It's been found to have connections to health and it can help set the atmosphere and context for your design.



Figure 3.36: A page from my site with its current color scheme (left) and a different color scheme (right). Note the different mood that comes about solely with a change in color.

Something else to note is that we rarely use color in isolation. We use colors in combination with other colors where the characteristics of each influences the other and it's the combination that impacts the viewer.

The term aspects of color refers to combinations of hues, saturation, and lightness values that have predictable characteristics and tend to lead to similar responses regardless of culture.

Let's consider the following four different aspects of color

- Light and dark
- Pale and bright
- Hot and cold
- Neutrals

Light and Dark



Figure 3.37: Lighter colors (left) and darker colors (right).

Lighter and darker colors are produced from different values of luminance. Light colors (above 50% lightness) will appear more white and dark colors (below 50% lightness) will appear more black.

As two colors become lighter, the contrast between them decreases. Similarly as two colors become darker, the contrast between them also decreases. Because contrast is a very important design principle, you want to balance lighter and darker colors with each other.

Lighter colors appear paler and even transparent at times. They tend to be associated with more positive feelings (at least in western cultures). Darker colors add drama and mood to a composition and at times can be used as neutrals. They tend to be associated with more negative feelings (again, at least in western cultures).

Either light or dark colors can be used as a background or accent color, though not at the same time. If your background is light, you'll want to use darker colors as accents and vice versa.

Bright and Pale



Figure 3.38: Brighter colors (left) and paler colors (right).

Pale and bright colors are based on saturation. Brighter colors are more saturated and are a purer form of a given hue. Bright colors tend to carry more visual weight and so attract attention more than pale colors. However, too many bright colors in a palette can be irritating and annoying as they all compete for attention, which could reduce the ability of the viewer to comprehend what you intend to communicate.

Paler colors are hues with more than 65% white added (tints). They're typically called pastels and they come with their own specific cultural associations. They tend to be seen as gentle and approachable and they're sometimes thought of as feminine or even childlike. Paler colors tend to be associated with weddings

and newborns. They make for good accents even against a white background and they can be used to highlight subtle color relationships.

Hot and Cold (Warm and Cool)

Colors have temperatures or a perceived warmth or coolness associated with them.



Figure 3.39: Warmer colors (left) and cooler colors (right).

Warm colors (red, orange, yellow) are the colors of fire and they radiate warmth. They're associated with passion, energy, and impulsiveness and are generally seen as more dynamic and active. They make us feel cozy and comfortable. The hottest colors (red being the hottest) draw attention and advance into the foreground of a composition, especially when paired with a cooler color.

Cool colors (green, blue, violet) are the colors of water. They're associated with calm, trust, and professionalism and tend to be seen as more dependable. They can also make us feel sad and

melancholy. Cool colors recede into the background, especially when paired with a warm color.

When I talked about depth in the last chapter, I mentioned that warm and cool colors can be used to separate figure and ground in a composition. It's their natural tendency to advance or recede that allows them to be used this way.

You can see this in **figure 3.40**. On the left the small red rectangle seems to advance into the foreground and sit above the blue background. On the right the colors are reversed and the small blue rectangle appears to be a cutout inside the red rectangle.

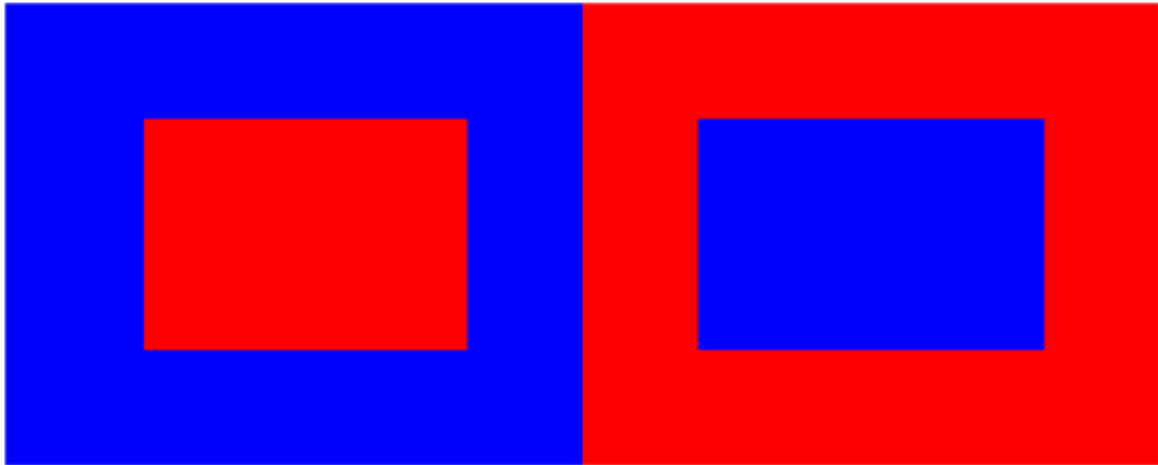


Figure 3.40: Warm red advances into foreground against a cool blue background.

You can make a cool color appear warmer by adding some red to it and conversely you can make a warm color cooler by adding some blue to it.

The demarcation between warm and cool colors falls somewhere between yellow and green at one end of the spectrum and violet and red on the other. Green and violet don't fall neatly into either temperature. They can take on different properties based on the colors around them. Green in a field of red will appear cooler and in a field of blue will feel warmer as seen in **figure 3.41**.

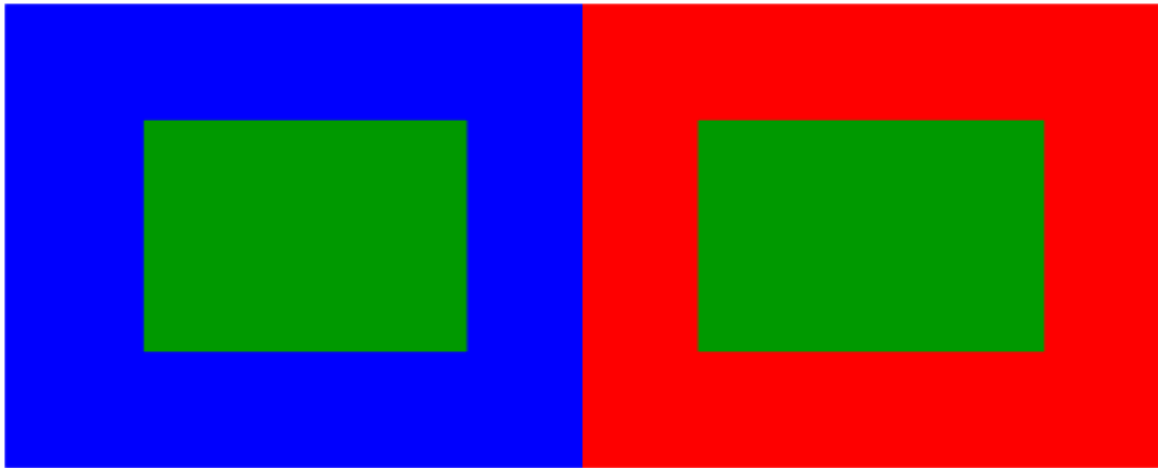


Figure 3.41: Green is generally a cool color, but at some point in its spectrum it becomes warm. Here on the left when compared to a cooler blue, the green rectangle appears warmer and advances. On the right it looks cool compared to the warm red and recedes.

You can enhance the message of an element by setting it against a color that enhances the natural temperature of the element's color. If you want an element to appear warmer and richer, you can place it against a cooler color. If you want an element to seem more trustworthy and dependable, you might try setting it against a warmer color.

The effectiveness of secondary colors in a composition can often

depend on how warm or cool they are. A small amount of warm color on a cool background will work best given the advancing and receding properties of each. A cool color on a warm background can attract attention and create tension since it works against the natural temperatures of each.

Neutral Colors



Figure 3.42: A variety of neutral colors.

Neutral colors are those that have a large percentage of brown or gray. They make for good all-purpose tones of color and are often an overlooked and underutilized category of color.

Neutral colors tend to be freer from cultural interpretation and distractions, hence the neutral description. Less distraction might suggest they're a good fit for things like navigation, since less distraction is usually helpful when choosing where to go next.

A neutral palette can work well when a project is targeted toward a sophisticated audience or where the design is trying to communicate feelings of calm and peacefulness. They work well

as secondary or background colors with brighter, more intense, and more saturated colors used as accents.

The Color Wheel

A color wheel is an abstract organization of color hues arranged in a circle or wheel. To create a color wheel you start with primary colors (of any color model) as corners of an equilateral triangle. You then add another triangle 180 degrees from the first with secondary colors. A triangle with tertiary colors is added and so on.

Figures 3.43 through 3.46 show the creation of a color wheel using an additive model where red, green, and blue are the primary colors. You could also create a subtractive color wheel using red, yellow, and blue as primary colors.

You begin with an equilateral triangle and place your primary colors at each of the triangle's points.

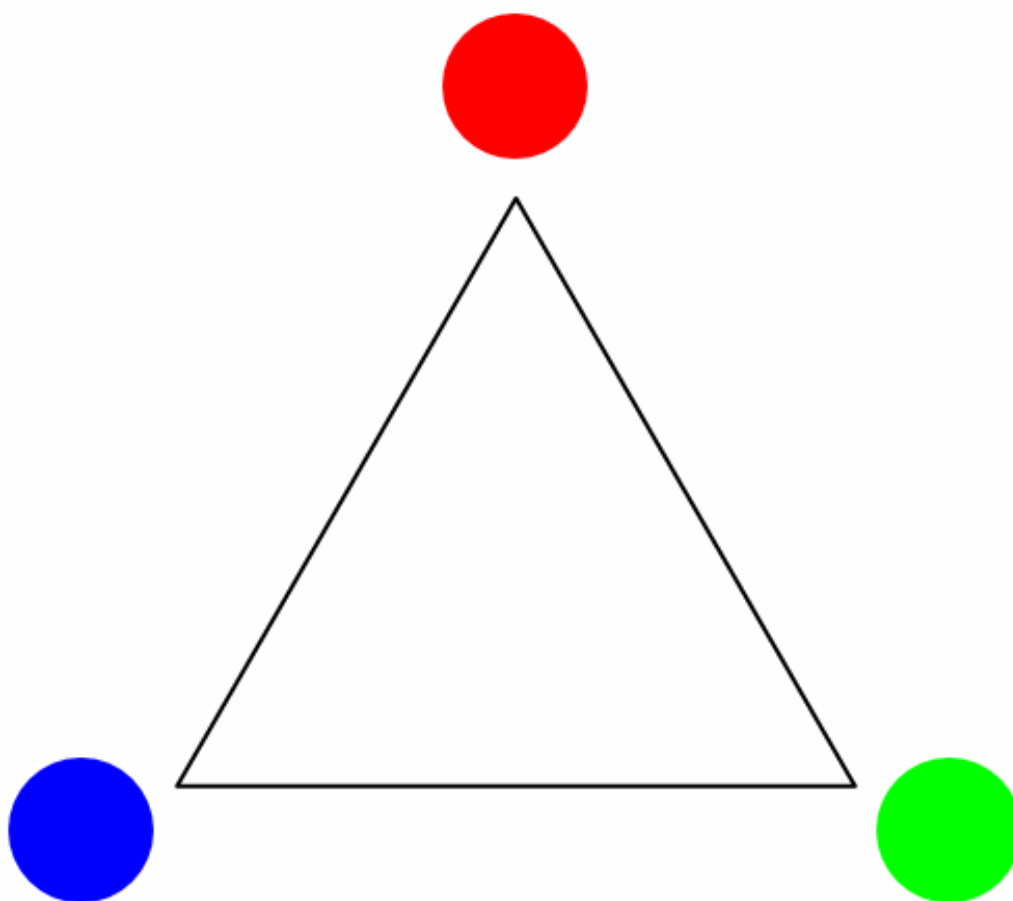


Figure 3.43: Primary colors in the RGB color system.

Add another equilateral triangle flipped vertically and add the secondary colors at each of the three new points. Add the secondary color that results from mixing two primary colors in between those two primary colors.

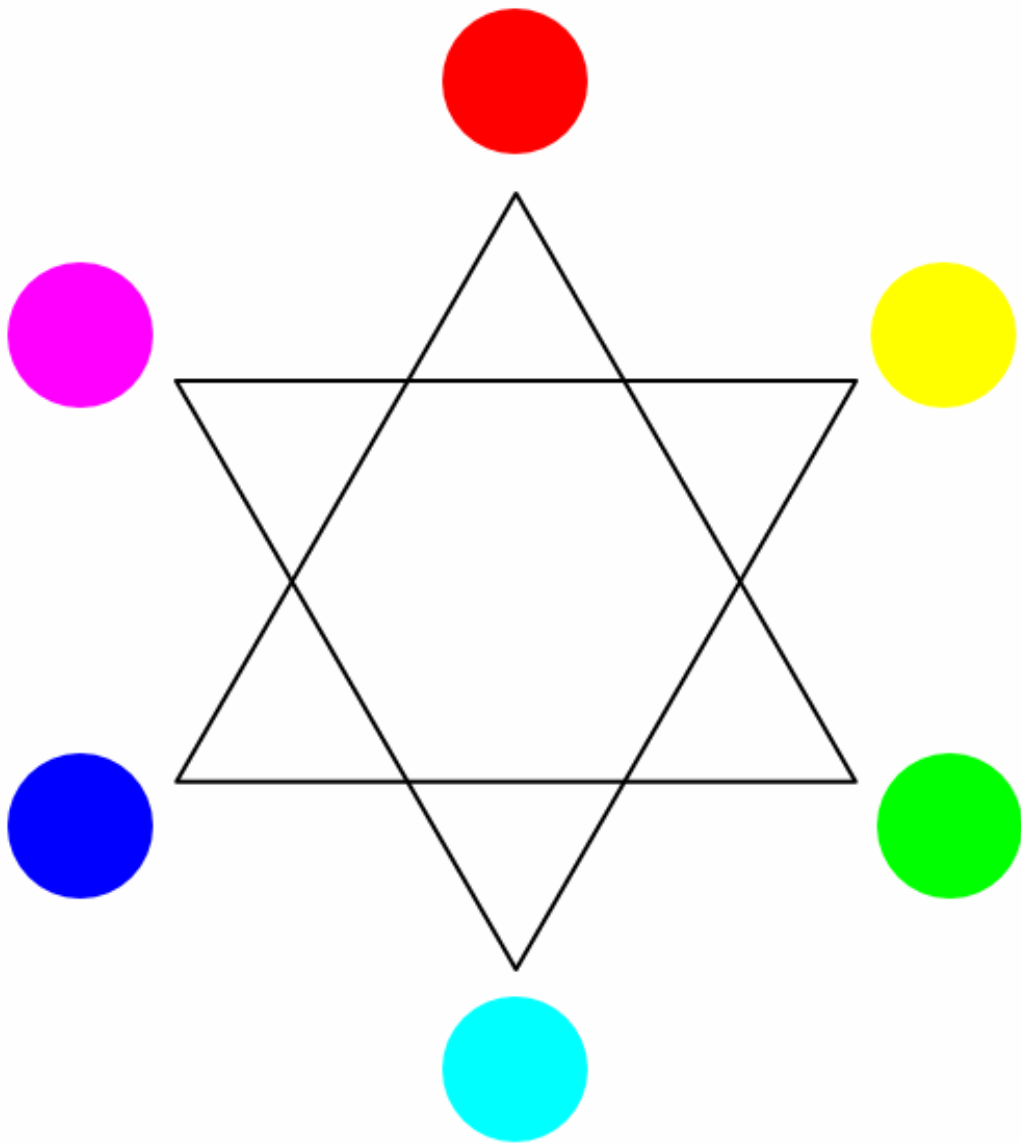


Figure 3.44: Primary and secondary colors in the RGB color system.

Add the tertiary colors by mixing the primary and secondary colors at neighboring points.

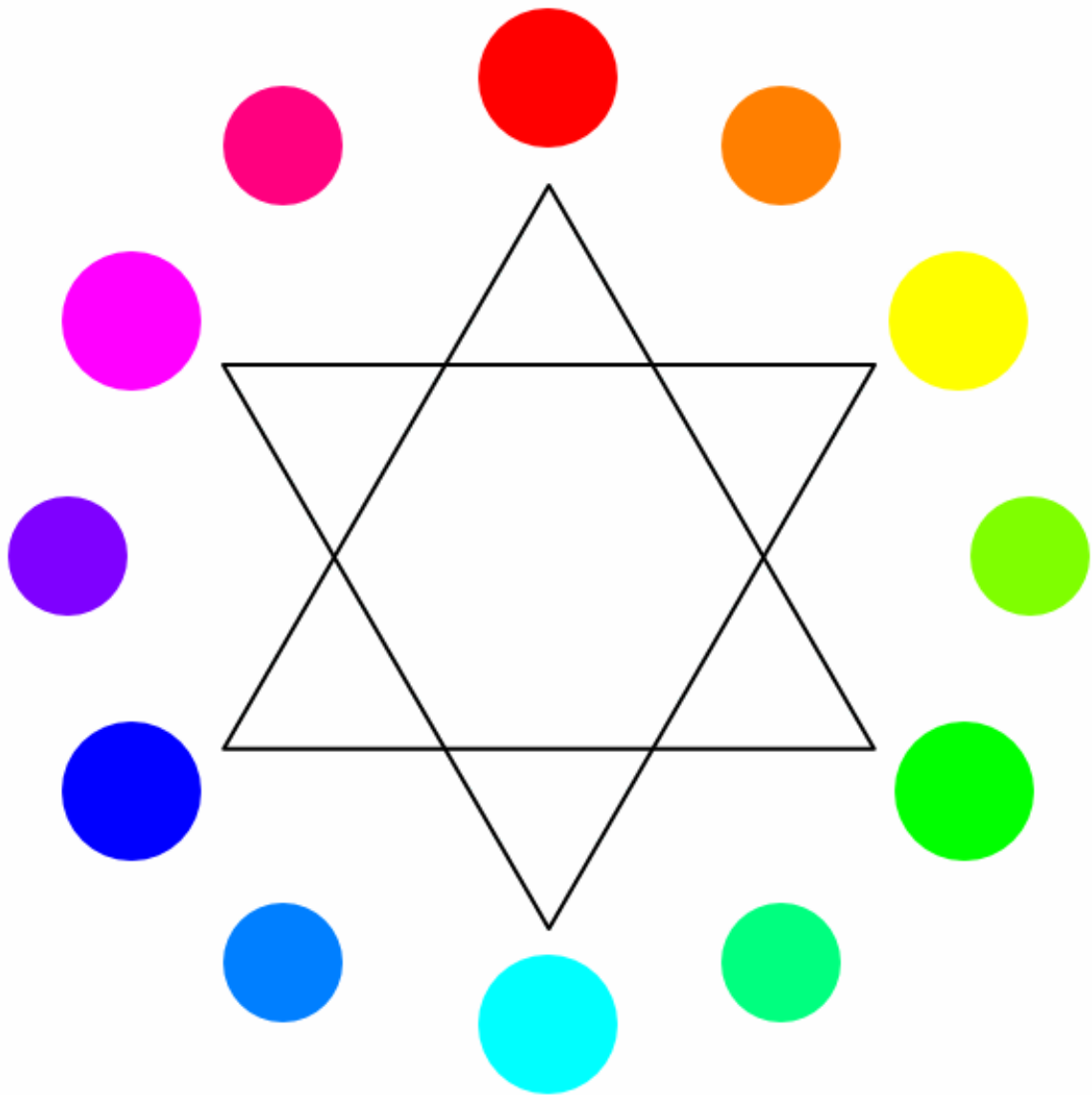


Figure 3.45: Primary, secondary, and tertiary colors in the RGB color system.

Finally, add a black, white, or gray to the center.

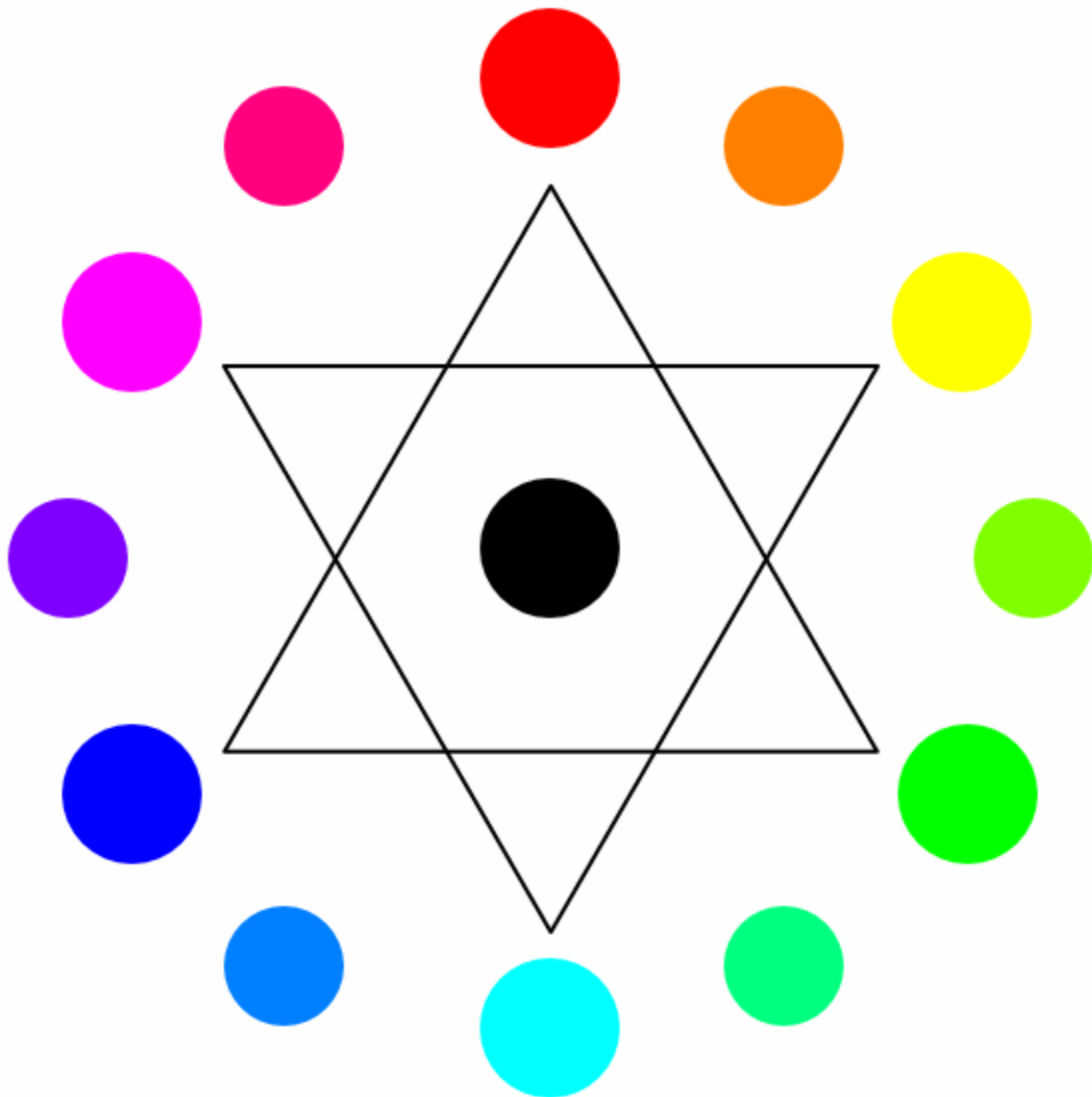


Figure 3.46: Primary, secondary, and tertiary colors, with black at the center.

That probably doesn't look like any color wheel you've actually used, as it only shows so many colors, but the process would continue. You'd keep mixing colors and adding new ones between them and you'd mix the colors at the outside of the circle with the

color in the middle to create a range of tones, tints, and shades of hues.

You might step things toward the center such as these 1874 colors wheels do.

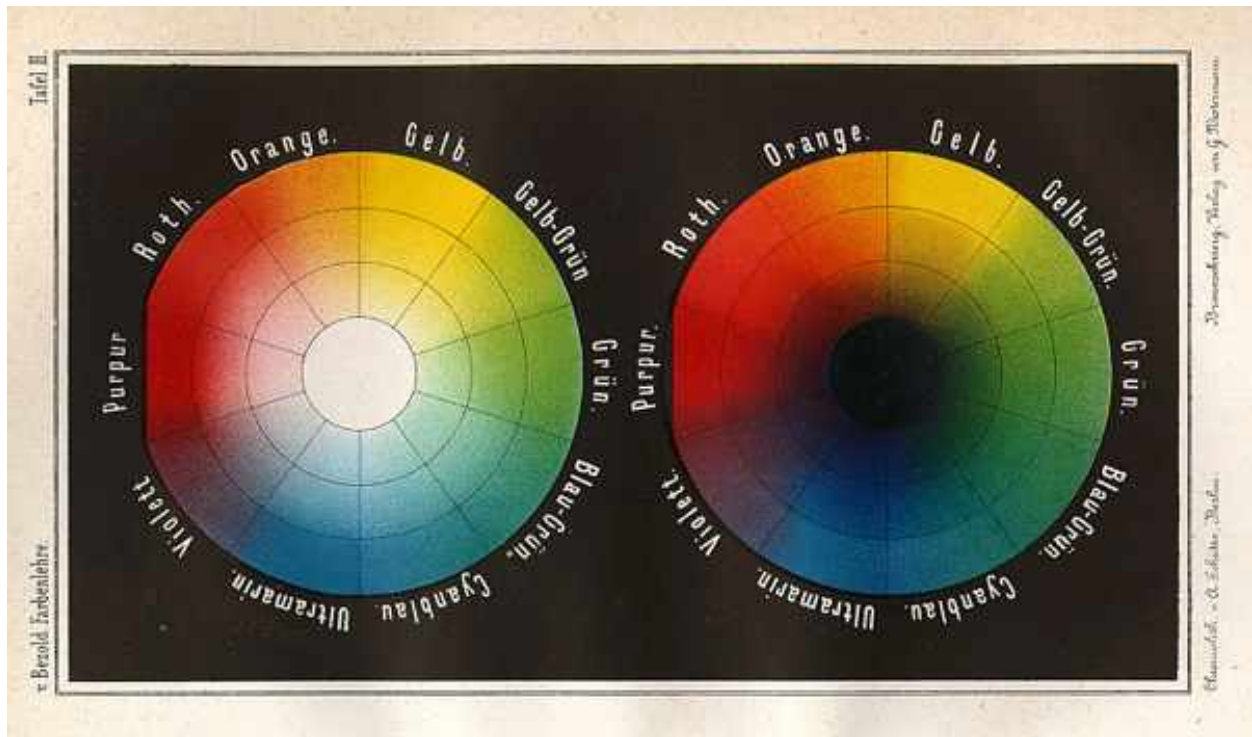


Figure 3.47: Wilhelm von Bezold's 1874 Farbentafel (image Dick Lyon https://en.wikipedia.org/wiki/Color_wheel).

Or you might have more continuous changes to the colors as this screenshot of the color picker in Pixelmator with a white center for a color wheel of tints.

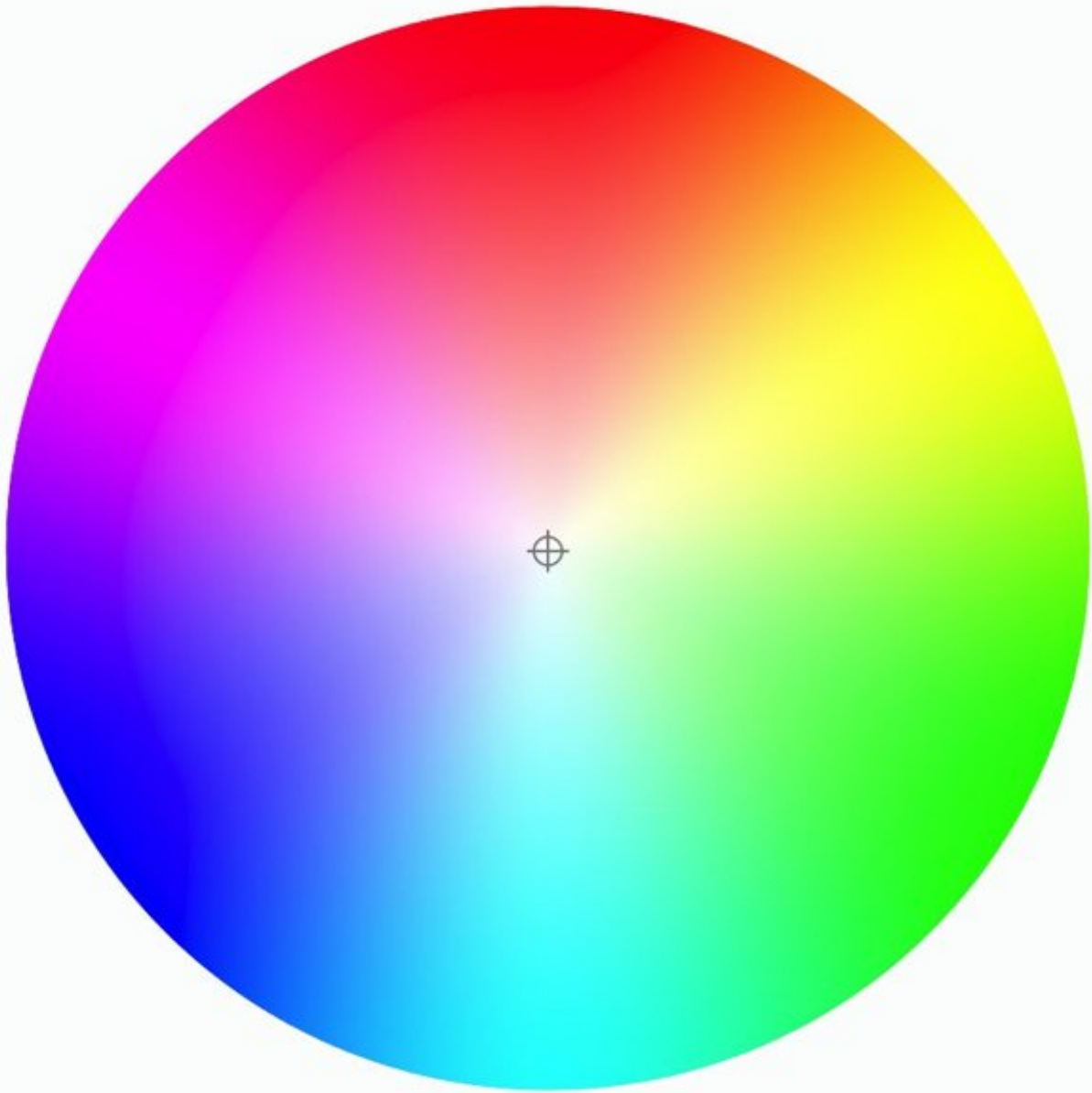


Figure 3.48: Color wheel captured inside the color picker in Pixelmator.

That's how you create them, though I suspect you'll continue to rely on those you have in color pickers and other color tools. The reason for using color wheels is that they show relationships between different colors in the spectrum. For example, warm colors are located on one half of the wheel while cool colors are located on the other half. Color wheel relationships can help you

choose which colors to use in combination so you can work with a color scheme instead of a few randomly chosen colors.

Color Schemes

I've mentioned a few times now that colors affect one another when seen together. Gray for example reduces the intensity of colors around it. Green can appear either cooler or warmer depending on the colors near it.

Color schemes are logical combinations of color based on their relative positions on the color wheel.

When choosing a color scheme you'll generally start with a dominant color. This might be a color in the company logo or it could be based on some cultural meaning you wish to communicate. You'll then want to choose other colors to go with the first. One way to help you choose additional colors is to choose them based on a color scheme.

Monochromatic color schemes—are based on different values of a single color. The hue remains the same, but the saturation and lightness vary. Monochromatic color schemes are clean and elegant and can be effective for establishing an overall mood based on the associations with the chosen hue.



Figure 3.49: A monochromatic color scheme using shades of red.

Monochromatic color schemes tend to produce a soothing effect and they're usually easy on the eye, especially when blue or green is the hue. Because they're based on a single color they tend to be unified and harmonious. They can however become monotonous due to the lack of different hues used. To combat the monotony the hues can be mixed with pure white, pure black, or both to create additional variation.

Analogous color schemes—are based on colors adjacent to each other on the color wheel. Analogous color schemes can be similar to monochromatic color schemes as they don't stray far from the base color. However, they do offer a more nuanced scheme, since more than one hue is present. This reduces the potential for monotony.

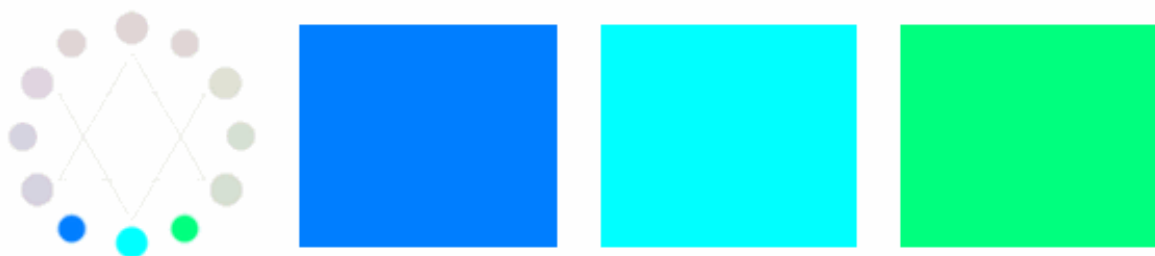


Figure 3.50: An analogous color scheme with cyan as the dominant color.

Analogous color schemes are often found in nature and are generally harmonious and pleasing to look at. Typically when working with this scheme you'll choose one color (the middle one) to be the dominant color, a second to support the main color, and third color for accents. Shades, tints, and tones of any of the hues can also be used to add interest and help provide contrast.

Complementary color schemes—are based on colors opposite each other on the color wheel. They tend to work best when a warm color is used against a cool one. This creates a high level of contrast and can lead to a dramatic look.



Figure 3.51: Complementary colors, red and cyan.

The contrast between colors intensifies them and the scheme becomes vibrant and attention getting. They can, however, become too vibrant and jarring. The colors can actually appear to vibrate on the screen if they're too vibrant. This is bad for text, especially when colors are used at full saturation. The use of different tones of contrasting colors helps lessen these negative effects.

Triadic color schemes—are created from three colors equally spaced around the color wheel. They contain strong visual contrast, while still being harmonious. They present a richness of color and have a certain stability due to the balance of each color in the triad around the color wheel.

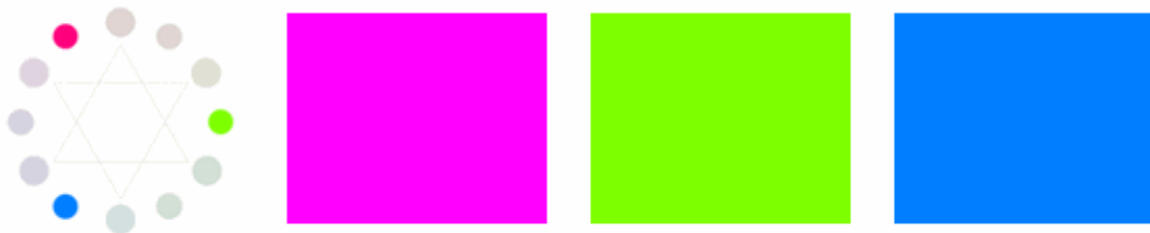


Figure 3.52: A triadic color scheme of tertiary colors.

Triadic color schemes can be vibrant even when the colors are desaturated, though not as jarring as complementary colors might become. The relationship between colors in the triad are simple

and can be dynamic. The danger is when used poorly they can come across as garish. When using this scheme in a design it's best to choose one color to be dominant and then use the other two colors as accents.

Split Complementary color schemes—are created by choosing one color and then two more colors that are adjacent to the complementary of the initial color. This scheme creates high contrast without the tension of the complementary color scheme.



Figure 3.53: A split complementary color scheme made from red and the colors adjacent to cyan.

A split complementary scheme can be hard to harmonize, but it offers a good choice for beginners as it's also difficult to mess up. It has more variety than a complimentary scheme without being as vibrant and attention grabbing.

Tetradic (Quadratic) color schemes—are created by choosing colors at the corners of a rectangle inscribed on the color wheel. They're more varied than split complementary color

schemes though less vibrant. They make for a rich and varied scheme.



Figure 3.54: A tetradic color scheme from tertiary colors.

Tetradic color schemes can also be hard to harmonize and they may look unbalanced. You should especially be careful with the balance between warm and cool colors. Choose one color to be dominant and use the other colors in a supporting and subdued way.

Black, White, Gray, and Neutral

You can, and should, add neutral and accented neutral colors to any of the schemes above. Neutral colors (black, white, gray, and brown) are those colors not found on the color wheel. Accented neutrals include these neutral colors and also include different tones of brown.

Blacks and whites in a color scheme will come across as cool colors. Browns will come across as warm. Grays can be either

warm or cool depending on the surrounding colors. All can be used to add greater variety to a scheme without worry that the additional colors will clash.

A final thought about color schemes. When choosing a color palette keep colors to a few. You want enough to be able to offer contrast, but not so many to lack similarity. Five colors is a good max as a rule of thumb and fewer is probably better. You can certainly use more, but each new color is that much more difficult to use effectively.

Interaction of Color

I started this section on color with a quote by Josef Albers about the subjectivity of color. All the color theory, the fundamental qualities of color, the different color models and color schemes and color aspects are great, but none of it helps you work with color as much as it might seem.

Theory is idealized and the real world isn't. I've mentioned throughout this section that colors affect one another. One color placed near another will change how we see the first color as will the intensity of the surrounding light

This is not to say you should ignore everything about color theory, but it is to say that the best way to understand color and learn how to use it in a design is to practice working with color. You have to use color and see how they make you feel in isolation and what effects they have on each other when used in combination.

If you have an iPad, Yale university turned Josef Albers book, *Interaction of Color*, into an iPad app (<http://www.albersfoundation.org/teaching/josef-albers/interaction-of-color/ipad-app/>). I think the original edition of the book is out of print or very expensive if it is still in print. It contains a lot of color plates to show the different relationships that Albers was trying to highlight. There are also revised paperback editions. These generally don't come with all the color plates from the original, but you still get the exercises Albers had his classes practice.

If you have an iPad I highly recommend the app. If you don't, it's worth the \$10 or so for the paperback. In either case the learning is on you. The book isn't one that tells you this means that. It's a book that provides all sorts of exercises for seeing how different colors affect one another.

Whether you get the app or whatever version of the book you can find or you completely ignore them, you do need to practice working with color if you want to use it most effectively. The only way to ultimately know how colors work together is to look at them together and make your own judgments.

Building up from Grayscale

Toward the start of this section on color, I talked about rods and cones and said that rods are sensitive to light and dark and given that we have twenty times as many rods and cons, we're better at distinguishing light and dark than we are either hue or saturation.

One way to gain skill working with color is to temporarily forget about its hue and saturation components and focus solely on luminance or value. Work for a time with black, white, and gray, and nothing else. Learn to work with light and dark alone first.

It's a trick of learning. When a subject is broad with lots of variables, find a way to hold most of those variables constant and work on others one at a time. Begin your practice with color by eliminating the chromatic information, in other words hold it constant, and practice with luminance or value until you feel comfortable working with it.

Then pick a single hue and work in monochrome. You'll already have a handle on light and dark at this point and now you can vary the saturation and get better working with it too.

When you're ready add the hue component to your practice. Try working with the different aspects of color I presented earlier and slowly build up your skill with different hues.

I think you'll find this method of holding most things constant to work on one component of color at a time an easier entry into working with color and the method works for pretty much anything you want to learn when it feels overwhelming.

Color and Accessibility

There's another reason for working with light and dark before saturation and hue and that's accessibility.

A large number of people have some form of color blindness and may not be able to distinguish between two different hues like red and green. You need to make sure hues are not the only indicators of difference between two elements that need to look different. Make sure something other than hue is different.

Since we are better at recognizing light and dark, it makes sense to use light and dark to show differences. It's not the only way to show differences between colors, but it's a very good way.

Make your red element dark red and your green element light green or vice versa. While someone with red-green colorblindness may not be able to tell that one element is red and another green, that person can tell that one is light and one is dark.

How do you know when you've made the difference between light and dark in elements enough? There are formulas to isolate the luminance from different colors and another formula called the contrast ratio that uses luminance values in its calculation. However, no one wants to make all those calculations and fortunately you don't have to.

There are plenty of tools online that will compare two colors and let you know if there's enough contrast between them. I've listed a few in the reference section toward the end of the book.

Another option is to run your entire design through a grayscale tool to strip out the chromatic information in your design and convert it to grayscale. Most browsers have extensions that will

convert web pages to grayscale for you.



Figure 3.55: My site in grayscale. Even without color headings are still clear as are links which are italicized and of lighter value than the main text.

Even though color has a lot of benefits, your design shouldn't require it to work. If your design was stripped of color and rendered in grayscale it should still function well and be aesthetically pleasing. Like patterns and textures, color works in a supporting role, however color can go a long way in setting the atmosphere for your design.

It's one of the first things people will notice about your design and it will likely go a long way in determining how visitors to your site feel about the aesthetics of your design. On the other hand using colors that don't work well together or using too many could drive people away before they see past your color palette.

Direction and Movement

Two related attributes of design elements are direction and movement. Direction implies movement and movement implies direction. Both help lead the eye from one part of a design to another.

When talking about lines and line-like elements, I said the fundamental characteristic or function of a line was to impart direction. Even earlier I mentioned direction as part of saccadic eye movement. Fixate and move. Fixate and move.

The general idea with direction and movement is to get the eye to look somewhere else, though direction alone can come with potential meaning.

Direction

There are three basic directions that can be present in a composition.

- **Horizontal**—suggests calmness, stability and tranquility.
- **Vertical**—suggests balance, formality and alertness.
- **Diagonal**—suggests movement and action.

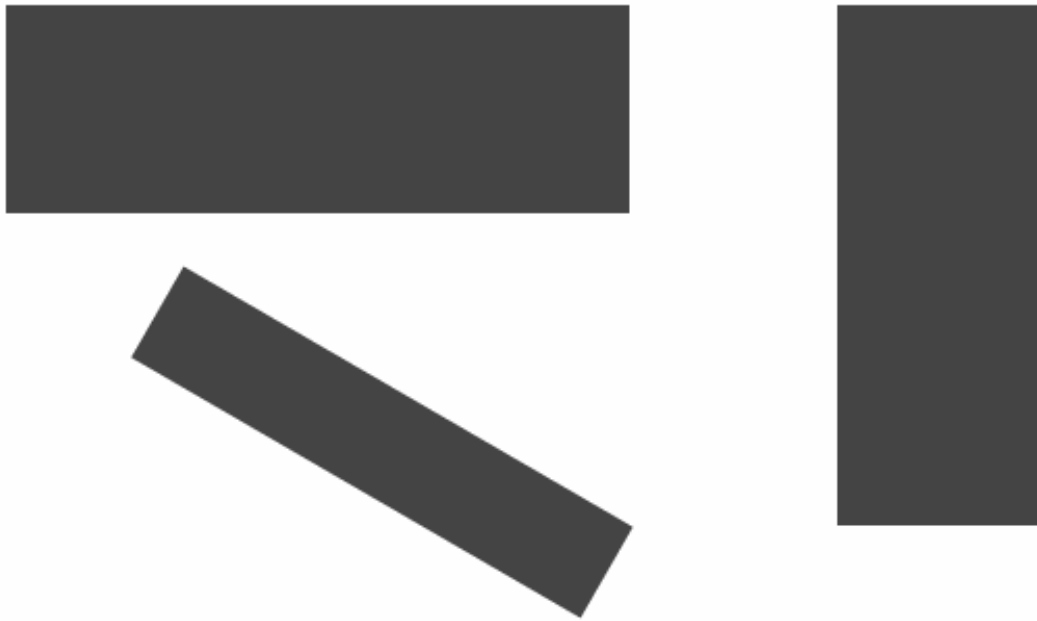


Figure 3.56: Three shapes indicating horizontal, vertical, and diagonal directions.

Figure 3.56, shows three line-like shapes one in each of the three directions, but lines and line-like elements are only one way to show direction. Direction exists:

- Through the orientation and shape of elements.
- Where people in images look.
- Where figures and objects in images appear to move.
- Through scale that creates perspective.
- Through arrows and other pointing devices.



Figure 3.57: Direction indicated by eye gaze, an arrow, and perceived movement.

A composition will usually have a dominant direction based on the direction of the majority of its elements, which can help set a general atmosphere. For example, a composition in which the dominant direction is horizontal can generate an impression of being stable and earth bound, while one with a vertical direction can come across as more dynamic.



Figure 3.58: Composition with horizontal direction (top left), vertical direction (top right), diagonal direction (bottom left) and a mix of horizontal and vertical direction (bottom right).

It is possible for a composition to have no dominant direction. The direction of different elements might be mixed and balance each other out in a way where none stands out above the others. When this occurs the viewer is able to and will impose his or her own dominant direction on the composition.

Since the viewer can impose a dominant direction with associations you might not intend, it makes sense to think about and plan to include one. You generally want your viewer to notice

key elements and information in your design and your composition should direct them to this information.

I'll talk more about direction and how it contributes to a design when we talk about compositional flow in the next chapter on design principles.

Movement

Disregarding animation and the ability to resize a browser and watch elements rearrange themselves on the screen, the elements in our designs don't actually move. Instead we imply movement.

Through the use of lines, colors, values, textures, forms, and space you can direct the eye from one part of a composition to another. This is considered movement or the illusion of movement in a design.

Direction leads to implied movement. Your eye follows the direction of a line or the gaze of a figure and your eye moves to see where the line leads or where the gaze is looking.

Movement is the path the eye follows when looking at a composition. How the eye travels through a composition can help create unity and it helps tie the elements together through the relationship of various components.

At the end of the Elements chapter, I presented Edward Hopper's *Lighthouse at Two Lights* to show how warmer colors advance and cooler colors recede. Here's the same image of the painting showing you the path my eye follows when I look at it (**Figure 3.59**). Notice how my eye follows the direction of several elements that stand out as it moves around the painting.



Figure 3.59: Where my eye moves through Edward Hopper's *Lighthouse at Two Lights*.

There are several ways in which we can show movement in a

composition.

- Rhythm
- Gradation
- Perspective
- Gestural lines
- Directional lines
- Repetition of elements
- Subject matter of elements
- Implied action an element exhibits

You might also arrange lines of text in patterns based on the length of each line as I've just done. I suppose this might be example of gradation of line length or maybe of an implied gestural line.

Movement in a design can be of one of two types

- Physical
- Compositional

Physical movement occurs when some physical activity is present in the subject. People walking, for example, or objects such as cars that appear to be in motion. Aerodynamic forms like planes suggest not only motion, but also speed.

These objects exist for movement and so they convey a sense of movement when we see them. They aren't literally moving on the

screen, but we know it's their function and perceive the movement they imply.



Figure 3.60: Representing physical movement.

Compositional movement occurs when different elements in a composition move the viewer's eye through the composition. This can occur by following a repetition of colors or patterns through the composition. Here you aren't concerned with a subject that appears to be physically moving, but rather the direction that elements are leading your eye.

Compositional movement can be further divided as either static or dynamic.

Static movement (**figure 3.61**) occurs when the eye jumps from one separate part of a composition to another. In static movement the eye will observe a color or shape in one part of the composition and jump to another part of the composition that includes a similar color or shape. Repetition of colors or isolated shapes are characteristic of static movement.



Figure 3.61: The color red creates static movement as your eye jumps between the red elements.

Dynamic movement (**figure 3.62**) flows more smoothly through a composition. With dynamic movement the eye is guided through a composition by continuous lines, forms, or gradations. Open shapes closely related to adjacent shapes are characteristic of dynamic movement.



Figure 3.62: Repetition of color, shape, and gradation give this composition a sense of dynamic vertical movement.

Direction and Movement in the Absence of Graphic Design

The eye will always move through a composition in some way. If you haven't planned for movement it will follow one of several natural patterns or their variations. Every composition has an optical center slightly above its geometric center. A viewer's eye naturally moves through this optical center as it moves from top to bottom in the composition.

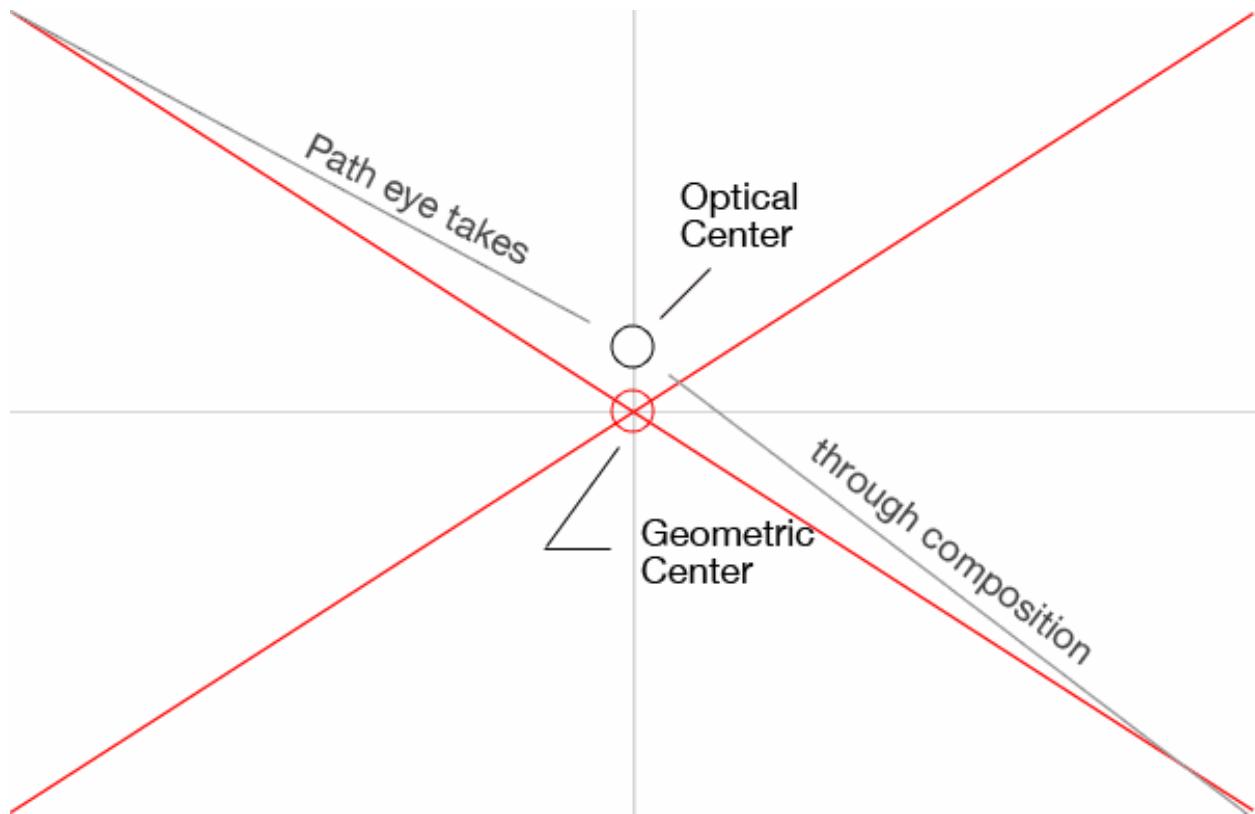


Figure 3.63: The optical center sits slightly above the geometric center.

Patterns exist that are based on this simple passing through the optical center. Here are three patterns, each described for languages that are read from left to right.

- **The Gutenberg Diagram**—The eye generally sweeps from the top/left to the bottom/right paying less attention to the other two corners.
- **The F-Pattern Layout**—The eye starts in the top/left and moves across the page to the right before moving back to the left and then down a little to repeat the same movement across the page. The general pattern follows the shape of the letter F.
- **The Z-Pattern Layout**—The eye starts in the top/left and

follows a z-pattern until it reaches the bottom/right.

- **The Zig-Zag Pattern Layout**—The eye starts in the top/left and follows a zig-zag pattern until it reaches the bottom/right.

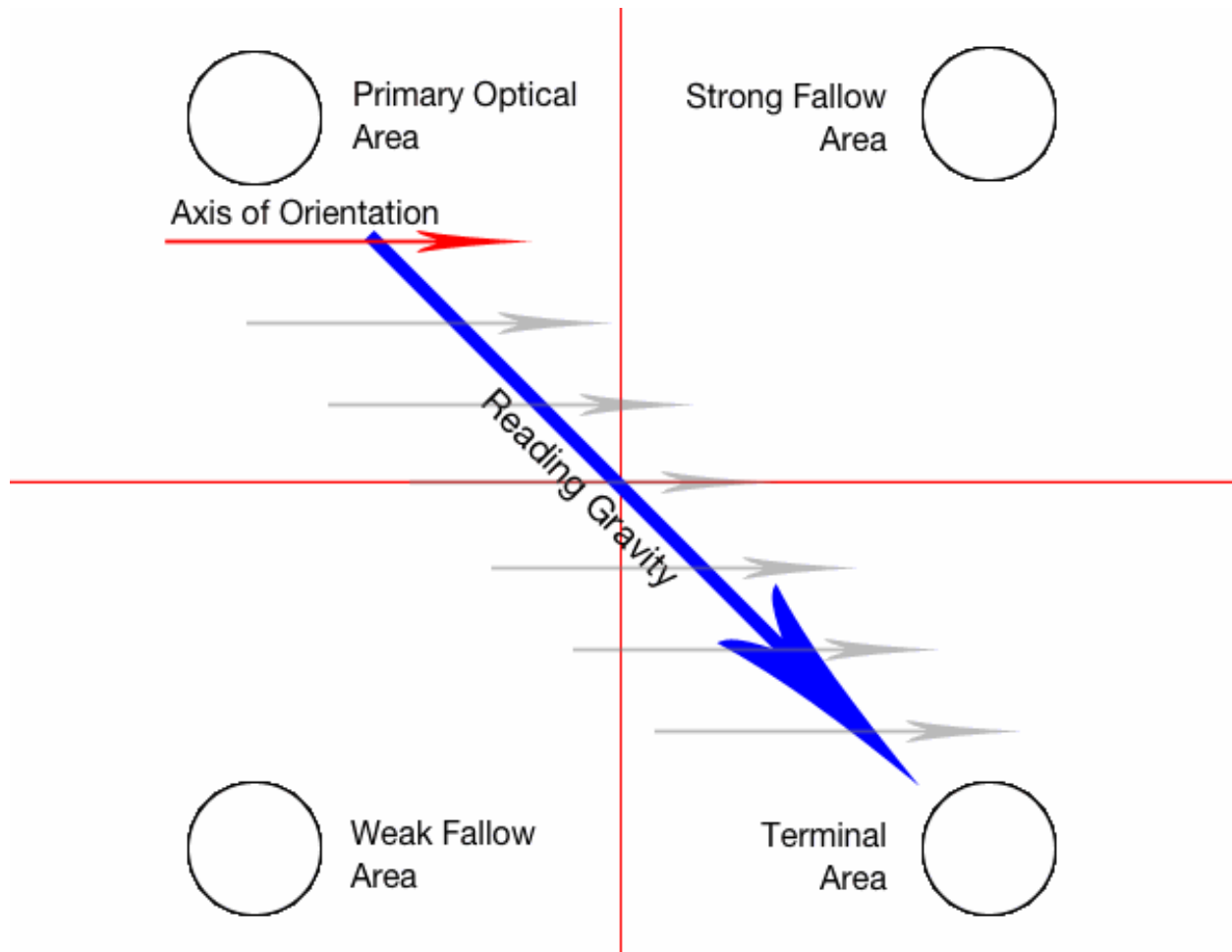


Figure 3.64: The Gutenberg Diagram.

Again, these patterns all start in the top/left in countries where reading is left to right. In languages that are read right to left, the pattern would be reversed and start in the top/right corner.

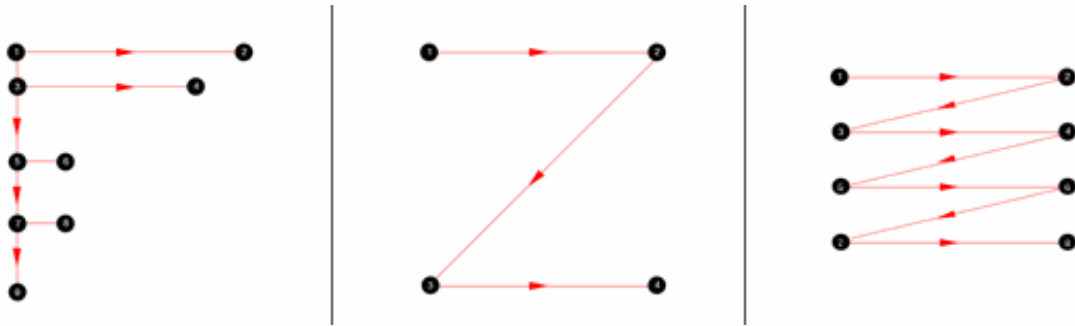


Figure 3.65: The F Pattern layout, the Z pattern layout, and the Zig-Zag Pattern layout.

Designing a sense of movement into a composition will always override these generic patterns. These natural patterns exist mostly in text heavy documents with an absence of design.

I'll talk more about each of these natural patterns when we discuss compositional flow in the Design Principles chapter, but let me repeat again that these patterns are in play when there's an absence of design. They exist as default patterns for the eye to follow in text heavy compositions, but as soon as you start to add dots and lines of various colors and sizes, with and without textures, these patterns no longer apply.

Visual Weight and Visual Direction

I hope you don't grow tired of me saying it, but I want to drive home the point that the eyes takes in visual information through moments of fixation and moments of movement to another location.

Ultimately all the different attributes you can give to different design elements exist so you can control the visual weight and visual direction in your composition. And as the eye works in fixations and movements, the point of visual weight and direction is to attract the eye and direct it to look elsewhere.

Visual Weight

Two-dimensional objects have no physical mass or weight. When we talk about visual weight in a composition we're talking about something else. Visual weight is a measure of how much an element attracts the eye.

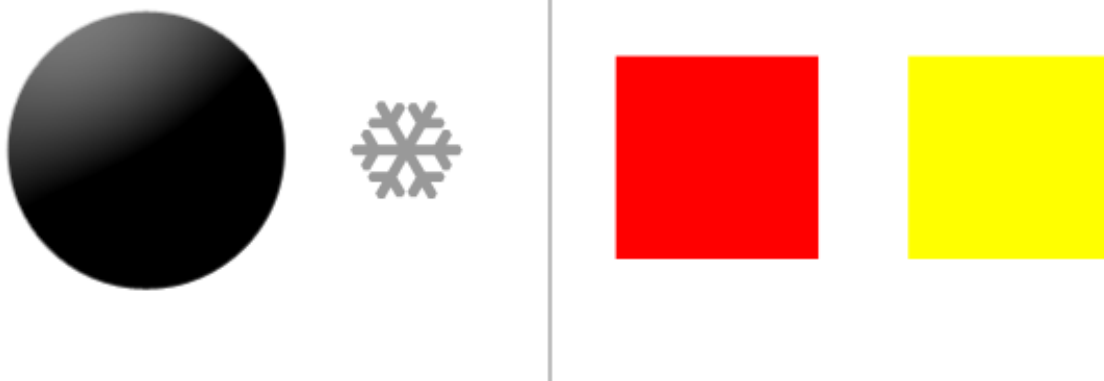


Figure 3.66: The larger, darker, denser, sphere carries more weight than the smaller, lighter, two-dimensional shape (left). The color red carries the most visual weight, while yellow carries the least (right).

Visual weight as an attribute comes from a combination of the many other possible attributes an element might have. We've already discussed a few of them in this chapter. Here's a summary that includes some attributes I haven't talked about and how each affects the visual weight of an element.

- **Size**—Larger elements carry more weight.
- **Color**—Different colors attract the eye to different degrees. Red is the heaviest color (most attractive) and yellow the lightest. Warmer colors tend to weigh more than cooler colors.
- **Density**—Packing more elements in a specific area of space gives more visual weight to that area of space.
- **Value**—Darker elements appear to have more weight than lighter elements.
- **Local white space**—A positive element surrounded by space appears heavier in its local environment.

- **Position**—Elements located higher in the composition appear to weigh more than elements located lower in the composition. They're likely seen to carry more potential energy. The further from the center or dominant area of a composition, the greater the visual weight. Elements in the foreground carry more weight than elements in the background.

- **Style**—Texture and three-dimensionality carries more weight.

- **Shape**—Objects of regular shape appear heavier than objects of irregular shape. The irregularity comes across as mass having been removed from a regular shape.

- **Intrinsic interest**—Complex and intricate objects appear heavier. We're also more interested in things we're specifically looking for.

- **Depth**—The greater the depth of field, the greater the visual weight.

- **Perceived physical weight**—An element that looks like an elephant will appear heavier than one that looks like a feather.

- **Orientation**—Vertical objects appear heavier than horizontal objects. Diagonal elements carry the most weight. Their dynamic nature attracts the eye to find out what might happen.

While the information above is good to know when you want to control the visual weight of elements in a design, there's no substitute for your eye. Look at a design and decide for yourself which elements attract your eye more. The elements that do are the ones with greater visual weight.

Kandinsky's Composition #8 (**figure 11-2**) uses elements with a variety of visual weights. The dark object in the upper left carries the most. It's the darkest and largest element and it's located high in the composition. It has a regular shape, some local whitespace around it, and it's next to a red element. Your eye likely notices it before other parts of the composition.

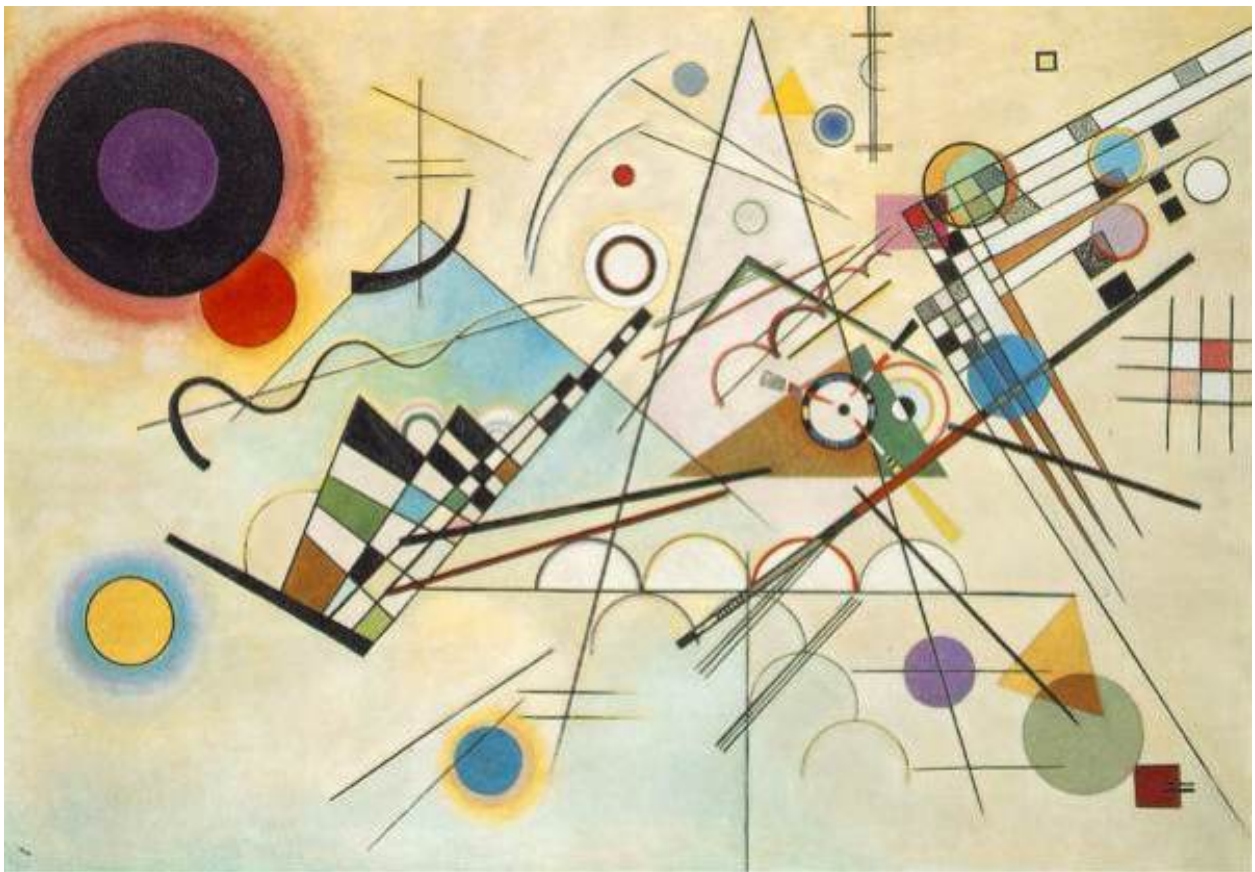


Figure 3.67: Kandinsky's Composition #8 shows elements with a variety of visual weights.

Keep in mind that visual weight is a combination of the attributes. While bigger carries more visual weight than smaller, a small dark circle surrounded by a generous amount of white space and

located at the top of the page might visually weigh more than a large irregularly shaped object of a cool light color at the bottom of the page.

Visual weight will play a large role in most of the design principles we'll encounter in the next chapter of this book. We've already seen it play a role in scale and proportion and when we considered depth and 3-dimensional objects. It will come up several more times before we're done.

Visual Direction

Visual direction is the perceived direction of visual forces in an element. It's the direction we think an element should be moving if it were given a chance to move based on the forces we think are acting on it.

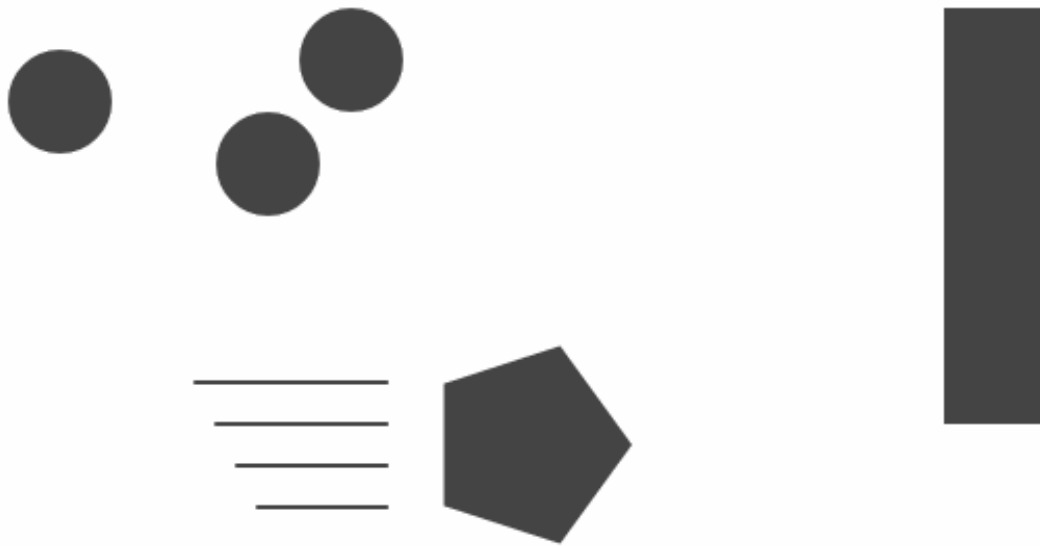


Figure 3.68: Circles exhibiting forces on each other impart direction (top left), a vertical shape indicates a vertical direction (right), and the lines next to the polygon make it appear to be moving and even pointing to the right (bottom middle).

Where we can equate visual weight with what attracts our eye the most, we can equate visual direction with where an object leads our eye. The area where the eye is led then gains more of our attention.

While not quite as many as for visual weight, here are a few attributes that affect visual direction.

- **Relative location of elements**—The visual weight of elements attracts and repels neighboring elements. This push or pull imparts direction.
- **Shape of elements**—The shape of an element creates an

axis that can impart directional forces.

- **Structural skeleton**—Every composition has a structural axis running through it based on the composition's format or canvas

- **Subject matter of element**—An arrow, a pointing hand, the gaze of an eye, all suggest direction.

- **Movement**—Objects may appear to be moving in a given direction.

Most of the above probably need no further explanation. One of them, structural skeleton, likely does.

Rudolf Arnheim, a psychologist who studied visual perception, suggested that any canvas has a structural network of forces running through it. Without any elements present we're more likely to be drawn to certain parts of the space because of these structural skeletons.

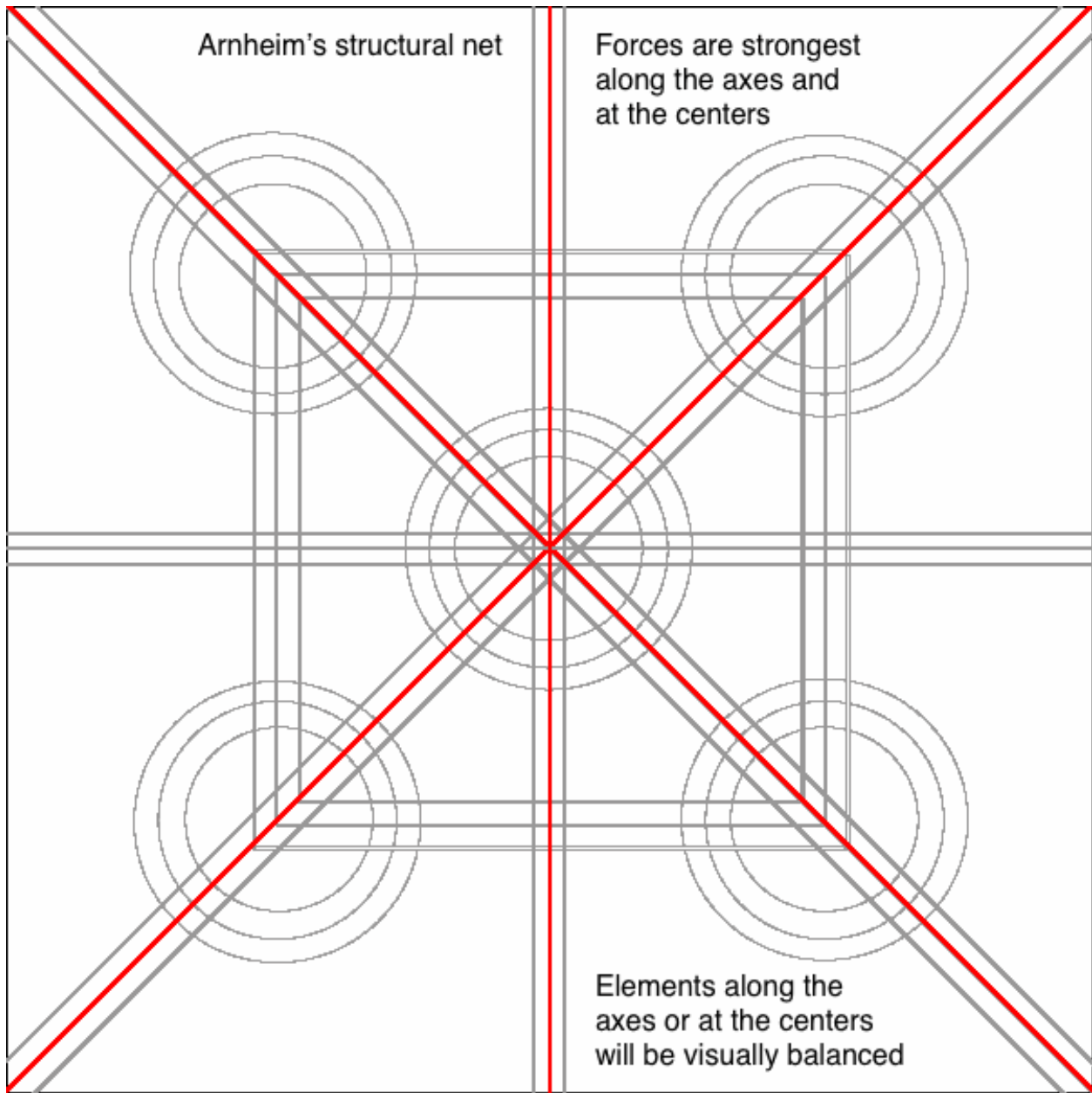


Figure 3.69: Rudolf Arnheim's structural network for forces.

According to Arnheim, the center of the canvas and its four corners are magnets that attract the eye. The center is stronger than any corner. Axes runs from corner to corner through the center and directional forces are strongest along these axes. Points midway between the center and each corner along an axis

also strongly pull your attention and there are also horizontal and vertical axes connecting these points.

When a composition hasn't been designed, viewers will tend to follow Arnheim's axes and come to rest at the different points of attraction. You have the ability, by using elements of differing visual weight, to override Arnheim's structural net. We'll discuss how in the next chapter.

We can also work with the structural net. If an object will naturally pull attention when located in the center, we can place an object we want people to see in the center. Knowing the eye will naturally want to move from the center toward a corner, we can place other important elements along these axes.

How we do these things is the subject of the next chapter. The design principles we'll talk about provide guidelines for how to use the different types of elements and their various attributes in creating compositions.

Chapter Four

Principles

Elements are the things, the objects, you add to the space of the canvas and the space itself. Attributes are their characteristics. They're the primitive features processed by the visual cortex.

Principles are the guidelines for choosing elements and their attributes to produce a cohesive composition. Design principles help you make decisions. They offer advice about when a circle makes more sense than a square or why you would choose the same dark green for several elements, but a bright red for another.

They provide context for the decisions you have to make as a designer. Principles offer rational reasons for your choices and they offer different ways to visually communicate the types of messages your design wants to convey.

Design principles are based on the combined experience of all who have come before. They exist because they've been shown to work again and again and because they arise out of the ways our eyes naturally take in their environment. By applying the appropriate principles you increase the odds your design will successfully do what you intend it to do.

Let's start with a set of observations known as gestalt, that describe how we perceive the things we think we see, as they form the foundation for everything that follows.

Gestalt Principles of Perception

The gestalt principles of visual perception originate with German psychologist Max Wertheimer, who had an insight while observing lights flashing on and off at a railroad crossing.

The lights flashed much as they do on a movie marquee. In sequence each light would turn itself on and then off as the next light would turn on. Even though what's really happening is a number of lights are turning on and off, it appears as though a single light is moving around the marquee. What Wertheimer observed was apparent motion.

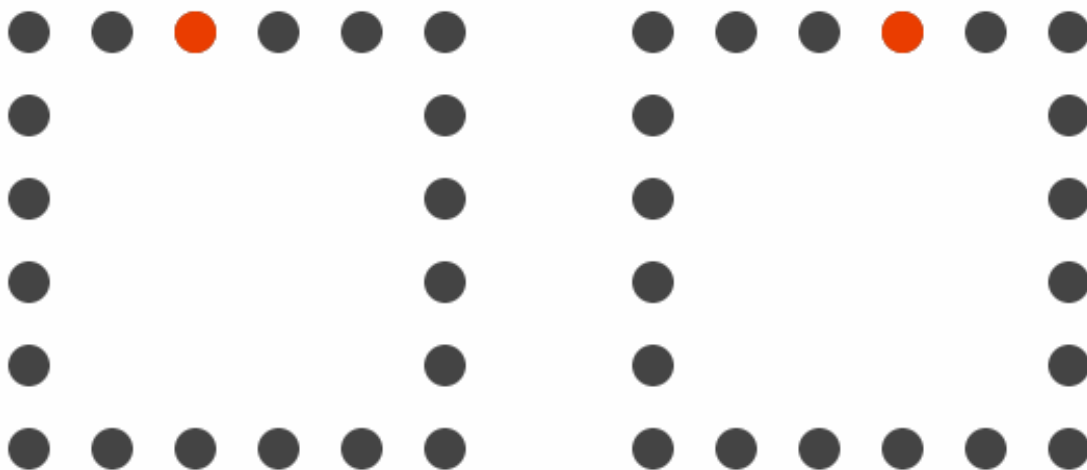


Figure 4.1: Seen in sequence the red dot above might appear to be moving to the right, when in reality two different dots are simply changing color.

He realized that what we perceive isn't necessarily what's actually there. This observation led Wertheimer and others to form a descriptive set of principles for how we perceive our visual environment as organized patterns and objects. These German psychologists weren't artists or designers, but their observations influenced both. Members of the Bauhaus school such as Paul Klee, Vassily Kandinsky, and Joseph Albers were greatly influenced by gestalt principles when creating their work.

Many fundamental design principles show a clear connection to gestalt theory so I think it makes sense to start this chapter about design principles with the principles of gestalt.

The General Ideas Behind Gestalt Principles

There are four general concepts for how we interpret what we see. These concepts tell us how we can perceive things that are only implied and they inform the principles that I'll get to momentarily.

- **Emergence**—We perceive the whole before the parts.
- **Reification**—We perceive more than what's included in the parts.
- **Multi-stability**—We can have alternate interpretations of the same thing.

- **Invariance**—We can recognize objects regardless of orientation or size.

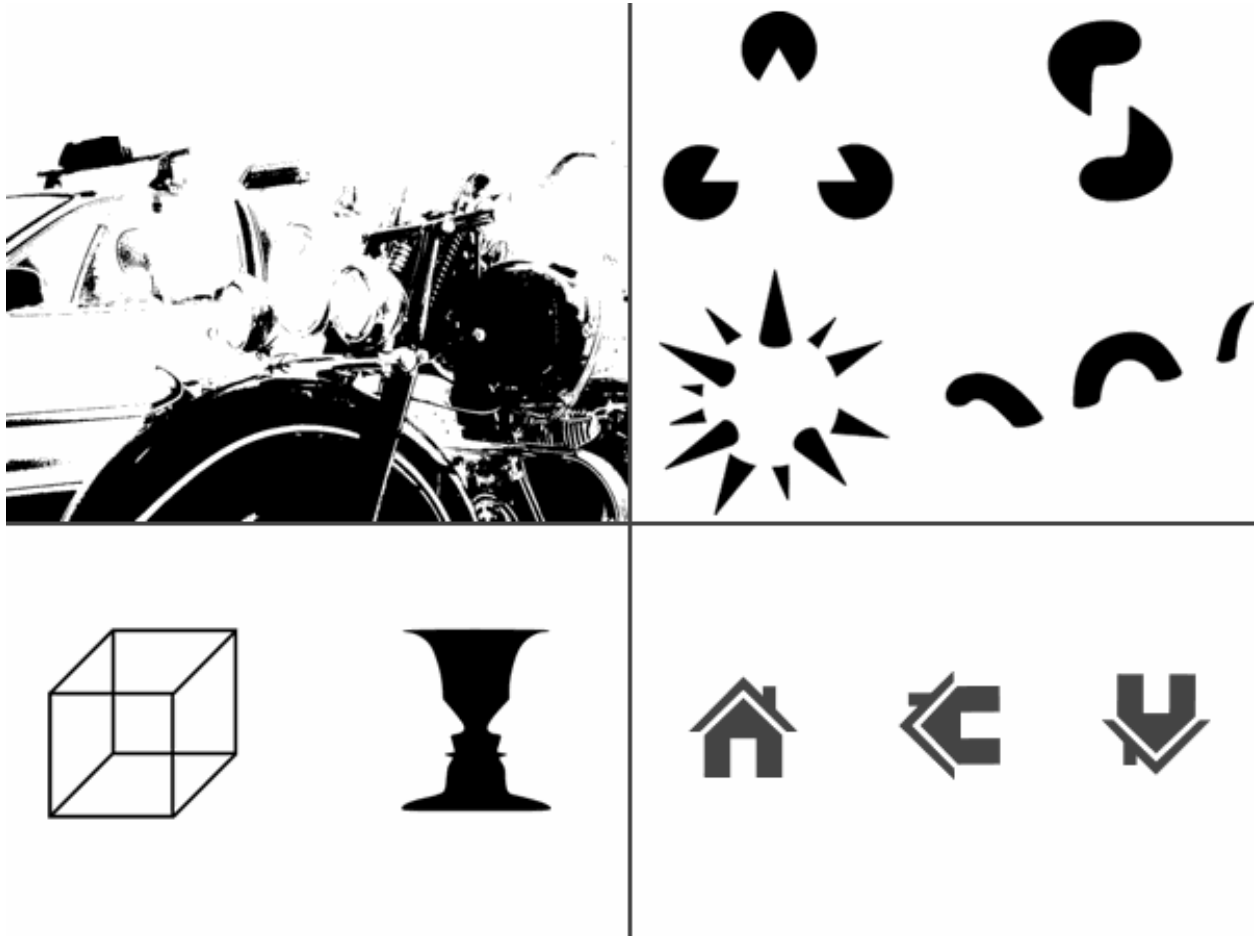


Figure 4.2: Emergence (top left), reification (top right), multi-stability (bottom left), and invariance (bottom right).

Emergence is the process of complex pattern formation from simpler rules. It's our perception of the whole before the individual parts. If we come upon a forest, we'll recognize it as a forest before we start noticing individual trees.

When you see a person, you don't see hands, feet, face, arms, and

then think person. You see the whole person first and only after you recognize a person is present will you focus on the hands, feet, etc.

The top left panel of **figure 4.2** contains part of a motorcycle in the foreground with part of an automobile in the background behind it. When you saw the car you probably saw it all at once. You'll notice though, that it's just a handful of lines and shapes that by themselves don't show much, but when you see them all together the shape of a car emerges even though most of the car isn't present in the image.

Reification is an aspect of perception where the whole that's perceived contains more information than what's actually present. Our mind fills in the gaps; the missing parts. What we perceive becomes a mix of what's actually present and what we think must be present in order for us to make sense of what we see.

In the top right panel of **figure 4.2** you likely see a triangle with its corners resting on top of three circles. No triangle is actually present. What is present are three PAC-MAN shaped figures arranged in such a way to suggest that a triangle is there. You might even think you see a shadow or thin border around the "triangle," though I assure you none is present. Similar for the other objects in the panel.

Multi-stability is a tendency for ambiguous perceptual experiences to move back and forth between alternate

interpretations. Most of the time the objects we see are stable. We can clearly distinguish what is the object and what is the background.

Sometimes objects and backgrounds have multiple points of stability. Two classic examples can be seen in the bottom left panel of **figure 4.2**. The cube on the left can be seen with either of two faces as the one nearest you with the other as the furthest away. On the right you can see either a vase or two faces in profile. Which you see depends on which you interpret as the object and which you interpret as the background.

Multi-stability seems to suggest that sometimes our reality is open to interpretation.

Invariance is our ability to recognize simple objects regardless of their rotation, translation, or scale. Show someone a picture of a house turned upside down as in the bottom right panel of **figure 4.2** and it will still be recognized as a house.

We can change the accepted color of an object, show it under unusual lighting, or deform it to some degree and it will still be recognized. Picasso's cubists paintings show invariance. The objects in the paintings are not drawn realistically, but we can usually recognize what they are.

The Gestalt Principles

While you probably haven't thought about them as laws or principles, most of the gestalt principles will seem obvious in hindsight. In fact, they all seem to arise from the way our eyes work and how we see and perceive our visual surroundings.

Remember that gestalt is an attempt to explain our natural tendency to see patterns to help us understand our visual environment. The design principles in the rest of this chapter arise out of the gestalt principles here. Most design principles can be traced back to some aspect of gestalt, which can be traced back to some aspect of how our eyes work.

General Laws

Law of Prägnanz (Good Figure, Law of Simplicity)—We perceive complex and ambiguous objects in the simplest form possible.

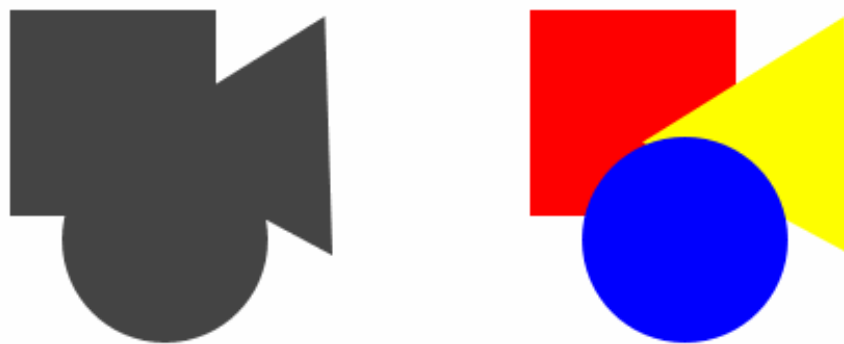


Figure 4.3: The complex shape on the left is easier to interpret as the 3 simple shapes on the right.

This is the fundamental gestalt principle. We want to make sense of the world and prefer things that are simple and clear. It's the Occam's razor of perception. We look for simple explanations to identify what we see, which won't always be to take one complex shape and think of it as three simpler shapes.

Closure—When looking at a complex arrangement of individual elements, we tend to look for a single, recognizable pattern.



Figure 4.4: It's simpler to see a rectangle here than four individual lines.

One object is generally easier to understand than a larger number of component parts. With closure we combine parts to form a

simpler whole. It's the glue that holds things together and plays into our natural tendency to seek pattern.

Symmetry—When we perceive objects we tend to perceive them as symmetrical shapes that form around a center.

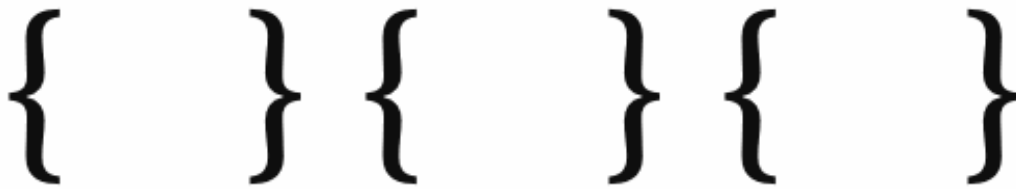


Figure 4.5: Symmetry suggests you'll see three pairs of opening and closing brackets.

Symmetry is organized. Our desire to see symmetry comes from our desire to impose order on chaos. It leads us to prefer balance, though as we'll see later, balance can be achieved even when symmetry is absent.

Figure/ground—We perceive elements as either figure or ground; element or background.

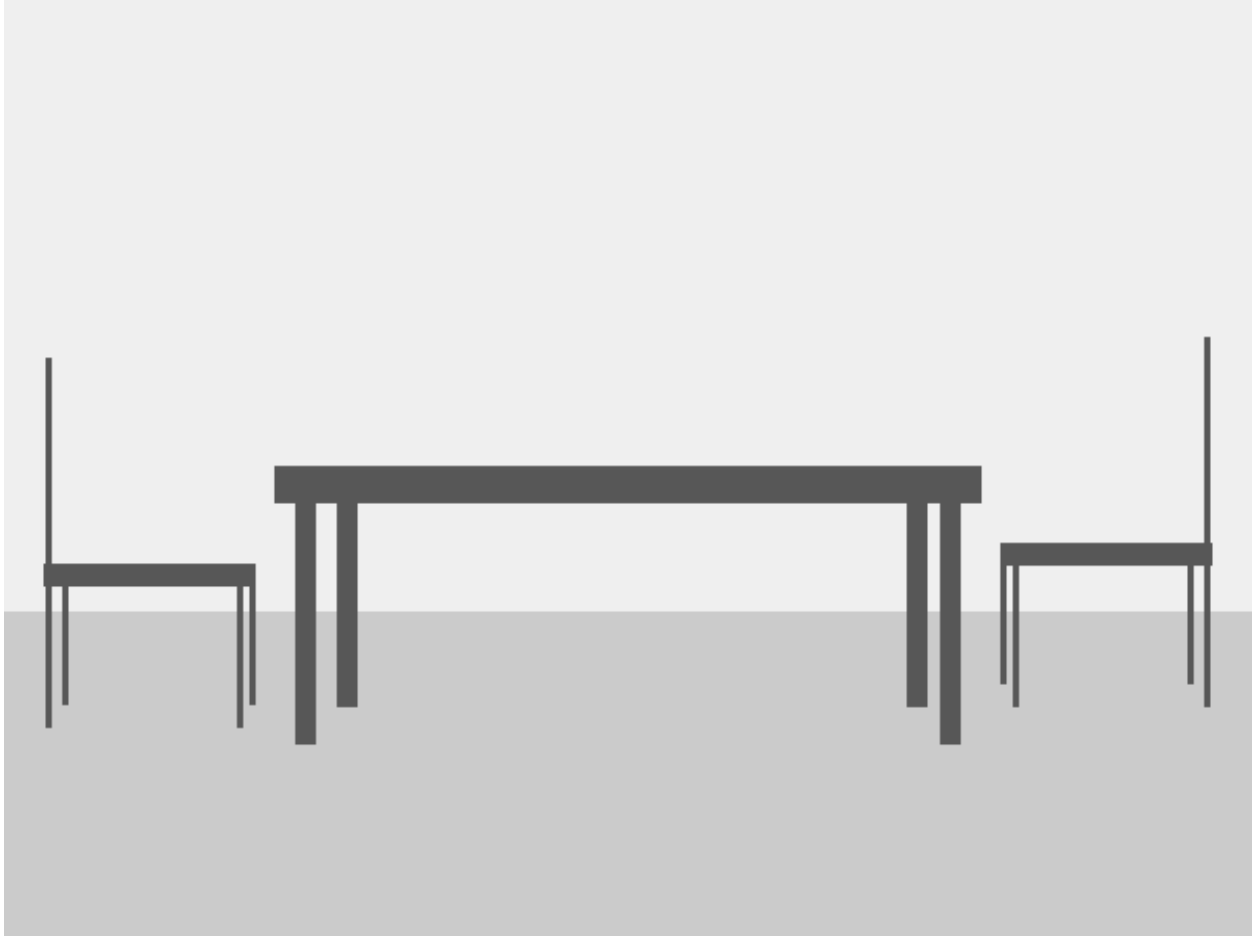


Figure 4.6: The simple composition above relies on a determination of what is figure and what is ground.

When looking at a composition one of the first things we all do is try to understand the subject. We quickly and, unconsciously, separate figure and ground in order to understand what we see. It helps us know what to look at and what's ok to ignore.

To make sense of the composition in **figure 4.6** you first need to decide that the table and chairs are in the foreground. Once you do, you can easily determine the background is divided into the floor and a wall behind the table and chairs.

A corollary principle of figure/ground is **area** or **smallness**, which suggests that the smaller of two overlapping objects is usually seen as figure and consequently the larger is seen as the background.

Laws of Connection

Uniform connectedness (law of unity)—When objects have a visual connection we perceive them as being more related than objects with no visual connection.



Figure 4.7: The objects appear unrelated (left) and connected (right).

This is the strongest principle suggesting objects are related and it will trump other principles that suggest relatedness. Lines, and line-like shapes, connecting objects are a common way of showing uniform connectedness.

Common region—When objects are grouped together in an enclosed region we perceive them as being related.

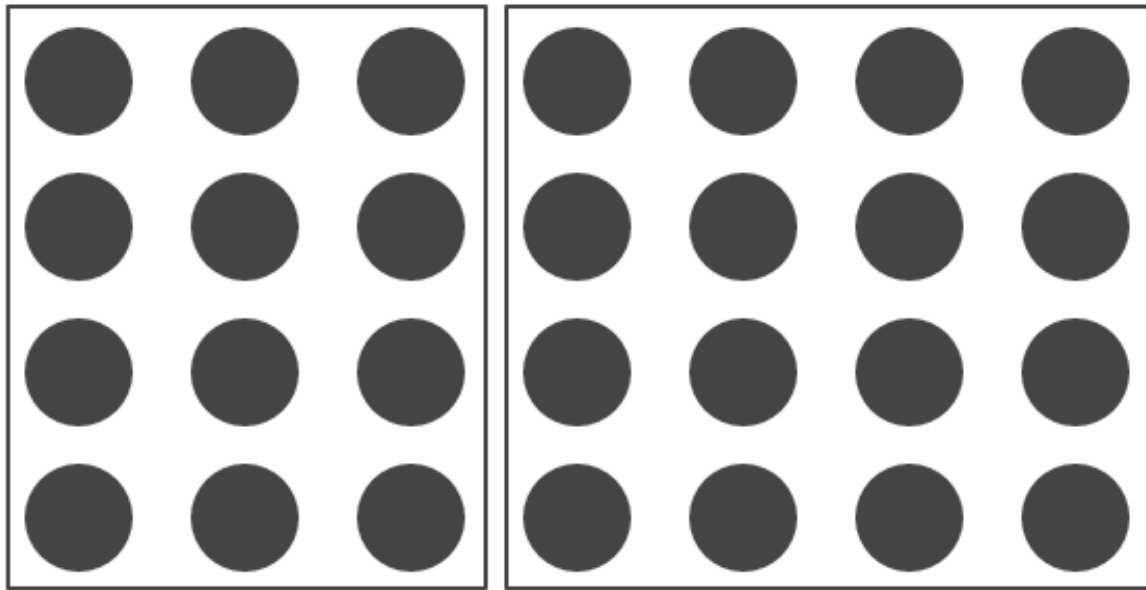


Figure 4.8: Enclosing dots groups them together and makes them appear related in some way and different from other groupings.

Everything inside the enclosure is seen as related in some way and everything outside the enclosure is seen as different in that same way. If you've ever placed a border around a group of elements in a design, you were making use of this principle.

Proximity—When objects are grouped closer in space we perceive them to be related.

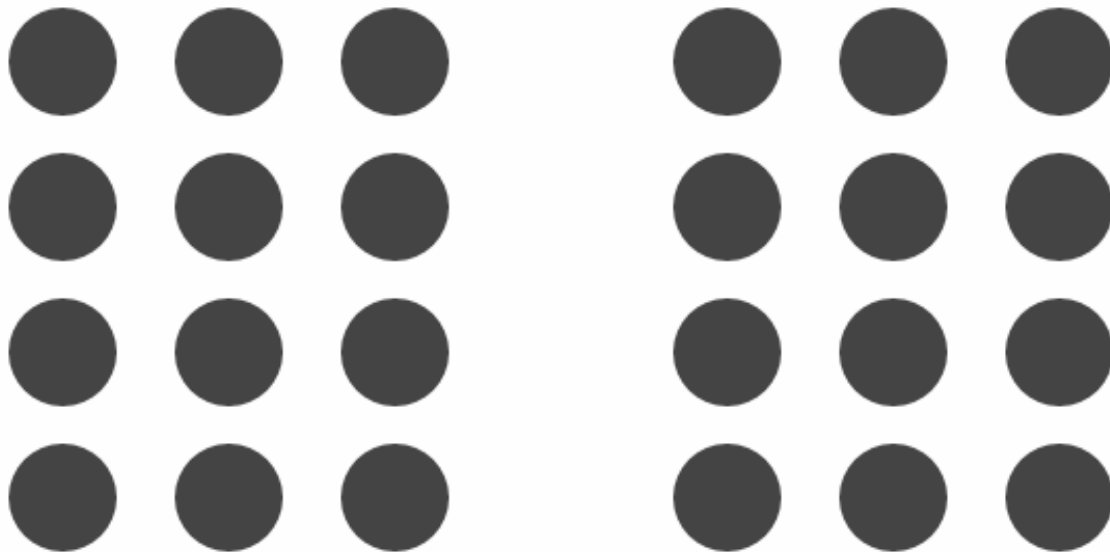


Figure 4.9: Space can be used as the enclosure to group elements.

Proximity is essentially the previous principle of common region where relative space is the enclosure. None of the dots in **figure 4.9** is actually enclosed within a boundary, but the relative space between the dots within each group is less than the space between the groups themselves.

Laws of Direction

Continuation—When objects are arranged along a line or curve we perceive them to be more related than objects not on the line or curve.

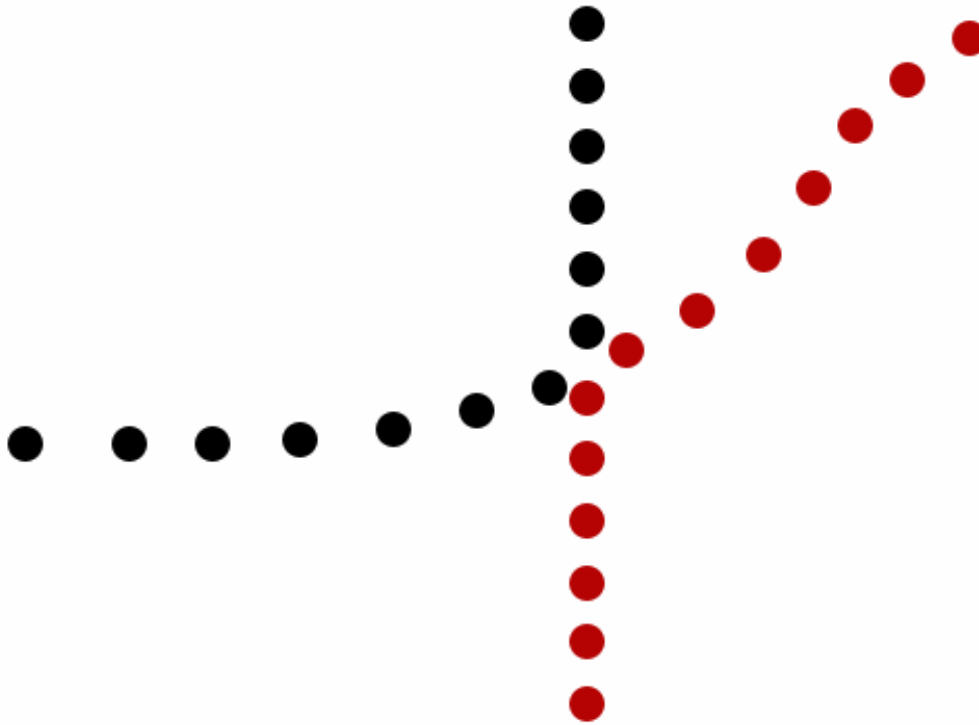


Figure 4.10: The continuation of the line and curve is a stronger relationship than the color of the elements.

Think of a river, path, or fence line. As you look or move in one direction you continue to look or move in that same direction. This principle follows momentum in a sense. In **figure 4.10** you could see the dots divided by their color, but you more likely see a curve and a vertical line, suggesting that continuation takes precedence over color.

Common Fate (synchrony)—When objects move in the same direction we perceive them as being more related than objects that are stationary or objects that are moving in different directions.

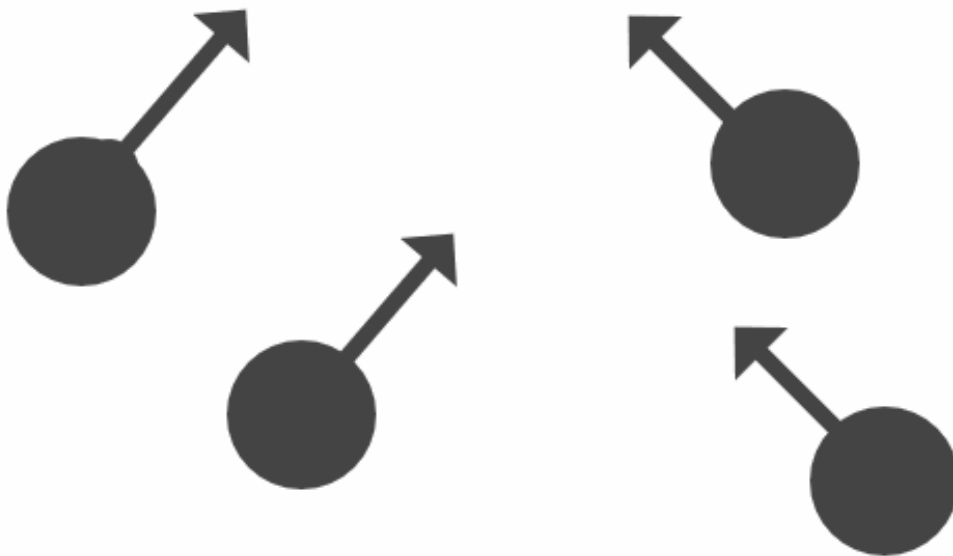


Figure 4.11: Objects that appear to share a common fate are seen as being more related.

In a sense this is the principle of continuation expressed in motion. No matter how dissimilar in other ways or how far apart they are, as long as the objects move in the same direction common fate applies.

What's perhaps not obvious is the objects don't actually have to be moving. It's more that they seem to have a common destination. Two people facing left would appear to have common fate and be more related than either is to a third person facing right.

Parallelism—Objects that are parallel to each other appear more related than objects not parallel to each other.



Figure 4.12: Parallel objects appear more related to each other than object not parallel to them.

This is similar to common fate. For us to see elements as parallel we must perceive their line-like characteristics. Lines are seen to point or lead somewhere, which creates the destination. Parallel lines appear to lead to the same destination.

Laws of Similarity and Contrast

Similarity—When objects have similar characteristics we perceive them to be related.

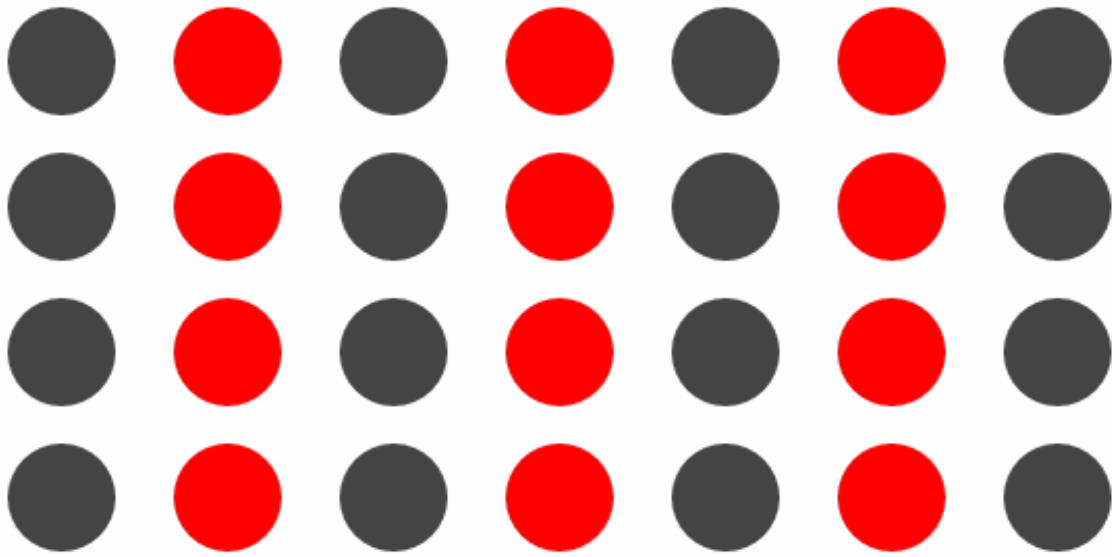


Figure 4.13: The dots that share a similar color appear more related than those that don't.

The specific characteristics don't matter. Two red objects are more related than a red and blue object. Two circles are more related than a circle and a square.

Law of focal point—When an object is different from its surroundings, it will capture attention.

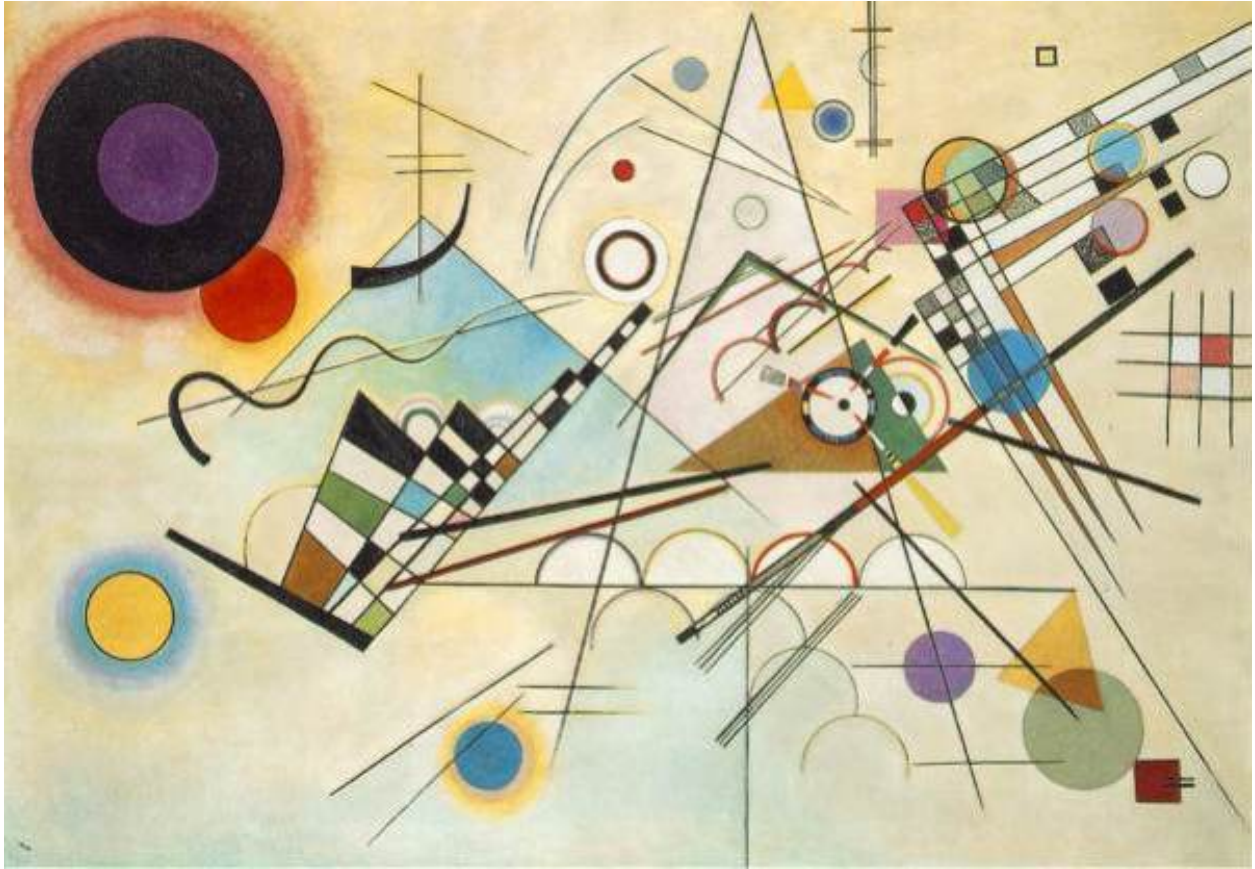


Figure 4.14: Kandinsky's Composition #8 contains a variety of focal points to attract and direct your eye.

Stated another way contrast and emphasis gain attention and interest. This is likely a survival instinct as the familiar is safe, while the unfamiliar needs to be identified quickly to determine if it's safe or not.

Past experience—If objects in our past experience were related, we'll perceive them to be related when we see them again.

If two people you know are dating, the next time you see them you'll assume they're still a couple until told otherwise. This is the weakest of all the gestalt principles and any other principle here

will take precedence.

It's also difficult to design for since it's unique to the individual. However, we do share a lot of common experiences and even more cultural experiences. If you remember, in the discussion of color I mentioned how much of the meaning of colors arises out of our cultural experience. It's our past experience of red octagonal signs meaning stop that allows us to recognize stop signs quickly.

Unity

The whole is more than the sum of its parts. If anything can sum up unity that would be it. It's the gestalt idea of emergence. This is what we're ultimately after as designers. Every decision we make should ideally fit into some unified whole.

When all parts of a design work together they create something greater than their sum. When elements in your design agree with each other and reinforce each other harmony is achieved.

Unity helps you communicate more clearly because everything is working together to communicate the same overall message, each part enhancing all the other parts.

Why is Unity Important?

Unity exists when all your elements are in agreement, when they all belong together. It exists when design elements are placed with a purpose and not randomly.

In practice, you won't have 100% of elements unified with each other. Unity should be a goal, but like perfection it won't be reached, and there are reasons why you might want some elements to break what is otherwise a unified design.

Still, unity should be your general goal and achieving it will usually overcome other issues in the various parts of your design.

While every element has its unique role to play, when they all work in harmony with each other they serve a singular purpose and communicate a singular message.

To give you an idea why unity is important, let me present an example of a non-unified design (**figure 4.15**).



Figure 4.15: The design of the imaginary site above is clearly at odds with the simple message the business wants to tell.

The fictional Unity Designs wants to communicate that they design simple websites, but their own site is anything but simple. Which do you believe the message they want you to believe or the one they're communicating with the site design?

If the design of your site is disorganized and uses complex shapes, it comes across as anything but simple. People will be confused by your complicated site and they'll be less likely to believe you when you tell them your product is simple to use.

For another example, how do you feel the eighteenth time the recorded message tells you how important you are to the company that put you on hold. I bet you don't feel that important hearing the automated voice. I know I don't. The words don't match the message.

When unity is present elements won't compete for attention. Your theme and message will be communicated more clearly and in greater depth. Your visitors will feel a sense of completeness in your composition.

Visual and Conceptual Unity

There are two types of unity to consider.

Visual unity—When the elements in a design look like they belong together.

Conceptual unity—when the elements in a composition communicate the same message or meaning.

Visual unity makes the relationships between elements easier to understand through visual cues. When a variety of different principles are applied well it creates a sense of visual order. There's a consistency of shapes and sizes, colors and movement. A balance and flow runs through the composition.

Visual unity exists in elements that show visual similarity. For example, all vertical elements in a composition are unified vertically. All diagonal elements are unified diagonally. All circles are visually unified with each other. Repeating the same style for links across a site ties them together visually. It unifies them. Aligning elements to a grid unifies space.

Conceptual unity exists when the messages individual elements communicate reinforce each other. For example, images of a hospital, ambulance, and gurney all reinforce the idea of an emergency room.

With conceptual unity, the relationships between elements are naturally conceptual as opposed to visual. A baseball, a bat, a glove, and a cap are all related to the game of baseball and are conceptually unified even though none of them looks like any of the others.

How to Unify a Design

The key to creating unified designs is to consistently ask yourself why. Whenever you're making a design decision ask why about the decision? Why this element? Why is it being placed here? Why am I giving it these attributes? If you don't have a good answer for why you're adding something to a design in the way you're adding it, then it probably isn't going to be unified with anything else in the composition.

Visually you want to create a balance between the similar and the different. More of the same means more visually unified, but too much sameness can get boring. On the other hand, not enough of the same, while visually stimulating is also chaotic and less unified.

Fortunately there are a lot of different attributes you can add to elements so you can unify some elements with color while using different shapes to add interest. You can design elements to look similar in some ways, while adding enough variety to them to keep the design from becoming monotonous.

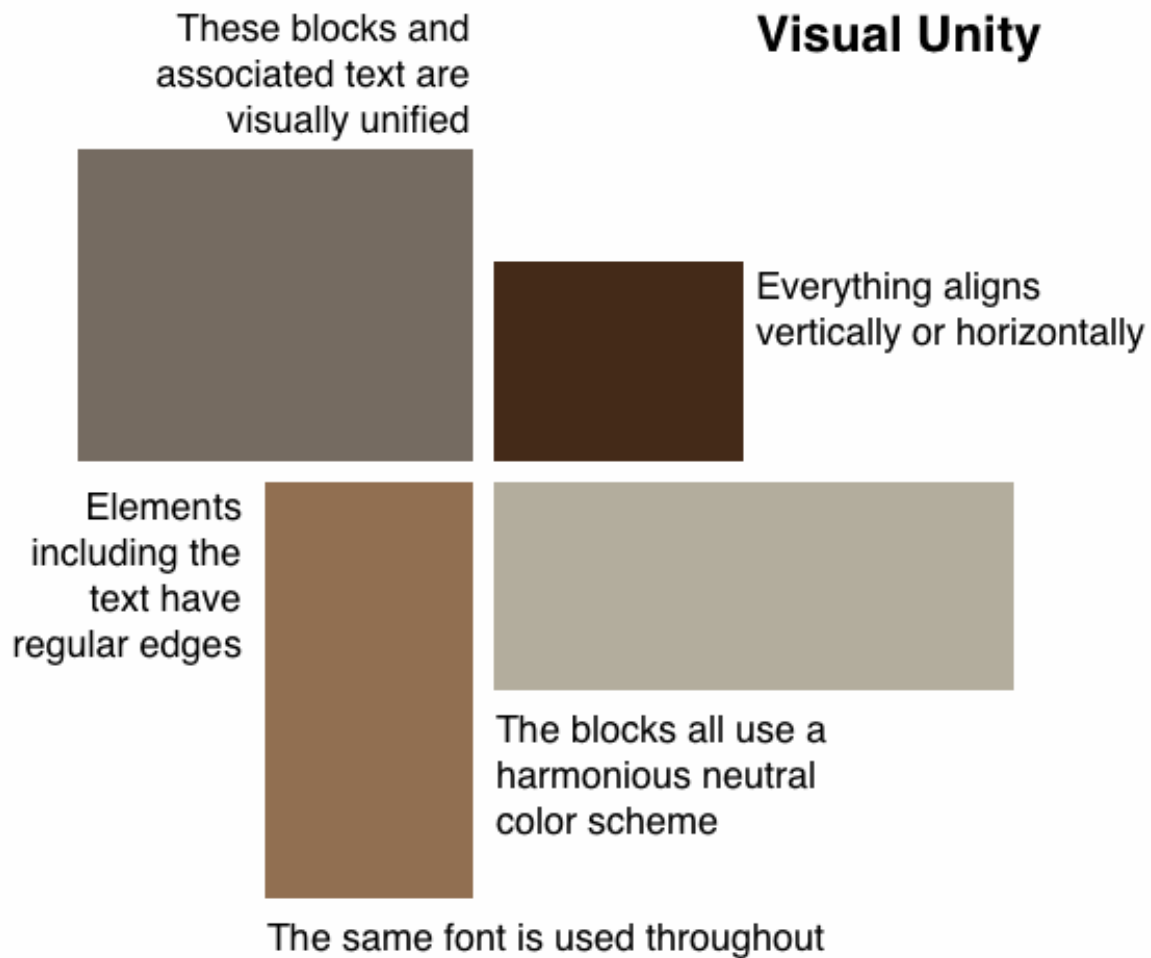


Figure 4.16: Visually unified elements.

Figure 4.16 is visually unified in a number of ways as pointed out in the figure. Notice that all the graphic elements are rectangles, though they aren't all the same size or shape. They're all brown, but not the same brown. Three of the elements are horizontal, while the fourth is vertical.

The text in the figure isn't all the same length. They're composed of different words, and they create different shapes based on their

line-length and how many lines of text are present. However, each block of text is aligned to the edge of at least one graphic element and they generally form rectangles of different shape and size just like the graphic elements do.

It's a very simple composition that's unified visually, but still offers enough variation to keep it somewhat interesting, given what it is.

The same ideas apply to creating conceptual unity. More similarity leads to more unity and with conceptual unity I would take the similarity even further than the I would for visual unity. Anything that conceptually disagrees could lead to confusion in your message, which you want to avoid.

Imagine you're trying to communicate that a business is open to new ideas and open to questions from its customers. You probably wouldn't want to group elements by containing them inside borders since that doesn't communicate openness. Grouping elements through space alone would be in greater harmony with the concept of open.

The first step in creating conceptual unity is to have a concept, for example, the openness of the business in the last paragraph. If the company wants to communicate that it's open, you would likely think about the word "open" and what it means in a variety of contexts, perhaps the open sea or something more abstract like the idea of freedom.

As you then make decisions about the design you would keep the word open and your general concept in mind and make choices based on whether they communicate openness. To me that suggests more space between and around elements. It suggests lighter colors. It might suggest allowing images to bleed off the screen to give the impression that the site has no boundaries and, of course, the images themselves would be of subjects that suggest open and wouldn't contain objects like fences or walls or anything that encloses space or presents a barrier to being open.

Again, the idea of unity is to have everything work in harmony to reinforce every other part. Each element on the page communicates something. You want them to communicate the same thing.

Placing an image on the page because you like it, isn't unity. Placing it on the page because it enhances and reinforces something else on the page creates a more unified design.

The ultimate test of unity is when nothing can be added or taken away from a composition without making it worse. Changing the relationship between even two elements would change the relationships between all other elements for the worse. As you might imagine this is not an easy thing to achieve, though it's something you want to strive for in every design.

My reworked design for the fictional Unity Designs company

(**figure 4.17**) is, no doubt, not the most beautiful design you've ever seen, but it's a much more unified design, both visually and conceptually to the chaotic design I presented earlier. I'm much more likely to believe that the company that created this second version is capable of creating a simple design, unlike the one that created the first version.



Figure 4.17: A design more conceptually unified with the message the business wants to tell.

The key to a unified design is similarity across the various parts while also presenting enough variety, enough difference, to keep things interesting. I think it's time then that we talked about

similarity and contrast.

Similarity and Contrast

Similarity and contrast have already been present throughout this chapter. Many gestalt principles are about either connecting (similarity) or separating (contrast). Both are also fundamental to how our eyes work. Contrast makes elements stand out so we can fixate on them and similarity can help us move from one element to another.

Contrast and similarity go together. You can't have one without the other. In fact each would become meaningless if the other didn't exist. What would it mean to be the same without understanding the idea of difference and what would it mean to be different without the idea of sameness.

- **Similarity**—Elements that share visual characteristics will be seen as belonging together and will suggest that what's true of one is true of the other.
- **Contrast**—Elements that visually contrast with the majority signal difference and create points of interest and emphasis that attract attention.

You show either through your choices in primitive features, that is the attributes we talked about in the previous chapter. Make one or more attributes of two elements the same and you show similarity between them. Make those attributes different and you show contrast.

Contrast

We're hardwired to notice differences. Once upon a time that thing you didn't recognize might want to eat you. We needed to recognize danger as quickly as possible and so we were drawn to anything that looks different from that which we already knew, in order to be safe. Being attracted to contrast is a survival mechanism.

Since we're naturally wired to notice things that are different, things that contrast with their surroundings, it stands to reason that you use contrast when you want viewers to notice something in your design. Through contrast you can create points of interest and emphasis, which highlight important information (gestalt principle of focal points). Contrast is possibly the most effective way to add interest and excitement to any composition.

Contrast communicates meaning through a value comparison of elements. Nothing has meaning in and of itself. It needs comparison. We saw this when talking about scale. Day and night, large and small, dark and light. All derive meaning in comparison with the other.

In **figure 4.18** the orange sphere stands out. Where all the other elements are black squares of the same size that are all aligned with each other, the sphere is not a square. It's orange instead black. It's larger than the squares, uses a gradient to give it depth, and it's positioned lower than the squares. All the contrast should

lead your eye to notice it first.



Figure 4.18: The sphere stands out because it contrasts with the squares in several ways.

Go big with contrast. Make it as clear as possible that the objects are different. A 12px heading at the top of 11px text doesn't stand out. At best it will look like a mistake. To make that heading contrast make it really different. 24px, 48px, 96px. Something that clearly sets it apart.



Figure 4.19: Is the difference in size on the left purposeful or accidental? Are we meant to see contrast? The squares on the right make it clear that they differ in size.

While more contrast works well when talking about one element

you don't want to overdo it and try to make every element different from every other element. Too much contrast is like everyone shouting for attention at the same time. It becomes noise and nothing really stands out. The trick is to use contrast sparingly to create a few areas of attraction. Too many can lead to confusion and take away from the harmony of a unified design.

Any attribute can be used to show contrast, but the more commonly used characteristics include the following.

- Size
- Color
- Shape
- Texture
- Position
- Orientation

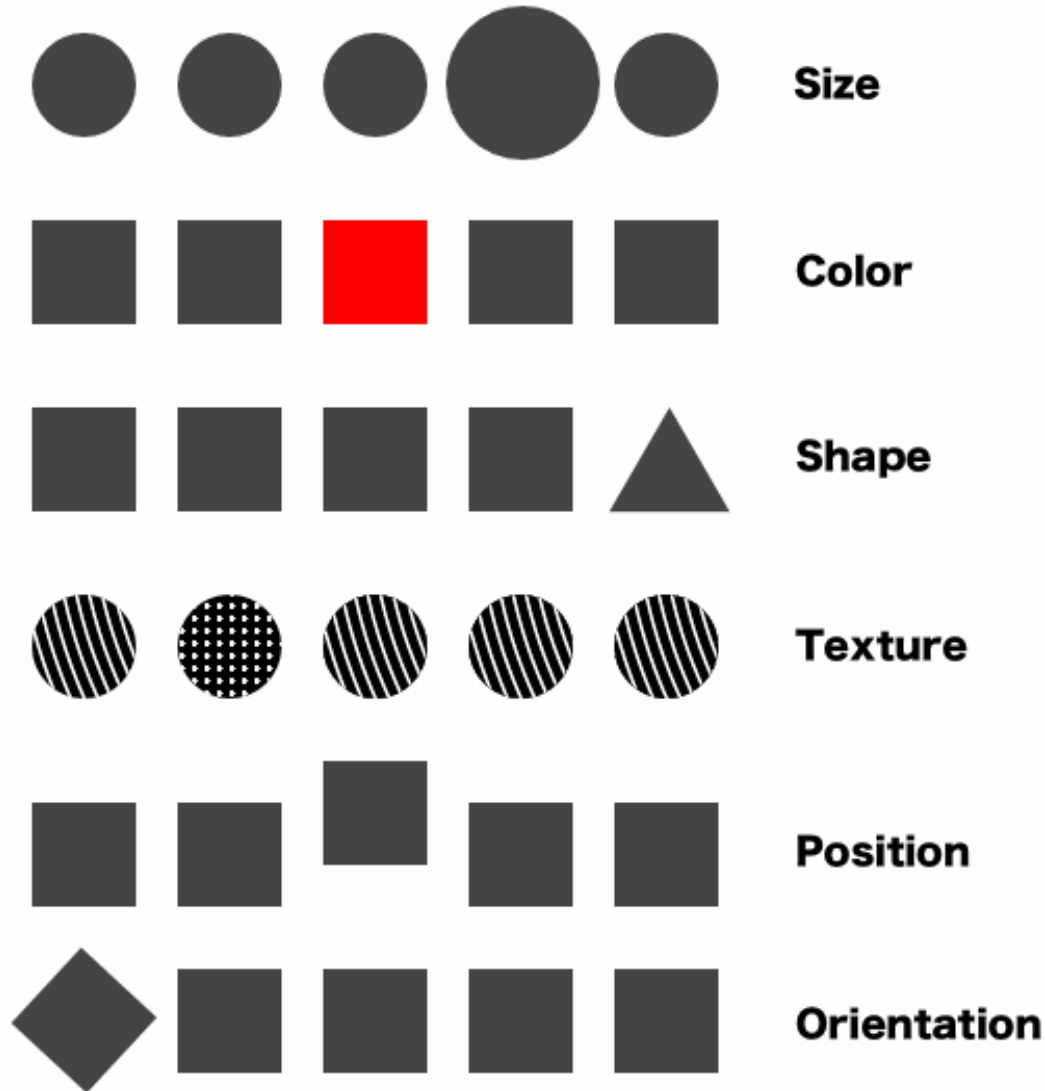


Figure 4.20: The common attributes to show contrast are also common attributes to show similarity.

In deciding how much contrast is needed, consider the surrounding objects. How much variation is there across objects where the primitive features are concerned? The less variation across the surrounding objects, the smaller the degree of contrast needed to cause an element to pop out. More variation in the

features and more contrast will be needed for pop out to occur.

Remember, you aren't limited to contrasting only a single attribute of an element. You can use a different color, a different size, and a different shape between elements. The more attributes you differ, the more the element will pop out. You can use any or all of the attributes (primary features) in any combination to help make an element stand out.

When an object contrasts enough in one or more visual channels, it will stand out and it can be processed fast enough to direct saccadic eye movement.

Similarity

The thing you see out of the corner of your eye may want to eat you, but it might also be a friend inviting you to dinner, so being able to identify similarities, like being able to recognize differences, is important.

Our ability to recognize similarity is one reason we're so good at recognizing and finding patterns, which helps us make sense of the world and provide context.

Similarity creates repeating patterns and your eye follows these patterns. In other words similarity can direct the eye from one part of a composition to another and it shows connections between elements.

Where contrast attracts the eye, similarity provides structure and stability. It creates relationships that communicate meaning and transfer what you know about one element to the others that look the same in some way.

When two elements are visually similar we tend to think they're also similar in other ways and dissimilar from elements that look different. Designing elements to be visually similar shows relationships between them. It communicates that they are the same in ways other than visual. Meaning learned from one element can be transferred to another. For example, if one string of text is blue and underlined and you determine it's a link, you'll likely think all the other blue underline strings of text are also links.

Any time you want to show that two elements or pieces of content are related, you should make them visually similar in some way.

You can use any attribute to show similarity. Like contrast, you aren't limited to using a single attribute. If anything, the more characteristics that are similar, the more the objects will be seen as related.

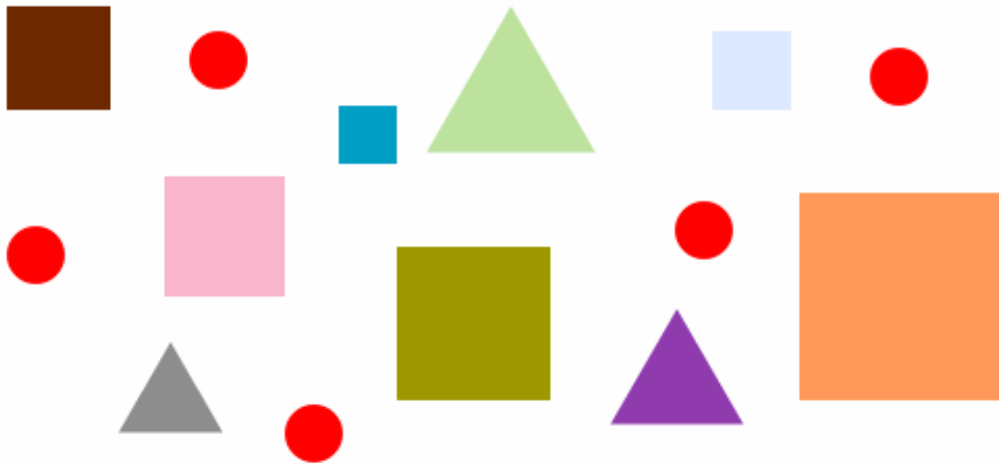


Figure 4.21: The red circles appear related because they're similar in shape, size, and color.

Similarity implies connection, leads to familiarity, and adds consistency, harmony, and unity. Similarity helps visitors process and comprehend what they see quicker and easier.

It also leads to convention. We easily navigate websites because we've seen navigational elements so frequently and they typically carry at least a few similar characteristics from site to site such as their location in the design.

Not all means of showing similarity are equal. Some signals will be stronger than others. In **figure 4.22** to which group does the red square belong? Do you see it as a member of the group of square elements or a member of the group of red elements. You probably see it as red before square indicating that similarity of color is stronger than similarity of shape.



Figure 4.22: Does the red square belong to the group of squares or red objects?

If you look back at the section on gestalt principles, you might notice that many of the principles have something to do with showing similarity or connection.

- Uniform connectedness is similarity through visually connecting elements.
- Common regions is when similar items are enclosed together.
- Proximity is similarity through enclosures in space.
- Continuation is similarity through rhythms in space.
- Common fate is similarity through movement.
- Parallelism is similarity through orientation.

Again, contrast and similarity need each other and they work best in together. Contrast in conjunction with similarity allows us to create hierarchy. It provides a mechanism for showing some things as more and less important than others. It allows us to draw attention to some things at the expense of others.

I'll talk about creating visual hierarchy in a bit, but first I want to talk about going really big with contrast. I want to talk about using contrast to create dominance and focal points.

Dominance and Focal Points

As I mentioned in the last section when talking about contrast, everything can't be equally emphasized. It defeats the point when everything is equally competing for attention. Nothing stands out that way. It's like a room full of people all yelling at once. You don't hear any one person, you only hear the combined noise from everyone.

Emphasis is relative. For one element to stand out, others have to remain in the background. Some elements need to dominate others visually in order that both can be noticed when appropriate to notice them.

What is Dominance?

When two elements are placed in a composition they are either equal in every respect or one element will exert some dominance over the other. You'll notice one first. It might be bigger or its color might grab your attention. Its location or subject matter might make it stand out. It'll appear to control the lesser element to a certain degree.

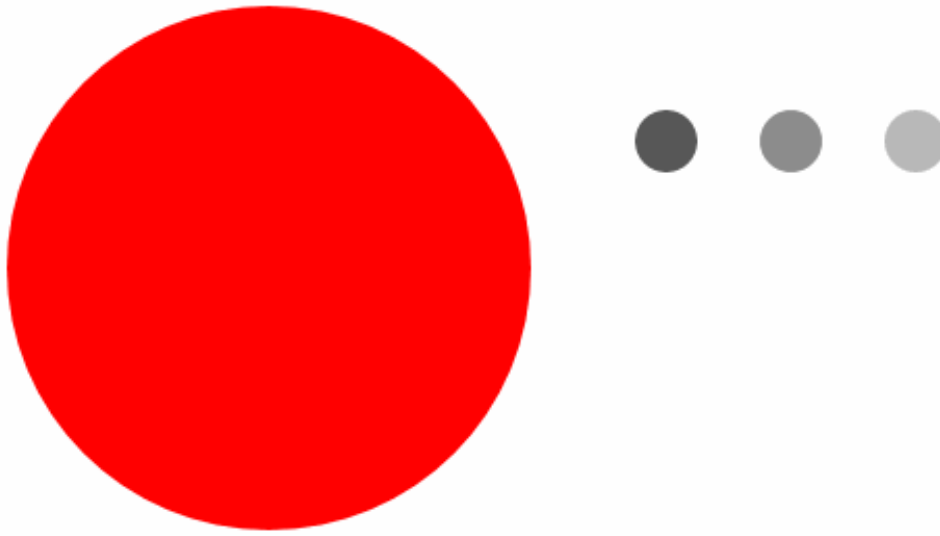


Figure 4.23: The large red dot dominates and pulls your eye into to this simple composition.

A lack of dominance between elements in a composition leads to competition between them. Imagine two red circles of equal size are present in a composition (or look at **figure 4.24**). Which should you look at? Chances are your eye will bounce back and forth between both, never quite sure where to stop and rest.



Figure 4.24: Without a clear dominant element the eye doesn't know where to

look first.

One element exhibits dominance over another by carrying more visual weight. The greater the visual weight, the more the element attracts the eye of the viewer and the more the element dominates other elements in the design.

You can also use visual direction to show dominance. For example, a series of arrows all pointing to the same element will likely lead the viewer directly to whatever the arrows point to.

What Are Focal Points?

Focal points are points of attraction in your design. They're areas of the composition that stand out and where the eye can rest (fixate). They exhibit dominance over the elements in their immediate surroundings.

Focal points are areas of your design you want people to notice. They're dots and dot-like elements that attract the eye. Ideally someone viewing your design will eventually notice everything included within it, but reality says most people will move on before taking in everything you want them to see. Designing some elements to stand out more likely means viewers will at least see those elements.

It makes sense to design important information as focal points,

because these focal points are what will get noticed when someone scans your composition.

The Dominant Element

One ring to rule them all, one ring to find them, One ring to bring them all and in the darkness bind them.

— Inscription on the one ring in *The Lord of the Rings*

As you continue to add more elements and more focal points to a composition some will dominate others. One element should ultimately dominate all of them, though not in the same evil way Sauron's one ring rules the rest.

This dominant element is the one that attracts the eye the most. It carries the most visual weight of any element in the composition. It prevails over all others. It commands attention and becomes the entry point into your design. It will be the first element people notice in your composition. It's the starting point.

Without a dominant element viewers must work to find an entry point into the composition. That's more difficult to do than it sounds. Look back at **figure 4.24** and think about which, if either, circle you noticed or settled on first. It's better not to make viewers work so hard to settle on one element. You want to reduce the amount of effort it takes to enter your composition by having a single dominant element that makes the starting point obvious.

If you don't, where people decide to enter your composition (assuming they do at all) may not be the place you want them to look first. It could mean they never see your most important message. Don't make your audience think. Do the work for them. Make it obvious where to begin looking at your composition and then make it easy to know where to look next.

How to Create Focal Points and Dominant Elements

You create focal points, including your dominant element through contrast and emphasis. Dominance is the varying degree of emphasis given to different elements. To attract attention, an element must contrast with its surroundings. More emphasis means more contrast. Ultimately it's about giving elements greater visual weight.

We talked about visual weight in the last chapter so as a reminder here are some of the attributes that can control the visual weight of an element.

- **Size**—Larger elements carry more weight.
- **Color**—Some colors appear to weigh more than others. Red is the heaviest and yellow the lightest. Warmer colors tend to weigh more than cooler colors.
- **Density**—Packing more elements into a given space gives

more weight to that space.

- **Value**—Darker elements have more weight than lighter elements.

- **Local white space**—positive elements weigh more than negative space. An element surrounded by space appears heavier in its local environment.

- **Position**—Elements located higher on the composition tend to weigh more than elements located lower in the composition. They're likely seen as carrying more potential energy. The further from the center or dominant area of a composition, the greater the visual weight. Elements in the foreground carry more weight than elements in the background.

- **Style**—Texture and 3-dimensionality can carry more weight.

- **Shape**—Circles gain increased weight as most elements in your design will likely be rectangular. Objects of regular shape appear heavier than objects of irregular shape. The irregularity comes across as mass having been removed from a regular shape.

- **Intrinsic interest**—Complex and intricate objects appear heavier.

- **Depth** — The greater the depth of field, the greater the visual weight.

- **Perceived physical weight**—An element that looks like an elephant will appear heavier than one that looks like a feather.

- **Orientation**—Vertical objects appear heavier than horizontal objects. Diagonal elements carry the most weight.

You want to learn how to control these characteristics of design elements in order to control their visual weights. There's no

mathematical formula for determining which element “weighs” more, but your eye will be a good judge, especially as your goal is to have elements with large disparities in visual weight.

Levels of Dominance

Levels of dominance are collections of elements that share a similar amount of visual weight, different from other levels that show a different amount of visual weight. Your dominant element is one level of dominance. Your focal points are part of another level.

Elements on one level of dominance will all carry a similar amount of visual weight that’s different from elements on other levels. To show different levels of dominance you must show that the visual weights on one level clearly contrast with how much visual weight is present in elements on other levels.

Every additional level reduces the contrast in visual weight between levels. Because the difference between levels need to be clear, there’s a limit to how many levels of dominance you can realistically create. Three levels is a good maximum. The more levels, the less the contrast between each level, and the less contrast, the harder it will be to distinguish one level from the next.

With three levels of dominance you can create dominant, sub-

dominant, and subordinate levels.

- **Dominant**—The element with the greatest visual weight. This element will have the primary emphasis and it will advance into foreground.

- **Sub-dominant**—Elements of secondary emphasis (focal points). These elements will have less visual weight than the dominant element, but more than everything else. This level becomes the middle ground in composition.

- **Subordinate**—These elements are given the least visual weight. They recede into the background of composition.

While possible, it's hard to add a fourth level of dominance. Human beings can easily distinguish most and least, but everything in between tends to become a gray area of equal dominance.

In **figure 15-4**, I created 3 levels of dominance. The large red circle is on the dominant level. It carries the most visual weight, given its size, color, and dimensionality. The blue rectangle in the lower right and the group of dots above it, sit at the sub-dominant level and serve as focal points. The former uses a drop shadow to give it extra weight and the latter use local density to give the group extra weight. Everything else in the composition sits at the subordinate level and recedes into the background.

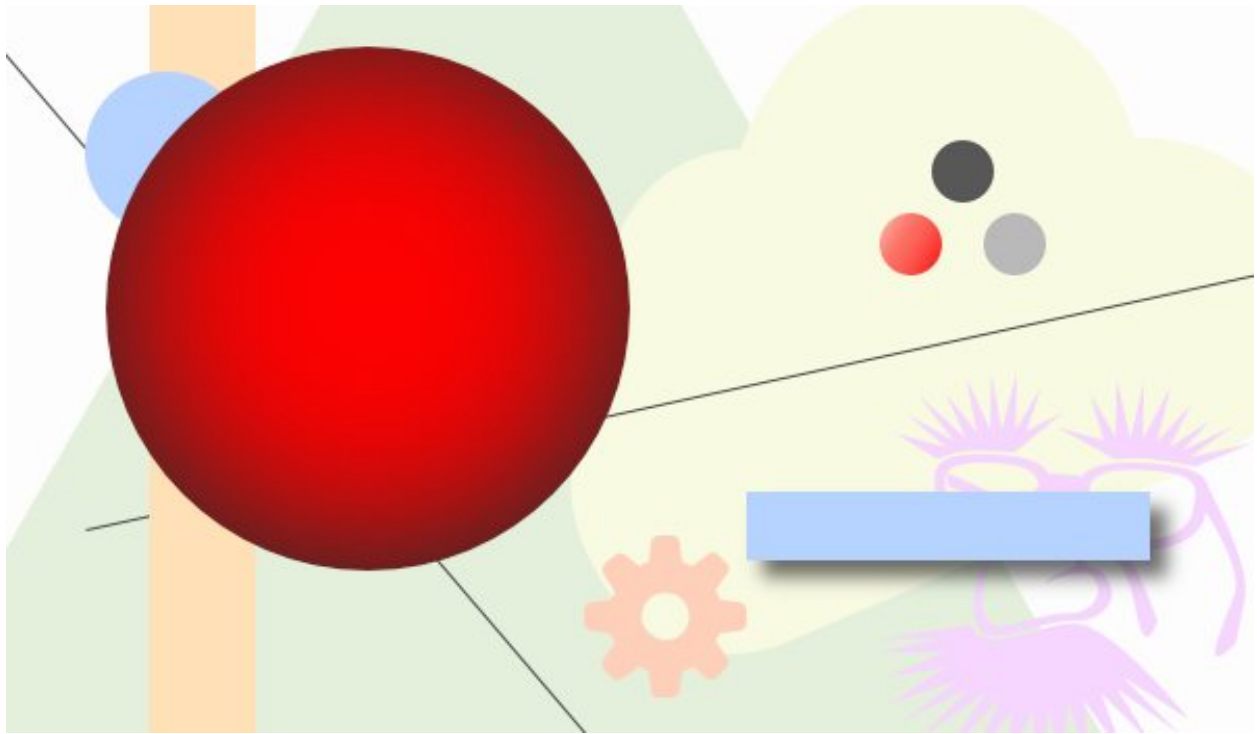


Figure 4.25: A simple composition with a dominant element (red circle left) and 2 focal points (blue rectangle and group of dots) created through different visual weights.

I'm suggesting three levels as a good goal, but you can create a fourth and maybe a fifth. Keep in mind you need to show enough contrast between levels, meaning your most and least levels will need to push further into the extremes to allow for additional contrast between levels.

You probably want to limit yourself to three, but I don't want to suggest it's a hard and fast rule that you can't break.

We'll see how these levels work in more detail in the next few sections on hierarchy, flow, and balance, starting with visual hierarchy.

Visual Hierarchy

Whether you stick to three levels of dominance or push to a fourth or possible fifth level, you're creating a visual hierarchy by designing groups of elements with different amounts of visual weight and direction.

Consider the two wireframes in **figures 4.26 and 4.27**. The first shows no hierarchy. It's one long block of text in which everything has equal visual weight. There's no designed entry point so you start either at the top left or top right depending on the language you're reading.

From there all you can do is work your way across and down the page until you reach the opposite corner from where you started or stop reading prior to reaching it.

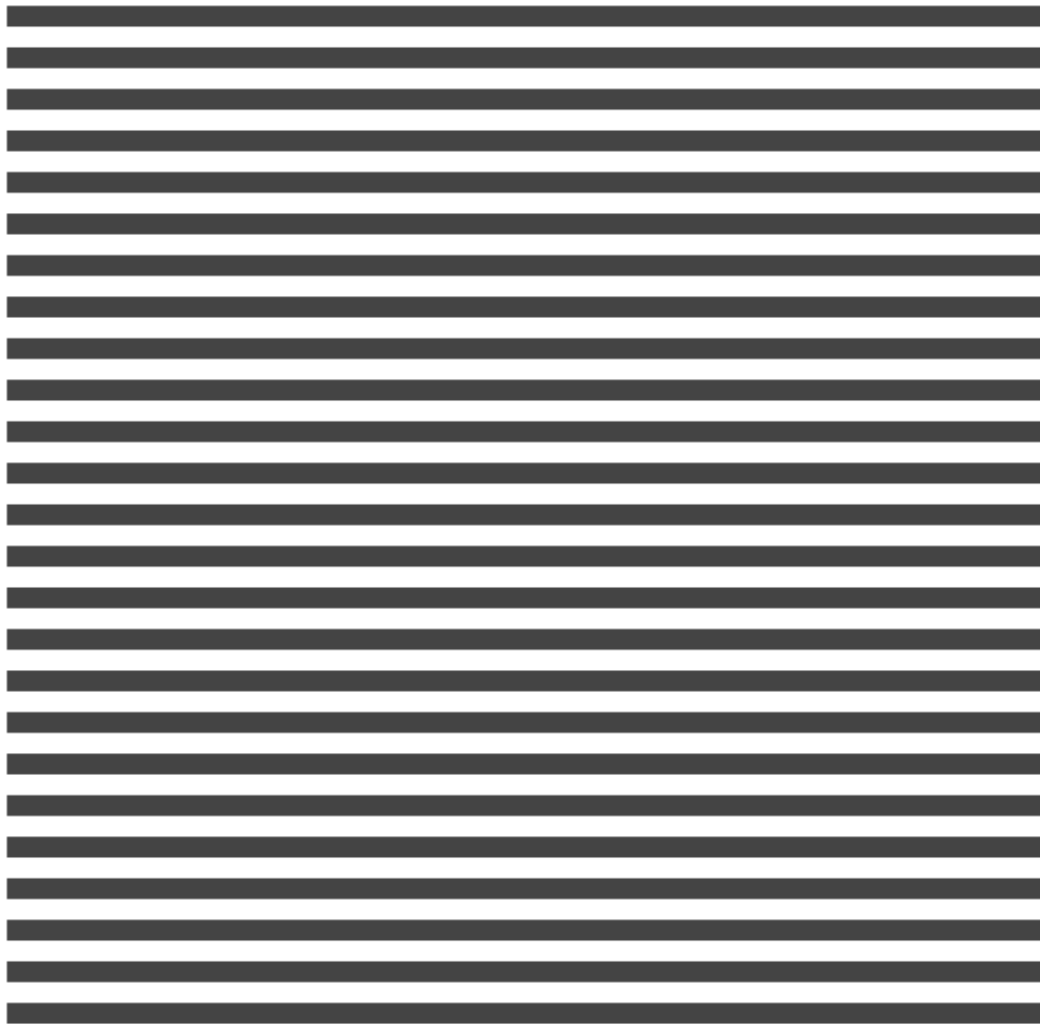


Figure 4.26: This image might represent an all text web page without any hierarchy. Your only choice is to start at the top and read all the way through to the end, without any idea in advance what you might find.

In the second wireframe, the text is broken up with headings (the darker line-like shapes), an image and caption, what is likely a header.

Your eye likely moves to the header first as it carries the most

visual weight and is the dominant element in the design. The, image, and other headings have similar visual weights and all serve as focal points. The light gray text creates a third level in the hierarchy.



Figure 4.27: Another possible web page. This time there's a clear hierarchy present allowing you to scan the information and take away some level of the message even if you don't go on to read the main content.

Why Visual Hierarchy is Important

Visual hierarchy helps both you and anyone who views your design. It works in harmony with the way our eyes work. Visual hierarchy allows the eye to fixate on an element and when ready, move on to the next.

It allows viewers to scan your design to quickly take in some information and decide if they're in the right place. It saves them time. Visual hierarchy also adds interest. It's more inviting and the organization helps viewers make sense of what they see faster. That makes it easier to identify what they see and integrate it into pre-existing memory.

Designing with hierarchy allows you to arrange elements and information into some order of relative importance. It allows you to create a sequence of priority to direct people where to look first, second, and third. This enables you to call attention to what's most important and communicate key points quickly and efficiently. It increases the likelihood that your most important information will be seen and absorbed.

At the top level of your hierarchy a viewer should be able to immediately answer questions such as:

- Where am I?

- Is what I'm looking for here?
- Where is it?

Ideally someone should be able to visit your design, pick up the key points it wants to communicate and come away understanding your basic message and story within a few seconds, because all of these things were more visually prominent in the hierarchy.

If someone sticks around a little longer, they should get some of the most important details about those key points. If they stick around longer still, they should come away with additional points and background information.

How to Create Visual Hierarchy

The first step in designing visual hierarchy is to figure out the hierarchy of your information. Decide what information is most important, next most important, and least important. Your visual hierarchy should match your conceptual hierarchy.

Journalists write in a style called the inverted pyramid. The idea is the most important information comes first. The who, what, when, where, why, and how, which should all be included in the lede, the first paragraph or two. The lede is then followed by several paragraphs that offer important details. Finally, general and background information that's nice, but not necessary, to

know is included.

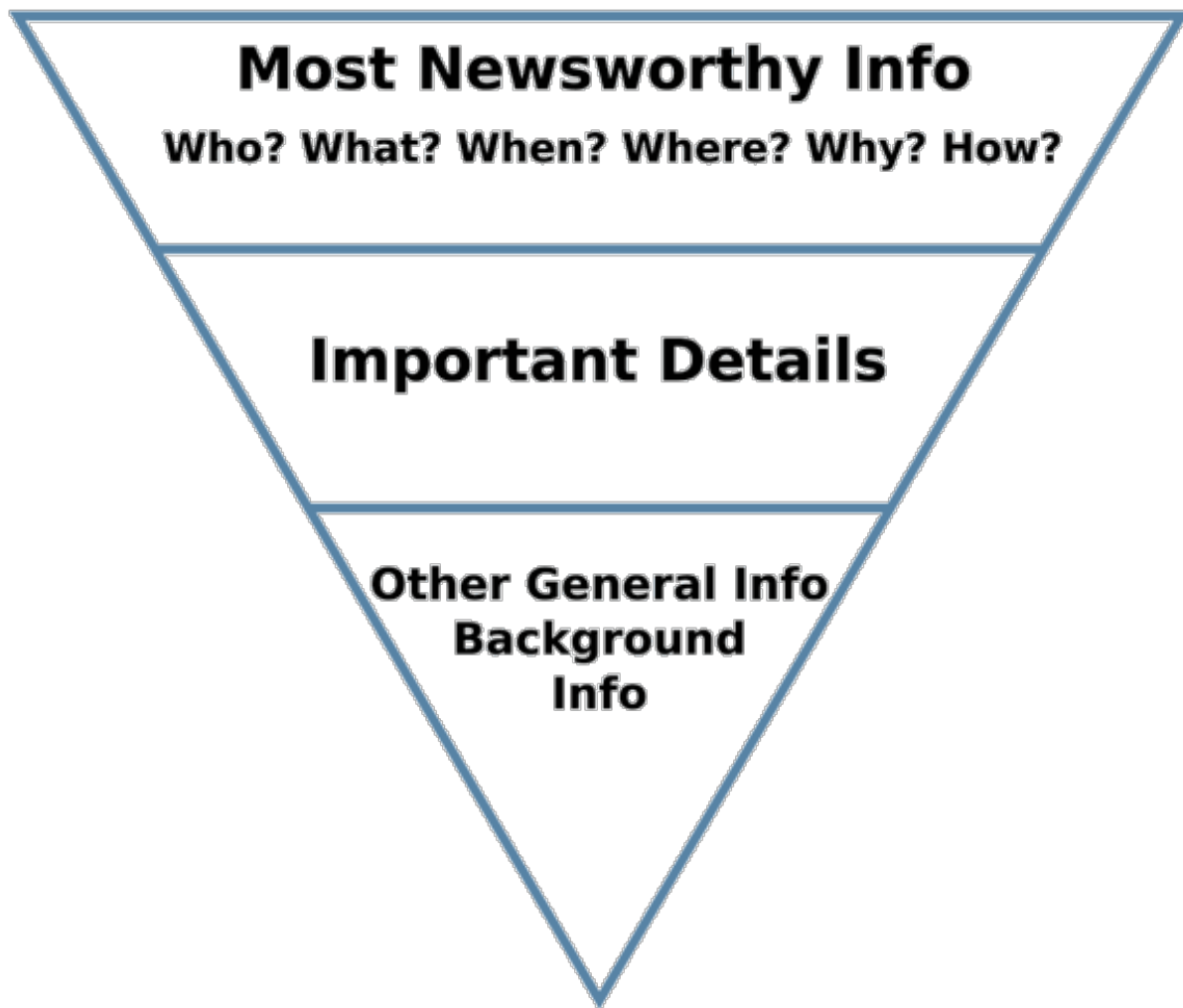


Figure 4.28: The inverted pyramid or writing used by journalists.

The idea is that anyone who reads a sentence or two comes away with everything they absolutely needed to know from the article. The more they read, the more they get, but they can stop at any point after a couple of sentences having absorbed what's most important.

Visual hierarchy works the same way. You want to give your most important elements, the most important information to communicate, the greatest visual weight. These elements should be the first that get noticed, starting with the dominant element in your design. Your next most important elements would get less weight and become a second level in your hierarchy. These are the journalist's details. Finally you'll have a large third level with everything else.

Imagine you only have a second or two to communicate something to a visitor. Your first job is to make sure they notice it. You make your most important information the most visually dominant information. If for some reason a visitor leaves after a few seconds, they should have at least seen what you want to communicate most. If a person stays longer they notice your next level in the hierarchy and so on.

Consider the design in **figure 4.29**. The title of the article carries the most visual weight. It's the most important information since it lets visitors know what the article is about. The next level in the hierarchy includes the image, which exists to pull you further into the content, the text to the left which has a lot of local visual weight, and the red used in the header so people notice the logo and the call to subscribe to the site.

If that's all anyone sees they should have a good sense of what's specifically on the page and generally on the site. Ideally it will be enough to convince them to explore the third level in the

hierarchy which is the text of the article.

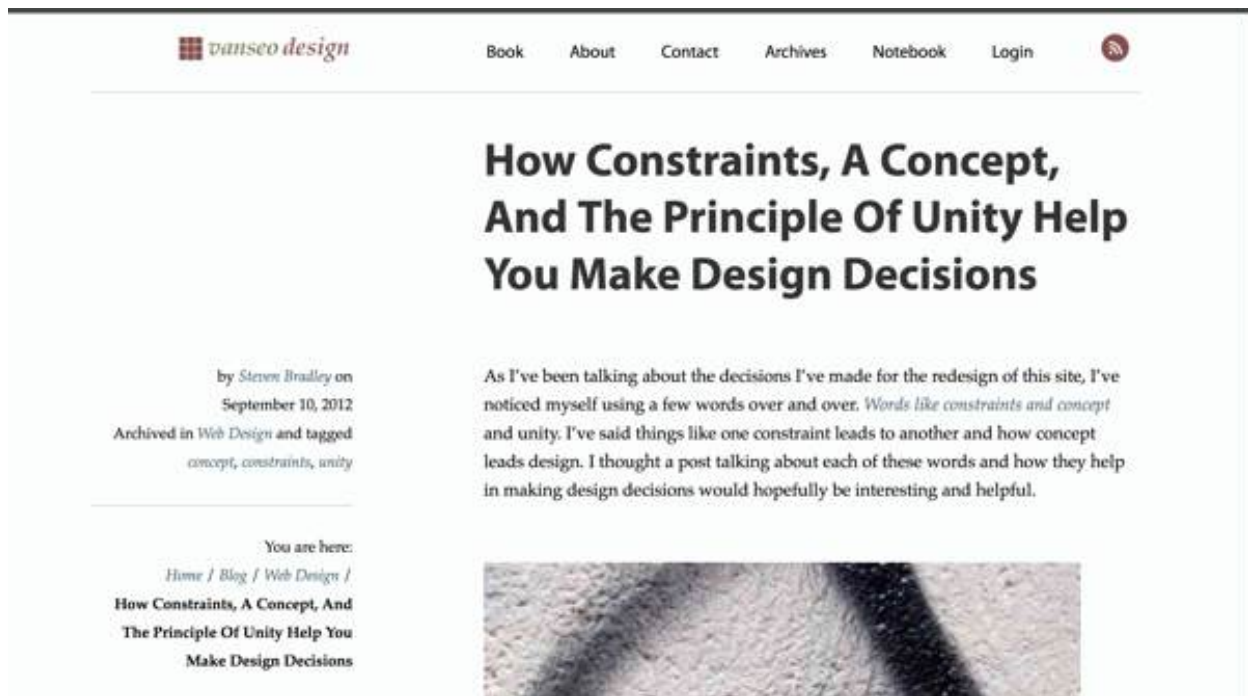


Figure 4.29: Hierarchy at the top of a typical post from Vanseo Design.

Typographic Hierarchy

Again, think in terms of three levels of hierarchy, three levels of dominance. You can go beyond three levels, if you must, but generally three levels works best. Make each level different enough from the others, but have each level share enough similarity to identify it as a distinct level.

- **Primary (Dominant) level**—This level leads people into design. You want to communicate your most important information here and then lead them to next level. This level is usually your main page heading (maybe your logo) You'll only be able to tell a small part of your story here so make it the most

important part.

- **Secondary (Sub-dominate) level**—This level draws your viewer further in and toward more detailed information. It includes subheads, pull quotes, captions, images and anything else that stands out from main text. You'll communicate more than in the primary level here.

- **Tertiary (Subordinate) level**—This level is your main content. Your main goal here should be to make the type legible. Readers have committed at this point so make it easy for them to get what they want. The first two levels will help people determine if they want to get to this one.

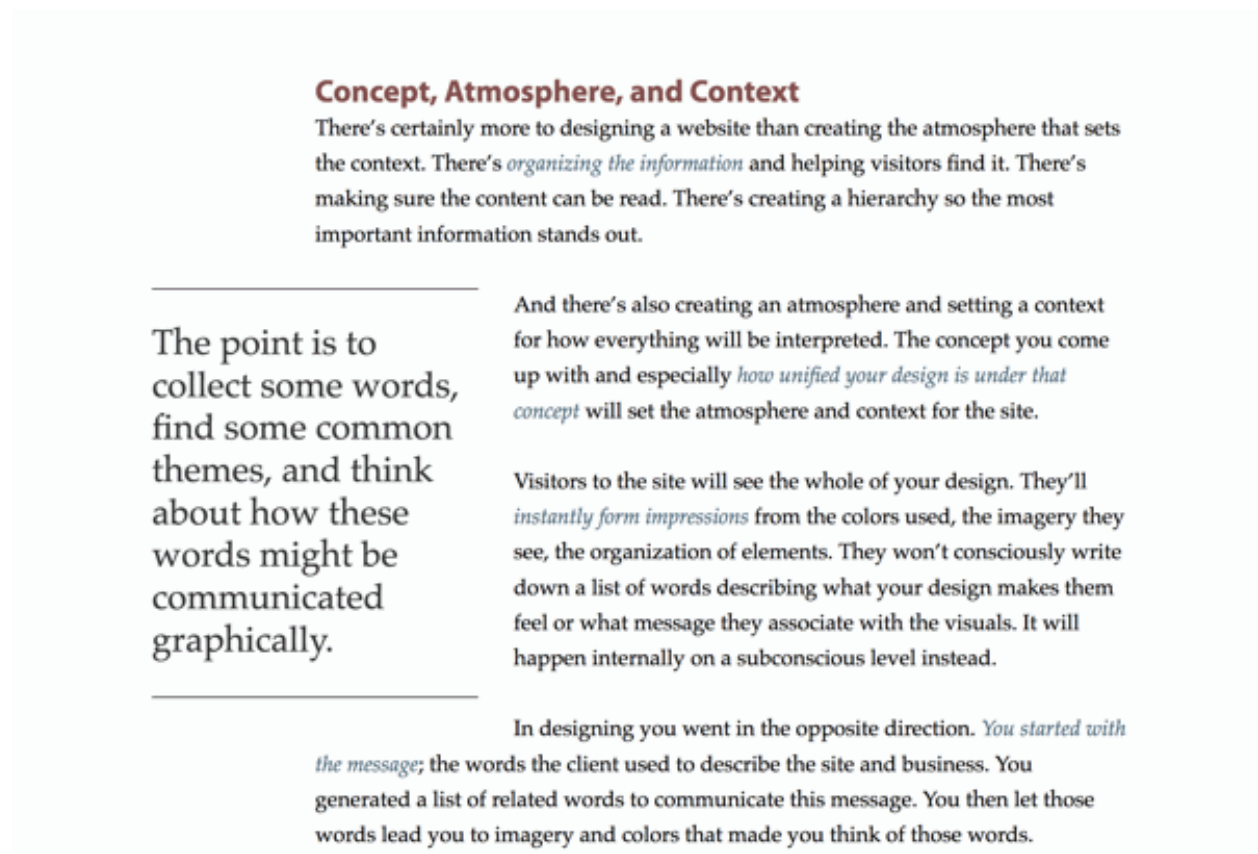


Figure 4.30: Two levels of hierarchy are shown in this detail of an article from Vanseo Design. One level (the secondary) includes the heading and pull quote

and is meant to capture attention when scanning. The other level (the tertiary) is the main body of text and is meant to be read after the quick scan creates interest.

Elements and information that are related go on the same level in the hierarchy. Elements and information that are different go on different levels.

Your primary and secondary levels will consist largely of display type, that is type meant more to be noticed than read. These two levels make your design more interesting to read. In other words it makes them more readable. The tertiary level is meant to be read so it consists almost entirely of text type. This level in the hierarchy is about legibility as opposed to readability.

Your hierarchy should move from more important to less important and from general to specific. General and important points are seen by everyone and less important details are seen by those that have expressed interest.

You can communicate both across and between levels in the hierarchy. Imagine three words or phrases. Each can be of a different size placing them on different levels of a hierarchical scale of size. Each could also be red placing them on the same level in a scale of color.

Make differences between different levels in the hierarchy significant. More contrast between them is better. The different levels need to be different. You aren't trying to create a continuum

from highest to lowest priority, but rather distinct levels of hierarchy.

One way to determine if you've successfully created visual hierarchy is to perform the squint test. With your eyes half closed you should still be able to make out the most important elements. Your highest level should remain visible while other levels become blurry. Close your eyes a bit more and even more elements should become less clear until only one, your dominant element, remains. Note all the elements that become blurry at the same time. These elements are all designed to sit on the same level in your visual hierarchy.

Compositional Flow

Believe it or not I started talking about compositional flow when I talked about dominance and focal points. I talked about it in the section about visual hierarchy too. A dominant element leads people into your design and focal points then attract their eyes to new locations.

Throughout this book I've used the phrase fixate and move again and again. Dominance, focal points, and visual hierarchy were about the fixate part of the phrase. Flow is about movement and direction. It's how you lead the viewer's eye through your composition.

You might take them from most important to least important information or through a sequence of information leading to a call-to-action button. Whatever the path, there's likely an order in which you'd like people to take through your design. You ideally want to lead them through your narrative and visually tell your story.

Think about this or any sentence in this book. I hope you've been reading each from first word to the last and not the other way around or in some random order. The sentences don't make much sense if you read them any way other than first word to last.

The same is often true when talking about a composition. For

example, it doesn't make much sense to present "Buy Now" buttons before showing the product that can be bought. Odds are you want people to take in the various parts of your design in a certain order.

What is Compositional Flow?

Flow is the way you direct a viewer's eye through a composition, through your design, both verbally and visually.

- **Verbal flow**—how text is arranged.
- **Visual flow**—how images and graphic elements are arranged.

The main way to achieve verbal flow is through consistency in the way you handle type. Is text in the design all in a single column? Then people will read from left to right (assuming a left to right reading direction) and from top to bottom down the column. Is the text presented in multiple columns? Then people will read down the first column until they reach the end and their eyes will move up to the top of the next column and so on.

Visual flow will depend more on how you specifically design and arrange the visual elements in the composition. It starts with the dominant element in the design and can move anywhere depending on the specifics of your design. Where are the focal points located? What directional cues exist in the design?

Flow in the Absence of Visual Design

Toward the end of the Attributes chapter, when I was talking about movement and direction, I mentioned there's a natural path a viewer's eye will take through a text-heavy design with little to no visual elements beyond the text. I mentioned the optical center of a design sits just above the geometric center and then I presented a few generic patterns before saying I would talk about them in more detail later. Well, it's later and I want to keep my promise.

A composition has a natural flow in the absence of a designed visual flow. In other words for text-heavy pages where verbal flow dominates. Text heavy pages follow several patterns based on the Gutenberg diagram.

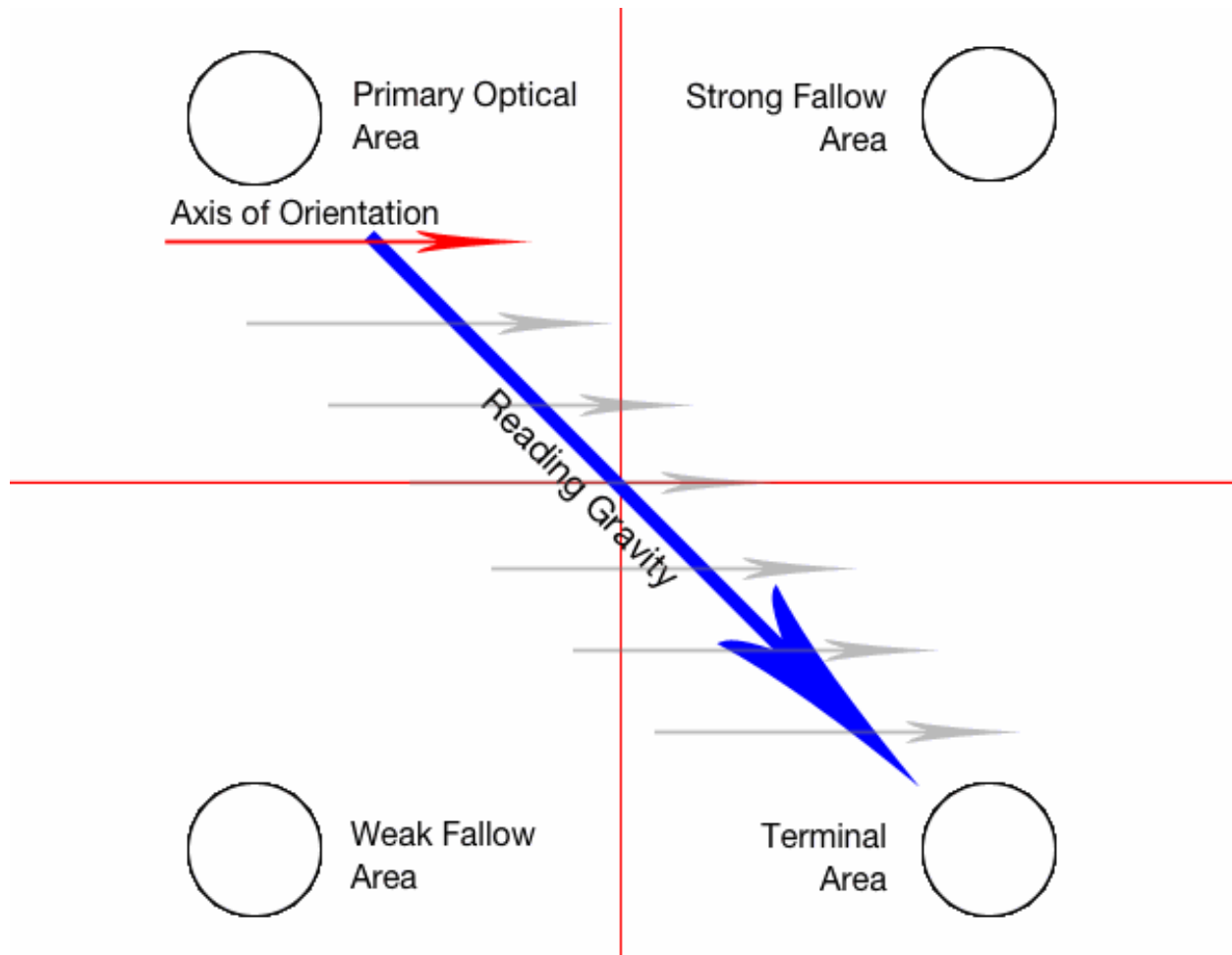


Figure 4.31: The Gutenberg Diagram indicating flow on a text heavy page.

The Gutenberg diagram divides the composition into four areas as seen in **figure 4.31**. The eye moves from primary optical area through the optical center and to the terminal area, paying some attention to the strong fallow area and little attention to the weak fallow area.

Note: In languages read right to left, the diagram should be flipped 180 degrees around its vertical axis so the primary optical area is in the top right instead of the top left

That's one path the eye might follow, but there are others that are similar. The Z-Pattern leads the eye from the primary optical area to the strong fallow area, down to the weak fallow area, and finally across to the terminal area.

The Zig-Zag Pattern is similar, though it steps down a handful of times instead of moving from top right to bottom left all at once. It's a bit down and then back across and then a bit further down and back and so on. Each of these steps is sometimes referred to as a golden triangle.

Note: If you're familiar with the idea of the golden ratio, know that this isn't it and I don't know why the word golden is used here. If you're not familiar with the golden ratio, my apologies for the interruption.

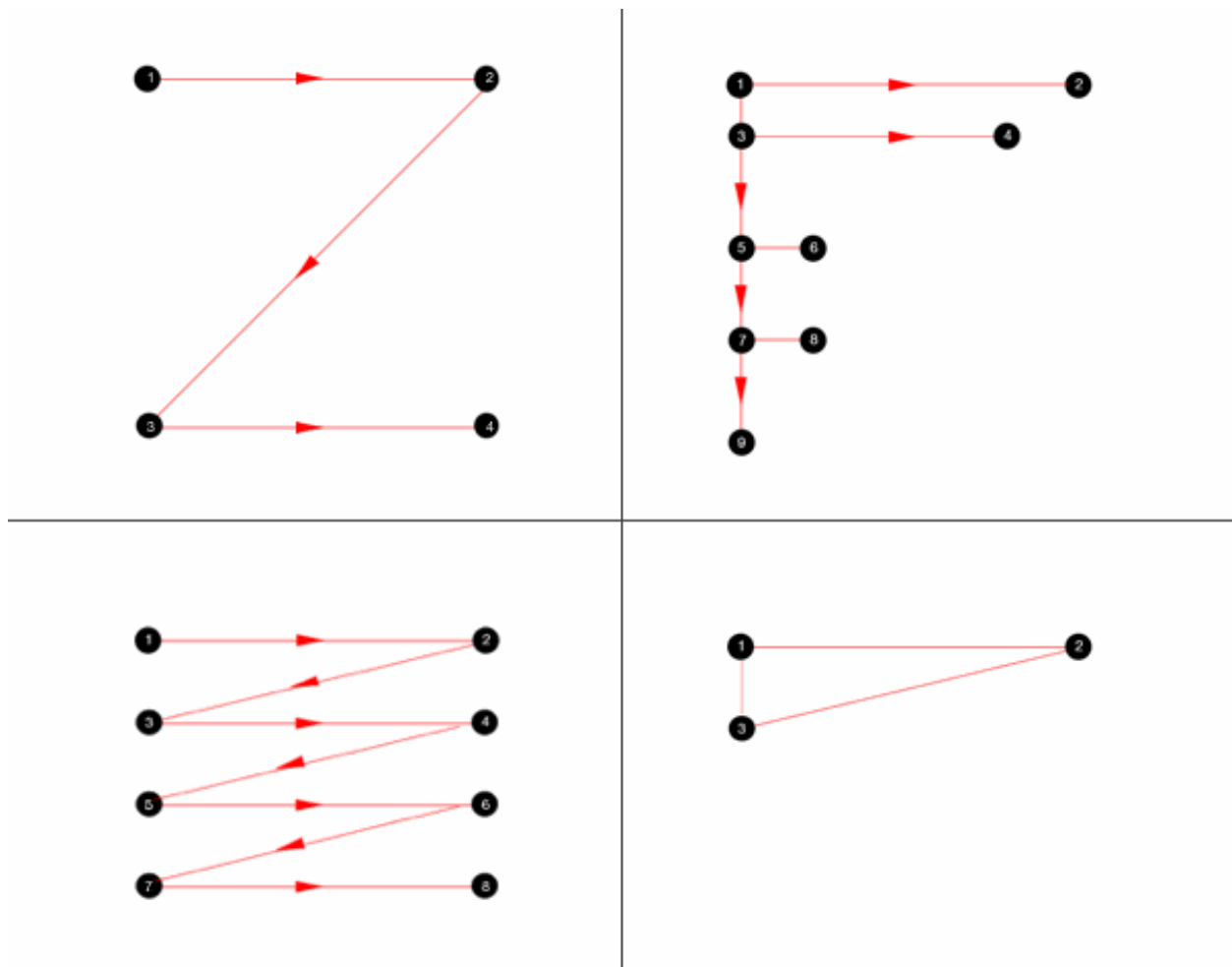


Figure 4.32: Clockwise from top left, the z-pattern, f-pattern, golden triangle, and zig-zag pattern.

The F-Pattern is a variation and it mostly applies to search engine results. The pattern begins similarly to the Z-Pattern, but instead of sweeping down and to the left all at once, it returns to the beginning of the line and then moves down to the next search result. Each sweep to the right is a little shorter than the previous one and the pattern takes on the shape of the letter F.

It's important to keep in mind these patterns only apply in the absence of a designed visual flow. They're natural patterns the eye

might follow through a design filled with little besides text. As soon as you add graphic elements and images you create a visual flow that will override all of these patterns, though you can make use of the natural tendencies of the patterns to strength your designed visual flow.

How to Create Visual Flow

Visual flow is created through your use of visual weight and direction. It begins with your dominant element, which should be the first thing someone notices on the page. From here viewers will work their way to the focal points on your second level of visual hierarchy.

Figure 4.33 is a composition we've seen a few times already. It's Kandinsky's *Composition #8* and it offers a good example of compositional flow. Your eye is probably first drawn to the large dark circle in the upper left, which carries the most visual weight in the composition.

From there my eye moves down the left side to the yellow circle with the blue around it. It next finds the blue circle with yellow around it at the bottom center and then moves to the purple and green circles at the bottom right. These are all focal points in the composition that attracted my eye and after I reach the circles in the bottom right my eye wanders back up toward the center and then to the top right.

Your eye might take a different path through the composition, but my guess is you notice the focal points I mentioned relatively quickly as you move through the hierarchy of visual weights.

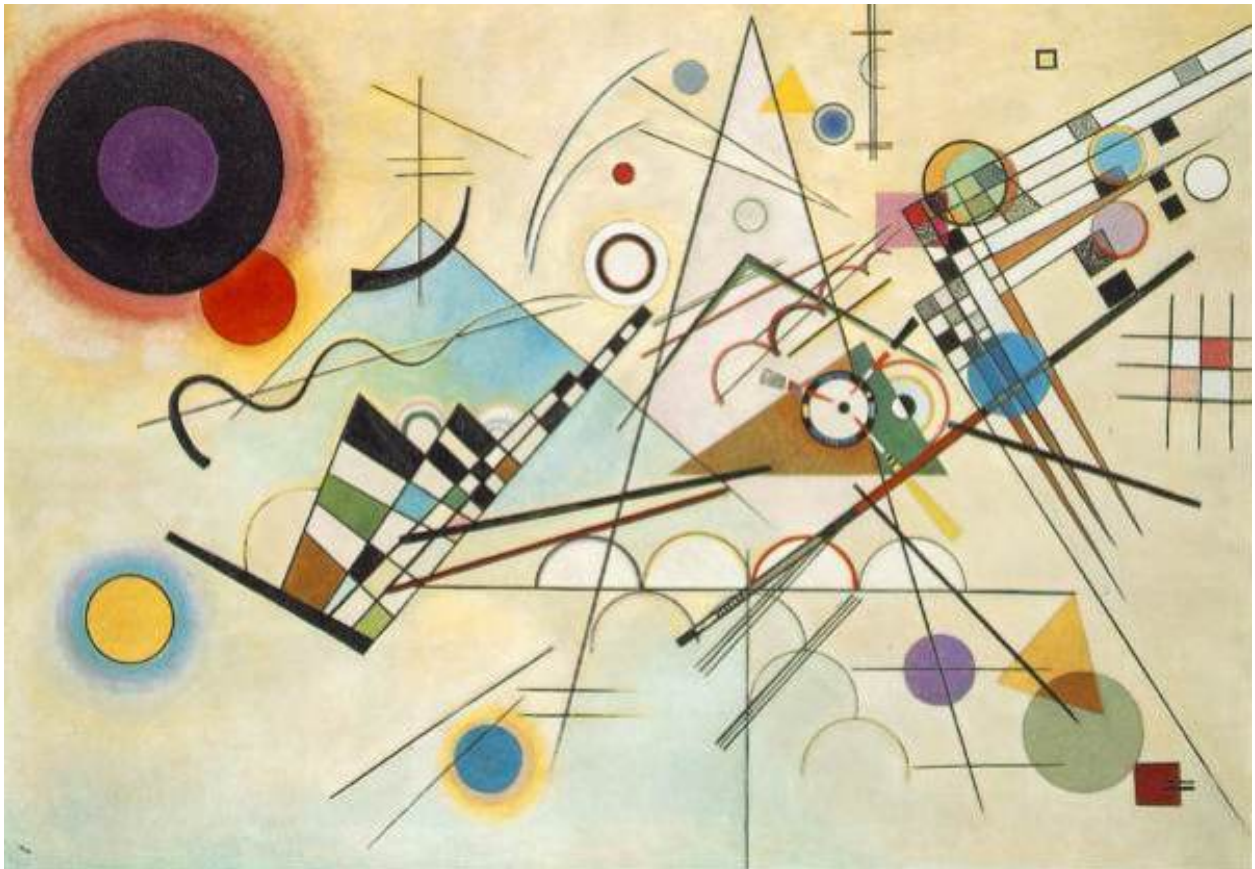


Figure 4.33: Kandinsky's Composition #8.

But it's not only visual weight that contributes to flow. You can further control where people look through visual direction. The shapes of lines and line-like elements point to where the eye should move next and they can also present a barrier when the eye moves perpendicular to their direction.

Lines and curves in Kandinsky's Composition #8 lead your eye

around the painting. Notice that many of the focal points are near the end points of lines. As your eye settles on one of these focal points the line pulls you to another part of the composition.

Look at the mass of elements in the center and top right of the composition. Many are lines or line-like shapes that lead you from one part of the composition to another, mostly sweeping from the top right to the bottom left, but with more than enough pointing in other directions so you can change course, if you like.

As we saw earlier there are several ways to impart direction. Lines and line-like elements are a common way, but not the only way. An image of a subject looking in one direction, an arrow, a hand pointing all compel viewer's to follow where they lead.

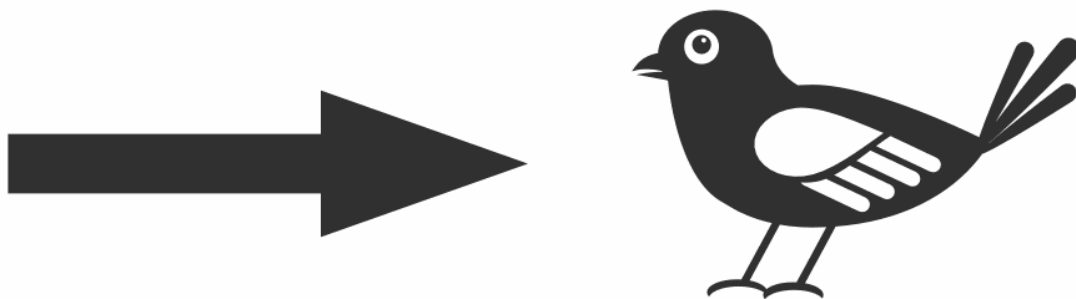


Figure 4.34: Direction from subject matter. The arrow directs you to the bird and the bird directs you back to the arrow.

When talking about visual direction earlier, I mentioned Rudolf Arnheim's structural net or structural skeleton (**Figure 4.35**).

Elements placed along these structural axes have a greater power to draw the eye.

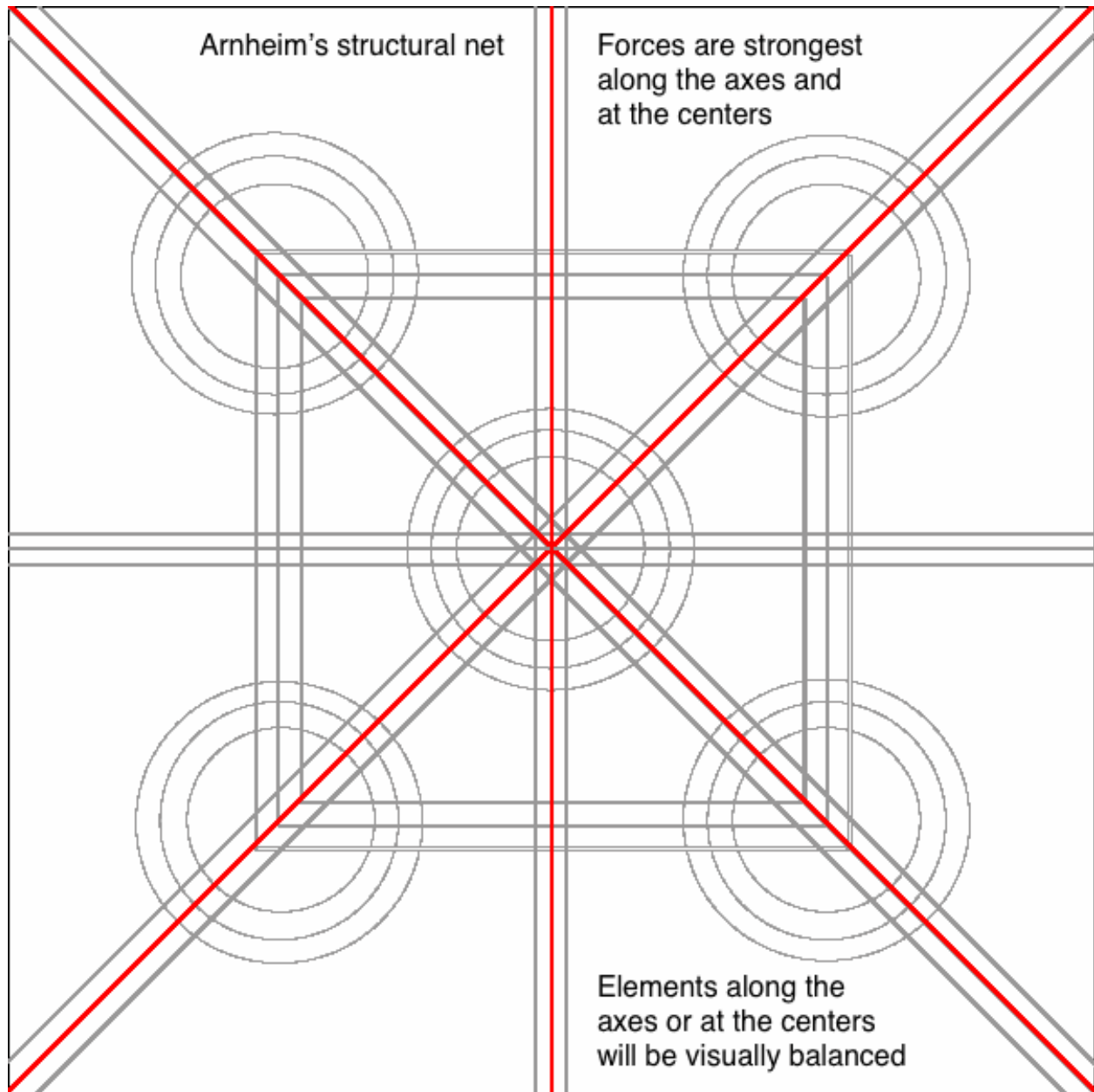


Figure 4.35: Rudolf Arnheim's structural net.

You can use these axes and the points along them to enhance or impede flow at different points in a composition. If the eye

naturally wants to move toward the area in lower right corner, you can place elements with more visual weight in the area or you can design visual cues that lead toward this corner. Both will enhance the natural forces pulling a viewer's eye there.

Movement creates direction and is another way to control flow through your design. Animation is one way to create movement as the eye is irresistibly drawn to literal movement. Literal movement, especially when it repeats, can be more than a little distracting.

The less obvious and more powerful way to use movement to create flow is through compositional movement. Earlier I presented several ways to create compositional movement. Here's the list again.

- Rhythm
- Gradation
- Perspective
- Gestural lines
- Directional lines
- Repetition of elements
- Subject matter of elements
- Implied action an element exhibits

If you look at the list above you'll notice lines feature prominently, but again, they aren't the only way.

For example, repetition. One of the reasons my eye moves from one circle to the next in Kandinsky's Composition #8 is because the shape of a circle is repeated. So is color. The two circles at the bottom are both blue and yellow, even if not in the same places. Once my eye settles on one blue and yellow circle, it's more likely to notice others and after noticing one nearby moves to it and fixates momentarily before moving on to the next focal point.

Micro Flow

So far I've been talking about flow from a macro perspective to control how a viewer's eye moves through your design. You also want to consider flow on a micro level to make sure that your flow is in harmony with elements in your design.

For example, think about a simple search field and search button. The logical flow is for someone to fill in the field and then click the button. It wouldn't make sense to visually place the button before the field or people will have to move through the button to get to the field and then back again to click the button. The visual flow would be out of sync with the logical flow of using the search form.

Figure's 4.36 through 4.38 provide another example. In **figure 4.36** the arrows point to the left while the reading direction of the text is left to right. The flow of the arrows is to the left, while for the text it's to the right as it's read from left to right.



Persecuti Saperet tibi que ut ius vero habemus ex duo cum congue

Figure 4.36: The arrows and text flow in opposite directions, each leading the eye away from the other.

In **figure 4.37** the arrows and the text switch sides. Both now flow to the right, but the arrows lead you off the page. After reading the first paragraph, the arrows might pull you away from reading the second.

Lorem ipsum dolor sit amet
Cras ut sem augue, labore sit amet
Donec posuere lorem ac leo
In et orci a ligula mattis



Lorem ipsum dolor sit amet
Cras ut sem augue, labore sit amet
Donec posuere lorem ac leo
In et orci a ligula mattis



Persecuti Saperet tibi que ut ius vero habemus ex duo cum congue

Figure 4.37: Here the text flows into the arrows, but the arrows take the viewer away from the text.

In **figure 4.38** the arrows lead viewers to the text, which lead the viewer to the end of the line before moving back to the left to read the next line. The arrows prevent the viewer from moving too far to the left.



Lorem ipsum dolor sit amet
Cras ut sem augue, labore sit amet
Donec posuere lorem ac leo
In et orci a ligula mattis



Lorem ipsum dolor sit amet
Cras ut sem augue, labore sit amet
Donec posuere lorem ac leo
In et orci a ligula mattis

Persecuti Saperet tibi que ut ius vero habemus ex duo cum congue

Figure 4.38: The arrows lead viewers to the text and the text leads viewers to the right and then back down to the next line. Both the arrows and the text get the reader to a new line.

Rhythm

I called out repetition as a way to lead to the eye through a composition. When the eye lands on an element of certain characteristics, it tends to seek other elements in the composition with similar characteristics. Color is a strong characteristic to use in repeating elements. Place a red element at the top left of the composition, then another directly in the center, and finally a third in the lower right and the eye will likely travel from top left through the center and to the lower right.



Figure 4.39: The repetition and curves of the stairs creates rhythm, movement, and flow in this image.

When the repetition is patterned and regular you create rhythm, which can both lead the eye and control the pace of movement. There are three ways to create rhythm.

- **Repetition**—creates pattern through predictability.
- **Alternation**—creates pattern through contrasting pairs.
- **Gradation**—creates pattern through a progression (scale) of regular steps.

Rhythmic patterns are built from elements and the intervals between elements. The eye will follow the path of the rhythm. As there are three ways to create it, there are also three primary types of rhythm.

- **Regular rhythm**—occurs when the intervals between elements are predictable or the elements themselves are similar in size and length.
- **Flowing rhythm**—occurs when either the elements or the intervals are organic. This creates natural patterns that evoke a feeling of organic movement. Stripes on a tiger or zebra are a good example.
- **Progressive rhythm**—occurs when the sequence of forms or shapes is shown through progressive steps. Some attributes of the elements might have stepped changes or the interval might have stepped changes. This gradual increase or decrease in

sequence creates movement and direction.



Figure 4.40: Regular, flowing, and progressive rhythm.

Rhythm is created by maintaining some kind of similarity across the elements or the intervals between them. The repetition of the similar characteristic(s) becomes the rhythmic element and draws the eye along it. Variations in the pattern can add interest.

Emphasis (contrast) can be used to break the rhythm and pause flow momentarily, further adding interest.

As soon as you place multiple elements with similar attributes in a composition, your viewer will see a pattern and some kind of rhythm will form. Better to be aware of rhythm and use it to your advantage than let it just happen, especially as it contributes to the overall flow of your composition.

Compositional Balance

There's one last principle I want to talk about and that's compositional balance. When the balance is right, the design just feels right. Balance helps keep your composition aesthetically pleasing, creates an interesting whole to your design, and contributes to visual unity and harmony. No part of the composition overpowers the other parts and everything appears stable and visually right.

When a design is unbalanced the individual elements dominate. The whole becomes less than the sum of its parts and unity is lost. An unbalanced composition can also lead to unwanted tension. For example, imagine a boulder clinging to the the side of a mountain. You know the boulder can't stay where it is and you feel the tension of the impending crash. It's hard to take in anything else as all your attention is focused on the tension of what you expect to happen.

Balance in the Physical World

In the physical world we have formulas to calculate if a system is in balance. Forgive my mention of formulas and the tiny bit of math to follow. I promise it will be simple and there will be no quiz.

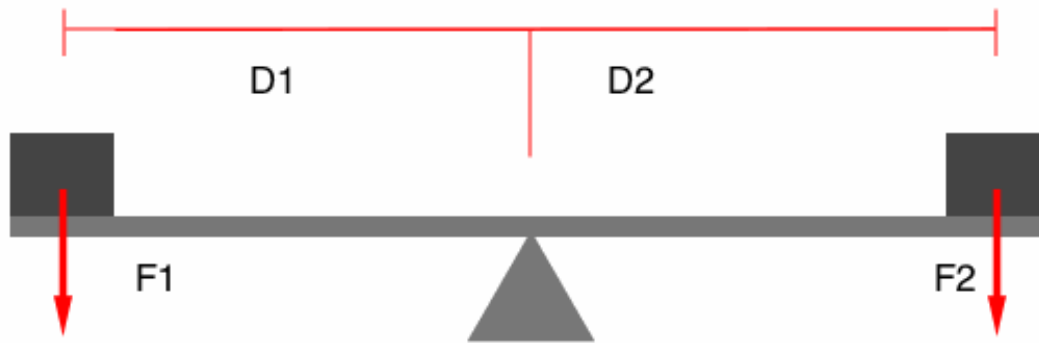


Figure 4.41: Elements of equal weight sitting equidistant on either side of a fulcrum.

To determine if objects are balanced around a fulcrum we can multiply the force of each object by the distance it is from the fulcrum and then add up all the various forces. In the physical world these forces will act down on either side of the fulcrum so what's on one side is opposite what's on the other, one force trying to create clockwise motion and the other counterclockwise motion.

$$F_1 \times D_1 = F_2 \times D_2$$

Where F = force (usually weight)

And D = distance from fulcrum

When the force on one side multiplied by its distance from the fulcrum is equal to the force on the other side multiplied by its distance to the fulcrum, things are in balance. When they aren't equal, things are out of balance and an instability is created.

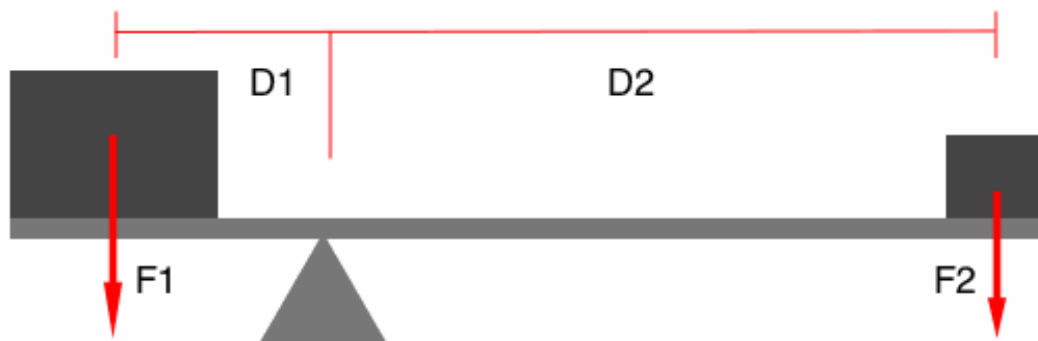


Figure 4.42: Elements of unequal weight need to be located at different distances to maintain balance.

When the forces are equal their distance from the fulcrum should also be equal as in **figure 4.41**. When the forces are unequal then their distance from the fulcrum must also be unequal as in **figure 4.42** if the system is to remain in physical balance.

Visual Balance

In a composition we aren't dealing with real physical forces. Your elements don't have physical weight, but they do have visual weight. What you're trying to balance is the areas in the composition that attract the eye. If all your focal points are all on one side of your design, the other side might never get noticed.

Unlike the physical world, we don't have a simple formula to calculate the various forces attracting our eyes, but the same general ideas still apply. Your elements have visual weight and

they're located at various distances from each other and an imagined fulcrum, for example, the optical center of the canvas.

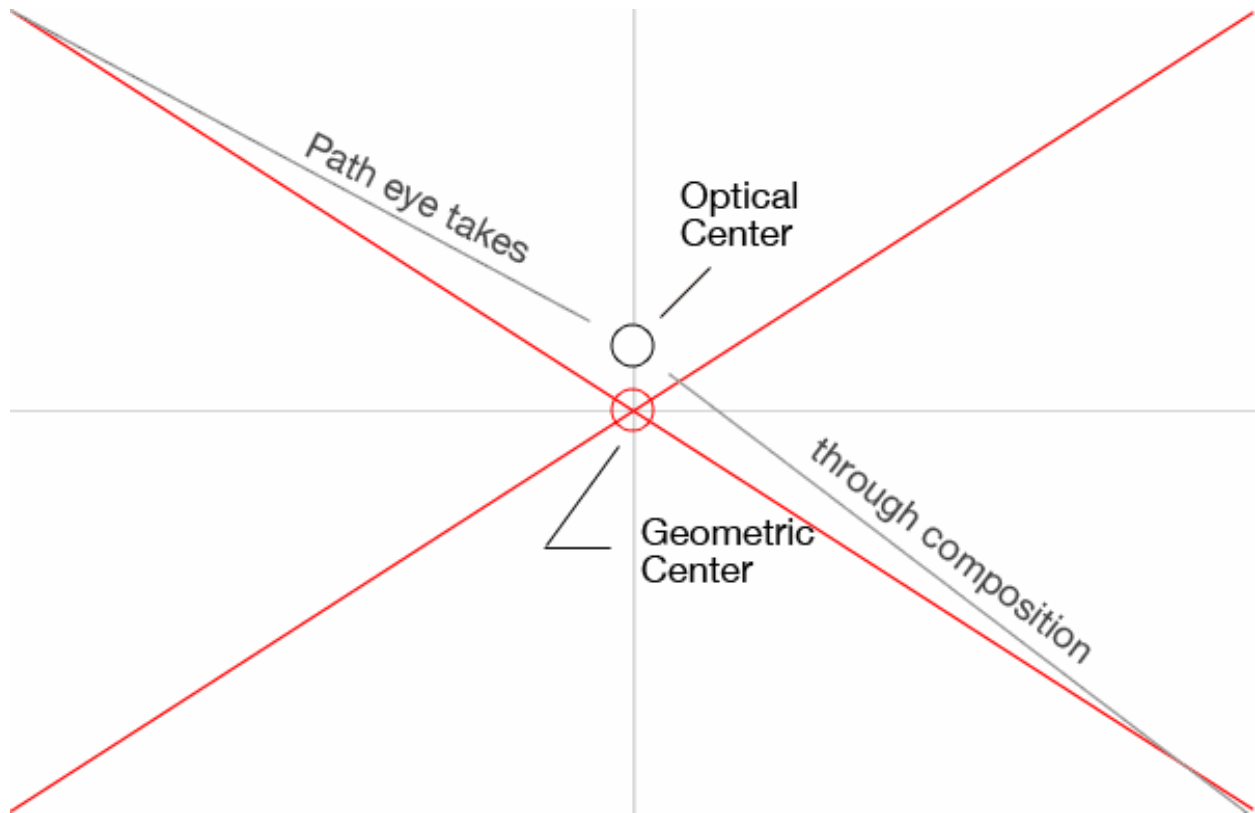


Figure 4.43: The optical center.

The optical center of a composition is the point around which elements are balanced. It has a strong natural pull for the viewer's eye and it sits slightly higher than true center. In the absence of a designed flow your eye will travel from the top left corner, through the optical center, and to the bottom right corner (reversed in countries that read right to left). In general we want to balance elements around this optical center.

We won't be able to do the math (something you're probably happy about). Instead we'll have to use our eye and our judgment

to determine if the composition is in balance.

One more thing to consider is the direction the forces act. In **figures 4.41 and 4.42**, I assumed the forces were a result of gravity and so acted downward, but visually you can change this by adding visual direction to different elements. Where no visual direction is present we can assume the same downward direction of gravity.

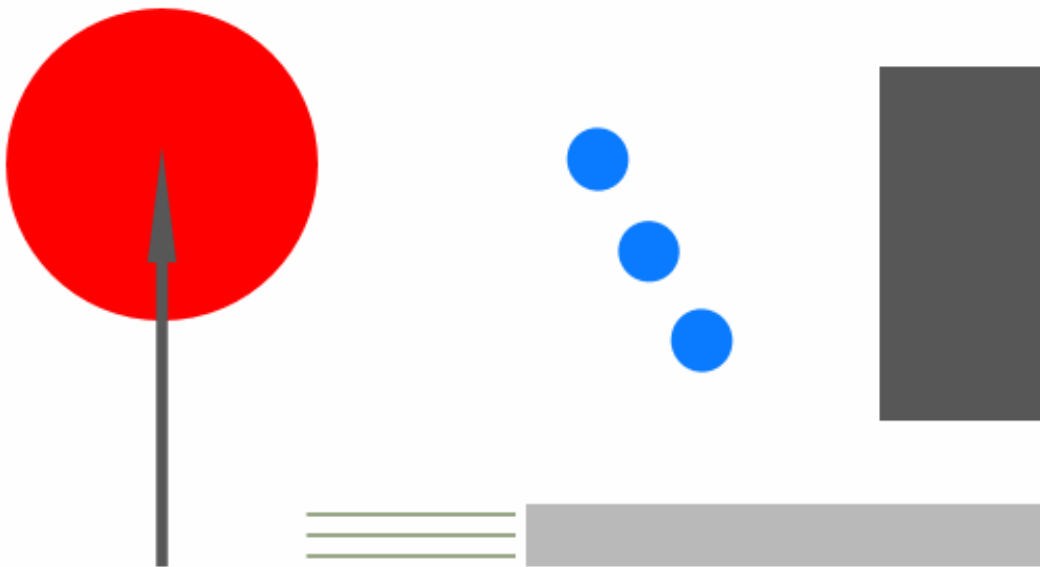


Figure 4.44: Elements of different visual weight acting in different visual directions.

The simple composition in **figure 4.44** consists of several elements of different visual weights. Without any direction present we can assume the force acts downward and all the elements will have some component of this downward force.

The red circle on the left carries the most visual weight and on its own the force acts downward. The arrow placed against it carries little visual weight, but imparts an upward direction on the circle, which lessens the overall downward force of the combined objects. In fact you might even see the red circle as moving up.

On the right the vertical rectangle's weight acts entirely downward, while the light blue circles have a diagonal component to their directions. Finally the horizontal rectangle has a horizontal direction, which is emphasized by the 3 lines on its left. The combined rectangle and lines appear to be moving to the right. This could be seen as adding a counterclockwise motion to the composition, which counters the clockwise motion the arrow on the left adds.

Types of Balance

The two figures on physical balance each showed a different kind of balance. In the first everything was equal on both sides of the fulcrum. In the second the individual parts, the forces and the distances, were unequal, but the whole was still balanced. That's because there are different types of balance and we can use each when designing.

- **Symmetrical balance**—Equal visual weight on each side.
- **Asymmetrical balance**—Unequal visual weight on each

side.

- **Radial balance**—The elements radiate from a common center.
- **Mosaic balance**—Balanced chaos.

To balance a composition symmetrically the elements on either side of the center should have a combined weight equal to the elements on the other side as in Leonardo's painting, Last Supper (**figure 4.45**). It's not perfectly symmetrical, but it's pretty close.



Figure 4.45: Leonard da Vinci's Last Supper is symmetrical balanced around the figure of Christ.

Symmetrical balance is easy to observe and achieve and it evokes feelings of consistency, elegance, and classicism. It can also be formal and static, and perhaps a little boring. It's a good choice for something like a wedding invitation that's meant to be formal and

elegant.

With asymmetrical balance all isn't equal on both sides of the fulcrum. The visual weight won't be so evenly distributed. One side of the composition might contain a very dominant element, while the other balances it with several less dominant elements.

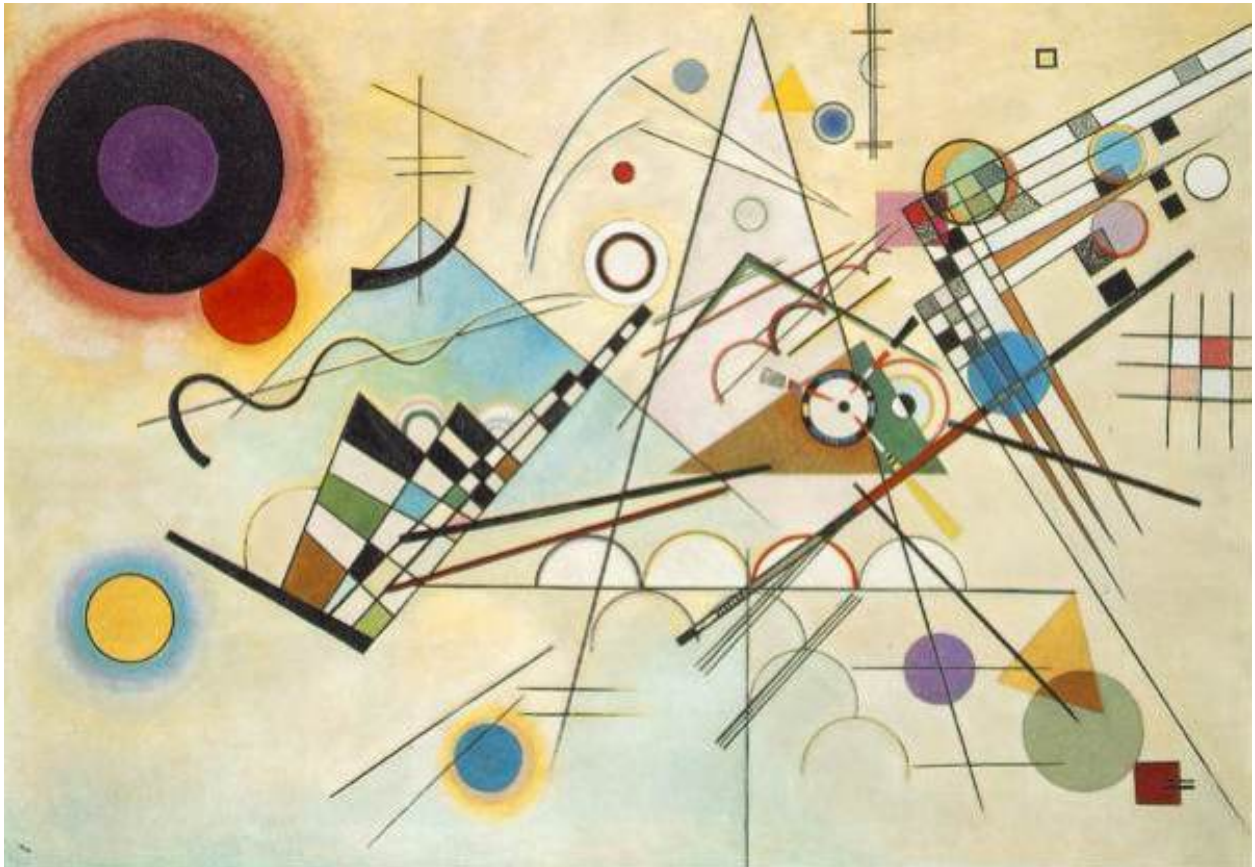


Figure 4.46: The now familiar Kandinsky Composition #8 is an example of asymmetrical balance.

Asymmetrical balance is more dynamic and thus more interesting. It evokes feelings of modernism, forcefulness, vitality, and movement. It offers greater visual variety and energy. It is, however, more difficult to achieve and it requires elements to

have more complex relationships between them. More whitespace is usually used to pull off asymmetrical balance.

Radial balance occurs when all elements radiate from a common center like the rays of the sun, the petals of a daisy, or the ripples in a pond after a stone has been tossed in.



Figure 4.47: A drop of water creates ripples that lead to radial balance.

Since radial balance requires a common center, this center naturally becomes a focal point for the eye to notice. Radial balance is typically symmetrical, though it tends to be a little more interesting.

Mosaic balance is where many elements combine to create a sort of balanced chaos. A Jackson Pollack painting is a pretty good

example. Mosaic balance lacks hierarchy and can appear to be little more than noise. It's hard to define a single focal point given all the chaos.



Figure 4.48: Jackson Pollack's Number 1 shows mosaic balance. The composition seems like balanced chaos.

Mosaic balance lacks a dominant element and it generally lacks hierarchy. It can appear to be visual noise at first glance, but it somehow works.

Symmetry and Asymmetry

Symmetry and asymmetry deserve a little more discussion not limited specifically to balance. Symmetry is often seen as the more beautiful of the two. It leads to a sense of harmony and pleasing aesthetics. However, it can also be seen as static and less interesting. Asymmetry while lacking the beauty of symmetry is seen as more interesting and more dynamic.

There are three primary types of symmetry, reflection, rotation, and translation.

Reflection (bilateral) symmetry is mirroring around a central axis. It's the type of symmetry I've been talking about to this point. The central axis can be in any direction or orientation, though so far we've been considering a vertical axis in the center of the composition.

Natural forms that grow or move across the earth's surface develop this kind of symmetry. The human face and a butterfly are examples.

When the reflection is a perfect mirror image, the symmetry is said to be pure. Much of the time it won't be perfect and each side will have slight variations. This is near symmetry, and it's more common than pure symmetry. Objects in the real world may often appear to have pure symmetry, but they are almost never perfectly symmetrical and exhibit near symmetry instead.

Reflection symmetry can also occur over multiple axes at the same time. For example, the left and right half of a composition could mirror each other, while the top and bottom also mirror each other. Snowflakes show reflection symmetry over more than two axes.

Rotational (radial) symmetry is the rotation of elements around a common center. It can occur at any angle or frequency as long as the center is common.

Natural forms that grow or move perpendicular to earth's surface develop this kind of symmetry. The petals of a sunflower are an example. Rotational symmetry without reflection symmetry is sometimes used to portray motion, speed, or dynamic action. Think of the spinning wheels of a moving car.

Translation (crystallographic) symmetry is when similar elements are repeated over different locations in space. It can occur in any direction or at any distance as long as basic orientation is maintained. Repeating fence posts are a good example.

Natural forms develop translation symmetry through reproduction. Translation symmetry can be used to create rhythm in design and it can also be used to show motion, speed, and dynamic action.

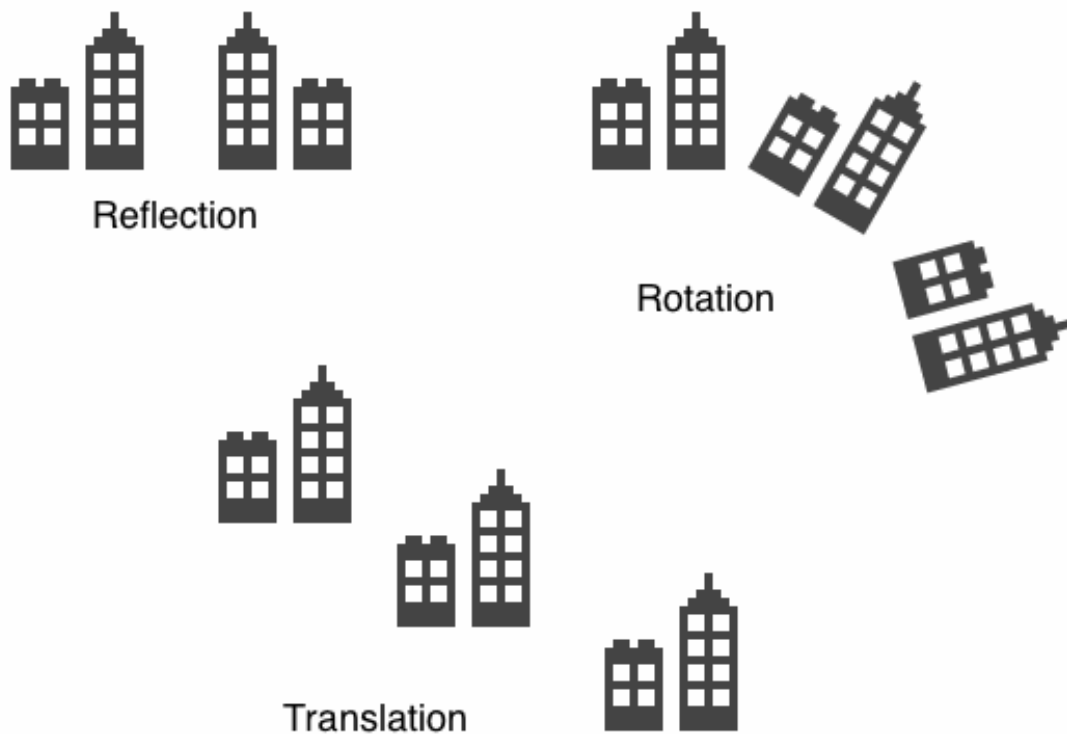


Figure 4.49: The 3 types of symmetry, reflection, rotation, and translation.

Symmetrical forms are usually seen as figure as opposed to ground. They receive more attention because they're simpler than asymmetrical forms and as a result are seen to carry more visual weight, than similarly sized and shaped asymmetrical forms. I'm talking about the specific elements here and not the overall balance of the composition.

Symmetrical elements can convey balance in and of themselves, but they can also appear too stable and too balanced, leading to a lack of interest. They also tend to create passive space around them because of the equality they create.

Asymmetrical forms lack the inherent balance of symmetrical forms, though you can certainly balance a composition with asymmetrical elements. It's fairly common in natural forms. People are right or left handed. Fiddler crabs have claws of different sizes. Dolphins have different sized lungs to make room for an asymmetrical heart. Rivers meander, trees grow in different directions, clouds have random shapes.

Asymmetry creates more complex relationships between elements, which tends to be more interesting and so draws more attention. It creates unpredictable patterns and it allows for a greater freedom of expression. However, the complex relationships can be difficult to balance and there's a possibility for too much variety leading to confusion. The space around asymmetrical forms is more active due to the more complex shapes.

You can combine symmetry and asymmetry to good effect. You can balance symmetrical objects in an asymmetrical way or vice versa. You can also break up symmetrical elements with a random mark to create interest.

Contrasting symmetry against asymmetry is very attention getting. Try asymmetrically balancing a number of symmetrical elements or symmetrically balancing asymmetrical elements. Use rotational and translation symmetry to indicate motion, create rhythm, and flow.

Vary the size, shape, color, and other attributes of elements to alter their visual weights if the composition feels unbalanced. Remember that symmetry and balance are not the same thing. They're clearly linked, but they are different concepts.

Closing Thoughts

I hope you enjoyed this walk through of the fundamentals of graphic design. Even more, I hope you now have a better understanding and a context for how to make design decisions on your next project and all that come after.

I haven't tried to present design as a recipe. I don't think the way to become a better designer is to follow a set of instructions step-by-step. Instead you should begin knowing what you want to communicate and then use the fundamentals to decide how best to communicate your ideas visually.

One of the things I've noticed in my own design education is how so much advice for design evolves out of the way our eyes naturally work to take in visual information, how our perception is mixed with long held beliefs, which direct what we see and how we interpret our visual surroundings.

We take in our visual environment through saccadic eye movements that alternate between fixating on one object and then moving to another object to fixate on it. You can think about everything in this book as a way to either attract the eye to a specific location or direct it to another; to help the eye fixate on an object or to help it move to another object.

Design **elements** are placed in space, which itself is a design

element, and will either exhibit the characteristics of a dot (attraction) or a line (direction).

Design **attributes** are the characteristics of elements. They're how elements can be described and they show you how to design some elements to look like others to direct the eye from one to the next and how to design some elements to look different from others to attract the eye to the different element. All the attributes build up to the concepts of visual weight to attract the eye and visual direction to direct it elsewhere.

Design **principles** are guidelines for deciding which type of element to use and how you should design it to look. They arise from gestalt principles, which arise directly out of visual perception. With these principles think in terms of similarities (direction) and contrast (attraction) and how they play a role in either helping the eye to fixate or helping it to move to another object.

Let me leave you with one final thought. Understanding all that's here as well as information you might learn in other books about graphic design and composition is one way to learn how to be a better designer. Another way is to look at designs and think about them.

When you come across a website, an ad in a magazine, a movie poster, or any piece of graphic design, spend a few minutes looking at it and asking yourself why you do or don't like it and

think about how the designer used different elements with different attributes, and see if you can identify the principles they used to arrange everything in the space of the canvas.

Then do the same with your own designs. Be aware of your own choices so you can continue to make more and more conscious decisions using everything you've learned and thought about.

Thanks.

More Books About Design

Following are some of the books that have helped me better understand the fundamentals of design. I've provided a few quick thoughts about each along with links to where you can purchase them.

Non-Designers Design Book

by Robin Williams (no, not that Robin Williams)
(Peachpit Press, 2008)

This is a great introduction to design, especially if you have no prior experience. The book limits its scope to a handful of important concepts and offers plenty of before and after illustration. It's a quick read and it's the first book I ever read about design.

[Peachpit Press](http://www.peachpit.com/store/non-designers-design-book-9780321534040)

<http://www.peachpit.com/store/non-designers-design-book-9780321534040>

[Amazon](http://www.amazon.com/Non-Designers-Design-Edition-Designers-ebook/dp/B00125MJYM/)

<http://www.amazon.com/Non-Designers-Design-Edition-Designers-ebook/dp/B00125MJYM/>

Design Basics Index

By Jim Krause

(How Design Books, 2004)

This is another book filled with quick practical tips and examples. It covers a wider range of topics than Non-Designers Design Book and offers a variety of exercises to help you practice.

[Amazon](http://www.amazon.com/Design-Basics-Index-Jim-Krause/dp/1581805012/)

<http://www.amazon.com/Design-Basics-Index-Jim-Krause/dp/1581805012/>

Universal Principles of Design

By William Lidwell, Kritina Holden, and Jill Butler

(Rockport, 2010)

The author's goal with this book is to begin a conversation about 125 different principles of design. The principles covered aren't quite those covered here. They're more cross disciplinary and cover things like the 80/20 rule, Occam's razor, and the human bias to favor things we find more attractive.

[Amazon](http://www.amazon.com/Universal-Principles-Design-Revised-Updated/dp/1592535879/)

<http://www.amazon.com/Universal-Principles-Design-Revised-Updated/dp/1592535879/>

Visual Grammar

By Christian Leborg
(Princeton Architectural Press 2006)

This book is an attempt to define the grammar of the visual language we work with. It talks in terms of objects, structures, relations, and activities, which loosely map to elements, attributes, and principles. Much of what I discussed about structures, patterns, and textures, comes from this book's discussion of structures.

[Princeton Architecture Press](http://www.papress.com/html/book.details.page.tpl?isbn=9781568985817)

[http://www.papress.com/html/book.details.page.tpl?
isbn=9781568985817](http://www.papress.com/html/book.details.page.tpl?isbn=9781568985817)

[Amazon](http://www.amazon.com/Visual-Grammar-Design-Briefs-Christian/dp/1568985819)

[http://www.amazon.com/Visual-Grammar-Design-Briefs-
Christian/dp/1568985819](http://www.amazon.com/Visual-Grammar-Design-Briefs-Christian/dp/1568985819)

Design Elements; A Graphic Style Manual

By Timothy Samara
(Rockport 2007)

I leaned heavily on the information in *Design Elements; A Graphic Style Manual* when writing the section on design elements here. It also covers topics related to text, color, images, as well as putting everything together into a cohesive design.

[QBookShop](#)

<https://www.quartoknows.com/books/9781592532612/Design-Elements.html>

[Amazon](#)

<http://www.amazon.com/Design-Elements-Graphic-Style-Manual/dp/1592532616/>

The Elements of Graphic Design

By Alex White

(Allworth Press 2011)

One of two books I've read by Alex White. It covers many of the same topics as Design Elements above, but does so from its own unique perspective. I found this book helped fill in a number of gaps in my understanding and again offered information from a perspective not found in other books about graphic design.

[Allworth Press](#)

<https://www.skyhorsepublishing.com/allworth-press/9781581157628/the-elements-of-graphic-design/>

[Amazon](#)

<http://www.amazon.com/Elements-Graphic-Design-Second/dp/1581157622/>

Art and Visual Perception

By Rudolf Arnheim

(University of California Press 2004)

This book was originally written in 1954. Arnheim was a psychologist who wrote extensively about the psychology of all things visual. Much of this book is connected to gestalt principles and it's a classic for learning visual communication. It's not a quick or easy read, but I highly recommend it when you want to dig a little deeper beyond the basics.

[University of California Press](http://www.ucpress.edu/book.php?isbn=9780520243835)

<http://www.ucpress.edu/book.php?isbn=9780520243835>

[Amazon](http://www.amazon.com/Art-Visual-Perception-Psychology-Creative/dp/0520243838/)

<http://www.amazon.com/Art-Visual-Perception-Psychology-Creative/dp/0520243838/>

These last two books cover visual perception. Everything I shared about visual perception comes from one or both of these books. They go beyond how the eye works and relate everything to graphic design, though not quite how I've tried to do so here. I don't know that I could pick a favorite between the two. I'd say if you're interested enough in the topic to read one of them, you'll likely enjoy reading both.

Visual Language for Designers

By Connie Malamed
(Rockport 2011)

[QBookShop](#)

<https://www.quartoknows.com/books/9781592537419/Visual-Language-for-Designers.html>

[Amazon](#)

<http://www.amazon.com/Visual-Language-Designers-Principles-Understand/dp/1592537413/>

Visual Thinking for Design

By Colin Ware
(Morgan Kaufmann Publishers 2008)

[Amazon](#)

<http://www.amazon.com/Visual-Thinking-Kaufmann-Interactive-Technologies/dp/0123708966/>

References

Following are links to some of the online content I used in researching this book, including articles from my own site at www.vanseodesign.com.

Chapter 1: Visual Perception

[Bottom-Up Visual Perception: What Saccadic Eye Movements Suggest For Designers](#)

[Top-Down Visual Perception: How You Can Tap Memory To Direct Eye Movement](#)

[How To Organize Information for Early Visual Perception](#)

[How To Direct A Viewer's Eye Through Your Design](#)

[Communicate Efficiently By Reducing Realism](#)

[Using Graphics to Make Abstract Concepts Concrete](#)

[How To Make Visually Complex Information Easy To Understand](#)

[Use The Efficient Power Of Emotional Design To Connect With Your Audience](#)

[Visual Perception — Series Wrap Up And Key Ideas](#)

Chapter 2: Design Elements

[The Elements of Design](#)

[Elements of Design](#)

Space

[How To Use Space In Design](#)

[Whitespace: Less Is More In Web Design](#)

[How To Activate Space In A Design](#)

[23 Examples Of Active Space In Web Design and Logos](#)

[White Space](#)

[Whitespace](#)

[Using white space effectively](#)

[Using White Space \(or Negative Space\) in Your Designs](#)

Points, Dots, and Lines

[Points, Dots, And Lines: The Elements Of Design](#)

[The Meaning of Lines: Developing A Visual Grammar](#)

[Communication, Mood and Meaning: Lines in Web Design](#)

[Design Principles And Elements: Lines In Graphic Design](#)

[Photographic Composition: The Line as a Design Element](#)

Forms: Surfaces and Planes

[The Meaning Of Shapes: Developing Visual Grammar](#)

[Forms: Surfaces And Planes, Volumes And Mass: The Elements Of Design](#)

[SYMBOLS and their Meaning](#)

Volumes and Mass

[Forms: Surfaces And Planes, Volumes And Mass: The Elements Of Design](#)

[11 Ways To Add Depth To A Design](#)

[Elements of Art: Volume, Mass, and Three Dimensionality](#)

[Become a Master Designer: Rule Five: Add depth to your designs](#)

Chapter 3: Design Attributes

Structures: Patterns and Textures

[Structures As Patterns and Textures: The Elements Of Design Pattern](#)

[Photographic Composition: Texture as a Design Element](#)

[Visual Design Elements: Texture](#)

Size, Scale, and Proportion

[How To Use Size, Scale, And Proportion In Web Design](#)

[3 Types Of Rhythm You Can Create Visually](#)

[Design in Art: Scale and Proportion](#)

[Size, Scale, Proportion](#)

[Proportion And Scale](#)

Color

[Color Theory, The Color Wheel And Color Schemes](#)

[How To Use Color To Enhance Your Designs](#)

[Why Luminance Is The Key Component Of Color](#)

[Color Theory for Designers, Part 1: The Meaning of Color](#)

[Color Theory For Designers, Part 2: Understanding Concepts And Terminology](#)

[Color Theory for Designer, Part 3: Creating Your Own Color Palettes](#)

[Color Series: Color Theory and The Color Wheel](#)

[The Colour Wheel](#)

[Color, Value and Hue](#)

[The Ultimate Guide to Understanding Hue, Tint, Tone and Shade](#)
[HSL, HSB and HSV color: differences and conversion](#)
[Contrast Ratio](#)
[Colour Contrast Check](#)
[Colour Contrast Analyser](#)
[Contrast Ratio Calculator](#)
[Easy Color Contrast Testing](#)
[Interaction of Color App](#)
[The Josef & Annie Albers Foundation](#)

Direction and Movement

[Direction](#)
[Visual Direction in Web Design](#)
[Movement in Fine Art and Graphic Design](#)
[Movement](#)
[Visual Movement: Flow in Web Design](#)
[Elements of Art: Movement and Time](#)

Visual Weight and Direction

[19 Factors That Impact Compositional Balance](#)
[Design Principles: Visual Weight And Direction](#)
[Working with Visual Weight in Your Designs](#)
[What Is Visual Weight? And How Visual Weight Helps Your](#)
[Photos](#)
[Visual Weight](#)
[Why do Colours Have a Visual Weight?](#)

Chapter 4: Design Principles

Gestalt Principles of Perception

[Gestalt Principles: How Are Your Designs Perceived?](#)

[Design Principles: Space And The Figure Ground Relationship](#)

[Gestalt Principles of Perception - 1: Figure Ground Relationships](#)

[Gestalt Principles of Perception - 2: Similarity](#)

[Gestalt Principles of Perception - 3: Proximity, Uniform Connectedness, and Good Continuation](#)

[Gestalt Principles of Perception - 4: Common Fate](#)

[Gestalt Principles of Perception - 5: Closure](#)

[Gestalt principles](#)

[Gestalt Principles](#)

[The Gestalt Principles](#)

[The Gestalt Principles of Design : the most important lesson for all designers](#)

Unity

[Unity In Design: Creating Harmony Between Design Elements](#)

[Principles of Good Design: Unity](#)

[Unity in Fine Art and Graphic Design](#)

[Unity in Web Design](#)

Similarity and Contrast

[Design Basics: Repetition To Create Visual Themes](#)

[Design Basics: Contrast To Stand Apart And Call Attention](#)

[Design Principles: Connecting And Separating Elements Through Contrast And Similarity](#)

[Contrast and Meaning](#)

[Design Principles: Repetition](#)

[Design Principles: Contrast](#)

Dominance and Focal Points

[Dominance: Creating Focal Points In Your Design](#)

[Design Principles: Dominance, Focal Points And Hierarchy](#)

[Developing Emphasis in Web Design](#)

[Emphasis, Dominance And Focal Point](#)

[Emphasis in Fine Art and Graphic Design](#)

Visual Hierarchy

[Visual Hierarchy: How Well Does Your Design Communicate?](#)

[Counterpart and Counterpoint in Typographic Hierarchy](#)

[Visible Narratives: Understanding Visual Organization](#)

[Visual Hierarchy](#)

[Understanding Visual Hierarchy in Web Design](#)

Compositional Flow

[Does Your Design Flow?](#)

[3 Design Layouts: Gutenberg Diagram, Z-Pattern, And F-Pattern](#)

[How To Control Flow Within Your Web Designs](#)

[Design Principles: Compositional Flow And Rhythm](#)

Compositional Balance

[Is Your Web Design Balanced?](#)

[19 Factors That Impact Compositional Balance](#)

[Symmetry And Asymmetry In Web Design](#)

[Design Principles: Compositional, Symmetrical And](#)

[Asymmetrical Balance](#)

Photo Composition: Balance

Balance

Asymmetrical Balance: Creating dynamic compositions

About the Author

Steven Bradley is a writer and former web designer. Born in Brooklyn and raised on Long Island, he now lives at the foot of the Rocky Mountains in Boulder, Colorado, where he hikes, bikes, plays softball, and enjoys beautiful weather nearly year round.

He writes about web design and development at Vanseo Design.

<http://www.vanseodesign.com/blog>

He has also written articles for Adobe, Smashing Magazine, Tutsplus, and .netMagazine, among others.

<http://www.smashingmagazine.com/author/steven-bradley/>

<http://webdesign.tutsplus.com/author/steven-bradley/>

http://www.adobe.com/devnet/author_bios/steven-bradley.edu.html

<http://www.creativebloq.com/css3/create-modular-and-scalable-css-9134351>

Also By Steven Bradley

- *CSS Animations and Transitions for the Modern Web*
- *Flexbox: A Beginner's Guide to the CSS Flexible Box Layout Module*
- *Sass for Beginners: How to Write More Organized and Maintainable Stylesheets*

You can find these and other books about design and web development at: <https://www.amazon.com/author/stevenbradleydesign>