Color Theory
Color Theory Lecture Topics

1. Phenomenology
2. Intent Behind Color Choices
3. Color Affecting Color
4. Synesthesia
5. Classic Color Theory
6. More Intent Behind Color Choices
7. Color Palettes
8. Color Balancing
9. Accents
10. Science of Color
phenomenology
Phenomenology
(Philosophical Method Invented by Husserl)

1. Perceive the world as phenomena.

2. Strip away preconceived notions such as cultural filters (or even language) that warp perception

3. Describe rather than interpret
What Color is This Guy?
What Color is This Guy?

well...

he’s not white.
What Color is This Guy?
What Color is This Girl?
What Color is This Girl?
What Color is the Grass?
What Color is the Grass?
What sensations and colors do you really experience when you look into a light?
Thousands of UNAMED colors are filtered into extremely loose word labels such as: WHITE, BLACK, GREEN, BLUE...
It is useful to use phenomenological techniques when analyzing design choices of others.
It is useful to use phenomenological techniques when analyzing the design choices of others. To do this you explore your unconscious and biological reactions of the design.
Intent Behind Color Choices
Which is the Unaltered Image?
What is the intent behind this color choice?
If this were the color choice what would the intent be?
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Which is the Unaltered Image?
What is the intent behind this color choice?
If this were the color choice what would the intent be?
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If this were the color choice what would the intent be?
How do these colors shape your “McDonald’s Experience”? 
• Eat Fast
• Have a Stimulating Experience
Yellow is also the most popular color to signify *caution*: 

- Road train route caution sign
- Caution sign with a diagram of a vehicle and the text "Beware when overtaking or passing"
- Caution sign indicating radioactive materials
Colors are highly contextualized by subject matter.
What is the intent behind these color choices?

How do they inform this design?
To Convey:

- Control over the Period
- Containment (red by white)
- Retaining Sexual Allure
What is the intent behind these color choices?
What is the intent behind these color choices?

- Feeling of being In the Core
- Intensity of Action -hotness
- Alertness –things are happening
What is the intent behind these color choices?
What is the intent behind these color choices?

I have no idea, I don’t have the necessary cultural experience.
What is the intent behind these color choices for Egyptian Currency?
I have no idea, I don’t have the necessary cultural experience.
What is the intent behind these color choices?
Ahh, now I get at least some of it. **These colors connote antiquity and evoke feelings of national identity by referring to ancient cultural structures.**
Color Affecting Color
Colors aren’t only contextualized through subject matter. They are also contextualized through other colors.
Principles of Visual Design 2720

Juxtaposition changes how color is perceived...

Is this a rich butterscotch mocha...
Juxtaposition changes how color is perceived…

Or a Dirty Yellow?
Temporal sequence changes how color is perceived…

Is this a pure grey…
Temporal sequence changes how color is perceived…
Temporal sequence changes how color is perceived…

Or a cool grey?
Synesthesia
Synesthesia

The faculty to receive stimuli through one sense, sight, for example, and perceive it through another, hearing, for example.
Synesthesia

Wassily Kandinsky heard blaring trumpets when he saw bright yellow.
Synesthesia

Milk = Milk
Synesthesia

452-6220 = 452-6220
Synesthesia

“bzzzzzzzzz” =
We are each a ‘synesthese’. It’s a subtle condition for most of us…

Which is Kiki and which is Booba?
Okay, okay, but what is the real applicable use of color theory?
Classic Color Theory
Color Theory Helps Devise Ways to:

LIMIT COLOR PALETTES
Color Theory Helps Devise Ways to:

LIMIT COLOR PALETTES

So everything is not a piñata...
Limit Color Palettes

&

And Coordinate Them.
But first ask:

Why Add Color at all?
Black and white images are like a visual shorthand, where we have to fill and color them in with our imagination.

Understanding Comics
Black and white images are like a visual shorthand, where we have to fill and color them in with our imagination.

Colored images force us to see the subjects’ shape and form. Color turns things into objects with weight and substance.
Color Wheel
Primary Colors
Secondary Colors
Tertiary Colors
Primary, Secondary and Tertiary Colors
Primary, Secondary and Tertiary Colors

![Color Wheel Diagram]
Standard 12-Color Wheel
Three Characteristics of Color

Hue

Saturation

Value
Classic Color Theory predominantly concentrates on Hue rather than Saturation and Value.
Hue, Saturation and Brightness (Value) in the Photoshop/Illustrator Color Picker
Hue, Saturation and Brightness (Value) in the Photoshop/Illustrator Color Picker
The First Color Wheel

Sir Isaac Newton created the first color wheel resulting from his experiments with refracting light.
Classic Color Theory
Classic Color Theory Overview

According to color theory, harmonious color combinations use:
Classic Color Theory Overview

According to color theory, harmonious color combinations use:

Any two colors opposite each other on the color wheel.
According to color theory, harmonious color combinations use:

- Any two colors opposite each other on the color wheel.

- Any group of colors next to each other on the color wheel.
According to color theory, harmonious color combinations use:

Any two colors opposite each other on the color wheel.

Any group of colors next to each other on the color wheel.

Any three colors equally spaced around the color wheel forming a triangle.
Classic Color Theory Overview

Any four colors forming a rectangle.
Classic Color Theory Overview

Any four colors forming a rectangle.

The split of one color’s complement.
Classic Color Theory Overview

Any four colors forming a rectangle.

The split of one color’s complement.

Monochromatic combinations.
Color schemes remain harmonious regardless of the rotation angle of the configuration.
Monochromatic color schemes are guaranteed to be harmonious as they are a single color with variations of value and saturation. They have the highest degree of harmony, but the lowest degree of contrast. Since they grab your attention less than any other color combination they're usually used for more reserved, corporate, expensive, or nostalgic types of designs.
However, as all rules are there to be broken.

Monochromatic Design

The subtle color scheme of this design makes other elements more prominent. If the colors contrasted each other in their hue we wouldn’t notice the strange imagery as much. Being of the same color the imagery seems to share presence.
Monochromatic Design

How does monochromatic design change our perception of it?
Monochromatic Design

How does monochromatic design change our perception of it?
Monochromatic Design

Red, Black and White is the strongest Monochromatic combination.
Monochromatic Design
Monochromatic Design
Complementary Colors
Any two colors 180 degrees opposite on the color wheel.
What is the definition of “complement”?
What is the definition of “complement”?
To complete or enhance each other.
What is the definition of “compliment”? 
What is the definition of “compliment”? To praise.
Complementary colors have the highest contrast. Because of this they are the boldest combination. Color compositions based on them usually work well, however they can sometimes be tiring to look at due to high contrast.
Complementary Colors

Complementary Colors have the highest contrast (in terms of hue, not value).
Using Complements as a basis for a color scheme, but allowing variances of value will often help soften a complementary color scheme.
Painters mix Complementaries to Achieve Rich Vibrant Grays, Browns, and Neutral Colors...
Classic color theory doesn’t take color **value** into account. So, according to this theory, these two hideous compositions are technically the same as the complementary colors of magenta and green.
Analogous Colors

These are any number of colors that are adjacent on the color wheel.
Analogous Colors
Analogous Colors

These combinations have an extremely high degree of harmony but low degree of contrast.
Analogous Colors

These can seem very drab. A complementary color could be added here for an accent that would empower the design.
Analogous Colors
(with complementary accent)

These can seem very drab. A complementary color could be added here for an accent that would empower the design
Triadic colors are any colors 120 degrees (one third of a 360 degree circle) apart on the color wheel.
The Triad of the Three Primary Colors are the most energetic and balanced color combination possible.
The Triad of the Three Primary Colors are the most energetic and balanced color combination possible. This combo draws intense interest. This combo is appealing to children and we've learned to associate this Triad with children.
Is this true with the Burger King design as well?
Split Complementary

This is a combination of two colors next to the opposite of the first color.
Split Complementary Colors

This structure is dynamic enough to hold interest, but not with an excess of intensity of hue contrast from which the eye tires so easily.
Split Complementary

This combination balances the interests of harmony and contrast, neither dominating the composition.
Split Complementary

This combination balances the interests of harmony and contrast, neither dominating the composition.
Split Complementary
Split Complementary
Analogous with a Single Complementary

This usually is pretty striking combination as the analogous colors are of the strongest harmony, but the complement of the center color punches the composition with a dramatic accent.
Analogous with a Single Complementary

This usually is pretty striking combination as the analogous colors are of the strongest harmony, but the complement of the center color punches the composition with a dramatic accent.
Double complementary combinations are almost on the verge of breaking down into simply a panoply of color without any structure. However, since we can still intuitively grasp the structure of this combination it will retain a (weakened) harmony.
Double Complementary
Double Complementary

As opposed to seeing:
Cyan, Blue, Orange and Red

We might basically see: “every color except green and purple.”
Double Complementary
Since there are a wide range of colors in this design the **saturation** levels and **values** are both very light to harmonize it.
Quick Classic Color Theory Quiz
This is a ____________ color combination.
Monochromatic
This is a ___________ color combination.
Complementary
This is a __________ color combination.
Complementary
This is a ____________ color combination.
Analogous
This is a ____________ color combination.
Triadic
This is a _____________ color combination.
Double Complementary
Invent New Color Combination Structures

Of course, you can always invent new combinatory structures. You could call this one *Alternating Analogous*. 
Invent Color Wheels
Invent Color Palettes
It’s All About **LIMITING YOUR COLORS**

in order to achieve the desired effect...
More Intent Behind Color Choices
What is the connotation of this color palette?
What is the connotation of this color palette?
What is the connotation of this color palette?
What is the connotation of this color palette?
What is the connotation of this color palette?
What is the connotation of this color palette?
What are the connotations of these color palettes?
What are the connotations of these color palettes?
What is the connotation of this color palette?
What are the connotations of these new color palettes for iPod?
What is this Design’s Color Palette and Its Connotation?
What is this Design’s Color Palette and Its Connotation?

Green (which usually connote *life*) seems like such an ironic color choice that I assume it’s intentional. Therefore I associate this complementary (or near complementary) color palette with humor and self-consciousness.
What is the Usual Connotation of Green/Red Complementaries?
How often is this really the case?
How often is this really the case?
The ‘Branding’ of Color is Exactly What many Companies and Artists Try to Do.

In pharmaceuticals what pill does this type of turquoise signify?
The ‘Branding’ of Color is Exactly What many Companies and Artists Try to Do.
The ‘Branding’ of Color is Exactly What many Companies and Artists Try to Do.
The ‘Branding’ of Color is Exactly What many Companies and Artists Try to Do.

What product brand is this gum package cross-referencing?
Color Palettes
What types of things are Color Palettes made for?
What types of things are Color Palettes made for?

- Websites
What types of things are Color Palettes made for?

- Websites
- Architecture
What types of things are Color Palettes made for?

• Websites
• Architecture
• Characters
What types of things are Color Palettes made for?

- Websites
- Architecture
- Characters
What types of things are Color Palettes made for?

- Websites
- Architecture
- Characters
- Anything that has a visual component
Technique for Building Color Palettes
Technique for Building Color Palettes

1) Select Image of Interest

2) Open it in Photoshop and tweak/exaggerate the colors Using Levels, Curves or Hue/Saturation

3) Using the eyedropper, swatch some colors off it.
Technique for Building Color Palettes
Technique for Building Color Palettes
Technique for Building Color Palettes
Technique for Building Color Palettes

Don’t forget to play with dominants, subdominants and accents colors.
Technique for Building Color Palettes
Technique for Building Color Palettes

Inverting Images can yield interesting results as well.
Technique for Building Color Palettes

Tweaking the levels, hue, etc., might be necessary to get the desired effect.
Technique for Building Color Palettes

Tweaking the levels, hue, etc., might be necessary to get the desired effect.
Technique for Building Color Palettes
Technique for Building Color Palettes
Enter the URL of an image to get a color palette that matches the image. This is useful for coming up with a website color palette that matches a key image a client wants to work with.

URL of image: http://www.lickapixel.com/images/facelcon.jpg

Color-Palette-ify!
Number One Technique for Building Color Palettes

RESEARCH!!!
Number One Technique for Building Color Palettes

RESEARCH!!!
Color Balancing
Each color also has its own visual weight.
Color Balancing

Different colors have different levels of influence on drawing the eye. For example...
Color Balancing

The yellow is screaming for attention while the blue patiently waits for your eye.
Color Balancing

So this is an unbalanced color composition.
Color Balancing

So how can we balance this composition out?
Color Balancing

We could try this.
Color Balancing

Or this.
Color Balancing

Or this.
Accents
Accent colors define a composition by drawing attention due to their anomaly in the design. Most effective designs have carefully calculated combination of accent and dominant colors.
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Accent Colors
Accent Colors
Accent Colors
Accent Colors
Selective emphasis on VALUE or SATURATION can also serve as an accent. For example...
In videogames characters often have stronger **VALUE** contrast ratios than their environment
Or artists will sometimes outline videogame characters in black to separate them from the background.
By De-emphasizing Color (by lowering Saturation or raising or lowering value) **Other Aspects** Become Accented
By De-emphasizing Color (by lowering Saturation or raising or lowering value) **Other Aspects** Become Accented
By De-emphasizing Detail, Color Can Become Emphasized.
Science of Color
RBG

Red Green and Blue
On RGB monitors small phosphoric dots combine to form color.
RBG
(additive color process)

Red, Blue and Green light combines to form White.
RBG
(additive color process)
RBG
(additive color process)
RGB in the Photoshop/Illustrator Color Picker
CMYK

Used in the printing process:
Cyan, Magenta, Yellow and Black
CMYK
(subtractive color process)
CMYK in the Photoshop/Illustrator Color Picker
The Web Uses a “Hexidecimal” Numerical System for Colors

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<td>C</td>
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The 216-Color Webmaster’s Palette

www.visibone.com
Some Hex Colors

Yellow-Orange
1: CC9666
2: C99333
3: C99000
4: FFCC00
5: FFCC33
6: FFCC66
7: FFCC99

Blue-Green
1: 006600
2: 339999
3: 00CC99
4: 66CCCC
5: 00FFCC
6: 33FFCC
7: 66FFCC
8: 99FFCC
9: CFFFFF

Red-Violet
1: 660033
2: 993366
3: CC3399
4: CC6699
5: FF0099
6: FF00CC
7: FF6699
8: FF66CC
9: FF99CC

Black
1: 000000
2: 333333
3: 666666
4: 999999
5: CCCCCC
6: FFFFFF

Orange
1: 996633
2: CC6633
3: FF9900
4: FF9933
5: FF9966

Green
1: 006600
2: 009900
3: 00CC00
4: 99CC99
5: 00FF00
6: 33FF33
7: 66FF56
8: 99FF99
9: CFFFFF

Violet
1: 663366
2: 663399
3: 993399
4: 996699
5: FF00FF
6: FF33FF
7: FF66FF
8: FF99FF
9: FFFFFF

Red
1: 660000
2: 993333
3: CC3333
4: CC6666
5: FF0000
6: FF3333
7: FF6666
8: FF9999
9: FFFFFF

Yellow
1: 666600
2: 999900
3: CCCC00
4: CCCC99
5: FFFF00
6: FFFF33
7: FFFF66
8: FFFF99
9: FFFFFF

Blue
1: 000099
2: 333399
3: 3333CC
4: 6666CC
5: 0000FF
6: 3333FF
7: 6666FF
8: 9999FF
9: CCCCCF

Red-Orange
1: 993300
2: CC3300
3: CC6600
4: FF3300
5: FF6600
6: FF6633

Yellow-Green
1: 336600
2: 339933
3: 66CC00
4: 33FF00
5: 99FF00
6: 99FF56
7: CCFF00
8: CCFF56
9: CCFF99

Blue-Violet
1: 660099
2: 9933CC
3: 9966CC
4: CCCC33
5: CC00FF
6: CC66FF
7: CC99FF
Is the full range of colors that can be recorded or output by a particular medium. In other words, its “Color Space”.
The yellow line = the color gamut for an average RGB monitor.
The cyan line = the color gamut for average CMYK printing.
Human Color (Visible Light) Gamut
Human Color Gamut
We have two types of Photoreceptor cells inside our eye:

Rods: Which responds to dim light.

Cones: Which responds daylight and color.
Their names were given for a clear reason…
Animals such as dogs have more Rods than we do but less Cones. What does this mean?
1) They have better night vision.

2) In darkness they have greater sensitivity to differences in color Value, but not Hue.

This is why they have trouble seeing a red ball in green grass. They aren’t color blind, but are color impaired compared to humans.

Red ball in the grass to you... and to your dog.
1) They have better night vision.

2) In darkness they have greater sensitivity to differences in color Value, but not Hue.

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Red ball in the grass at night to you… and to your dog.